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**GOVERNANCE AND
CHANGE IN THE BRITISH
SEAFOOD SUPPLY CHAIN
1950 TO 2013**

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CONTENTS

Abstract.....	4
Acknowledgements	5
Declarations	6
Acronyms	7
Chapter 1: Situating the Seafood Supply Chain.....	10
1.1 Introduction: the Rationale for this Research.....	10
1.2 Outline of the Seafood Supply Chain in Britain and Key Actors.....	14
Chapter 2: Governance and Supply Chains	23
2.1 The Concept of Governance	23
2.2 Governance and the Role of the State	27
2.3 Private Governance: Theorising Change in the Food System	42
2.4 Governance and Standards: Public, Private and Civil Society Roles	66
2.5 Governing Food Consumption.....	81
2.6 Theories of Governance and the Seafood Supply Chain Project.....	97
Chapter 3: Methodology	107
3.1 The Research Questions.....	107
3.2 Approach to Methodology	110
3.3 The Seafood Companies Database	116
3.4 The Stakeholder Interviews and Visits.....	123
3.5 Reflections on the Companies Database and the Interviews.....	136
Chapter 4: Seafood Supply - Provision and Governance.....	141
4.1 Changes in Supply for the British Market.....	141
4.2 Capture Fish: Supply, Governance and Sustainability	143
4.3 Farmed Fish: Supply, Governance and Sustainability	186
4.4 Shellfish Supply and Governance.....	198
4.5 Future Supply.....	204
4.6 Governance and Seafood Supply.....	206
Chapter 5: Governance for Quality and Food Safety - Relationships in the Seafood Supply Chain.....	216
5.1 Introduction	216
5.2 Defining Quality and Safety in Seafood	217
5.3 Producing Quality and Safety at Sea.....	221
5.4 Producing Quality in Farmed Seafood.....	229
5.5 Context: Seafood Distribution and Processing	238
5.6 Securing Food Safety and Quality in Processing and Distribution	246

5.7 Supply Chain Relationships	270
5.8 Governance and Seafood Safety and Quality.....	274
Chapter 6: Governance of Seafood Consumption, Retail and Foodservice	283
6.1 Introduction	283
6.2 Seafood Consumption Trends.....	284
6.3 The Discourse of Seafood and Health.....	303
6.4 Influencing Consumer Attitudes to Seafood.....	320
6.5 Retail and the Governance of Consumer Supply.....	337
6.6 Foodservice and the Governance of Consumer Supply.....	354
6.7 Conclusions about Governance of Seafood Consumption, Retailing and Foodservice.....	366
Chapter 7: Conclusions - Governance, Change and Theory.....	377
7.1 Findings in Relation to the Research Questions	377
7.2 The Seafood Supply Chain and Agri-Food and Governance Theory	390
7.3 Reflections on Policy Issues.....	406
7.4 Reflections on the Research Process.....	409
7.5 Indications for Further Research and Contribution	412
Appendices	416
References.....	438

ABSTRACT

The thesis firstly examines the extent to which different sources of governance activity have both changed the supply, processing and consumption of seafood in Britain and achieved its sustainability, food safety and quality over the period 1950 to 2013 and secondly reflects on the implications for agri-food and governance theories in which the UK seafood chain has not previously been considered. Using documentary sources, the compilation of a database of seafood companies and stakeholder interviews the research has reconstructed development and change over this period. In doing so it demonstrates a range of changes which can be related to different forms of governance: these include transformation of supply, diverse activities to raise sustainability, greatly improved quality and food hygiene systems and variations in consumer attitudes and practices. The thesis underlines the significance of public forms of regulation in changing the sources of supply as well as in the contested movement towards the more sustainable exploitation of fisheries, in raising food hygiene standards and in establishing the basis for nutritional advice to consumers with regard to seafood. Complementarily, the account also shows how private forms, particularly certification systems, have dominated governance of domestic aquaculture and of quality generally and how they have impacted on food safety. The thesis further examines how implementation of public governance is delegated and shared, including by analysis of various forms of mixed public and private governance, considers the various ways seafood consumption has been governed with attention both to both retailing and foodservice roles and assesses the contributions of civil society organisations. Based on these findings, the thesis argues that agri-food theories about internal supply chain functioning and the role of major retailers needs to be modified; it shows the limitations of explaining standards systems as the mode of control and the benefits of incorporating a power model of chain relationships. Further, in relation to external supply chain impacts the thesis demonstrates the need to emphasise the role of state regulation in the overall governance of food systems to a much greater extent than has usually been done hitherto. In relation to governance theory more broadly, the thesis examines the way changes in the operation of the British state have related to the seafood supply chain and the importance of examining the interests served in different types of governance with particular attention to the balance of public and private benefits resulting. The thesis thus analyses change in an important food source, illustrates how delegated state governance functions in a specific area and contributes to the theoretical basis for understanding food chains in general.

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DECLARATIONS

I declare that the work presented in this thesis except those elements specifically acknowledged is entirely my own work, carried out at City University, London.

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ACRONYMS

ACFA	Advisory Committee on Fisheries and Aquaculture
ASC	Aquaculture Stewardship Council
BRC	British Retail Consortium
BSE	Bovine Spongiform Encephalopathy
CAC	Codex Alimentarius Commission
CAP	Common Agricultural Policy
CCRF	Code of Conduct for Responsible Fisheries
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CFP	Common Fisheries Policy
CIWF	Compassion in World Farming
CoGP	Code of Good Practice for Scottish Finfish Aquaculture
COMA	Committee on Medical Aspects of Food Policy/Committee on the Medical Aspects of Food and Nutrition Policy
COT	Committee on Toxicity
CSR	Corporate Social Responsibility
DEFRA (Defra)	Department for Environment, Food and Rural Affairs
DHA	Docosahexaenoic acid
EC	European Communities <i>or</i> European Commission
EEC	European Economic Community
EEZ	Exclusive Economic Zone
EFF	European Fisheries Fund
EFSA	European Food Safety Authority
EFSIS	European Food Safety Inspection Service
EHO	Environmental Health Officer
EMAS	Eco-Management and Audit Scheme
EMFF	European Maritime and Fisheries Fund
EPA	Eicosapentaenoic acid
EQ	Economy of Qualities
EU	European Union
EUMOFA	EU Market Observatory for Fishery & Aquaculture Products

EUREP-GAP	Euro Retailer Group for Good Agricultural Practices
FAO	Food and Agriculture Organisation of the United Nations
FASFA	Frozen at Sea Fillets Association
FEAP	Federation of European Aquaculture Producers
FIFG	Financial Instrument for Fisheries Guidance
FQA	Fixed Quota Allocation
FSA	Food Standards Agency
GAA	Global Aquaculture Alliance
GAP	Good Agricultural Practice
GCC	Global Commodity Chain
GDA	Guideline Daily Amount
GG/GLOBALGAP	Global Good Agricultural Practices
GPN	Global Production Network
GSI	Global Salmon Initiative
GVC	Global Value Chain
HACCP	Hazard Analysis of Critical Control Points
ICES	International Council for the Exploration of the Sea
IFCA	Inshore Fisheries and Conservation Authorities
IFG	Inshore Fisheries Group
ISO	International Organisation for Standardisation
ITQ	Individual Transferable Quota
IQF	Individually Quick Frozen
IUU	Illegal, Unreported and Unregulated (fishing)
MAFF	Ministry of Agriculture, Fisheries and Food
MAP	Modified Atmosphere Packaging
MCS	Marine Conservation Society
MCZ	Marine Conservation Zone
MMO	Marine Management Organisation
MPA	Marine Protected Area
MSC	Marine Stewardship Council
MSY	Maximum Sustainable Yield
NACNE	National Advisory Committee on Nutrition Education
NEAFC	North East Atlantic Fisheries Commission/North East Atlantic

	Fisheries Convention
NFFF	National Federation of Fish Friers
NFFO	National Federation of Fishermen's Associations
NGO	Non Governmental Organisation
NUFTA	New Under Ten Fishermen's Association
PDO	Protected Denomination of Origin
PGI	Protected Geographical Indication
PHRD	Public Health Responsibility Deal
PO	Producers' Organisation
QIM	Quality Index Method
RAC	Regional Advisory Council
RFMO	Regional Fishery Management Organisation
RFS	Responsible Fishing Scheme
SACN	Scientific Advisory Committee on Nutrition
SAGB	Shellfish Association of Great Britain
SALSA	Safe and Local Supplier Approval
Seafish	Sea Fish Industry Authority
SFC	Sea Fisheries Committee
SI	Statutory Instrument
SME	Small & Medium-Sized Enterprises
SR(NI)	Statutory Rule, Northern Ireland
SSGO	Scottish Salmon Growers Association
SSI	Scottish Statutory Instrument
SSPO	Scottish Salmon Producers' Organization
TAC	Total Allowable Catch (quota)
TCE	Transaction Cost Economics
UK	United Kingdom
UNCLOS	United Nations Convention on the Law of the Sea
US	United States
WFA	White Fish Authority
WHO	World Health Organisation
WTO	World Trade Organisation
WWF	World Wide Fund for Nature

CHAPTER 1: SITUATING THE SEAFOOD SUPPLY CHAIN

1.1 Introduction: the Rationale for this Research

The subject of seafood, or more often fish, has in recent years received huge attention both in the public media and in academic scholarship. Previously when the production of fish did not seem to be a cause of difficulties it had received limited consideration but two parallel developments in the late twentieth century changed this situation. One was the increasing over-exploitation of many of the world's key fisheries, accompanied by a developing awareness of the resulting problems which gradually reached political actors and the public generally. The second was the rise of aquaculture and the massive change from fish being primarily available wild by hunting to the possibility of domestication on a major scale. These fundamental changes in the production of seafood have taken place over a very short period of time and it has been difficult for analysis to keep pace.

Some aspects, particularly the threat to stocks from overfishing and certain problems connected with farmed seafood, have certainly been well-studied. These issues have also received considerable political attention, both campaigning and regulatory. This has inevitably been partial in two senses: dealing with some aspects only of the situation and often with very specific objectives. The partiality is reflected in much coverage of seafood issues, whether it is media reporting, the product of passionate campaigns or scientific work emphasising specific environmental concerns. At the same time the seafood industry has its own, managerially oriented literature.

In relation to consumption, recent emphasis has been given to seafood in the public discourse on nutrition and health. The connection between food and health has become more important generally in British culture and within this context there has been growing recognition of the benefits of fish in the diet. Until recently, this discussion over consumption took place quite separately from the previous debates concerned with major issues about production. However, this has been challenged and the question of whether nutritional

advice about fish eating should take sustainability issues into account has become more prominent. There is also a body of work about consumer attitudes to seafood, mostly from a viewpoint of understanding the market for this food and how effectively it can be served and particular segments targeted.

However, the field of agri-food scholarship has had fairly limited consideration of seafood. Its very terminology is problematic and a more accurate descriptor for the subject might be aqua-food studies. While the present research has been proceeding, more academic work has appeared but has so far touched only on certain elements of the global industry, not including the UK.

With most work dealing with seafood being about production and a relatively small amount on consumption, what is lacking is an understanding of the entire supply system, how it functions and has dealt with the major changes faced over recent decades. That is a gap which the present study aims to reduce, with a focus on Britain and processes that lead to domestic consumption.

The key concept adopted for exploring the dynamics of the seafood supply system is that of governance. That means aiming to understand how the system is controlled, regulated and influenced. Governance may come from public regulation, significant to many elements of production, from private rules whether for self-regulation or for relations between parties in the supply chain or from influence exercised by others, covered broadly under the rubric of civil society and from combinations of these sources.

For the purpose of investigation, the concept of governance needs to be operationalised. This has been pursued through three aspects which are, or might be expected to be, the chief goals of governance of seafood provision: food safety, quality and sustainability, together with the linked factor of traceability. Therefore these four attributes have been particularly highlighted both in examining theories of governance and in the way interviews for this project have been conducted.

'Supply chain' has been used as the most straightforward way of denoting systems and routes which bring food to the consumer, here from boat or farm to plate. Various theoretical approaches have used a number of other metaphors to describe such food systems including 'commodity chain', 'global commodity chain' and 'value chain' and in some literatures 'commodity network', 'commodity cellular network' and 'global production network' as will be indicated in the following chapter. The simpler concepts have been criticised for theoretical deficiencies but can still be useful for study purposes. Following this indication, the decision here has been taken to employ 'supply chain' as the most inclusive and general term, not wedded in advance to any specific school of analysis.

But while the supply chain may be a relatively clear-cut concept, fish and shellfish constitute an immensely complex world. The huge number of edible species, the existence of two modes of production, fishing and farming, and diverse global sourcing make this subject far more complicated than dealing with any other food group. Indeed the complexity begs the question of how far it is appropriate to refer to 'the supply chain' and this is of course a simplification. There are indeed some partial sub-chains which can be distinguished as will be seen later. However, to a large extent the products of different sourcing streams come together at the processing and distribution stages prior to the pre-consumption stages of retail and foodservice. This intermediate stage is a particular focus of the research.

The subject of this supply chain enquiry is British consumption so the topic may be further clarified as the system which delivers seafood to retail or foodservice points in the UK. Nevertheless, as British production systems for fish and shellfish serve both domestic and export markets and governance systems do not normally distinguish between them, the coverage is at times wider than would be the case if focusing on consumption alone.

A well-established paradox about the current seafood position in Britain is that 'The UK imports what we eat and exports what we catch' (Rutherford J 2009). But this state of affairs is relatively recent. In fact there have been striking

changes affecting every stage of the supply chain for seafood which merit exploration. And as the inclusion of 'what we eat' implies, the dimension of consumer preference needs to be fully incorporated into the analysis.

The thesis makes the following contributions to this under-researched field: First it descriptively presents a picture for the first time of the development of the seafood chain in Britain over the period of sixty years from the mid-twentieth century to the present. Secondly it provides an account of the series of major changes in different parts of the chain over this considerable time-frame, employing the concept of governance as an explanatory factor. Thirdly it includes a particular focus, including new material, on the middle of the chain covering processing and distribution, an aspect which has generally received less attention in agri-food studies. Fourthly it incorporates issues around consumption and how they relate to other aspects of the seafood supply chain. Finally, from a theoretical point of view, it redresses imbalances in much of the agri-food governance literature by detailing the regulatory role of the state in relation to this food chain and providing a more even-handed account of how public regulation relates to governance exercised by private interests and by civil society.

Turning to an outline of the thesis, the second section of this chapter introduces the seafood chain in Britain and the key actors and institutions involved. Chapter 2 examines how the workings of food supply chains have been theorised and empirically investigated with special attention to seafood examples and covers uses of the concept of governance as it has developed in several literatures to explain the changing role of both the state and private sector; additionally, use of the concept in relation to the area of consumption is developed. In chapter 3 the approach to methodology is set out and the particular data sources generated for the research expounded. Each of the following three chapters then examines in detail specific changes that have taken place in each of the key stages of the seafood supply chain over the last sixty years and the particular types of governance that have been material to them. Chapter 4 focuses on transformations in the supply of seafood for the UK and how sustainability has come to be a central preoccupation, chapter 5

examines the changes in relation to food safety and quality and chapter 6 turns to alterations at the end of the chain covering retailing and foodservice and other influences on seafood consumption. In relation to governance, chapter 4 deals with external impacts on the supply chain, chapter 5 with both external actors and internal governance arrangements within the supply chain and chapter 6 both with external governance influences on consumption and the relationship between changes in consumption and the rest of the supply chain. The final chapter draws together conclusions about this chain's functioning and relationships and presents the implications for agri-food and governance theory.

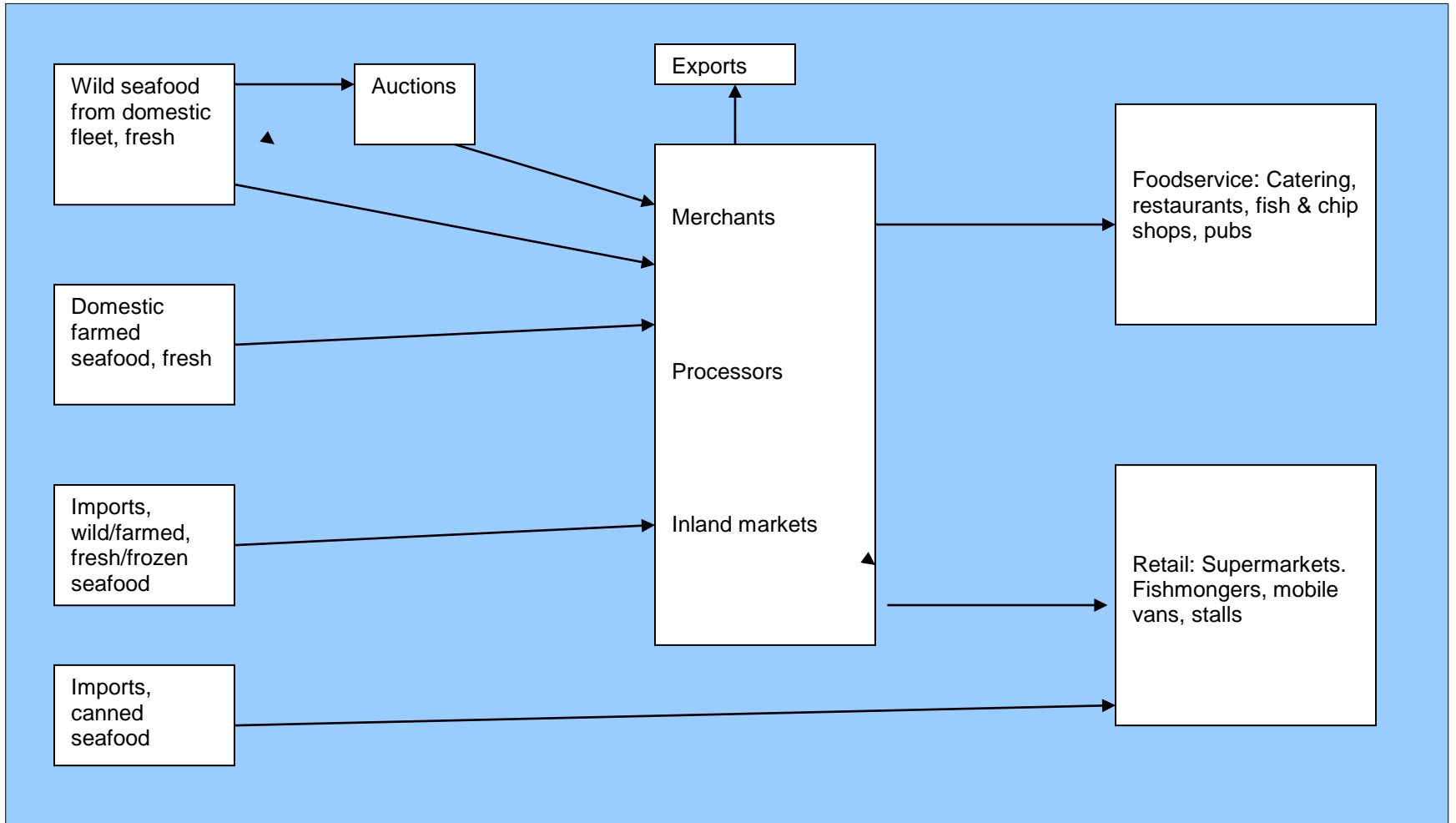
1.2 Outline of the Seafood Supply Chain in Britain and Key Actors

A simplified model of the present seafood supply chain is shown in Figure 1.1.

The chain starts with diverse sources of supply both domestically produced and imported. A range of merchants and processors manipulate the raw material to a greater or lesser extent which they then send as fresh or frozen seafood or in various processed forms, including ready meals and other convenience food, to either the foodservice or retail sectors, the latter comprising supermarket chains plus a minor share sold by fishmongers, stalls or mobile vans.

Within the overall framework as shown on Figure 1.1 various species-based groups can be identified even though they do not always function separately and some divisions between them can be blurred. Thirteen categories are presented in Table 1.1 To a certain extent they can be regarded as sub-chains which trace individual routes from different wild (capture) or farmed sources. In some cases they may retain distinctive distribution paths such as frozen-at-sea whitefish fillets produced for the fish and chip trade or special processing formats like langoustines turned into scampi. But in others they become part of

Figure 1.1 The Current Supply Chain for Seafood



Source: Author

the broad offer supplied by merchants to retail or foodservice customers or perhaps ending up in some combination such as Scottish farmed salmon, wild haddock from Icelandic waters and farmed warm water prawns from South Asia united in a ready meal. The 'mixed' and 'other shellfish' categories cover strands that may or may not pass through the auction system prior to onward distribution. The groupings therefore partly show the complexity of supply routes, partly some specific features of British seafood consumption preferences and partly the flexibility by which many species can be regarded as alternative ingredients from the globally sourced cornucopia.

It has not always been like this and the supply chain for seafood at around 1950, the starting point for the analysis, differed from the picture presented in Figure 1.1 and Table 1.1 in several key respects. The species involved were very much more limited and fresh fish was mainly the product of the British fishing fleet; there was no farmed seafood in the mix and neither was frozen fish yet available. Landings were sold at auction to wholesalers and a considerable proportion sent on to the (then) great urban inland markets. The distribution system handled mainly whole fish and processing meant smoking and other traditional types of preparation. The supply, whether obtained from the inland markets or direct from port wholesalers, went on to fishmongers, stalls and mobile vans or to caterers, restaurants and fish and chip shops. Tinned fish, continuing to be imported and to be sold mainly through retail outlets seems to have been the least changing element but the species involved, sourcing and presentation may all have altered.

Thus the change from the 1950 situation to the present has been massive. The first broad area of change has been in supply. British fishing capacity became restricted during the period and now provides only a small part of whitefish requirements but the gap has been filled by various imports. At the same time a large increase in supply has been provided by the development of domestically farmed salmon and to a smaller extent trout and shellfish, supplemented by further imports of these and other farmed species. But accompanying these change which in many ways have marked an expansion

Table 1.1 Main Seafood Groups Consumed in Britain

<i>Wild/ Farmed</i>	<i>Species Based Categories</i>	<i>Producing Country/ Region</i>	<i>Formats/ Processing</i>	<i>Consumer Routes</i>
Wild	Whitefish (mainly cod & haddock)	Iceland, Norway, Russia	Frozen-at-sea; twice frozen; chilled (may be previously frozen); smoked; ready meals	Fish & chips; other foodservice; major retailers; fishmongers
	Mixed (includes whitefish, brill, lemon/Dover sole, monkfish, plaice, sea bass)	Britain	Chilled; frozen	Fishmongers; online; small foodservice; some major retailers
	Pelagics (herring, mackerel)	Britain, Norway	Chilled; smoked; cured; pâté	Major retailers; fishmongers; selected foodservice
	Preserved (anchovy, mackerel, sardines, salmon, tuna)	Global sourcing	Canned	Retail, all types
	Cold water prawns	Norway, Greenland, Canada	Chilled; frozen; cooked	Major retailers; fishmongers; foodservice
	Other shellfish (includes crabs, langoustines, lobster, scallops)	Britain	Live; chilled; cooked; langoustines as scampi	Small retailers; foodservice; some major retailers
	High value (including tuna, grouper, kingfish, salmon)	Global sourcing	Chilled	Major retailers; selected foodservice
Farmed	Salmon	Britain, Norway	Chilled; frozen; smoked; ready meals; sandwiches	Small & large retailers; foodservice
	Trout	Britain	Chilled; ready meals	Small & large retail; foodservice
	Mediterranean (sea bass, sea bream)	Greece, France, Turkey	Chilled; ready meals	Major retailers; foodservice
	Warm water prawns	South East Asia and elsewhere	Chilled; cooked; ready meals	Retailers; foodservice
	Mussels & oysters	Britain & EU	Live; chilled; cooked	Major retailers; fishmongers; foodservice
	Tropical (pangasius & tilapia)	Global sourcing	Chilled (may be previously frozen)	Major retailers

Source: Author

of supply has been a growing current of concern about its long-term sustainability which has resulted in measures which have impacted on production in various ways. Consumption has changed in concert with changes in supply but also for other social reasons with overall volume decreasing and increasing at various times but with decisive shifts to a wider range of species and different formats, including an array of convenience preparations. These have been facilitated through various technical developments which have made fresh chilled and frozen seafood and ready meals all easily available and with marked improvements in quality. This availability reflects broad changes in food retailing which has also entailed partial alteration of a particular distribution system for seafood, and there have also been related impacts on the foodservice sector. Thus changes in processing and in distribution, less public than those affecting production and consumption, have been equally important. The detailed story of how and why this set of transformations has taken place is told in chapters 4, 5 and 6.

The supply chain is made up of commercial enterprises whose activities and inter-relationships are explored in later chapters. However, as well as relationships with each other they are affected, and to varying degrees interact with, other interests in both public systems of regulation and other forms of governance; (the meanings and uses of the concept of governance are discussed fully in chapter 2). Table 1.2 introduces the fields of governance relevant to the seafood supply chain by listing the various levels of operation and their associated key actors and areas of action: global governance; the European Union (EU) an intergovernmental polity here referred to as a 'supra-state'; the British state and its various devolved and delegated arrangements; the industry itself; and those elements of civil society particularly involved.

Table 1.2 Actors and Levels of Governance Affecting the Seafood Industry

<i>Level/ Group</i>	<i>Key Actors</i>	<i>Field of Action</i>
Global governance	UN & agencies especially Food & Agriculture Organisation (FAO) Regional fisheries management organisations (RFMOs) World Trade Organisation	United Nations Convention on the Law of the Sea (UNCLOS); FAO guidelines on fisheries, food safety and related issues. Management of fishery resources in international waters/straddling species Facilitating/regulating global trade
Supra-state governance	European Union	Common market Common Fisheries Policy (CFP): Food hygiene regulation
State governance	British Government	Economic policy Influencing & implementing CFP; national fisheries & aquaculture regulation & enforcement Food safety policy & legislation
Governance devolved/ delegated to public bodies	Devolved administrations Inshore Fisheries and Conservation Authorities/Inshore Fisheries Groups Marine Management Organisation Food Standards Agency, Local authority environmental health departments & Port Health Authorities Local authority planning departments Environmental agencies	Policy & implementation in devolved areas Implementation and management of local fisheries & aquaculture regulation. Implementation of fisheries licensing & quota systems; enforcement of fisheries regulation Food safety policy implementation Aquaculture planning permissions Implementing environmental legislation
Mixed public -private governance	Sea Fish Industry Authority (Seafish) Producer Organisations	Seafood industry development. Implementation of CFP: quota allocation & market management

Private-led governance	Seafood companies, foodservice companies & retailers Certification organisations & companies Trade organisations	Transactions which maintain seafood supply and ensure appropriate standards Corporate social responsibility (larger companies) Managing certification schemes Representing interests of fishermen, farmers, processors
Civil society governance	Environmental NGOs & other civil movements	Formulating and campaigning for environmental goals relating to the seas.

Source: Author

There are three threads within the Field of Action column. The first is economic policy of which the liberalisation of global trade and the European common and single market projects have both been important to the seafood sector. The second is regulation of seafood production, with the greatest impact on fishing but also including aquaculture, which has increasingly focused on sustainability objectives. The third is food safety and quality which is the subject of both public and private rulemaking.

Most of these actors are clearly either part of either the public sphere of the state, in the private world of business or part of civil society. However, a brief clarification is needed at this point on the two characterised as ‘mixed public-private governance’ organisations.

First there is Seafish (the Sea Fish Industry Authority) established by legislation as a ‘non-departmental public body’, that is a quango. It describes itself on its website as supporting ‘all sectors of the seafood industry for a sustainable, profitable future’ with the overall aim ‘to support and improve the environmental sustainability, efficiency and cost-effectiveness of the industry, as well as promoting sustainably-sourced seafood’ and it is funded by the industry through a levy. As will be seen in subsequent chapters the organisation, while constituted as a public body with a publicly appointed board, functions to represent the interests of the seafood industry.

The members of Producer Organisations (POs) relevant to the study are vessel-operating fishermen or companies so private enterprises. POs were established as part of the European Common Fisheries Policy (CFP) to undertake certain marketing and price control functions but in the UK they also have the devolved role of allocating fishing quotas which is a governmental responsibility. Hence, they too have been characterised as mixed public-private governance organisations in Table 1.2.

Civil society involvement in the governance of seafood is mainly via what are broadly termed 'non-governmental organisations' (NGOs). The significance of the term NGO is linguistically broad and this has led to usage by a range of organisations, sometimes more attached to the private sector than to civil society. Alternative terminology such as Environmental Civil Society Organisation and Civil Society Organisation which has been employed elsewhere provide more clarity and 'the third sector' has also been used (Gale F & Haward M 2011;Hutter BM & O'Mahoney J 2004). However, there is no one alternative which has gained general acceptance and NGO as the term generally current has been adopted here and will be used throughout.

Certification bodies which are responsible for particular standards, some specific to seafood, others relevant to food more generally, are a mixed group with different origins and concepts of their roles. In general they are distinct from certifying companies which operate commercially and are clearly private interests. Many certification bodies include environmental and/or social objectives among their scheme aims and some allow for the participation of civil society representatives but all the same they exist to provide a service to business. This includes two seafood certification bodies which one NGO, the World Wide Fund for Nature (WWF), has been involved in establishing. It has been suggested that the term 'hybrid' be used for such bodies (Gale F & Haward M 2011) because of their mixed characteristics but the view taken here is that it is preferable to ask what interests are chiefly served and define roles accordingly because the hybridity concept can mask the significance of relationships and hinder analysis. The assessment here is that these

certification organisations should be classified as functioning for private interests.

In contrast, environmental NGOs and other civil organisations that campaign on issues to do with the seas take stances that are quite distinct from those of the seafood industry. They may also take oppositional positions to state policies or try to influence such policies in certain directions. The question of sustainability of fish and other wildlife of the seas and indeed the long-term viability of ocean ecology has aroused strong passions and some of the organisations involved figure in the story told in later chapters.

State, private and civil society representatives, the roles played by all these actors feature at various points of the story of change in the seafood supply chain. The modes of governance which they exercise, singly and in various combinations, and the resulting impacts on the British seafood system will be fully explored and comprise the major focus of this study.

CHAPTER 2: GOVERNANCE AND SUPPLY CHAINS

2.1 The Concept of Governance

This chapter examines the concept of governance and how it has been used to understand key dynamics in the workings of food systems. It has already been noted that governance is relevant to the seafood industry in three areas: economic policy, management of supply and food safety plus quality. Consumption has generally been omitted from discussions of governance but is included in this review with the intention of incorporating into the analysis both influences on seafood consumption and of consumption on the rest of the supply chain.

Governance has become a central issue in food systems and food policy discourses with all its considerable ambiguity, arguably because it is a broad concept which can be used in various ways, indeed a 'capacious term' (Griffin L 2012). This chapter aims to unpick uses of governance terminology in certain literatures in order to establish what will be helpful for understanding drivers in the seafood industry. Contrasting usage in political science to indicate a less hierarchical form of state government and in economics to refer to supply chain co-ordination has been noted but does not exhaust practice (Mayntz R 2003). Other analysts have identified seven (Bevir M & Rhodes RAW 2003), nine (Van Kersbergen K & Van Waarden F 2004) and ten (Pattberg PH 2007) different types including global governance, intra-company corporate governance, participatory governance and good governance in the public sector. Many of these usages have little in common (Rhodes RAW 2007). Some contrasting definitions of governance from different literatures are reproduced in Appendix 1 to illustrate the range of meanings.

While governance in political science is a usage tending to emphasise the sharing and devolution of control compared to (related) terms like 'governing' and 'government', in supply or value chain discourse it is more about control being exerted by some parties on others. In this thesis both the political science and economics usages will be seen to be relevant to understanding

the seafood supply chain. This chapter discusses the governance concept in more detail in relation to the role of the state in section 2.2 and as applied to supply chains in sections 2.3 and 2.4.

The term 'regulation' may be used in ways that overlap 'governance'. References to 'private regulation' or 'private interest regulation' are not uncommon (Marsden TK et al. 2010). For example in one study, with the observation that regulation is not exclusively a state preserve and that other actors are drawn into regulatory activities, this term is employed very broadly and applied to such bodies as insurance companies, trade associations and NGOs (Hutter BM 2011). A narrower and more traditional definition in an official report is: 'Regulation may widely be defined as any government measure or intervention that seeks to change the behaviour of individuals or groups' (Better Regulation Task Force 2003) (page 1).

Here, 'regulation' is used throughout only for state activities, while the expression 'governance' is used in broader ways and applied to both state and non-state actors and endeavours. The only exception is in acceptance of the term 'self-regulation', a known usage and comprehensible whereas the equivalent 'self-governance' would be unfamiliar, possibly suggesting other meanings, and therefore unclear. Maintaining a terminological separation between uses of 'regulation' and 'governance' is an aid to understanding roles and responsibilities. It is important for both analytic and policy reasons to uphold clarity about the actions of the state and of others involved in governance while recognising overlaps and interlinkages in practice. The state mainly referred to is the British entity and the term supra-state has been used for governmental activities undertaken at levels above it, that is by the European Union (EU) and its predecessor bodies or by global institutions, the latter also denoted as global governance, another common usage.

Governance and regulation both embody assumptions about power. Most writings about the modern (liberal democratic) state are based on the assumption that it exercises power, power that has a coercive element but which for the most part means the deployment of rational authority in the

Weberian formulation (Giddens A 2009). The way state power has been changing is considered in the next section.

There has been some radical questioning of how to understand power in general, emphasising its relational and contingent nature. Thus it has been argued that while based on access to relevant resources it requires these to be mobilised for specific purposes rather than states and corporations being considered as fixed sites of power (Allen J 2004). This provides a useful reminder that whatever the conditions, the agency of human decision-making is always a factor. However, it does not seem helpful to deny that those controlling the resources to exercise power will usually aim to do so. Hence much of the demonstration of governance and the exercise of power in the thesis is about the actions of either the state or large private concerns, separately or in conjunction. At the same time, as indicated in chapter 1, governance is also exercised by civil society actors who need to make use of different kinds of resources in order to exert influence. This relates to wider conceptions of power, not just as 'domination' but possibly in the form of seduction, manipulation or threat (Allen J 2003). From the viewpoint of the examination of food chains these wider types of power are particularly relevant to consumption and are considered in section 2.5 of this chapter.

Three main strands of thinking about governance and power may be identified as relevant to understanding changes in seafood supply chains. The first deals with the role and functioning of the state and how it has been altering. The second concentrates on relationships between firms in the private sphere. These two paths can be said to combine in a third element of discussions about how certain relationships between companies are calibrated to achieve publicly as well as commercially valued objectives in which both public and private governance activity is involved, along with a third participant in the form of civil society. Table 2.1 summarises the various approaches to governance. The distinctions drawn here are for analytic purposes as the literatures are not entirely distinct and over time cross-cutting influences have developed. However, they encapsulate different ways of looking at governance and hence the forces for change that can be considered in relation

Table 2.1 Conceptual Approaches to Governance Relevant to Supply Chains

<i>Public/Private Decision-Making</i>	<i>Discipline/Field</i>	<i>Theoretical Focus</i>	<i>Main Issues</i>	<i>Relevance to Seafood</i>
Public	Political science	Role of state	Types of governance Regulation/deregulation/re-regulation	Regulation of primary production & food safety
Private	Economics	Transaction cost economics	Information asymmetry, asset specificity Types of co-ordination including hierarchy, contracts	Relationship between firms in supply chains
	Marketing	Transaction cost & organisation theory	Relationships/collaboration Power	Relationship between firms in supply chains
	Management	Supply chain management	Relationships/collaboration Power	Relationship between firms in supply chains
	Agri-food studies/ Development studies/ Geography	Commodity systems Commodity chains Global commodity chains Global value chain	Industrialisation of agriculture & food production Power Transnational corporations Industrialised/developing country relationships	Industrialisation of capture fishing/Aquaculture development Global sourcing
Private & public plus civil society with overlapping objectives	Economics Agri-food studies	Governance through standards & audit systems	Relations between public & private governance Role of civil society	Impact of public/private/civil society Relationship between firms in supply chains

Source: Author

to seafood. Influences on consumption have been analysed in different literatures which are outlined separately in section 2.5.

2.2 Governance and the Role of the State

The first body of work examined is a mainly political science literature about the state and the way its role has changed during the second half of the twentieth century. During and in the years following the Second World War, Britain like many other Western countries experienced the state taking a very visible role in both the economy and for social provision. However, this Keynesian welfare state started to come under strain with widespread economic and financial problems that started in the 1970s. The last quarter of the twentieth century saw the increasing divestment of direct government activity in various spheres (Pierson C 1996). In addition, certain state powers had transferred to the supra-state level, particularly to the EU and its predecessor entities. At the same time economic forces became more globalised and less amenable to control by individual states in isolation. These developments are reflected in an academic debate about governance and the role of the state. The fact of change is agreed but not necessarily its result, whether indicating decline or alternatively a restructuring to deal with new situations.

One influential strand of analysis with a focus on Britain has been described as the 'hollowing out of the state'. With sharing or divestment of various functions above to the EU and below to a range of public and private organisations, the extent of public authority is seen as significantly reduced and its functioning now more reliant on semi-autonomous networks for both policy development and service delivery in a 'differentiated polity' model (Bevir M & Rhodes RAW 2003; Rhodes R 1996). Changes within the UK, not least devolution, have meant more power leaving the centre while also creating opportunities for local partnerships, which may be described as multi-level governance (Bache I & Flinders M 2004; Flynn A & Morgan K 2004; Peters BG & Pierre J 2001). In a parallel thread, the functioning of the EU has also been described as multi-level governance with certain agencies and cross-cutting relationships that

operate independently of the member governments (Hooghe L & Marks G 2001). More generally, those employing the governance concept within political science emphasise in addition to networks a more pluralist sharing of power between different levels of government and with a range of interest groups, together with a trend to horizontal over hierarchical relationships (Griffin L 2012).

However, others take a different stance as suggested by the statement: 'Rumours of the demise of the state have been greatly exaggerated' (Plattner M 2013) p22. The dominant view is rather that the state remains the key channel for pursuing collective interests, that it still retains considerable power and that far from being hollowed-out its capacity is being increased through sharing with non-state actors. Nevertheless, its mode of operation in part at least is described as shifting to a co-ordinating rather than direct management role, emphasising consensual and participatory forms of decision-making (Amin A & Thrift N 1997; Bartolini S 2011; Bell S & Hindmoor A 2009; H eritier A & Lehmkuhl D 2011; Pierre J & Peters BG 2000). One important aspect of this shift that has been particularly detailed for the UK is the delegation of state functions away from direct political control to a large number of quasi-autonomous bodies, sometimes termed agencification (Flinders M 2006; Flinders M 2008).

The changed mode has paradoxically led to increased regulation, resulting in the 'regulatory state' characterisation. Rather than a situation of influence over the economy simply being lost, new forms of regulation have been created to deal with the changed economic playing field. Fresh rules and standards and innovative regulatory agencies have replaced direct ownership and control or have marked extensions which reflect changing policies and priorities; state activity may be shared with or delegated to private interests (Grabosky P 1995). 'Steering not rowing' the ship of state is a popular metaphor for a changed emphasis towards retaining strategic policy decisions while reallocating implementation in various ways. However, the co-ordinating and enforcement roles of the state are still needed to deal with complex issues. Even the deregulation which has occurred in certain economic areas can be

seen not as the removal of government controls but as a cheaper and more effective substitution. The end-result is often labelled as re-regulation. (Clark GL 1992;Gamble A 2000;Gunningham N 2009;Jordana J & Levi-Faur D 2004;Majone G 1996;Moran M 2001;Ogus A 2004;Scott C 2004;Yeung K 2010). At supra-state level the international arena is also increasingly regulated (Lang T, Barling D, & Caraher M 2009;Levi-Faur D & Jordana J 2005).

Starting earlier and evolving in parallel, a separate mainly American strand of analysis has produced a critical account of state regulation in the form of 'public choice' (also as 'rational choice') theory. Applying an economics frame of reference and assumptions about individual self-interest to political issues, it argues that public regulation is typified by 'command and control' heavy-handedness, reflects special interests and is inefficient, resulting in poor policies that benefit particular groups ('regulatory capture') and involve excessive spending; however, others have contended that genuine public interest both exists and is supported by democratic politics and that public regulation is necessary (Balleisen EJ & Moss DA 2010;Butler E 2012;Hindmoor A 2006;Wittman D 2010). The US state, strongly influenced by the public choice analysis, did undertake a programme of deregulation in the 1980s and 1990s including elements such as the selective dismantling of legal restrictions and systems of enforcement (Balleisen EJ 2010) but this was not the case in Britain or Europe generally (Fligstein N 2010). Nevertheless, the critique of the state has affected both political discourse and policy in the UK.

Contrary to the public choice approach, others maintain that although the beneficiaries of public regulatory activities may vary, only state action can enhance public welfare, correct market failures and reduce social risk (Levi-Faur D 2008), from a collectivist point of view acting on behalf of society as a whole (Hall S 1984). Regulation can therefore be seen as justified by the concept of a public interest (Fearne A et al. 2004;Feintuck M 2010). However, state authority is a site of contestation; how it has been used or not used has varied over time, in relation to different issues, in response to different

pressures and representations and according to which groups and actors hold the levers of power at any point and the interests they favour.

In relation to food the British state has had varied roles at different periods, with a tendency to serve producer more than consumer interests (Lang T 1999). It acted in a particularly powerful way during the Second World War when under conditions of great difficulty the food system for Britain as a whole was managed with considerable success through the Ministry of Food (Foster R & Lunn J 2007).¹ Post-war, although the mechanisms of control reverted to market forces, there was a strong state impetus to enhancement of supply. British (similarly to European) policy was motivated by productionist objectives, structures and funding arrangements being put in place to increase agricultural output (Flynn A, Harrison M, & Marsden T 1998;Lang T, Barling D, & Caraher M 2009). Action to enhance fisheries production took place in parallel. The productionist ethos was still a strong feature of European strategy, including the Common Agricultural Policy (CAP), when Britain joined the Community in 1973. Subsequently, when excessive surpluses had become a notorious feature, support was moderated in various reforms and the production of some commodities controlled by quota systems but policy has continued to be oriented to farmers rather than consumers, these being assisted in various ways (Foster R & Lunn J 2007). For rather different reasons which are detailed in chapter 4, state policies in relation to fisheries also changed and from the 1980s has been dominated by forms of regulation which aim to restrict production. Other areas of regulation affecting food production include control of pesticides and of veterinary inputs. Recently, policy debates about food have shifted to questions of sustainability, food security and the impact of climate change but without an integrated food policy being created (Barling D, Lang T, & Sharp R 2010;Cabinet Office Strategy Unit 2008;Department for Environment 2006;Feindt PH & Flynn AC 2009;Policy Commission on the Future of Farming and Food 2002;Scottish Government 2009b;Welsh Assembly Government 2010). Sustainability has also come to be a major factor in the regulation of fisheries as chapter 4 shows.

¹ However, this was not achieved in many parts of the British Empire, the worst failure being the 1942-43 Bengal famine (Collingham L 2015).

In parallel to these developments, food systems were being transformed by supra-state trade agreements covering agricultural and fishery products in the Uruguay Round of the General Agreement on Tariffs and Trade, subsequently replaced by the World Trade Organisation (WTO) in 1995. The international trade agreements, key to economic globalisation, were part of a general policy movement in the fourth quarter of the twentieth century to liberalisation of markets and pro-corporate rules (Lawrence G & Burch D 2007). But while national states gave up certain powers by agreeing these rules, they nevertheless were necessary to the creation and legitimation of the new global arrangements (Marsden TK, Lee R, Flynn AC, & Thankappan S 2010). As with other foods, the new arrangements facilitated the global expansion of trade in fish.

Returning to Britain, while state activity in some areas was reduced, most notably with the series of privatisations of nationalised enterprises during the 1980s and 1990s, one significant economic regulatory role has continued albeit with some organisational change since inception in the 1970s, that of competition regulation which can provide a measure of restraint against the potentially most powerful corporations. In the food sector it has been applied particularly to the retail part of the food chain. A series of investigations has been carried out, one into a major supermarket takeover, others on the general impact of the multiples (Competition Commission 2000b; Competition Commission 2003; Competition Commission 2008; Howe WS 1990; Monopolies and Mergers Commission 1981; Office of Fair Trading 1985). Thus far it cannot be said that the result has borne very heavily on the major retailers so this has not been an example of strong regulation. The takeover was allowed, albeit with various required divestments. A Code of Practice for supermarket behaviour was established in 2001 which many felt had not resulted in the desired changes so following complaints and a further investigation an extended Grocery Supply Code of Practice was promulgated in 2008 but the establishment of the recommended special ombudsman to support it was the subject of hostile lobbying by retail interests and has been considerably delayed, the necessary legislation only passing much later. While the modest

Groceries Code Adjudicator Act 2013 has limited provision, it is significant that the state has eventually responded to continuing public pressure with such regulatory action even though assessed as falling far short of what would be necessary for fair producer-retailer relations (Burch D, Lawrence G, & Hattersley L 2013; Seely A 2013). The (limited) activity of competition authorities in relation to UK seafood companies is discussed in chapters 4 and 5.

Another set of general provisions which affect food concerns in the same way as other businesses came in the *Companies Act 2006*. Although mainly a piece of consolidating legislation it introduced corporate social responsibility (CSR) for the first time, requiring directors to have regard to the company's impact on both community and the environment and generally to the long-term consequences of its decisions (in paragraph 417). Although it cannot be disentangled from other motivations which food businesses have for developing ethical policies, particularly in the case of retailers with their direct contact with the public, such regulation must have contributed to their thinking; the growth of CSR policies relevant to the sector is covered in section 2.4 of this chapter.

An area of broad regulation which had a specific impact on the supermarkets has been the use of planning law. While a major period of expansion producing out of town stores took place during a particularly deregulatory phase of government in the second half of the 1980s, the reaction to some of the adverse social consequences for certain groups eventually resulted in a re-tightening of the rules. This in turn was one reason for some major retailers to return to town centres and smaller towns with new format stores (Wrigley N 1998). This has been an example of the state being withdrawn to a certain extent from an area of control but its authority being exerted again when those in power judged this to be necessary.

Over food there has been regulation dealing with various topics in the second half of the twentieth century including general legislation with the *Food and Drugs Act 1955*, the *Food Act 1984* (for England and Wales), *Food Act*

(Scotland) 1985 and the *Food and Environment Protection Act 1985*. Food labelling regulation effectively started in 1946 and after revisions in 1953 and 1970 became more extensive in the 1980s and 1990s when European directives were incorporated (Turner A 2007). Much state activity over food has been concerned with safety, an absolute public requirement (Gray P 1991; Marsden TK, Lee R, Flynn AC, & Thankappan S 2010). Specific food hygiene legislation in the postwar period included *The Food Hygiene Regulations 1955*, *The Food Hygiene (Scotland) Regulations 1959*, *The Food Hygiene (Markets, Stalls and Delivery Vehicles) Regulations 1966* and *The Food Hygiene (General) Regulations 1970* and of course these applied to the seafood industry. There seemed to be considerable regulation in place but food scares in the late 1980s and the consequent public reaction showed it to be inadequate, resulting in major new legislation, the 1990 *Food Safety Act* (Lang T 1997); this also implemented the European *Official Control of Foodstuffs Directive 1989*, part of the project of harmonising food law preparatory to the establishment of the European single market.

The 1990 Act has sometimes been described as marking a devolution of state responsibility with its introduction of the criterion of 'due diligence'. This product liability defence for the first time spread responsibility from a given company to other parts of its supply chains. Effectively private companies, with the major supermarket chains playing a dominant role, were required to take responsibility for food safety and quality assurance being implemented upstream. Several accounts produced when the legislation was in prospect or recently passed make it clear that the Act was seen at the time to be strengthening not weakening regulation. It reinforced controls, added new enforcement capabilities, removed Crown immunity from various state-managed premises and bestowed much greater power on the executive to issue codes of practice as well as new regulations in the future; an additional £30 million was added to the funding of local authorities in recognition of the extra workload required (Anderson KG 1990; Audit Commission 1990; Flynn A, Harrison M, & Marsden T 1998; Hobbs JE & Kerr WA 1992; Jacobs M &

Fletcher Cooke G 1991;Jukes D 1993;Spears K 2000).² New powers to require licensing and registration of food premises were welcomed by the Richmond Committee (Committee on the Microbiological Safety of Food 1990). Though one view was that enforcement weaknesses had not been addressed, others argued that the legislation was over-controlling and resulted in too much prescription from enforcement personnel (Harrison M, Flynn A, & Marsden T 1997;Howard MT 2004;Jukes D 1991). Harrison et al (1997) report that local Environmental Health Departments were initially encouraged by the then Ministry to use the new enforcement powers in the *Food Safety Act* energetically but subsequently after complaints and media criticism the government adjusted its policy with the result that large corporations such as the major retailers were expected to self-regulate while local enforcement personnel concentrated on smaller businesses. Thus while the Act itself was not deregulatory, the government's subsequent partial backtracking could be interpreted as such to some extent, which was in keeping with its general stance. Further, the Act did show the state sharing governance functions regarding food safety with other actors and the *de facto* acceptance of more self-governance was in keeping with a deregulatory position, with legislation still providing backstop safeguards. However, it could be argued that far from being a deregulatory move, the requirement that retailers and others in supply chains ensure safe food for the public is akin to the 'polluter pay' principle, that is ensuring that businesses absorbs what would otherwise be cost externalities (cf (Howard MT 2004) in relation to health and safety regulation).

The debate around implementation of the 1990 Act draws attention to the enforcement aspects of regulation. This has been the focus of a 'responsive regulation' literature which has generally taken its starting point from the avowedly normative text which introduced the 'enforcement pyramid'; it indicated the range of measures that can be taken by state personnel from advice, persuasion and education at the bottom, moving up through to inspections and a range of penalties further up, based on the idea that the most severe will only be relevant to a minority of recalcitrant businesses and individuals at the narrow top (Ayres I & Braithwaite J 1992). In fact British

² Crown immunity had already been removed from hospitals in 1987.

Environmental Health Officers (EHOs) who have the role of implementing food safety rules at local level, have long had a culture of using support and negotiation, with prosecutions pursued only as a last resort; moreover research has shown that an educational approach by EHOs is more effective than an emphasis on deterrence and penalties (Fairman R & Yapp C 2005;Hutter BM 2011). Thus while state regulation has often been characterised as the 'command and control' approach, this is a misleading expression. As seen in relation to food safety and in chapter 4 over fisheries management, the enactment of rules has never simply led to their fulfilment and various methods, with varying levels of commitment and negotiation, have been used over time by different state actors to achieve policy objectives.

Indeed, the 1990 *Food Safety Act* notwithstanding, continuing food scares in Britain through the 1990s drew dramatic attention to the shortcomings of a system which had not secured food safety, whether because of failures of enforcement or for other reasons (Knowles T, Moody R, & McEachern MG 2007;Loader R & Hobbs 1999). As summarised in a specific reaction to the BSE (Bovine Spongiform Encephalopathy) crisis, there had been 'a failure of food governance' (Lobstein T et al. 2001) (p1). One analysis did attribute the malfunction at least in part to what was characterised as deregulatory 1990 legislation but its description of the meat chain pointed to financial pressures on abattoirs, squeezed between rendering companies and supermarket buyers, combined with a reduction in enforcement resources connected to the establishment of the Meat Hygiene Service, cumulatively allowing poor standards to continue unchecked (Schofield R & Shaoul J 2000). It is hard to see how the pre-1990 legal situation would have better dealt with the problems of poor hygiene standards in abattoirs but the account certainly indicates inadequacies in the regulatory system. This was to be remedied for Britain in two directions.

The first was dealing with public loss of confidence in the existing institutions with their perceived conflicts of interest as a result of the succession of food crises. The Ministry of Agriculture, Fisheries and Food (MAFF) in particular was seen as too tied to the agriculture industry to be able to serve consumers

adequately (Lang T, Millstone E, & Rayner M 1996); the existence of conflicts of interests in the department between farmers and consumers was in fact a long-standing phenomenon (Foreman S 1989). There had been earlier calls for an independent agency at the time when the 1990 Food Safety Bill was progressing through the legislative process but this had not been accepted by the government of the day (Jukes D 1991).³ However, a new government did respond to the perceived problems with a reorganisation: the Food Standards Agency (FSA) was established by the *Food Standards Act 1999*, as a 'non-ministerial government department' its role being to put consumers and the general public interest first, separate from MAFF which was subsequently replaced by the new Department for Environment, Food and Rural Affairs (DEFRA) (Barling D 2004; Flynn A, Marsden T, & Smith E 2003). Thus while the private responsibilities encompassed in 'due diligence' were unchanged, the establishment of the FSA which began functioning in 2000 reasserted the importance of public oversight of food safety. Put another way and using the concepts in the differentiated polity model (Bevir M & Rhodes RAW 2003), the food crises posed dilemmas which the Thatcher and Blair governments on the basis of their different beliefs and traditions solved in different ways. Subsequently, although some aspects of the agency's decision-making were criticised, it was acknowledged that the FSA did achieve greater public confidence in the food system (Rothstein HF 2006).

The second shift was change of policy in the EU, galvanised by the BSE and other food crises. Hitherto, safety issues had mainly been dealt with as potential trade barriers. Reforms now included a comprehensive food law, Regulation (EC) No 178/2002, *The General Food Regulation*, establishing the European Food Safety Authority (EFSA) and laying down procedures in matters of food safety, plus the restructuring of the Commission to create a focus on consumer health. EU food law then became a further motivator for British companies, especially over requirements for traceability, labelling and

³ See also the memoranda by the Consumers' Association in the Minutes of Evidence to (House of Commons Agriculture Committee 1998) which states that it had proposed a food agency in 1990 and (Young M 1991b) which called on behalf of the (retailer financed) Food Safety Advisory Centre for an independent government agency to be responsible for food hygiene at the beginning of the decade.

the use of the Hazard Analysis of Critical Control Points (HACCP) system for managing risk. The new rules were based on the precautionary principle and on distinguishing the three separate functions of risk assessment, risk management and risk communication (following documentation produced by the Food and Agriculture Organisation of the United Nations and the World Health Organisation - FAO and WHO) and these distinctions carried the implication that political decision-making would be needed independently from scientific appraisal. See (Alemanno A 2006;European Commission 2002b;Flynn A, Marsden T, & Smith E 2003;Food and Agriculture Organisation of the UN/World Health Organisation 1997;Houghton JR et al. 2008;Knowles T, Moody R, & McEachern MG 2007;Millstone E et al. 2000;Vincent K 2004;Vos E 2000). Food safety remains a 'contested governance' issue within the EU and its multi-level governance structure, indicating amongst other things that the differing views of member states remain important (Ansell C & Vogel D 2006;Caduff L & Bernauer T 2006). More broadly, the EU, like all authority, is the site of political manoeuvring by many interests, a process which has been regarded as 'regulatory capture' in describing the food safety situation pre-reform (Millstone E & van Zwanenberg P 2002). An alternative view that the struggle for advantage should be seen as a 'regulatory space' which realistically is bound to be dominated by large organisations whether private or public in origin (Hancher L & Moran M 1989).

European food law, duly translated into British regulations, has required food producers to make significant changes, indicating a strengthening of regulation (Cumbers A, Leigh R, & Smallbone D 1995). Whether such food risk management has been successful is contested (Houghton JR, Rose G, Frewer LJ, Van Kleef E, Chryssochoidis G, Kehagis O, Korzen-Bohr S, Lassen J, Pfenning U, & Strada A 2008). Certainly European-originating food safety regulation has had a big impact on the seafood industry as will be seen in chapter 5.

More distantly, British companies are affected by global regulation of food safety taking place in the Codex Alimentarius Commission (CAC) with its subsidiary bodies and expert committees (Food and Agriculture Organisation

of the UN/World Health Organisation 1997). Its standards, embodied in the Sanitary and Phytosanitary Measures and the Technical Barriers to Trade Agreements, are accepted within WTO law. However there is tension between neo-liberal trade objectives and public health goals related to food, and the WTO system has been accused of ignoring consumer demands (Barling D & Lang T 2005; Hobbs JE & Kerr WA 2006). The EU has been active within the CAC and has achieved some success which can be related to public health objectives both on the precautionary principle and on traceability and labelling of foods derived from biotechnology (Poli S 2004), in turn impacting on British policy.

Although safety has been the major area of recent food regulation, it is not the only one. European regulation of organic production started in 1991 with Regulation (EEC) No 2092/91 *On organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs* and was revised by Regulation (EU) No 834/2007 *On organic production and labelling of organic products* with complementary rules relating to imports. Regulation in the UK was established from the time when the earlier of these regulations took effect in 1993, undertaken by quangos, initially the United Kingdom Register of Organic Food Standards, replaced in 2003 by the Advisory Committee on Organic Standards, on behalf of the competent authority, DEFRA. Subsidising organic production started with the UK Organic Aid Scheme in 1994; the form at 2013 is the Organic Entry Level Stewardship element of Environmental Stewardship (the general support programme for environmental management in farming) with top-up available for conversion. This sphere of regulation is relevant to seafood in relation to organic aquaculture.

Health claims for foods have been legislated more recently with the European harmonisation regulation (EC) No 1924/2006 *On nutrition and health claims made on food* which came into force in 2007, its purpose being both to protect

consumers and to facilitate the single market.⁴ A companion regulation (EC) No 1925/2006 *On the addition of vitamins and minerals and of certain other substances to foods* provides for the positive side of what manufacturers can do. Business claims have to be submitted via member states to EFSA which assesses whether or not they can be accepted on the basis of both scientific validity and whether the benefits claimed are comprehensible to the average consumer; those approved are listed on a register maintained by the Commission. A large proportion of claims submitted in the initial period of operation has been rejected (Gilsenan MB 2011). The trend of change from non-regulation of health claims to legislative action is one which Europe shares with other developed countries (Nocella G & Kennedy O 2012).

There are a number of other areas of government activity with food implications. At the broadest level it is only at state and supra-state levels that policy can be determined to tackle climate change and sustainability issues in food production. Another major area is public health where nutrition because of problems such as obesity is increasingly recognised as needing state leadership (discussed in section 2.5). A further important state role, connected to these issues is that of public procurement, exercised at different state levels where provisions are purchased for a range of public sector services such as hospitals, prisons and schools. Apart from its economic importance, this buying power has the potential to have policy effects in relation both to sustainability and public health if deployed purposefully with such goals. All of these subjects have implications for seafood.

One further relevant area of state action is in relation to the environment where regulatory activity has been chequered and change often hindered or blocked by various interest groups, meaning that governance has always been shared. Nevertheless, regulation is considered to be the necessary bedrock of environmental policy (Garner R 2000; Jordan A et al. 2003). General

⁴ Implementing *Nutrition and Health Claims Regulations* 2007 have been passed for each of the four administrations and again separate *Nutrition and Health Claims (England) (Amendment) Regulations* 2010 and equivalents for each administration. The responsible UK agency was initially the FSA and has remained for Northern Ireland and Scotland but in late 2010 responsibility passed to the Department of Health for England and to the Welsh Government.

conservation legislation applies to the marine environment while the European Habitats and Birds Directives and the Water Framework with their corresponding UK regulations are particularly relevant here in addition to the Marine Strategy Framework Directive itself.⁵ The marine environment was one focus of the UK *Marine and Coastal Access Act 2009*.

Quangos exercising governance with a role in some seafood-related matters are the Environment Agency, Natural Resources Wales and the Scottish Environment Protection Agency; the Northern Ireland Environment Agency is an agency within the province's Department of the Environment.⁶ Certain environmental policies have an impact on the seafood industry as will be seen in chapters 4 and 5.

While the preceding account has largely been about increased regulation, British governments since the mid-1980s have also had policies aiming at measures of deregulation, generally conceived in terms of better regulation and often formulated as a need to decrease burdens on business. A series of government bodies have been established to improve regulation, indicating that this has been a priority for successive administrations over the period, and

⁵ The Habitats Directive 92/43/EEC *On the conservation of natural habitats and of wild fauna and flora* and the Birds Directive, 2009/147/EC *On the conservation of wild birds* (which codified the earlier 79/409/EEC with the same title) have been transposed into SI 2716 *The Conservation (Natural Habitats, &c.) Regulations 1994* and SR(NI) No 380, *Conservation (Natural Habitats &c) Regulations (Northern Ireland) 1995*; for England and Wales now superseded by SI 490, *Conservation of Habitats and Species Regulations 2010*. The Water Framework Directive, 2000/60/EC *Establishing a framework for Community action in the field of water policy*, was transposed into *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003*, the *Water Environment and Water Services (Scotland) Act 2003* and *The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003*. The Marine Strategy Framework 2008/56/EC *Establishing a framework for community action in the field of marine environmental policy* is reflected in the *Marine and Coastal Access Act 2009*.

⁶ The Environment Agency covered England and Wales when established in 1995 but since April 2013 when Natural Resources Wales began operation, it has been responsible for the former entity only.

various items of legislation for this objective have been passed.⁷ A policy of undertaking Regulatory Impact Assessments upon prospective new legislation has been introduced (National Audit Office 2001). The Hampton Report established principles aiming at simpler systems of inspection and enforcement, recommending particularly that such activity should be based on risk assessment rather than carried out routinely (Hampton P 2005). Ostensibly a rational approach, analysis of one area where this has been put into practice early on and indeed argued to have influenced the Hampton review, namely the operation of the Health and Safety Executive, has concluded that light-touch, risk-based regulation has led to ‘an emasculation of the regulatory system of social protection’ (Tombs S & Whyte D 2013) (p74). Thus there has been contestation between pressures for stronger regulation to deal with new or newly-recognised problems and demands for reduction in the impact and costs of regulation, with different outcomes in different areas. Food safety in this context has experienced less deregulatory pressures compared to other fields such as the health and safety of workers because much greater public concern has been expressed, not least because it is of universal and not sectional relevance to the population at large, but reductions in funding for local authorities carries the risk of reduced EHO enforcement effectiveness.

This section has considered the role of the British state in certain policy areas related to food and shown that although its authority has come to be shared

⁷ Formal organisation for better regulation in government began with the establishment of the Enterprise and Deregulation Unit in 1986, subsequently renamed the Deregulation Unit, relaunched as The Deregulation Task Force in 1994 and with a new government replaced by the Better Regulation Task Force and Better Regulation Unit in 1997, later renamed the Regulatory Impact Unit and subsequently the Better Regulation Executive while the Better Regulation Task Force became the Better Regulation Commission. In 2007 the Better Regulation Executive became part of the restructured Department for Business, Enterprise and Regulatory Reform, thus emphasising a pro-business approach. In 2008 the Local Better Regulation Office was set up and the Better Regulation Commission was replaced by the Risk and Regulatory Advisory Council which then ended in 2009 but the Regulatory Policy Committee was established that year. The new government from 2010 with various policies to end excessive regulation introduced the Reducing Regulation Committee and in 2012 the Better Regulation Delivery Office replaced the Local Better Regulation Office. In addition, there has been legislation to improve regulation: the *Deregulation and Contracting Out Act 1994*, the *Regulatory Reform Act 2001*, the *Legislative and Regulatory Reform Act 2006* and the *Regulatory Enforcement and Sanctions Act 2008*. See Stanley M, www.policy.manchester.ac.uk for details (accessed 24 April 2014).

with European and global institutions and that there is much greater involvement of private actors, its regulatory activities remain very significant. This demonstrates how state power can be exerted when those who command it decide to do so. The field of food safety has been particularly highlighted and here public governance was considerably strengthened during the later part of the period reviewed during which organic certification and health claims have also become regulated. Later chapters detail the impact of public regulation on seafood in relation to production and sustainability, to food safety and to nutrition.

2.3 Private Governance: Theorising Change in the Food System

Moving from governance in the political sphere to private sector governance, the focus in the second group of writings is on firms linked in supply chains. Studies within economics, marketing and management theory have explored different avenues, often with normative as much as analytic intent. Other strands have developed around the concepts of commodity systems and commodity chains, convention theory and *filière* analysis.

2.3.1 Transaction Cost Economics and Vertical Integration

Transaction cost economics (TCE), the branch of neo-institutional economics particularly associated with the work of Oliver Williamson which developed from the mid-1970s aims to complement classical theory by explaining mechanisms which supplement and rectify inadequacies in the workings of the market. The supply chain in this approach appears almost indirectly as an aspect of governance arrangements. There is a starting assumption that in a perfect market of many buyers and many sellers there would simply be individual transactions governed by price. The supply chain would then consist of a number of successive spot transactions through which goods and services would pass from producers to final consumers. However, because of the costs of transactions and various aspects of buyer and seller behaviour more formal arrangements are needed resulting in various forms of contract and vertical

integration, considered as modes of governance. With its motivating principle of minimising costs, the theory proposes that a firm will vertically integrate if the costs of internal administration are less than the costs of using the open market but that intermediate forms of governance, termed hybrids, might be selected under appropriate circumstances. The TCE concepts of *bounded rationality* and *information asymmetry*, both relating to differential knowledge between the two parties, the resulting scope for one party's potential *opportunism* or *moral hazard* risk-taking and the *asset specificity* of financial or human investment continue to have traction extending into other theoretical lines and have greatly influenced certain subsequent work as will be seen later in this section. (Williamson OE 1985;Williamson OE 1987;Williamson OE 1995). The three forms of governance in transaction cost theory, market, hybrid and hierarchy have different responses, the first reacting more strongly to market incentives the last to bureaucratic controls, the hybrid with an intermediate position; it was further argued that autonomy of decision-making in market transactions and the command mode in a hierarchy are each more efficient at responding to change than the hybrid form on the grounds that the latter requires consent. Further, different types of transaction are considered as suited to different governance arrangements (Williamson OE 1979;Williamson OE 1991). With these concepts the approach has provided a toolkit for analysing inter-firm relations and governance issues between them (Chabaud D & Saussier S 2002).

Transaction cost theory has been used in several food chain studies (dealing with pork, beef, lamb, fruit and potatoes and also food safety in various countries) and considered to be a useful tool of analysis. It provides concepts and a vocabulary which have been found helpful in elucidating commercial decision-making and arrangements (Cavalho JM, Loader R, & Hallam D 2000;Farina EMMQ & Machado EL 2000;Hobbs JE 1996;Hobbs JE, Kerr WA, & Klein KK 1998;Loader R 1997;Martino G & Perugini C 2006;Stanford K et al. 1999). Several of these studies focus on reasons for vertical co-ordination but only one (Loader R 1997) considers power as a dimension in some relationships, specifically showing this was exercised by exporters in relation to producers and by supermarkets over consumers.

Vertical co-ordination has been a strong theme in United States (US) food system studies and transaction cost analysis found to be relevant in considering factors conducive to vertical co-ordination in its food industry as a whole (Henderson DH 1994;Hennessy D 1996). One account in this literature recognises that as co-ordination increases, one party is generally in the dominant position (Frank SD & Henderson DH 1992). The interest in exploring the use of contracts and vertical co-ordination of supply chains was clearly linked to changes in the organisation of some branches of American agriculture. The intensified industrialisation of agriculture in the second half of the twentieth century went hand in hand with a change from undifferentiated commodities to specialised products and with decreasing sales on the open market. Industrialised rearing along with tight vertical control exercised by operators in the middle of the chain (the terminology indicates packers, contractors and integrators in different studies) progressed first in the poultry industry followed by similar trends with pigs and cattle (Barkema A & Drabenstott M 1995;Hennessy D 1996;Lawrence JD et al. 1997;Martinez S 2001;Sporleder TA 1992;Vukina T 2001).

Similar integration has also been documented in other American studies not specifically employing a transaction costs framework (Welsh R 1997;Welsh R, Hubbell B, & Carpenter CL 2003). The picture from many accounts shows power over the chain shifting to certain operators downstream of farmers. Nevertheless a contrasting study of fruit and vegetable chains in California, also not using TCE, concluded that contractors in contractual relationships with growers were not managing them in a vertical co-ordination sense, and suggested that powerful companies upstream of producers were more likely to become dominant in farm-level decisions (Wolf S, Hueth B, & Ligon E 2001) so there has not been a single trend of development. In Britain there were similar developments and by the early 1980s some poultry and egg production was already on the basis that buyers supplied the major inputs and specified the production process while for pigs and vegetables there were contracts in which buyers had partial control, supplying some inputs and having a share in

production issues, with peas the subject of particular integration between growers and freezer/processors (Malcolm J 1983).

Four seafood studies using TCE, all in US settings, have been found. Two examined the workings of the market in different New England fisheries. In neither case do transaction costs themselves seem to be significant; the emphasis is on the discussion of what are characterised as hybrid forms of governance where in both instances long-term relationships between individual fishermen and buyers were found to be the key, in one case study not without opportunism on either side, but apparently in both examples with roughly equal power relations between them. However, in each study the markets were assessed as flawed in relation to both supply and quality (Acheson JA 1985; Wilson JA 1980). The third case dealt with exclusive dealing arrangements between tuna boats and tuna processors which after the technological change from pole-and-line to purse-seine methods in the mid-1960s involved a degree of vertical integration by processors financially investing in the now more expensive vessels, explained as an efficient lowering of distribution costs, apparently without the relative financial benefits to the two parties involved being investigated. This and other vertical arrangements are defended on the basis of transaction cost efficiencies against a possible judgement that they constitute uncompetitive practices (Gallick EC 1984; Shelanski H & Klein P 1995). A fourth study concentrated on possible relationships between vertical integration and property rights in three fisheries; it found none because factors specific to each situation were more significant but it did conclude that asset specificity was the most important overall factor relevant to vertical arrangements (Dawson R 2003).

Several food studies employing TCE have required additional factors to explain individual supply chains such as the strength of co-operatives in the Danish pork industry (Hobbs JE, Kerr WA, & Klein KK 1998), post-Soviet restructuring in Poland (Boger S, Hobbs JE, & Kerr WA 2001) and in some inter-country comparisons a range of local and specific influences (Gellynck X & Molnár A 2009; Zuurbier PJP 1999). An ambitious attempt to produce an explanatory model based on TCE to explain changes in the US grains industry modestly

concluded that transaction costs constitute just one component of an explanation for the development of greater vertical co-ordination (Hobbs JE & Young ML 2000). In a British study of retailer developments, TCE was seen as relevant to the growth of own label products using manufacturer surplus capacity but not able to explain the new chain needed for the creation of innovative chilled foods, characterised by small and medium-sized firms (Doel C 1996;Wrigley N 1998).

In addition to such explanatory limitations there is a methodological issue. Researchers using the transaction cost approach for agri-food studies have operationalised it in very different ways. Frank and Henderson (1992) used official and commercial statistics for their set of proxy measures; Loader (1997) analysed all dyads in his selected supply chain; Hobbs (1996) developed conjoint analysis to compare the subjective views of stakeholders about identified cost variables. Thus there is no agreed method of translating the transaction cost approach into a usable form (Bowlby S & Foord J 1995).

There have also been theoretical critiques of TCE from various directions for: ahistoric assumptions about market and hierarchy institutions, lack of understanding of organisational functioning and failure to analyse governance structures from the viewpoint of both parties (Ankarloo D & Palermo G 2004;Dow G 1987;Gummesson E 1999;Zajac EG & Olsen CP 1993). Further, the treatment of economic factors in isolation ignores the embeddedness of transactions in social relations and hence the approach underestimates the importance of long-term trust-based associations in business but overestimates the effectiveness of organisational fiat (Granovetter M 1985;Johanson J & Mattson L-G 1987). An alternative conception of business relationships has been particularly well described by (Hutton W 2007) (p204-205) in terms which are very relevant to consideration of supply chains:

'A firm, like other institutions, can never be conceptualised merely as a bundle of transactions ... Rather, adaptation and responsiveness in the marketplace depend on the mutual trust among those delivering information, those processing it and those who will later act differently because of it. Firms are sites of social acts and social exchanges which depend on reciprocity and

mutual respect, operating within processes that are understood to embody those values.'

To summarise the TCE work on food chains and commodities, it was found relevant by many researchers because the highlighting of organisational issues and particularly the concepts of vertical co-ordination and vertical integration provided a structure in which to grapple with significant changes happening in the organisation of agriculture and of food chains generally while the hybrid governance idea helped to explain why markets did not function perfectly. But as already noted, the transaction cost approach on its own has only been able to go part-way in providing explanations. Further, though the approach is based on assumptions about efficiency-seeking forces, analyses sometimes, as with the seafood selling arrangement studies, showed that other factors reflected in long term personal relationships might be equally important.

2.3.2 Power or Partnership?

In the academic traditions more closely intertwined with business practice, alternative paradigms emerged to explain how supply chains worked, with the contrasting themes of power and collaboration as modes of governance (though not necessarily employing governance terminology). Both of these might well be relevant to a given situation and some have considered that conflict and co-operation will always be simultaneously present in supply chain relationships (Hingley MK 2001).

The concept of power tends to be absent from transaction cost analysis as Williamson specifically denied its appropriateness except in certain defined circumstances (Williamson OE 1995). Discussions of vertical integration in this tradition seem to be curiously vague about how its benefits will be spread as if they will be equally distributed along every part of the supply chain. In reality the changes in US commodity chains have resulted in ever more powerful companies upstream, whether poultry or hog integrators or giant grain and seed conglomerates, while producer profits have declined (Hendrickson M et al. 2008). The European picture is more varied with local and historic factors

resulting in diverse situations in different countries and supply chains (Schulze B, Spiller A, & Theuvsen L 2006).

The concept of power has, however, been used in other literatures. American marketing studies had raised power play issues for supply chains (termed 'marketing channels' in this body of work) from the 1970s, that is beginning even earlier than the development of transaction cost theory. Studies in this tradition aimed to understand power and to measure it empirically in supply chain relationships in various industries, though not generally with a food interest (El-Ansary AI & Stern LW 1972; Hunt SD & Nevin JR 1974; Lusch RF & Brown JR 1982). They contain descriptive observations on such issues as exercised versus non-exercised and coercive versus non-coercive types of power and on factors conducive to conflict or its avoidance. But power seems curiously intangible in these studies because it is abstracted from the details of how particular supply chains or industries operate. In addition, some of the reviews set out a number of inadequacies, both conceptual and methodological in this work (Frazier GL 1990; Gaski JF 1984; Gattorna J 1978).

But in the 1990s the American 'power in marketing channels' literature was picked up by British researchers from a range of disciplines, economics and geography as well as business and marketing, who were responding to the overwhelming fact of power resulting from the retailer multiples' then recent concentration and extending reach. Their rise in Britain and elsewhere has been extensively documented (Burt SL & Sparks L 2003; Collins A 2001; Dawson J 2004b; Dobson P, Waterson M, & Davies SW 2003; Dries L, Reardon T, & Swinnen JFM 2004; Howe WS 1998; Wrigley N 1987). In the UK it has led to an oligopoly with a small number of supermarket chains sourcing from a large base of producers and a fairly extensive range of suppliers and serving a large proportion of the population, raising competition and welfare issues (Burt SL & Sparks L 2003; Dobson P & Waterson M 1996; Dobson P, Waterson M, & Chu A 1998). An investigation found that due to market power retailers' returns were significantly higher than those of their suppliers and it was concluded that at times they take monopoly rents (profits) (Moir C 1990).

As the supermarket chains have continued to develop, their impact has been further analysed with recent emphasis on domination through own brands which, particularly in the UK, have had an increasingly significant impact on the entire food system from production to consumption (Burch D, Dixon J, & Lawrence G 2013). Some argue that supermarkets through their own-label ranges have become the main drivers of innovation, more responsive to consumers, constantly seeking change, with an ability to provide automatic shelf space that contrasts with manufacturer brands working on a small number of items for which retailer stocking agreement is needed (Burch D & Lawrence G 2007;Harvey M, Quilley S, & Beynon H 2002). An alternative analysis is that manufacturer brands drive innovation and that there is a plateau at which own-label growth stops though the actual level differs in each country (Chimhundu R, Hamlin RP, & McNeill L 2011), one advantage being greater investment in research and development (Omar OE 1995). It is an issue that probably needs to be considered separately for individual categories in specific national situations and may well differ for each retailer.

With the transformation of retailing, much research on food chains has focused on the role of the leading supermarkets and their relationships in supply chains. In an early phase of examining these power dynamics, three sets of researchers using different frameworks examined grocery retailer-supplier relationships in Britain and came to fairly similar conclusions although with different emphases. They agreed that the extent of power exercised depended on the relative bargaining strength of each party in specific relationships. One formulation sees a 'strategic game' in which various factors specific both to the product range (bread was the food item examined) and to the two companies concerned will affect the nature of their arrangements (Bowlby S & Foord J 1995;Foord J, Bowlby S, & Tillsley C 1996). Another draws distinctions between four types of relationship: mutual dependence between the big brand manufacturers and the top supermarkets; potential partnerships between those same manufacturers and other large retailers who use mainly branded goods; strategic alliances between some large retailers and smaller manufacturers which may be used to counter the brand giants; and finally the dominance of retailers over own-label suppliers (Ogbonna E & Wilkinson B 1998). Similarly

and more formally, another study presents a four category model based on whether there are few or many suppliers and few or many retailers, resulting in four types of relationship: interdependence, supplier dependence, retailer dependence and unstable dependence; the balance of power and other characteristics of the each type of relationship are then identified (Hogarth-Scott S 1999;Hogarth-Scott S & Parkinson ST 1993). Similarly a study using data from France found that the retailer's power over manufacturers could be limited by consumer preferences (Krishnan TV & Soni H 1997). These analyses are based on branded goods where manufacturers have the greatest strength. However, retailer power has been identified in relation to a perishable commodity in work on the Netherlands pork chain; the second of these references also notes slaughterhouses as secondary sources of power and this contribution further categorises the types of power exerted which for retailers has the following elements: information, expert, referent (image) and persuasion (Lindgreen A, Palmer R, & Trienekens J 2005;Visser JJ, Vlaar PWL, & Fava Neves M 2000).

A particularly extensive and ambitious construction of a power based theory of supply chains has come from a range of British studies by Andrew Cox and his collaborators. They pay tribute to the transaction cost approach for its exploration of ideas such as bounded rationality and uncertainty but point out that cases of market dominance are far from being the rarity Williamson suggests and argue that business success comes not simply from efficiency but from having the power to appropriate monopoly rents. With an emphasis on the uniqueness of each supply chain their model is based on the utility and scarcity of the resource each party has for the other which produces four possible power structures: dominant buyer, dominant supplier, independence and interdependence; it is stressed that a given company may be in different situations for upstream compared to downstream relationships. A series of case studies, two involving food (forecourt retailing and the industrial sugar chain) broadly showed that the categories defined as more powerful are likely to be much more successful financially, assessed in terms of gross profit margins, in other words taking a relatively large share of the gains produced by the supply chains in which they function (Cox A 1999;Cox A et al. 2002;Cox A,

Sanderson J, & Watson G 2000). Further work on red meat chains showed different power relations in those for beef, lamb and pork respectively, with supermarkets taking the highest proportion of value from the last of these, so the conclusion was that collaboration is not necessarily the best strategy for companies to follow depending on specific relationships and circumstances (Cox A & Chicksand D 2007;Cox A, Chicksand D, & Palmer M 2007).

Others have pointed to the various dimensions of corporate power in agri-food chains. Major food companies including retailers have not only huge purchasing power but influencing power over other parties, on consumers and in the political realm which they may use to maintain unbalanced structures and externalised costs (Clapp J & Fuchs D 2009;Sodano V 2006). Directly and through lobbying groups they influence national and European regulation (Marsden T & Wrigley N 1995).

Although not explicitly addressing the issue of power, there have been some studies of seafood value chains which by presenting information about differentials in gains can indicate asymmetries in relationships. An FAO report comparison of two white fillet chains found that retail obtained 61% of the value of Nile perch from Tanzania but only a 37% share of Icelandic cod while in contrasting pelagic chains, retail achieved 75% for Moroccan anchovy but only 38% for Danish herring; it is pointed out that these differentials partly reflect the fact that developing countries undertake less processing and therefore keep a lower share (Gudmundsson E, Asche F, & Nielsen M 2006). An analysis of the British chain covering three key species found a complicated picture: for chilled cod, supermarkets took 67% of added value, processors only a third but in foodservice nearly all the value could be taken by upmarket restaurants with little going to processors or distributors while the added value of fish fingers was shared equally between processors and supermarkets; fish and chip shops took two-thirds of the value of fresh or frozen haddock, the processor the next largest share and the vessel least but if fresh haddock was added to a fish pie the added value went mainly to the supermarket and primary processor, the boat getting the next share and the secondary processor least; finally there was a contrast between frozen coated scampi where two-fifths

went to the secondary processor, most of the rest being shared between retail and vessel and the same animal as live langoustines sent abroad, for which nearly half was taken by the restaurant and a quarter by the boat, the rest being shared between exporters and importers (Sandberg MG et al. 2004). In an analysis of the chain for frozen cod from Norway into the UK, there was a more straightforward finding that processors were squeezed between supply difficulties on the one hand and the purchasing power of retailers and food service companies on the other so that a high proportion had been failing to make a profit; the study also noted stable relationships between processors and retail/catering with higher levels of trust compared to those between processor and fishermen and in the latter some trend to vertical integration, albeit limited by legal restrictions on the ownership of vessels (Grunert KG et al. 2004). A Europe-wide seafood chain analysis with particular attention paid to the impact of salmon farming found that while the market was mainly competitive and European consumers had received some benefits, redistribution had occurred in favour of large processors, retailers and exporters into the Community (Guillotreau P 2004).

While power aspects of supply chains were being emphasised in some work, on the other side of the spectrum collaboration was being reported and promoted. A key focus has been on the integrative role played by the major retailers in food chains with a shift from market type transactions to longer term relations and preferred suppliers, sometimes termed an administered system or relational contracting (Bowlby S & Foord J 1995; Dawson J & Shaw SA 1989; Mazé A 200; McCluskey JJ & O'Rourke D 2000). One included fish processing firms in the analysis (Dawson J & Shaw SA 1989). In transaction cost theory terms the change has been towards the hierarchical end of the continuum towards vertical co-ordination.

The foodservice sector has also seen an increase in vertical integration in Britain but this has taken different and more varied forms than in retailing. The cost market of institutional catering has become more concentrated particularly following hospital and school services privatisation in the 1980s. Fast food and other restaurant and pub chains have become more significant in the profit

market and there is a trend to outsource and rationalise the purchasing function but there are still a large number of small and independent enterprises (Bamford C 2001; Dawson J 2004a; Eastham J, Sharples L, & Ball S 2001). Non-collaborative relationships in the foodservice sector have also been identified (Mawson E & Fearne A 1996).

Recognition of the more powerful position of the supermarkets does not preclude co-operation. The power of the retailers it has been argued should be seen as nuanced and varying with different commodities and companies rather than monolithic (Harvey M 2007). Differences in the quality of relationships between different chains and their suppliers have been identified, some emerging with much better ratings than their competitors (Fearne A, Duffy R, & Hornibrook S 2005). While using their huge buying power for ruthless price bargaining may be appropriate for certain volume goods, the retailers need more of a partnership for new product development or to achieve particular levels of quality and consistency, especially for own label items. Some suppliers are themselves large and powerful companies, having dealings with more than one retailer and anyway power differential between the parties is not a bar to successful collaboration (Doel C 1999; Hingley MK 2001; Knox SD & White HFM 1991; White H 2000). However, participants may feel that even where collaboration is experienced, the main financial benefits accrue to the retailers (Hogarth-Scott S & Dapiran GP 1997). Governance was becoming integration by the most powerful in food chains to maximise both overall benefits and their share of the total. Other participants may also gain but to a lesser extent.

There are a large number of positive accounts describing the benefits of food supply chain collaborative management and active chain governance (Folkerts H & Koenhorst H 1998). Some stress efficiencies and the gains to be made by applying the 'lean thinking' which has been so successful in the Japanese motor industry, including reports from the Food Chain Centre, a British government-supported initiative connected to a strategy of improving the farming industry. (Bouma J 2000; Bourlakis MA & Weightman PWH 2004; Duffy R 2002; Duffy R & Fearne A 2004; Fearne A 1998; Fearne A & Dedman S

2000;Fearne A & Hughes D 1999;Fearne A, Hughes D, & Duffy R 2001;Food Chain Centre 2007;Leat P & Revoredo-Giha C 2013;Ricks D, Woods T, & Sterns J 1999;Simons D et al. 2004;Simons D & Zokaei K 2005;Taylor DH & Fearne A 2006;Van Roeckel J et al. 2002;Wilson N 1996). There is one seafood study, describing the production-led Icelandic fishing supply chain, which recommends organisational collaboration to deal with various inefficiencies (Hameri A-P & Pálsson J 2003). Several of the accounts argue that competition between supply chains is replacing competition between individual companies. Put another way, the whole supply chain is deployed to improve horizontal competitiveness against rival supermarkets.

A later development has encompassed more wide-ranging relationships extending supply chain management to networks and in one formulation the combination term 'netchains', both generally (Lambert DM & Cooper MC 2000;Lazzarini SG, Chaddad FR, & Cook MI 2001) and in relation to food (Bijman J et al. 2006;Janzen R & de Vlieger JJ 2000;Omta O, Trienekens J, & Beers G 2001). This stream is part of a normatively-oriented management literature.

In parallel with the trend to stressing collaboration in supply chain management, marketing literature also developed a strong strand of thinking about relationships. Relational marketing, contrasting with (but not always replacing) transaction marketing rooted in adversarial confrontation, emphasised longer-term bonds and cooperation (Buttle F 2012;Christopher M, Payne A, & Ballantyne D 1991). Relational marketing has also been seen as associated with the evolution from mass volume production which could be managed by the traditional 4Ps marketing mix (product/place/price/promotion) approach, to a new emphasis on building loyalty by generating trust and commitment to meet more individualised customer requirements (Grönroos C 1994;Gummesson E 1999;Lindgreen A et al. 2000). A specific application to food in this framework focuses on building trust in a pork chain (Lindgreen A 2003).

Despite so much agreement about the benefits of partnership working there have been some dissenting views (not specifically relating to food) arguing that collaborative supply chain management is difficult and not much apparent in reality (Emiliani ML 2003;Fawcett SE & Magnan GM 2003;Quayle M 2003;Ramsay J 2004;Sabath RE & Fontanella J 2002) and giving advice about how to stand up to supermarket power (Fiddis C 1997;Segal-Horn S & McGee J 1989). Even supporters of chain collaboration may acknowledge that it does not necessarily benefit all parties (Boys J 2007). In any case the dissenters are emphasising the power inequalities usually at play in supply chains (Hogarth-Scott S & Dapiran GP 1997;Kearney AT 1994), particularly for small and medium size businesses (SMEs) (Morrissey B & Pittaway L 2004).

In the very diverse studies outlined in this sub-section governance is not a concept generally used but two models have emerged, based respectively and contrastingly on collaborative relationships and on power inequalities. Partnership working has been emphasised and indeed strongly recommended in some work on food supply chains. But more often than not supermarket leadership is the driver for such collaboration addressed to improving the efficiency and deliverables of supply chains in forms of vertical co-ordination and implicit in it is the exercise of retailer power. There have been varying emphases on power in other studies discussed which have highlighted the often superior position of the major retailers, in some cases along with other large food companies. It would seem that collaboration and power inequalities may often be combined in supply chains.

2.3.3 Commodity Systems and Commodity Chains

In parallel to the work discussed so far, alternative approaches were being developed from different disciplinary backgrounds including political economy and rural sociology. Compared to the previously discussed approaches, commodity studies are more consistently comprehensive in examining the whole chain from production onwards, with the term agri-food chains coming into play, and also in explaining change further back in time, registering significant historic developments. Although two branches of commodity chain

analysis have been identified in one source (Jackson P, Ward N, & Russell P 2006), a more complete picture emerges by considering three broad approaches with some shared assumptions: commodity regimes, commodity systems and global commodity chains (GCCs). Commodity studies, like much of the supply chain analysis already discussed had a starting point with production in a developed country (mainly the US) which in some cases expanded internationally. GCC and more recently global value chain (GVC) studies focus on scenarios where production from a less developed country is exported to richer ones. What these traditions share is an understanding of the global links in food production systems.

The regimes analysis provides historic periodisation to the development of the modern food system: large scale exports of grains and meat from the US and Australasia from the late nineteenth century in the first regime as well as of tropical commodities, continuing on and with further intensification in the second regime post-World War II with extended export of wheat from the US to many developing countries and the development of an intensive meat complex involving huge increases in soy bean and maize production, together with developments in a range of other commodities such as sugar, fats and poultry (Friedmann H 1995;Friedmann H & McMichael P 1989). At the same time key commodities were being increasingly industrialised through chemical inputs, mechanical substitutes for labour and processing developments such as canning in what have been termed appropriation and substitution processes (Goodman D, Sorj B, & Wilkinson J 1987) although this did not apply to perishables where the shift was to geographically diversified supply, large scale production, standardisation and minimisation of seasonal fluctuations (Goodman D & Redclift M 1991). There is an ongoing debate about whether a third regime has begun and how it is to be characterised or indeed if to be regarded as manner of analysis rather than chronological episode (Campbell H & Dixon J 2009;McMichael P 2009). In these accounts the specificities of particular commodities are much less important than the overall economic changes in the world capitalist and geopolitical systems.

Commodity systems, the second approach, has provided an umbrella for a stream of empirically detailed studies of specific food production systems aiming for a comprehensive analysis, covering all inputs and processes which could capture the changes occurring in the industrialisation of agriculture (Buttel F & Goodman D 1989). They have a greater range than the concentration on buyer-seller interactions of much supply chain analysis to include production inputs and systems, labour, producer organisation, distribution and consumption, aiming for holistic understanding of commodity systems as set out in (Le Heron R 1993), (Dixon J 1999) and (Friedland W 2001). The range of work produced has included accounts of increasing vertical integration in certain US food industries particularly chicken and pork which overlap with studies previously mentioned produced using transaction cost theory. However, there are significant differences of approach, some to do with the wider remit of the commodity systems approach and the inclusion of factors like the contribution of publicly funded research to the technologies of industrialised poultry production and differing labour arrangements. More different still is the emphasis placed on power aspects of the newly dominant companies upstream of primary production which undertake chain vertical integration such as poultry and pork integrators, meatpackers and the major grain and seed companies. As with the analyses discussed earlier, the terminology of governance was not in use but it is quite clear in each account which parties are dominant and determine the supply chain rules, using various mechanisms such as contracts or the ownership and control of inputs like genetics and feed (Boyd W & Watts M 1997;Heffernan W & Constance DH 1994;Page B 1997;Watts M 2004). Retailing being slower to concentrate in the US and assume the level of power achieved in Britain and other parts of Europe, that aspect received much less attention. However, the comprehensive commodity systems analysis of the Australian supply chain for chicken did document retailer power, unusually emphasising its cultural dimensions (Dixon J 2002;Dixon J 2003). There has not been a similar range of commodity studies relevant to Britain but one with different theoretical foundations taken from the work of Polanyi has analysed changes in the production, distribution, exchange and consumption of tomatoes (Harvey M, Quilley S, & Beynon H 2002).

There are two seafood studies using forms of commodity systems analysis each dealing with the prawn chain.⁸ One presents a world-wide overview of the development of its aquaculture from the 1980s; the other describes the role of a powerful Thailand-based conglomerate in a number of Asian countries with various vertically integrated arrangements including feed production, farming and processing (Goss J, Burch D, & Rickson RE 2000; Skladany M & Harris CK 1995).

The third strand is the commodity chain work which had its origin in the 1970s world system theory of Hopkins and Wallerstein. Initial conceptualisation of the simple commodity chain, with its focus on the world capitalist economy and influenced by dependency theory and structuralist development economics was succeeded by the global commodity chain (GCC) and global value chain (GVC) formulations (Bair J 2005; Raikes P, Jensen MF, & Ponte S 2000). Much of the focus of this stream of thought is on how supply chain management affects the development of the less industrialised and poorer countries of the world.

A significant impetus to GCC analysis came from Gereffi's distinction between producer-driven and buyer-driven chains and his demonstration of how buyer leadership and co-ordination of globally organised industries takes place (Gereffi G 1994; Gereffi G & Korzeniewicz M (Eds) 1994). Control was shown to be effective without the hierarchical integration posited by the transaction cost model but the latter provided the concept of governance. This kind of relationship also shows how power may be exercised at a distance (Allen J 2011). Following Gereffi's usage of the term to characterise this type of sway, the notion of governance became widely adopted to refer to the mechanisms of supply chain domination. While Gereffi's initial research dealt with the clothing industry, the idea of food chain power being exercised by retailers was clearly apposite to the position of leading supermarkets in many countries

⁸ There is overlapping usage of the terms 'prawn' and 'shrimp' in different sources and different preferences in different countries. As most commonly accepted in Britain, 'prawn' is employed throughout the thesis but note that these two references both refer to 'shrimp'.

including the UK and could be readily adopted. Power was now at the centre of the problematic.

The food area where buyer control over a commodity has been most thoroughly explored has been fresh vegetables grown in East and Southern Africa for the UK market. The domination of leading British supermarkets over these chains means that their standards have to be implemented at all levels; by making demands that are difficult for smallholders to meet, they affect the mode of production which increasingly comes from large farms and exporter-owned plantations and is characterised by insecure forms of employment (Dolan C 2004;Dolan C & Humphrey J 2000). Horizontally extended and network analysis (the 'commodity cellular network' concept) has added complexity with the differential impacts of various actors but the dominance of the key buyers remains (Barrett HR, Browne AW, & Ilbery B 2004;Tallontire A et al. 2011). Thus the ethical standards of UK supermarkets are paid for by suppliers and growers (Friedberg S 2003). Over time, lesser levels of overt co-ordination have been needed because standards and systems are so well established while the relationship between the large exporters and their growers remains closely controlled (Dolan C & Humphrey J 2004;Gibbon P & Ponte S 2005). But just as in the domestic chains, certain enterprises prepared to meet the retailers' requirements can prosper as some research has shown (Bain C 2010;Jaffee & Masakure 2005).

Work on seafood along commodity chain lines has produced a much more varied picture. The salmon farming chain in Chile is described as conforming to the buyer-driven model because production fulfils the requirements of distributors and retailers in the countries to which the product is exported but rather than the hands-off basis seen in other chains, ownership lies with large overseas companies which are in some cases vertically integrated upstream with feed production (Phyne J & Mansilla J 2003). From a different perspective based on political ecology, a later analysis of Chilean salmon aquaculture, including the impact of devastating disease in the late 2000s, emphasises change to a sustainability-oriented and broader-based governance regime influenced by global buyers and environmental NGOs and with more state

involvement (Barton JR & Fløysand A 2010). Bangladesh prawn aquaculture has buyer-driven characteristics but its production systems have also been heavily influenced by both international environmental NGOs and government requirements (Islam MS 2008). In marked contrast, two Tanzanian fisheries (one on Lake Victoria) with extensive exports to the EU and elsewhere have been analysed as not buyer-controlled but functioning largely on the basis of market forces without other governance arrangements (Gibbon P 1997a; Gibbon P 1997b). An account of the Lake Victoria fishery from a Kenyan perspective (not in any specific theoretical framework) notes that the growth of exports saw traders, generally tied to particular processors, becoming sources of power in the supply chain at least in relation to the fishers (Henson S, Brouder A-M, & Mitullah W 2000). Another contribution using a chain management rather than commodity chain model and generalising over all the fisheries based on Lake Victoria concludes that it is a hybrid, neither production not market-driven (Thorpe A & Bennett E 2004).⁹ An analytical variant emphasising networks in its commodity chain approach shows the way traders' relationships with prawn farmers in Vietnam are socially embedded to explain why these arrangements continue (Bush SR & Oosterveer P 2007).

Turning to developed country seafood production, the activities of the French and Spanish industrialised tuna fleets have been analysed as a political economy variant of commodity chain analysis, much of the fish being canned for various European markets; there are varying degrees of vertical co-ordination in the different companies involved in the sector, including processing firms integrating upstream and a fishing enterprise integrating downstream with a manufacturer, and considerable rationalisation has taken place, associated with the development of ever-larger vessels chasing depleted resources in the successive 'commodity frontiers' of new fishing

⁹ The chain management model on which this analysis is based comes from (Folkerts H & Koenhorst H 1998). Note that in generalising about the whole Lake Victoria fishery, Thorpe and Bennett's analysis overlaps with the account of one of the Tanzanian fisheries previously mentioned (Gibbon P 1997a) but comes to a somewhat different conclusion; this could be because the Tanzanian fishery has different characteristics from others on the lake, because the two studies were done at different times and there had been changes in the interim or because different judgements have been made.

grounds (Campling L 2012). A commodity chain account of a US prawn fishery describes it as based on socially embedded market relationships, the fishers selling to a small number of buyers with whom they have long-term personal connections and who may provide them with fuel, ice and credit; however, many of these relationships were breaking down under the strain of a drastic fall in prices due to imports of farmed seafood, with household labour power being deployed to make ends meet (Marks B 2012); (the way the chain operated before the pressures set in seems very similar to the functioning of the New England fisheries analysed using TCE as outlined in section 2.3 but the emphasis of the explanation differs in each case). Finally a brief overview of certain Australian seafood supply chains undertaken in order to improve management rather than for analytic purposes indicates that three chains mainly serving export markets (wild prawns, wild abalone and farmed prawns), two with some degree of vertical integration, all had exporter leadership while a general fishery mainly consisting of individually-owned boats selling through a co-operative was judged to be led by major wholesalers; these four were unfavourably compared to a yellowfin tuna chain exporting to the premium Japanese market which was (very unusually) controlled by the fishers themselves (Peterson J, Cornwell F, & Pearson CJ 2000).

The diversity of structures shown by these brief descriptions indicates that seafood chains do not fall into any particular pattern and that whether based on capture or farming, in the developing or developed world, local and contingent factors dominate.

Returning to the theoretical story, in a further development of the commodity chain, researchers choosing the GVC approach have put governance and the production and distribution of returns at the centre of their enterprise. Chain co-ordination has become more essential in response to global diversification and, in some industries, fragmentation of production. The attendant risks require governance mechanisms to ensure both product and process standards are met as well as volume and delivery targets achieved (Gereffi G 2005;Humphrey J & Schmitz H 2001;Kaplinsky R & Morris M 2002). (Standards are discussed fully in the next section.) In a development of the

framework, a range of governance types has been proposed based on certain key variables: complexity, ability to codify transactions and the capability of the supply base. Market and hierarchy modes are the two extremes, as with TCE, and the intermediate levels of (increasing) co-ordination are termed modular, relational and captive types of governance. Here further concepts from transaction cost economics have been absorbed into the GVC formulation including opportunism, information asymmetry and asset specificity. The focus is very different, with chain power asymmetry at the heart of analysis, but this formulation has been criticised for reducing clarity on power drivers in chains and the role of lead firms (Gereffi G, Humphrey J, & Sturgeon T 2005; Gibbon P, Bair J, & Ponte S 2008).

In relation to food generally, value chain analysis has been used to demonstrate the nutritional impacts of the way chains are organised (Gereffi G, Lee J, & Christian M 2009).¹⁰ A study focusing on governance of the fresh pineapple chain for Europe with production mainly in Côte d'Ivoire in earlier years, more recently concentrated in Costa Rica, shows the important role of the respective states in the establishment of the industry, vertical integration strengthening from the mid-1990s with chain leadership from fruit transnational corporations, subsequently shared from the 2000s onwards with retailers; it suggests state measures that could be taken to support domestic small producers (Vagneron I, Faure G, & Loeillet D 2013).

Two seafood studies using the GVC approach have been found. One argues that 'the global fish chain' rather than being simply buyer or supplier-driven demonstrates the influences of powerful companies in fishing and aquaculture as well as in retail and foodservice (Wilkinson J 2006). The other one about prawn aquaculture in Vietnam, while noting the importance of government regulation both locally and in the importing countries, categorises it as a

¹⁰ Terminology here is a potential cause of confusion. The expression 'value chain' was initiated by Michael Porter within conventional economics to cover certain activities, referring to the more complete chain as a 'value stream'. He and others undertaking value chain analysis do not have the globalisation focus of the GVC theorists. The confusion is increased when those working in the GVC tradition also use the simpler term 'value chain', dropping the 'global' part of it (Kaplinsky R & Morris M 2002; Porter ME 1985).

buyer-driven GVC at the level of relationships between processor/exporters and importers where decisions to purchase are made and where standards, increasingly requiring third party certification, are set but it also describes how below processor level the chain is split between very large numbers of small producers and traders and is not governed at all; the development of vertical integration to give processors control over quality is predicted (Tran N et al. 2013).

Critiques of GCC and GVC approaches from a geography perspective have variously sought to incorporate spatial aspects, symbolic and cultural meanings of commodities, horizontal relationships and active agents within commodity networks and/or to focus on labour processes (Hughes A & Reimer S 2004; Leslie D & Reimer S 1999; Smith A et al. 2002). Such thinking has produced the 'global production network' (GPN) concept which as well as replacing the chain as the unit of analysis, aims to situate firms in their wider social and economic contexts. Gaps identified in GCC/GVC analysis for GPN attention include logistics, intra-firm relationships, the relationship between companies and both the natural and the national environment, the impact of global governance systems, labour and civil society (Coe N, Dicken P, & Hess M 2008; Henderson J et al. 2002). The GPN framework seems not to have been applied to detailed study of any part of the food system but the pinpointing of both environmental issues and the nation state as key elements will be seen as highly relevant to seafood chains. However, there may be a risk that with such a comprehensive agenda, the usefulness of the key concept of governance in understanding drivers for change could be lost by adopting this framework.

2.3.4 Convention Theory and the *Filière* Approach

Certain other analytic traditions which could be relevant to supply chains have also been briefly considered within the limits of English language publication to see if additional approaches to governance can be obtained. Convention theory and the *filière* approach have both been found useful by some analysts

working with the GCC and GVC methodology. The 'economy of qualities' is examined in the next section.

Convention theory emphasise social norms and rules which enable actors to deal with uncertainty and risk, thus providing another way to think about economic co-ordination and to step beyond the individualist thinking of conventional economics. In the economics of conventions governance is not specified but would be the outcome of the shared values held and rules observed by supply chain participants within particular structural arrangements (Bessy C 2002;Biggart NW & Beamish TD 2003;Cidell JL & Alberts HC 2006;Lazega E & Favereau O 2002). Quality and trust have been highlighted as key concepts in convention theory (Raynolds LT 2004;Wilkinson J 1997). The approach has been used in case studies of eggs and organic meat production in Italy, contrasting industrialised and localised production when each chain changed over time to take on alternative features (Murdoch J & Miele M 1999). Convention theory has proved attractive to some GVC theorists because of the shared importance given to quality standards, considered as rules which are central to chain governance (Ponte S & Gibbon P 2005). However, the emphasis on rules being constructed through interactions rather than being pre-given militates against a governance problematic. The theory does not seem to have a place for the kind of power in supply chains already identified, power in fact to make or change rules and impose them on others.

The much older French tradition of *filière* chain analysis is fundamentally about commodities and empirically based but does not have a single theoretical framework. Its field has been mainly tropical commodities and in its origins had a public policy link to centralised state management of certain crops in post-colonial countries. More recent studies have extended to such subjects as the low-cost French wine chain and international markets for certain commodities and have included some work on quantifying the distribution of profit along chains, which it has been argued provides greater potential analytic usefulness (Raikes P, Jensen MF, & Ponte S 2000). A seafood study stating use of the *filière* approach describes a chain for the production of a

locally-eaten fish in Tanzania, finding it to be controlled by a wholesalers' cartel in a particular location (Gibbon P 1997c). However, it is unclear how in general this framework provides any advantages compared to commodity systems analysis.

2.3.5 Summarising Approaches to Private Governance

This section on private governance in the food system has reviewed various ways of understanding relationships between firms in supply chains. There has been both a chronological development of theory and to some extent the choice of theoretical approaches that seem particularly apposite to the developments that have attracted research scrutiny. Just as TCE and commodity systems analysis were found useful to those analysing trends to vertical co-ordination in some sectors of agriculture and power theories to those looking at relationships between retailers and their suppliers, the GCC and GVC approaches have been fruitful for analysing chains with global dimensions producing in the South for consumption in the North. However, the studies related to seafood often show differences from other developments in food systems such as the continuation of long-term bilateral selling arrangements or export production which is market-led rather than retailer controlled while others conform to theoretical models at least in part.

The main change identified for food provisioning generally has been the increasing co-ordination of agriculture and supply chains by powerful corporations which in different circumstances come from different chain positions. Often but not always the lead has been taken by major retailers. What has yet to be detailed are the mechanisms of governance and this is the subject of the next section.

2.4 Governance and Standards: Public, Private and Civil Society Roles

The key governance mechanism in supply chains identified in numerous studies consists of standards plus audit. A major feature of GCC and GVC analysis, these also have obvious links with convention theory. But the burgeoning phenomenon has been examined from many other viewpoints as well, starting with transaction cost theorists. There has been increasing overlap of views in work produced from different traditions. Importance has been given more recently to the relationship between private and public forms of governance.

In regard to the outputs of food chains there is always a potential public interest as the population must be adequately fed. As previously described, the British state has at times been actively involved in promoting the volume of food produced but from the late 1980s has had to be more concerned with food safety. Whether in relation to quantity or quality, government action (in a non-authoritarian political system) has always and could only be taken in conjunction with food providers, or put another way by considered intervention in relation to the market forces which constitute the food provisioning system.

Private companies have clear interests in securing quality of both inputs and their own products, and in the case of food particularly its safety, if they want to keep in business. Quality delineation, having both objective and subjective aspects, not based purely on physical characteristics and related to marketing, is intrinsic to business activity (Bowbrick P 1992). Ensuring quality and food safety incurs a number of transaction costs such as supplier identification and product verification (Holleran E, Bredahl ME, & Zaibet L 1999). But failures may result in greater expenditure such as for recalls and compensation and even worse loss of reputation leading to reduced market share (Henson S & Northen J 1998).

From a conventional economics viewpoint, public regulation should only be needed where market incentives are insufficient. Market imperfections in

relation to food include information asymmetries (such as consumers being unable to detect safety characteristics), differential risk perceptions and externalities such as health service costs that do not fall on food providers (Henson S & Traill B 1993; Segerson K 1999; Swinbank A 1993). The public health importance of the issue is a further fundamental reason for public intervention (Fearne A, Garcia M, Bourlakis M, Brennan M, Caswell J, Hooker N, & Henson S 2004). Regardless of the exact market causes, food safety failures have certainly occurred and as detailed in an earlier section led to public expectation of remedial action which was met by strengthened UK and EU regulation.

The market traditionally offers a number of ways to overcome buyers' information asymmetry and to signal quality: by brands, warranties, insurance and the experience of repeat purchasing. But these may not be sufficient to deal with upstream asymmetries and uncertainties or high monitoring costs (Buhr BL 2003; Sporleder TL & Goldsmith PD 2001). Hence the introduction of traceability and quality assurance schemes which have various benefits for companies. Traceability can reduce transaction costs by simplifying the process of dealing with a safety problem, by clarifying liability and by reducing information costs for purchasers (Hobbs JE 2004). Both types of programme are credited with the ability to improve operational efficiency, prevent costly failures, strengthen supply chain relations, support integration and provide marketing appeal while food safety is essential to brand value and can be used to satisfy both customers and regulators. (Fearne A 1998; Holleran E, Bredahl ME, & Zaibet L 1999; Leat P, Marr P, & Ritchie C 1998; Loader R & Hobbs 1999; Manning L 2007; Manning L, Baines RN, & Chadd SA 2006; Ménard & Valceschini 2005; Zaibet L & Bredahl ME 1997). More broadly, the complexity of modern globalised supply chains require modes of ordering at a distance which standards have developed to provide (Higgins V & Larner W 2010).

The need to take some responsibility for what takes place in other parts of supply chains to satisfy the 'due diligence' requirement of the 1990 *Food Safety Act* gave a huge impetus to the use of formal schemes in Britain. Responsibilities fell to all parties in food chains but as leaders, the retail

multiples responded with particular energy, especially as in addition to the food scandals they had to deal with the subsequent legislative obligations of the following decade, notably EU food law with its requirements for traceability, labelling and the use of the Hazard Analysis of Critical Control Points (HACCP) system. Food and quality assurance intertwined with the supermarkets' integrative objectives and became a key mechanism for ensuring control of their supply chains. At the same time broader objectives embodied in standards have become a key means of differentiation in economic competition.

Some analysts suggest that retailers pursue different strategies for different products, depending on whether they can achieve a premium price for more rigorous quality standards and on specific relationships with producers. When they link an own brand product to a specific assurance scheme they are likely to become tied to particular suppliers. In economic terms, public regulation which imposes certain standards on all suppliers gives more scope for cheaper spot market purchasing and therefore benefits retailers and consumers through lower prices. Conversely, producers may benefit more from implementing a quality scheme which attracts a specific reward. These issues may reflect varying retail strategies in different countries depending on diversity in regulated standards and market conditions. (Codron, Giraud-Heraud, & Soler 2005; Giraud-Heraud E., Rouached L, & Soler LG. 2006). In any case the use of assurance schemes has become very widespread in Britain especially as EU food law embodied similar principles of food business responsibility for safety.

While suppliers' own quality assurance and first party monitoring lacks objectivity, efficiency motivations led major food companies including retailers to move from their own direct, second party, auditing to the increasing use of independent third party agencies in formal certification schemes. Among their advantages for retailers are the shifting of liabilities to the certifiers while passing costs to suppliers and generally limiting the transaction costs of monitoring and enforcement (Fearne A, Garcia M, Bourlakis M, Brennan M, Caswell J, Hooker N, & Henson S 2004; Hatanaka, Bain, & Busch

2005;Henson S & Northen J 1998). Third party certifiers may also be seen as more objective and so reassure consumers about the veracity of quality claims (Deaton BJ et al. 2010). However, certification has become a significant business activity in its own right and may give rise to conflicts of interest in the usual situation where the subjects of such audits employ the auditing company so that there is a mutual advantage in a positive judgement (Busch L 2011).

A number of private quality systems applying to food have developed. Types include broad international systems like ISO 9000 (from the International Organisation for Standardisation), national farm led schemes such as those in Britain covering beef, lamb and pigs as well as proprietary supermarket systems. Subsequently, major food companies supported overarching schemes with third party auditing, the two dominant ones in the UK being the British Retail Consortium (BRC) and GLOBALGAP (initially EUREPGAP) although certain retailers have maintained their own systems; the former is a retailer initiative but GLOBALGAP represents an alliance of retailers and producers (Fulponi 2006;Global Food Safety Initiative 2011;GLOBALGAP 2012;Holleran E, Bredahl ME, & Zaibet L 1999;Konefal J, Mascarenhas M, & Hatanaka M 2005).¹¹ Both the BRC (in relation to food safety) and GLOBALGAP (as applied to aquaculture) programmes are relevant to the seafood chain.

Standards are the mechanism most reported but may be complemented by other formal governance instruments including contracts (Martinez SW 2010) though these seem to be less used in Britain. It has been suggested that there is continuum of relationships embodying different strategies, from partnership working at one end to the simple imposition of standards at the other (Busch L 2011). Informal modes of governance such as sharing of information, values and culture are more likely in the former type, and the stronger the relationship with partners, the more likely it is that informal, collaborative methods will be

¹¹ Information about the BRC standards are on www.brcglobalstandards.com and about GLOBAL GAP on www.globalgap.org/uk. The overseeing governance committee for the BRC standards has predominant retailer (not only food supermarkets) representation. GLOBALGAP is a membership organisation open to retail, foodservice, producing and trading companies but its board represents a partnership between major retailers and agriculture producers.

used to achieve desired outcomes (Gimenez C & Tachizawa EM 2012; Pilbeam C, Alvarez G, & Wilson H 2012) or in other words cognitive and discursive influences are important in addition to standards (Pattberg PH 2007).

Although as private arrangements the schemes are voluntary, the purchasing power of the major chains is such that compliance is often forced on suppliers (Burch D, Dixon J, & Lawrence G 2013; Havinga T 2006; Henson S 2006). Privately imposed standards have been described as so dominant that they drive the global food system, harmonising across borders especially those of developing nation producers which export food to richer countries, the controllers being the large supermarket chains for whom quality criteria are tools of differentiation and thus fundamental to their marketing strategies (Busch L & Bain C 2004; Fuchs D et al. 2011; Fulponi 2006; Henson S & Reardon T 2005; Konefal J, Mascarenhas M, & Hatanaka M 2005). Thus 'governing through standards' is seen as replacing market mechanisms (Ponte S, Gibbon P, & Vestergaard J 2011a) while standards have even been considered as a fundamental underpinning of capitalist economies, serving both practical and ideological purposes (Busch L 2000).

The pervasiveness of standards and assurance schemes in food industries has led some researchers to describe the current situation as the 'economy of qualities' (EQ), identifying with the approach of the third French tradition employed in agri-food studies (the others being convention theory and *filière* analysis, already discussed) (Deaton BJ, Busch L, Samuels WJ, & Thompson PB 2010; Magnan A 2011). Another social perspective for understanding markets, EQ focuses on the relationship between products and consumers; competition between firms is then calibrated in terms of their activities in engaging users round their products and disengaging them from what is offered by their rivals. In a food example, a marketing campaign presented children with free gifts to attract them to a newly revamped brand of orange juice (Callon M, Méadel C, & Rabearisoa V 2002). EQ may be useful in relation to mechanisms for connecting consumers with the schematisation of quality but like convention theory its phenomenological basis is antithetical to engaging with more structural issues. Indeed the reality is less an economy of

qualities than an economy of powerful companies who use the standards and audit technology as part of their armoury for competition and control. The idea of an 'economy of qualities' does not seem to adequately deal with such governance impacts.

These dominant companies have ensured that private governance of food has developed well beyond the safety agenda and specific traceability requirements to more extensive quality policies. However, the programmes used are not always well developed in relation to broader criteria. Among general schemes only GLOBALGAP has been noted as including environmental protection standards (Vorley B 2007) though as will be seen in chapter 5, aquaculture programmes do incorporate other ethical issues such as animal welfare and labour conditions. Certain other schemes have included environmental benefits although their effectiveness may have been variable as a study of several British quality assurance schemes for livestock concluded that they did not contain sufficiently specific standards to achieve stated environmental goals although they might improve baseline practice (Morris C 2000). A review of private food safety schemes has concluded that they vary greatly in purpose, some serving a public interest, others private interests which may be compatible with public policy or in some cases have the potential to undermine it (Clarke R 2010).

Nevertheless, retailers are able to stock products with the cachet of ethically-based standards arising from civil society action and the previous establishment of organic agriculture. The Fair Trade movement and various food-focused schemes with environmental objectives provide a range of certificated goods which can help companies to improve their credentials. Ethical purchasing of such products has been credited with the potential to transform current economic arrangements or at least to pressurise companies into better social or environmental policies but may also provide a means for a corporation to improve its image without making really significant changes (Barham E 2002; Littler J 2011).

Although having similar arrangements to other certification schemes run on a private basis, organic production is state regulated (UK and EU) as outlined in section 2.2 and the approval of certifying bodies is required for each set of standards. The environmental philosophy of organic agriculture makes it a potentially ethical choice though consumers may not be deciding on such a basis or at best have mixed motives. Analysis of the organic sector in the US has argued that it has become increasingly penetrated by agribusiness, using similar production processes such as monocultures and with similar poor labour conditions, thus making consumer motivation of opposition to industrialised food questionable (Buck D, Getz C, & Guthman J 1997;Guthman J 2003) but no such description has been produced (as yet) of British organic production nor of that in countries from which organic foods are usually imported into the UK. The mainstreaming of distribution is also relevant and in Britain supermarkets have become the main channel with consequent impacts on production processes although alternative distribution networks continue to operate (Banks J & Marsden T 2001;Raynolds LT 2004).

A step change occurred during the 1990s when some NGOs, dissatisfied with perceived lack of change by governments in response to their campaigning, began to take issues more directly to companies. While some types of action were hostile campaigns, publicising what were seen as failures or abuses, others involved involvement with business to persuade and incentivize change, including by means of fair trade and other certification initiatives. Such schemes with their environmental and ethical objectives have been considered to be an effective tool for achieving social objectives (Arts B 2002;Bartley T, Balboa CM, & Auld G 2007;Cashore B 2002) but with the inclusion of civil society actors still constitute private governance (Pattberg PH 2007). Certification schemes for seafood are described in chapters 4 and 5 and other impacts of NGOs on the chain examined in chapter 6.

It has been argued that food companies increasingly accommodate themselves to the demands made by NGOs (Vogel D 2008) and one view is that the environmental NGOs are so successful that they are making adoption of their preferred standards compulsory (Wilson T 2011). As NGOs became

involved in certification schemes they have been described as acting under new forms of legitimacy (Cashore B 2002) and even been credited with emulating state legitimising roles (Constance D & Bonanno A 1999) which is certainly an exaggeration. A recent analysis shows that while NGOs have generally succeeded in holding public trust and are credited with genuine commitment to publicly valued aims, there are limits to what they can achieve and when engaged in efforts to influence governments they have often had to make compromises (Hilton M et al. 2013); while the referenced study does not cover NGO engagement with private companies which is the focus here, similar limitations apply which will be seen again in later discussion of certification and seafood.

The reasons for companies to adopt ethical principles are various, both responses to external pressures and perceptions of consumer views and as an aspect of the internal governance expressed in their corporate social responsibility (CSR) policies. Action has been needed as the food system has been judged to lack a moral culture, failing in a range of ethical issues, retailers in particular noted as not dealing fairly with their suppliers (Robson I & Rawnsley V 2001; Stainer L, Gully A, & Stainer A 1998). Developing first in the US, CSR became an institutionalised expectation in Britain through the 2006 *Companies Act*, that is through public regulation as previously noted. It has been argued that required social and ethical policies were a return for the neo-liberal approaches adopted by both American and British governments and that they provide useful opportunities for companies to self-legitimise (Banerjee SB 2008; Brammer S, Jackson G, & Matten D 2012; Kinderman D 2012). Standards and audits can be seen as achieving public trust and legitimacy for these corporations, especially when connected to ethical objectives (Levi-Faur D 2005). As a senior manager of a leading retailer has put it: 'We're brand owners and brand value is about all of what you bring to society'.¹²

¹² The full quote attributed to Matt Simister, Group Food Commercial Director, Tesco, was: 'Organisations these days aren't just here to make money; we're brand owners and brand value is about all of what you bring to society', in Van Vark C, 'Stopping the rot in the food supply-chain', 7 November 2013, *The Guardian*.

The British supermarket chains which have come under periodic public attacks alleging inequitable treatment of suppliers and unfair competition with small retailers have good reason to develop a positive and ethical image for which CSR policies are helpful. Positive engagement in CSR policies has been argued to raise trust in companies bringing them a number of potential benefits (Pivato S, Misani N, & Tencati A 2008). One is enabling businesses to self-present as the guardian of values while in fact the activity is an aspect of marketing strategy and positioning in quality-based competition (Dixon J 2007;Hatanaka M, Bain C, & Busch L 2006). Food companies can gain by association with NGO values when using the schemes they sponsor or support. Whether policies such as supermarket-imposed environmental or ethical standards have real beneficial effects has been questioned (Challies E 2013;Fuchs D & Kalfaggianni A 2010) and it has been noted that sustainability messages in supermarkets are undercut by the dominance of messages to consume more (Jones P, Hillier D, & Comfort D 2011).

Various seafood studies illustrate the impact of private and publicly regulated standards and their interplay. A comparison of farmed pangasius (catfish) in Bangladesh and Vietnam concluded that while the former had smaller-scale, more extensive and hence environmentally preferable systems, the products of the latter country are more likely to be chosen for export because production methods there have been the basis of the standards used while traceability requirements are more easily met by larger operations (Belton B et al. 2011). Similar issues were at stake in the debate over standards for cultivated tilapia in Thailand where the way sustainability was defined, including the involvement of environmental organisations, was judged to undervalue broad social and environmental benefits in favour of methods used by large export-oriented companies (Belton B, Little D, & Grady K 2009). In the Bangladesh prawn farming study already mentioned as an example of commodity chain analysis, in which the influence of environmental NGOs was emphasised, it seemed likely that a third party certifier would be taking over hitherto government-managed responsibilities for standards (it is not explained what these had been) but that the government was expected to retain some influence over the industry (Islam MS 2008). Research on organic prawn

farming in Indonesia showed the asymmetries of power between the developed country NGOs, buyer co-operative and consumers compared to the producers especially over the formulation of standards and the failure of one particular supply chain (Hatanaka M 2009). However, an account of the development of prawn aquaculture in Thailand shows that it has motivated increased government regulation and surveillance, albeit very unevenly, spatially varying with both physical and political factors (Vandergeest P, Flaherty M, & Miller P 1999). Another analysis dealing with prawn farming in the same country selects the impact of the banned substance nitrofurans being found in EU tests; following a big drop in exports the Thai government enforced a Code of Conduct for sustainable production (Bush SR & Oosterveer P 2007). The East African Lake Victoria fisheries similarly provide examples of legislative and other measures by governments to ensure that standards were met when exports were hit by an EU ban in the late 1990s due to food safety fears, the industry itself also taking remedial action (Henson S, Brouder A-M, & Mitullah W 2000; Kambewa E et al. 2006; Ponte S 2007; Thorpe A & Bennett E 2004); again it was the EU, representing the interests of European buyers collectively, that exercised power over these supply chains. With a different emphasis, an account of the Nile perch chain as fished in Kenya, pointing to various power imbalances, describes the government's inability to enforce its own regulations to improve sustainability (Schuurhuizen R, Van Tilburg A, & Kambewa E 2006). All these studies are of developing countries. Turning to the developed world, the US provides an example of public regulation of an environmental standard through legislation to protect dolphins in tuna fisheries.¹³ The subsequent search for 'dolphin-safe' tuna as well as for lower costs resulted in a complete reorganisation of the industry, an about-turn away from the vertically-integrated arrangements approved in the study discussed in the TCE section above to processors sourcing on the international market, previously declared to be less efficient (Bonanno A & Constance D 1996). Finally, a demonstration of the construction of quality in three commodity

¹³ US legislation to protect dolphins in tuna fisheries goes back to 1972, though subsequently watered down to requiring fewer instead of zero mortalities, and after industry contestation and environmentalist campaigning it eventually led to embargoes of imports judged not to meet the criteria, starting a still ongoing trade dispute. In 1990 further legislation stipulated the conditions which would allow a 'dolphin-safe' label to be used on canned tuna (Brown J 2005).

chains producing surimi (fish paste) showing how different standards are in place for diverse markets in Japan and the US, illustrates purely private criteria (Mansfield B 2003).

The lessons that can be drawn from these very diverse situations and studies are that patterns of governance vary greatly with different seafood production systems in different parts of the world and that governments may well, but do not always, play important roles alongside private interests and sometimes NGOs.

While much of the literature has emphasised buyer power in food chains through standards schemes, some modifying views have been put forward. It seems to be contradicted by the apparent limitations of what purchasing or supply chain managers seem able to accomplish as indicated by their professional literature in the US (Gibbon P & Ponte S 2008) although this seems at odds with accounts of how British retailers have exerted their purchasing power. Some studies have shown that standards are not always followed in practice by producers (Bain C & Hatanaka M 2010; Havinga T 2006; Ouma S 2010; Ponte S 2007). Indeed while private governance systems can be successful, gross failures of private auditing to safeguard food safety standards have occurred in the US with severe public health results (Lytton T 2013). The 2013 British horsemeat scandal in which horse and pork DNA was found in a large number of purportedly beef products demonstrated that some major UK supermarkets, for all the schemes in operation, did not have full knowledge of or control over their supply chains. In addition to such problems there are accountability and legitimacy issues with private governance regimes and problematic impacts on global suppliers (Busch L & Bain C 2004; Fuchs D, Kalfagianni A, & Havinga T 2011) though it is recognised that accountability in relation to state regulation may also be imperfect.

As well as contributing to the inclusion of ethical criteria much private governance has developed to deal with supply chains in countries where government ability to impose rules is weak or where under neoliberal influence there is reluctance to act (Blair MM, Williams CA, & Lin L-W 2011; Newell P

2000;Ponte S, Gibbon P, & Vestergaard J 2011b). Nevertheless, some commentators point out that public regulation would be more effective (Mayer F & Gereffi G 2010;Vogel D 2008). In fact a recent seafood contribution suggests that some developing countries are now capable of managing their own effective regulation so private governance arrangements in them should be more closely linked to state action (Bush SR et al. 2013a).

Thus while the importance of private schemes is undeniable, it would be incorrect to see them as replacing state-based governance; both are needed and they should be seen as complementary (Fearne A, Garcia M, Bourlakis M, Brennan M, Caswell J, Hooker N, & Henson S 2004;Smith G 2009). Schemes dealing with food safety rest on statutory regulation in the developed countries and the obligations that companies importing from elsewhere must fulfil. The schemes always incorporate requirements that local national laws should be followed and one example notes specific deference (by GLOBALGAP) to state legislation (Lockie S et al. 2013). Private systems ideally need legal back-up and enforcement that depend on state control (Busch L 2011) though in fact they may be used in countries where the rule of law is not fully established. It has also been argued that government action is needed to complement privately set ethical standards for these to function equitably (Giovannucci D & Ponte S 2005). Conversely, private standards may be accepted by state agencies and may indeed fill a gap where public regulation is weak (Lockie S, McNaughton A, Thompson L-J, & Tennent R 2013). A seafood example is the announcement by the government of Vietnam that from 2016 all its pangasius farms and related supply chain companies will have to be certified in a recognised aquaculture scheme.¹⁴

Such factors have led to growing emphasis in scholarly work on considering interdependencies between public and private systems. Private and public standards may be inter-related or mutually self-reinforcing (Ponte S, Gibbon P,

¹⁴ See 'National allegiance pledged to ASC' (Aquaculture Stewardship Council) in www.fishnewseu.com, 8 April 2014 (unlike the headline the text states that certification will be required to the ASC scheme or equivalent). Pangasius is a major Vietnamese export product. The move may have been decided as a counter to unjustified attacks on the quality of Vietnamese pangasius which have been attributed to supporters of European fishery interests as explained in (Bush S & Duijf M 2011).

& Vestergaard J 2011b). An example is HACCP, originating in publicly funded (space) research, then picked up as a voluntary private standard and subsequently becoming mandatory in EU food law. Industry codes of good practice can acquire legal standing if accepted by the courts as defining acceptable standards (Busch L & Bain C 2004) while public systems of accreditation underlie the third party auditing system (Henson S 2006). Private standards reinforce public ones and business control systems are needed in tandem with state regulation for an effective food safety system to be achieved (Fearne A, Garcia M, Bourlakis M, Brennan M, Caswell J, Hooker N, & Henson S 2004). Indeed markets generally require institutions and policies that are mandated by states (Eisner MA 2010).

It is also notable that, as with the last-mentioned citation, the analysis of private governance in business relations which developed from theories of supply chain functioning now has growing input from both political science (including international relations) and law perspectives as the broader implications of these systems are explored (Abbott KW & Snidal D 2009; Bernstein S & Cashore B 2007; Pattberg PH 2007; Vogel D 2008). Thus the distinction made early in this chapter (Table 2.1) between the discipline dealing with the public realm and the state as against study areas concerned with private economic relations has recently become blurred, just as public and private forms of governance have become more interwoven.

One approach to dealing with the developing complexity of arrangements is to characterise many as hybrids. This term has already been met twice in these pages: the first example was in chapter 1 where it was noted that certain certifying organisations had been termed hybrids in one source because they incorporate both private and civil society interests; the second, in a previous section of this chapter, was the usage specific to transaction cost economics where 'hybrid' refers to inter-firm relationships considered to fall between pure market and hierarchy types of arrangement. The broader usage by those analysing systems of regulation and governance covers various combinations of public, private and civil society actors and/or different approaches and mechanisms (Havinga T & Verbruggen P 2014).

These varying meanings reflect considerable imprecision in the use of hybrid terminology, imprecision which is at odds with the most common meaning of the word in general usage derived from the context of biology where hybrids are physically discrete and often able to reproduce themselves. For this reason, the preference here is to use language less loaded with false impressions of definiteness; instead 'mixtures' seems a better solution: mixtures are more obviously liable to changes of composition. Hence two types of organisation relevant to the seafood industry have been described in chapter 1 as providing 'mixed public-private governance'; as will be seen in chapter 4 they do this in very different ways and are quite different mixtures of the two elements. The seafood example above of Vietnam stating that its pangasius farmers will have to meet the standards of an NGO/private scheme is another kind of mixture again; what will be important to understand is how directive the government will be, whether there will be resulting changes in the programme and whose interests will be served compared to the usual situation where the state stands aside from such forms of governance. Put another way there may be a question about whether this will be a step towards public regulation of a private standards scheme but referring to the arrangement as a hybrid will not throw any light on these questions.

In a domestic policy example of a possible mixed public-private approach to food safety enforcement, the FSA has been considering the use of third party assurance schemes to replace local environmental health inspections, although various limitations of these programmes in relation to such a prospect have been noted (Wright M et al. 2013).¹⁵ A comparable arrangement is in place in the Netherlands (Havinga T & Verbruggen P 2014). In tune with such thinking, some have advocated formal systems of public-private co-regulation

¹⁵ Issues include: questioning about how far third party schemes have actually contributed to food safety; the schemes do not monitor general levels of standards; they often do not provide advice on dealing with problems; many do not have arrangements to communicate common problems to others in the industry; they do not necessarily report serious public health problems which may require enforcement action; there is no process to ensure updating for example with new legislation; some standard setting and approval bodies are profit-making, carrying a risk of competitive pressures; schemes have low coverage of retail and foodservice businesses.

for food safety (Garcia Martinez M et al. 2007). However, as presented, this is in good part simply a way of describing the fact that public regulation in Britain (and comparable countries) has always taken varied forms, including enforced self-regulation and incentives for better practice, in addition to becoming accompanied in recent years by a growing number of private schemes while its formulation has always involved various degrees of consultation with economic interests. Further, the concept of co-regulation suggests an equality of function between participants but whether this is correct needs to be considered for each case individually. The report on the FSA and third party schemes just cited (Wright M, Palmer G, Shahriyer A, Williams R, & Smith R 2013) suggests various requirements that might be made of the latter to deal with their identified limitations for 'earned recognition' from the Agency to be achieved and their incorporation into the state regulation system; this could be seen as a potential delegation of public functions and co-regulation but it could equally well be argued that if put into operation it would mark a stage towards state regulation of private schemes, that is setting conditions to be fulfilled for public recognition to be given. How such a development can be understood (were it to proceed) would be important but simply using the 'hybrid' label would be uninformative.

The overall characterisation of food chain governance that emerges from the wide range of studies considered in this section is that it is a multi-level phenomenon, sometimes described by researchers as a hybrid, with roles for the state, private interests and civil society. There is much private governance but overall state control at least in developed countries and increasingly in developing ones. The systems are dynamic and continually changing and the relative strength of participation of each sector has adjusted to developments, as seen in responses to food scares. The multiple food retailers have become the pivots of the structure, the crucial agents who combine legislative and civil society demands with their own requirements and hold the most power relative to other private interests. (Barling D 2008; Flynn A, Marsden T, & Smith E 2003; Hutter BM 2011; Lang T, Barling D, & Caraher M 2009). Many of the studies reviewed have tended to give greater emphasis to and provide more

detailed analysis of private compared to state regulation making it difficult to derive a balanced picture from their accounts.

There is overlap between the work discussed in this and in the previous section which has been examined separately to allow the importance of standards and audit systems in food chains to be highlighted. It has also shown how consideration of private governance from different starting points has converged with GCC and GVC analysis in which standards are analysed as the means for lead companies to control supply chains, as outlined in the preceding section. In the process, while the previous section concentrated on analyses of relationships within supply chains, in this one the interrelationship between private standards and state-defined systems of regulation has been much more apparent as has a certain input from civil society. Both these factors will be seen to be very important in the operation of the UK seafood chain.

2.5 Governing Food Consumption

The previous sections have examined public and private influences on the operation of food supply chains but different literatures are needed to examine the final stage of consumption. Consumption has too often been omitted from the analyses of supply chains though as well as being an endpoint for specific products it is an essential element feeding back into the other stages.

Governance is not a concept usually applied to consumers as the latter term foregrounds a market frame of reference, an arena of choice and competition. But governance can mean affecting attitudes and behaviour as well as straightforward direction, something essential to new forms of rule (Majone G 1996). Governance in relation to consumption is not the same as the exercise of power apparent in state authority or between asymmetrically placed parties in supply chains; rather it is about many forms of influence, some explicit, others such as manipulation and seduction as indicated earlier (Allen J 2003) more hidden. Consumption is indeed governed in various ways, partly

inherent in the structures which deliver food, partly in overt attempts to change what is purchased and eaten. However, there has been only limited investigation of the impact of food chains on consumption and health (Hawkes C 2009).

Both the state and the food industry govern consumption through decisions that influence what is available. State and supra-state policies have affected what is produced, prices (for example Retail Price Maintenance and its cessation and the general impact of the CAP and earlier subsidies in keeping food costs low), competition and what is available through trade (Corrigan P 1997; Davies S 2005; Dawson J 1995; Foster R & Lunn J 2007; Hawkes C et al. 2012; Tierney RK & Ohnuki-Tierney E 2012). The state role in relation to research and to information, both provided directly and required in labelling laws, is also relevant (Ippolito PM 1999). Food composition can be affected by requirements for certain foods to be fortified, in operation since the Second World War (Foster R & Lunn J 2007). In summary, by establishing rules about food production and standards, public regulation structures choices (Flynn A, Harrison M, & Marsden T 1998).

The food industry, with a greater or lesser impact from state policies, determines availability and pricing. Agricultural decisions have led to leaner meat and different varieties of fruit and vegetables being offered. Changes in prices related to earnings affect consumption; an increase in fish purchase (along with meat, fruit and vegetables) at the expense of staple items has accompanied rising incomes while supply itself can produce increased consumption as with farmed salmon production and cheap chicken and pork, each of which created a corresponding demand (Ritson C & Hutchins R 1995a; Ritson C & Hutchins R 1995b; Rivera-Ferre MG 2009). Processing developments and refrigeration have increased the range of foods and the general availability of nutritional benefits but with more processed foods there has been a deleterious impact on some intakes such as levels of salt and sugar (Duff J 1999). The major retailers have a huge influence on consumption through decisions on what to stock, promotions, the location of stores and their targeted offers and more subtly through the use made of

loyalty cards (Davies S 2005; Dawson J 1995; Loader R 1997; Wrigley N 1998). Retailers are responsive to consumers but also shape demand (Dawson J 2013; Ippolito PM 1999). For example the food industry has greatly developed convenience foods which meet needs related to changes in the role of women and in household composition but has also altered patterns of consumption (Goodman D & Redclift M 1991). Advertising is part of supermarket display and extensively used by brand manufacturers and retailers to influence purchasing.

Apart from advertising there are two particular desirable attributes of food which are the subject of explicit messages designed to influence action. In one case it is about doing good to the consumer by improving the individual's health. The other is potentially about doing good in the world by making ethical choices. Health messages about individual benefits are a province of public pronouncements but also a field of action for industry. Messages about doing good in the world such as by choosing on the basis of better environmental outcomes, animal welfare or labour conditions, generally originate from civil society but then involve private delivery arrangements although some claims may be publicly regulated. Both health and ethics in food consumption are areas of contestation between formulations by public authorities and/or civil society on the one hand, and potential profits to be made by commercial interests. Both possible attributes are relevant to seafood consumption.

Nutritional education was a feature of British food policy during the Second World War in which state action included the establishment of Food Advice Centres and the issuing of Ministry of Food dietary advice which was spread through women's magazines, complementary to actual controls of pricing and represented by rationing (Barker ME & Burrige JD 2013). After the end of the food control system of the war and immediate post-war period it seems that governments ceased to issue such advice.

This was first tentatively broken with some broad nutritional guidelines in a 1978 Department of Health and Social Security paper, *Eating for Health*; they

were general statements without precise targets such as 'to eat less salt might be beneficial'. A much bigger impact on the public was made by the 1983 National Advisory Committee on Nutrition Education (NACNE) report which for the first time addressed to the public specific objectives for lower consumption of fats, sugar and salt.¹⁶ In the background, nutritional scientists had an important input into food policy during the Second World War while in the subsequent period two successive expert bodies have provided advice to the government on diet and nutrition, from 1963 to 2000 the Committee on Medical Aspects of Food Policy (COMA - as Committee on the Medical Aspects of Food and Nutrition Policy from 1998) and thereafter to date the Scientific Advisory Committee on Nutrition (SACN); COMA produced recommended nutrient intakes, updated in a series of reports, which were used for the NACNE publication. (Foster R & Lunn J 2007;NACNE 1983;Smith D 1998). The resulting recommendations for the public have been subsequently conveyed in various formats with the current one, summarised as *8 Tips for Eating Well*, encapsulated in the Eatwell plate produced by the FSA which shows visually the relative share of each food group of which the advised diet should be composed.¹⁷ The Eatwell plate was one of the activities undertaken by the Agency as part of its responsibilities for public nutrition but following the 2010 change of government these transferred back to the Department of Health. The way seafood became incorporated into the advice is detailed in chapter 6 along with the impact of the subsequent removal of the FSA's nutrition responsibilities.

A totally separate exercise by the Institute of Grocery Distribution has produced guideline daily amounts (GDAs) of nutrients for population groups and these have been widely used by certain manufacturers and retailers in packaging information (Foster R & Lunn J 2007). The existence of the GDA system in parallel to public nutritional guidelines may be a source of confusion to consumers, especially as the quantities can easily be read as advice to

¹⁶ NACNE, unlike COMA and SACN was not directly associated with the government but formed, initially as the Joint Advisory Committee on Nutrition Education, by the British Nutrition Foundation and the Health Education Council so represented a combination of private and public action (Foster R & Lunn J 2007).

¹⁷ The Eatwell plate can be viewed on the following website, accessed on 2 September 2013, www.food.gov.uk/multimedia/pdfs/publication/eatwellplate0210.pdf.

consume certain levels of fats, sugar and salt rather than these being limits which should not be exceeded.

Advice to consumers on nutrition overlaps with the outputs of the dieting industry in the form of books and other written information as well as specific food products. As with nutritional recommendations in general, moral and social ideals are conveyed together with the need for disciplined behaviour to achieve them. In recent years this has overlapped with denunciations and warnings about obesity and the health problems ascribed to it, again usually emphasising individual responsibility. (Biltekoff C 2012;Corrigan P 1997;Lavin C 2013). At the same time it has been noted that food advertising is weighted to less healthy products, high in fat, sugar and salt (Adams J, Simpson E, & White M 2011;Barker ME et al. 2013).

There is a multifaceted consumption response to these various counsels. Beliefs about the nutritional and health properties of foods are culturally complex and advice from different sources becomes differentially incorporated into pre-existing, socially based understandings and belief systems (Dibsdall LA, Lambert N, & Frewer LJ 2002;Furst T et al. 1996;Helman C 2007;Maddock S, Leek S, & Foxall G 1999;O'Key V & Hugh-Jones S 2010;Parraga I 1990;Shepherd R 1999). Consumption decisions may be driven by unconscious processes (Graves P 2013). Food and meal patterns have symbolic and communicative, as well as physical aspects and are affected by many social factors including class, gender and life course changes, all of which interact with official and unofficial nutritional advice and cut across its usually individualistic assumptions (Bourdieu P 1984;Devine CM 2005;Douglas M 2003;Marshall D 2005;Wood RC 1995). In this context, food recommendations can be seen as externally imposed, restrictive and unacceptable (Bisogni CA et al. 2012).

In addition, regardless of attitudes, there may be various practical barriers that limit access to healthy food, some linked to personal low incomes which affect transport options as well as affordability, others characteristic of local areas with limited food choices. Thus a recent reduction in levels of fruit and

vegetable consumption in Britain, as in other European countries, has been attributed to declining incomes due to economic circumstances, despite general knowledge about their benefits (Van Rijswijk C 2013). These factors show the limitations of the personal information approach to nutrition, indicating that attention should be paid to policies relevant to structural disadvantage and more generally to the operation of the food system (Caraher M et al. 1998;Caraher M & Coveney J 2004;Lang T & Caraher M 1998).

Hence it is not surprising that change in the national diet has been slow and that some view the impact of nutritional advice as nugatory or at best as an aid for the better-off and better-educated (Anderson A, Milburn K, & Lean M 1995;Duff J 1999). There is some British evidence, partly related to food, that media health campaigns can work if the effort is sustained (Wakefield M, Loken B, & Hornik RC 2010) and other evidence which seems to relate to the US that carefully targeted programmes through models of either individual or community-based change can also be effective (Contento I 1995). In the UK the main approach has focused on individual nutritional knowledge (Anderson A, Milburn K, & Lean M 1995) but in recent years there has been development of strategic thinking about food and nutrition in all four of the UK administrations, with a particular concentration on tackling obesity together and various initiatives aiming for healthier eating, many targeted at children (Caraher M, Crawley H, & Lloyd S 2009;Department of Health 2005a;Department of Health 2005b;Food and Nutrition Strategy Group 1996;Welsh Assembly Government 2008a). Slow progress and especially the continuing problem of obesity has led to some calls for more use of public regulation to support healthy food policies (Jewell J, Hawkes C, & Allen K 2013).

Nevertheless, while the mechanisms are unclear, some of the change in the average British diet that has taken place over the last sixty years does accord with nutritional advice, notably a shift to lower fat items in the meat and dairy categories (Foster R & Lunn J 2007). Whether dietary advice related to seafood has had an effect is considered in chapter 6.

Promotion of healthy food has not been confined to public information activity as already noted in relation to dieting. Apart from advice appearing in various media, the food industry has often been quick to incorporate the latest nutritional ideas. This was already the case in the inter-war years when new and modified products incorporated then current nutritional knowledge, including the recently identified vitamins, and information about them was presented to consumers (Horrocks SM 1997). An analysis of advertisements in women's magazines over 1940 to 1955 showed that the nutritional knowledge of the day was adopted into the advertising of various manufactured food products for which health claims were made (Barker ME & Burrige JD 2013).

The food manufacturing industry has continued to incorporate nutritional science into both its products and its advertising. The identification of beneficial nutrients may be a basis for promoting products which already contain them but further led to the production of functional foods in which such nutrients have been added or increased so that they can be sold with specific nutritional or health claims. This trend has been criticised as 'nutritionism', the engineering of highly processed items based on nutritional elements abstracted from ordinary foods (Scrinis G 2008). In this way part of the food industry has used the findings of nutritional science to promote products that contradict much public nutritional advice on the benefits of minimally processed fruits and vegetables. Nutritionist thinking has been used in relation to fish as will be seen in chapter 6. The nutritionist approach is also the basis of the supplements industry which again has relevance to seafood.

In recent years, health claims about food have become widespread and a supermarket survey in Ireland (no equivalent for the UK was found but the situation is likely to be not dissimilar as several supermarket chains operate in both countries) carried out before the health claims legislation outlined in section 2.2 had an effect, showed that nearly half of the items analysed carried a nutrition claim and nearly a fifth a health claim¹⁸ (Lalor F et al. 2010). An

¹⁸ The categorisation, based on the EU regulation 1924/2006 distinguishes a nutrition claim that a food has particularly beneficial nutritional composition such as 'high in

analysis of British women's magazines showed that nutritional claims in food advertising increased from the 1960s onwards reflecting over time scientific findings relating to dietary fat and fibre and in the 1990s specifically including fish oils (Barker ME, McNeir K, Sameer S, & Russell J 2013). For a more recent period, a review of Dutch magazine advertisements determined that the number with nutrition and health claims generally increased over the period 1990 to 2008 (Zwier S 2009).

The impact of health claims on diet is unclear as yet and the operation of European legislation still at an early stage though as noted earlier has already led to EFSA ruling against many of those submitted. There is certainly scope within the terms of the regulation for claims to confuse or mislead consumers, for example promoting nutrients which are already adequate in the diet and in total possibly leading to public nutritional guidelines being sidelined by a wealth of claims (Mariotti F et al. 2010). The wording and other features of the presentation of claims can be manipulated to affect responses (Nocella G & Kennedy O 2012). As with dietary advice generally, how consumers react to claims varies according to personal and social circumstances and findings in different studies have been inconsistent; there have been indications of overt scepticism towards health claims in some British work which does not preclude the possibility that they nonetheless have an influence (COI Communications & EdComs 2007; Petrovici D et al. 2012; Wills JM et al. 2012). Nutritional science provides the basis for both industry health claims and public dietary advice, a field of contestation which will be seen to be relevant to nutritional claims over seafood in chapter 6.

Turning to ethical consumption, the previous section briefly indicated some of the options, especially organic and fair trade products, while here the reaction of consumers is considered. Ethical purchasing can be a personal moral

fibre' or 'low fat' from a health claim of a specific relationship between a food and either health (such as a role in physical or psychological development) or disease reduction. In the Irish survey frozen fruit and vegetables and breakfast cereals carried the highest proportion of nutrition claims while health claims most often referred to improving the digestive system and reducing cholesterol. There has been a lag between the legislation coming into force and its full impact being seen due to the time needed for EFSA to assess claims and the leeway allowed for pre-authorisation stocks to clear.

choice (Zwart H 1999). However, it has also been seen as a lifestyle choice, an aspect of identity functioning which is only available to those who can afford the higher costs of such products (Ankeny R 2012;Boström M & Klintman M 2009). Prices have indeed been identified as an obstacle to ethical consumption (Gribben C & Gitsham M 2007;Hughner RS et al. 2007). While experimental studies have shown consumer willingness to pay more for risk reduction, animal welfare and environmental benefits (Baker GA 1998;Burgess D & Hutchinson WG 2005;Hamilton SF, Sunding DL, & Zilberman D 2003;Hobbs JE et al. 2005), positive attitudes about green purchasing intentions may not be reflected in practice, leading to a call for ‘consumer social responsibility’ to match the corporate kind (Devinney TM et al. 2006;Manning L 2013). Would-be ethical consumers may face barriers such as lack of appropriate products and their own occasional desires for non-conforming products as well as the need to negotiate what is to be purchased with other members of their households (Bedford B 1999). Nevertheless, Britain has a relatively large market for organic food (although it is still a very small overall proportion) and has been rated highly for ethical purchasing in one source (Singer P & Mason J 2006).¹⁹

There is some, mainly American, research about motivations for fair trade purchasing (Doran C 2009) but the evidence relating to organics is the most relevant to interrogate for potential seafood interest because of the shared importance of environmental factors and the existence of some, albeit limited, organic aquaculture production. Selecting organically produced food is considered one of the three most important contributions to a more sustainable food system that a consumer can make (the other two being reductions in meat eating and in use of products transported by air) (Thøgersen J 2010). However, studies among the UK population indicate that the primary reasons for organics being purchased are health and safety, the avoidance of

¹⁹ The judgement in this book (*op cit* p6) is: ‘The extent to which British consumers choose ethically when buying food is, by American standards, quite astonishing.’ The reality can be illustrated by 2012 figures: the total value of the UK organic food market (multiples, other retailers, home delivery including box schemes, farm outlets and catering) was £1.6 billion while total expenditure on food, drink and catering was £180 billion (Cottingham M 2013;Department for Environment 2012). These are not fully comparable figures but give an idea of the scale of difference.

genetically engineered content and sometimes taste; taken altogether this means for personal rather than environmental benefit (Baker S et al. 2004;McEachern MG & McClean P 2002;Padel S & Foster C 2005;Rimal AP, Moon W, & Balasubramanian S 2005). Such motives are echoed in a broader literature review (Hughner RS, McDonagh P, Prothero A, Shultz CJ, & Stanton J 2007). There are also demographic factors with younger people more likely to purchase (Fearne A 2008). Whether or not organic foods are indeed healthier or safer than conventional products is a highly disputed subject (Crinnion WJ 2010;Dangour AD et al. 2009;Heaton S 2001;Magkos F, Arvaniti F, & Zampelas A 2006;Smith-Spangler C et al. 2012;Soil Association & Sustain 2001;Williamson CS 2007) and it is significant that nonetheless, with some negative reporting and with little advertising, contrasting with the energetic marketing of functional foods, that positive views about the health and food safety advantages of organics have become established. The FSA's commissioning of one of these studies (Dangour et al 2009) may be considered as a governance exercise and both it and other negative results have been reported in the media; whether they have had an impact on purchase of organic products is not known.²⁰ Regardless of the effect on individuals, levels of organic consumption has been argued to depend less on personal motivation than on structural factors such as suitability of soil and climate for this type of agriculture in the country concerned, whether there are effective distribution channels, the national culture and levels of state support (Thøgersen J 2010).

²⁰ The Dangour et al study was reported in 'Organic "has no health benefits"', BBC News, 29 July 2009 and in Gray L, 'Organic food has no added nutritional benefit, says Food Standards Agency,' 29 July 2009, www.telegraph.co.uk. The Smith-Spangler et al 2012 study was reported in 'Organic food "not any healthier"', BBC News, 4 September 2012 and Smith R, 'Organic food is "not healthier"', 4 September 2012, www.telegraph.co.uk (all accessed 13 September 2013). Recent annual Soil Association organic market reports indicate that there has been a decline in the UK organic market in each year from 2009 to 2012, measured by value, which is in every case attributed to the economic downturn (Cottingham M 2011;Cottingham M 2012;Cottingham M 2013) and this fits other evidence that, like luxury goods, organic food is more sensitive to economic changes than what are regarded as necessities (Thøgersen J 2010). It is possible that publicity denying health advantages to organic food has also been a factor but no information by which to test this question has been found.

Anxiety about the industrialised food system is a key reason for the continuing interest in organics (Raynolds LT 2004). Choosing organics or local production are two strategies which some consumers use to mitigate perceived risks (Fonte M 2002). The background to specific concerns about food is the increased separation of consumers from the reality of food production and their sense of decreasing influence over it (Shaw A 1999). More deeply, consumers need various strategies to face the dilemma which has been posed as: 'How can one manage to eat "healthily" ... when all kinds of food are said to have toxic qualities of one sort or another and when what is held to be "good for you" by nutritional experts varies with the shifting state of scientific knowledge?' (Giddens A 1991) (p148).

The specific issues that may concern consumers have been grouped by researchers in different ways but three broad types of risk can be identified. The first is technological and includes agri-chemicals, contaminants and genetic engineering. The second category is about health and lifestyle pointers such as fat consumption and nutrient levels. Finally there are microbiological or spoilage problems (Brewer MS, Sprouls GK, & Russon C 1994;Frewer LJ, Shepherd R, & Sparks P 1994;Nelson K 2004;Zwart AC & Mollenkopf DA 2000). Perceived risk results from many social influences interacting with personal experience and is affected by demographic and social variables including gender and ethnicity (Frewer LJ & Miles S 2001;Lobb A 2005;Mitchell V-W 1998). An important distinguishing factor is the level of control that can be exerted by individuals, some depending on lifestyle choices or personal hygiene, others on production methods that are remote from consumers.

Choices made by consumers depend on their perception of risk; contrary to the technical approach to risk assessment which balances the magnitude of consequences from a particular cause against the likelihood of its occurrence, they typically react more strongly to possibilities with worse consequences than to those more likely to actually happen. But paradoxically on an individual basis consumers demonstrate an 'optimistic bias' which underestimates personal risk (Frewer LJ, Shepherd R, & Sparks P 1994;Henson S & Traill B 1993;Weinstein ND 1998). People are more likely to support regulatory control

for hazards in the technological category where they have less control while for lifestyle issues their preference is for informed choice (Frewer LJ & Miles S 2001). Individuals feel better able to manage issues where their involvement and control is greater whereas for other risks fear is more predominant (McCarthy M et al. 2006; Nelson K 2004).

In making choices, the traditional methods of assessment open to consumers, namely search (based on visible attributes) and experience, are felt to be decreasingly useful guides when the processes involved in getting food to the supermarket may be complex and little understood by most people. Hence the third type, credence attributes, have become much more important, so that whether seeking safety, taste, health or ethical production the purchaser relies both on the provider of food and the information supplied by that provider. This has highlighted the issue of trust, the counterpart of the risk concerns which have been identified. Hence a key aspect of the governance of consumption is over the mechanisms which convey or at least attempt to convey trustworthiness: brands, labelling and assurance schemes. Here the needs of consumers come together with the requirement of the food industry for verifiable standards. This underlies the actions taken particularly by the food retail chains to invest their own brands with ethical, public interest qualities as described in the previous section.

Where consumers place trust regarding the food system has been analysed on the basis of technical, political and social approaches to risk decisions (Lobb A 2005) and in terms of relationships to institutional factors, varying in different countries (Kjærnes U, Harvey M, & Warde A 2007). In research on British consumers in the late 1990s lower trust in government was found, greater in organisations seen as independent (Frewer LJ et al. 1998) and less confidence in food safety than in some other European countries (Henson S & Northen J 2000); these studies date from a time close to the BSE and other food scares. But another comparative study on attitudes to meat carried out only a little later found high trust in Britain, attributed to the success of regulatory changes that had responded to those crises (Kjærnes U, Dulsrud A, & Poppe C 2006), echoed by an analysis arguing that it was the combination of the new

regulatory body, the FSA, and the development of integrated supply chains led by the supermarkets in which HACCP and traceability could be readily adopted that provided the basis for renewed public trust (Wales C, Harvey M, & Warde A 2006). This was tested in the 2007 food scare when avian influenza affected turkey production in Britain but while this led a minority to change purchasing behaviour, trust in food chain actors at this point held up (De Krom MPMM & Mol AP 2010).

There have been varying findings relating to assurance schemes, some introduced to allay the anxieties generated at the time of the BSE and other food scares. Studies in Britain have shown confidence in producer-led schemes for Scottish lamb and beef (which the researchers noted were based on unwarranted assumptions about higher quality) and in assurance schemes for chicken (McEachern M & Warnaby GG 2005;Yeung RMW & Yee WMS 2003). However, a broader investigation found general scepticism about assurance claims (Eden S, Bear C, & Walker G 2006).

A different strand of action in relation to consumer views was taken when the then six leading supermarket chains funded the establishment of the Food Safety Advisory Centre and a telephone enquiry Foodline service for the public, motivated by what was seen to be irresponsible media reporting on the subject. Active for nearly a decade from 1989, it published food safety information oriented to consumers and sponsored research into impacts of listeria and salmonella (Food Safety Advisory Centre 1993;Young M 1991a). It seems that the Centre ceased after the establishment of the FSA, a development it had supported. Thus private governance was expressed in the establishment of a service to fill a perceived lack of trustworthy information for the public which did not at the time have confidence in the responsible department (MAFF) but it gave way to the public arrangement after this had

been reformed.²¹

The 2013 horsemeat scandal has provided a more recent test of faith. This is reported to have led to a loss of consumer confidence particularly in frozen and ready meal meat items together with loss of trust in the food industry generally and in one leading supermarket in particular.²² However, a few years earlier an investigation over falsified date labels in stores of two top supermarkets, probably a far greater food safety risk than horsemeat substitution, appears not to have sparked much public concern as coverage was limited.²³ Seafood too has been affected by falsified labelling as discussed in chapter 6.

Apart from the issue of confidence in the food industry, the horsemeat scandal also raised questions about the performance and powers of the FSA. The removal of some of its responsibilities by the government in 2010 has been criticised in several reviews (Elliott C 2013; House of Commons Environment 2013; National Audit Office 2013) and the erosion of its role has been described as ‘alarming’ (Hutter BM 2011) (p151). Although this change did not involve a transfer of a public role to others but was rather a case of reverse delegation, it can be seen as an example of action to weaken state regulation, illustrating continuing contestation over governance of the food system. Indeed this very struggle over the role of the FSA was presciently outlined before the agency had even started work: ‘Some sections of industry do not want to see a strong interventionist agency, and if there is to be one, want it restricted to safe territory like microbiological safety rather than entering into “danger zones” such as nutrition and the ethics of genetic engineering’ (Lang T 1999) (p175).

²¹ The most recent indication of activity by the Food Safety Advisory Centre that have been found are the memoranda it submitted dated October 1997 and February 1998 to the House of Commons Agriculture Committee investigation on food safety in the wake of proposals to establish the FSA. It is assumed that lack of any record of activity thereafter indicates the closure of the service though no specific information to confirm this has been found.

²² Smithers R, ‘Tesco hires farmers’ voice to restore trust lost in horsemeat scandal’, 3 July 2013, in *The Guardian* reports that Tesco sales were hit and that Mintel research found that consumer confidence had been dented so that only half those surveyed trusted the industry to provide safe food six months after the scandal broke.

²³ Changes of use-by dates by staff in Sainsbury’s and Tesco stores were revealed by an undercover investigation reported in Brown A, ‘Out-of-date food in UK supermarkets’ dated 21 May 2007 on the BBC News website and in the connected programme broadcast on 22 May 2007.

The opposition of the food industry to a nutrition remit for the FSA was made clear in evidence given to a Parliamentary Select Committee at the time when legislation to establish the FSA was being discussed, the rationale presented as a need to concentrate on food safety.²⁴

An example of conflict over the interests which the FSA should serve is in an examination of its performance following the 2005 Hampton Report. It raised as an 'issue to be addressed' the view that the Agency had gone beyond its statutory role of protecting the public to becoming a consumer champion, thereby complicating its relationship with business (Better Regulation Executive & National Audit Office 2008) (p7).

Labelling has been another such site of explicit governance contestation in relation to the specification of nutritional information. Disagreement has focused on whether it should be in the form of a 'traffic light' design which the FSA started to promote following research which had indicated that a high/medium/low level colour icon would be most helpful to consumers (Food Standards Agency 2006; Malam S et al. 2009). After years of disputation from sections of the food industry, in 2013 the government announced an agreement for a traffic-light coded 'reference intake' labelling scheme which is voluntary but has the agreement of all the major retailers and of some but not necessarily the most significant manufacturing companies from the viewpoint of potential benefits to be obtained from such labelling.²⁵ The non-conforming

²⁴ See Minutes of Evidence given by John Wood and Derrick Kilsby of the Food and Drink Federation and memoranda submitted by the British Retail Consortium and by J Sainsbury plc in (House of Commons Agriculture Committee 1998).

²⁵ The government's plan is set out in its press release 'Final design of consistent nutritional labelling system given green light', 19 June 2013 which contains supportive quotes from representatives of Which? and the British Heart Foundation while Nestlé UK, PepsiCo UK and a seafood business, Young's Seafood Ltd, as well as all the major supermarket chains including discounters are in the list of companies mentioned as having signed up to the scheme. However, the significant companies who have not agreed to conform, listed in O'Reilly L, 'Major brands shun Gov't [sic] traffic light labelling scheme' in *Marketing Week*, 19 June 2013, namely Coca-Cola, Dairy Crest, Kellogg, Mondélez (Cadbury's), Unilever and United Biscuits, manufacture a high proportion of the products for which the potential warnings in a traffic light system would be particularly instructive. See also Hall J, 'Plans for new food labelling to combat UK obesity are dealt blow as Cadbury and Coca-Cola reject "traffic light" system', 19 June 2013, *The Independent*.

businesses aim to maintain their governance of consumption by continuing with the GDA scheme and withholding traffic light rating information.

In this section, various types of governance have been shown to be in operation in relation to consumption but functioning in a less direct way than is the case in other parts of the supply chain. They certainly do not raise the same issues of power as have been seen in other supply chain relationships. There is an inherent recognition of the need to persuade consumers who cannot be ordered to adopt any particular dietary plan. The situation is well recognised in the statement of one official report: 'Precise targets might be misunderstood as biologically optimal, but targets are usually a compromise between biological advantage and social, cultural or economic acceptability.' (Committee on Medical Aspects of Food Policy 1994) (page 5). This is a negotiating stance albeit in an indirect way, indicating a need to find middle ground between scientifically determined goals and what is believed to be tolerable to consumers at large. Similarly, health or ethical claims made by food producers aim to persuade and have varying impacts. It is in this context that official advice is considered in chapter 6 along with health claims and ethical attributes relevant to seafood .

The question of whether and how consumers exert governance impact upstream in food chains is much harder to pin down. Little academic work on this issue has been done (Hutter BM 2011) although it has been asserted that the supply chain is a loop in which information about consumer demand influences production (Kinsey J 2003). Food scares may have an immediate impact on demand which is often short-lived but can be very disruptive and cause difficulties for certain chain operators. Other changes are long-term trends to which supply chains adjust while at the same time aiming to influence them towards certain products as they have in the shift to lower fat versions. Information for consumers, especially in the form of labelling, as well as helping people with their consuming decisions, also facilitates consumer feedback to the rest of the chain. Market beliefs about how consumers may act or react are a continuing element in decisions made and are relevant to seafood as will be seen in chapter 6.

2.6 Theories of Governance and the Seafood Supply Chain Project

The review of various literatures in this chapter has covered a range of governance strands, political and economic, public and private which all assist understanding of the influences on food provisioning and the changes that have occurred in the last half century. The impact of both public regulation and private governance on food supply chains as well as their inter-relationships have been shown. Further, the sections on public and private governance alike have demonstrated the tremendous increase in governance mechanisms, both in legislation and in mainly private controls within supply chains, that has been a feature of developments in recent decades.

The way these factors impact on supply chains is varied and complex as particularly shown by work in relation to seafood that has been reviewed in this chapter. The seafood studies bearing on the understanding of supply chain relationships (whether or not this was an explicit topic and including some which did not deal with governance issues) known to the researcher have been summarised in the previous sections. These are listed in Table 2.2 in the order in which they appear in the text so that the range of types of seafood chain and explanatory approaches can be conveniently seen together; (some have been referenced more than once in the text in relation to different points and the order follows the first appearance).

Table 2.2 Seafood Supply/Commodity Chain Studies

<i>Reference</i>	<i>Country (Producer)</i>	<i>Production Type</i>	<i>Theoretical Approach</i>	<i>Governance/Power Relations</i>
Acheson JA 1985	US	Fishery	TCE	Long-term relationships between fishers & buyers
Wilson JA 1980	US	Fishery	TCE	Long-term relationships between fishers & buyers
Gallick EC, 1984	US	Fishery - tuna	TCE	Fisher-processor vertical integration
Dawson R	US	Fisheries (3)	TCE	Individual to each fishery

2003				but asset specificity most relevant factor.
Gudmundsson E et al 2006	Various	Fisheries	Value chain analysis	Not discussed
Sandberg MG et al 2004	Various	Fisheries	Value chain analysis	Not discussed
Grunert et al 2004	Norway	Fishery - frozen cod	Value chain analysis	Trend to vertical integration fishers-processors; long-term relationships processors & retail/foodservice with latter more powerful.
Guillotreau P 2004	Europe	All, emphasis on impact of salmon farming	Value chain analysis	Not discussed
Hameri A-P & Pálsson J 2003	Iceland	Fishery	Management	Not discussed
Skladany M & Harris CK 1995	Global	Aquaculture	Commodity systems	Considerable vertical integration
Goss J et al 2000	Thailand	Aquaculture	Commodity systems	Vertical integration
Phyne J & Mansilla J 2003	Chile	Aquaculture - salmon	Commodity chain	Buyer-driven
Barton & Fløysand 2010	Chile	Aquaculture - salmon	Political ecology	Increased influence of buyers & NGOs, more state governance
Islam MS 2008	Bangladesh	Aquaculture - prawn	Commodity chain	Driven by buyers, NGOs & state regulation
Gibbon P 1997a	Tanzania	Fishery - Nile perch	Commodity chain	Market forces
Gibbon P 1997b	Tanzania	Fishery - prawn	Commodity chain	Market forces
Henson S et al 2000	East Africa	Fishery - Nile perch	Management	Traders/processors over fishers; EU over processors
Thorpe A & Bennett E 2004	East Africa	Fishery - Nile perch	Chain management	Hybrid: neither producer nor buyer-driven; increased government action with private sector to deal EU food safety concerns
Bush SR & Oosterveer P 2007	1. Vietnam 2. Thailand	Aquaculture - prawn Aquaculture - prawn	Commodity networks	1. Market relationships embedded socially. 2. State regulation over nitrofurans problem
Campling L 2012	France & Spain	Fishery - tuna	Commodity chain/political economy	Varying degrees of vertical integration applying to different companies
Marks B 2012	US	Fishery - prawn	Commodity chain	Long-term relationships fishers & buyers but under strain

Peterson J et al 2000	Australia	Fisheries (prawn, abalone, general & tuna) & prawn aquaculture	Management	3 chains led by exporters, 1 by major wholesalers, 1 by fishers
Wilkinson J 2006	Global	All	GVC	Driven by various powerful companies including producers, retailers, foodservice
Tran N et al 2013	Vietnam	Aquaculture - prawn	GVC	Buyer-driven from processor level upstream but production not governed
Gibbon P 1997c	Tanzania	Fishery - <i>dagaain</i> (silver cyprinid)	Filière	Wholesaler cartel control
Belton B et al 2011	Bangladesh & Vietnam	Aquaculture - pangasius	GVC (certification)	Driven by retailers & NGOs in North
Belton B et al 2009	Thailand	Aquaculture - tilapia	Sustainability (certification)	Large-scale & export-oriented companies favoured
Hatanaka M 2009	Indonesia	Aquaculture - prawns	Standards (organic certification)	Northern NGOs/ consumers over Southern NGOs & farmers
Vandergeest et al 1999	Thailand	Aquaculture - prawn	Political ecology	Increased government regulation in certain areas
Kambewa E et al 2006	East Africa	Fishery - Nile perch	Management	Increased government action to deal EU food safety concerns
Ponte S 2007	Uganda	Fishery - Nile perch	Standards	Increased government action with private sector to deal EU food safety concerns
Schuurhuizen R et al 2006	Kenya	Fishery - Nile perch	Management	Buying agents over fishers; international traders not directly involved in chain; government not enforcing sustainability measures
Bonanno A & Constance D 1996	US	Fishery - tuna	Political economy	Processors changed from 1970s vertical integration to 1980s spot-market purchasing Government regulation for 'dolphin-friendly' tuna changed supply sourcing

Mansfield B 2003	US & Thailand	Fisheries (3) - whitefish for surimi	Relationship between nature & social processes	Different end markets determine different constructions of quality in each chain
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Source: Author

The table shows the range of theoretical or framing discourses used in the listed studies and points to differences in power relations in various seafood supply chains; no single approach stands out. State regulation is identified as relevant in a minority of cases. The table shows that with the exception of the tuna chain which they have dominated, the role of processors has been little discussed. Finally it indicates that global industry coverage is very partial indeed: South-East Asian aquaculture, the East African Lake Victoria Nile perch fisheries and tuna fishing are better investigated while much of the rest of the world's seafood production seems analytically untouched.²⁶

This includes Britain although (Sandberg MG, Gjermundsen A, Hempel E, Olafsen T, Curtis HC, & Martin A 2004) in the table does deal with seafood supply chains within the UK. There is certainly a large literature about many aspects of the seafood industry in Britain and also about fisheries management which is used in later chapters but this body of work is focused on organisational practice and does not interrogate seafood supply chain relationships or engage with broader explanatory issues. As sketched out in chapter 1, there have been major changes in the British seafood supply chain over the last six decades, changes affecting the content and methods of production of supply, the quality and forms of presentation of products, the distribution system and what is consumed. Yet these have not been discussed

²⁶ Despite the number of published studies on these regions it has taken recent journalist investigations to reveal that in the Kenya Lake Victoria fishery, distributors in the local (not export) chain who purchase from fishermen are women who pay not only in cash but also with sex, while much locally produced feed for the Thai farmed prawn industry is produced by slave labour, two vivid but shocking examples of economic transaction embeddedness in social and gender relations: see Lowen M, 'Kenya's battle to end "sex for fish" trade', 17 February 2014, on the BBC website and Hodal K, Kelly C and Lawrence F, 'Revealed: Asian slave labour producing prawns for supermarkets in US, UK', 10 June 2014, *The Guardian*.

in the agri-food literature leaving a major gap in understanding and theorising the supply chain for seafood consumed in the UK which this thesis addresses.

The first part of this chapter has shown how political science theorising has reflected changes in the content and style of state operation and its exercise of regulation while later sections reviewed changes in the functioning of food chains and how economic and agri-food research has engaged with these. However, there is a gap in marrying up these two lines of thought, that is in showing how changes in the functioning of the state have been manifest in relation to supply chains for food and with what results.

Putting these issues together, questions that arise from considering the review of governance in this chapter in relation to the seafood industry changes outlined are: What part did state and/or supra-state regulation play in these developments relative to the impact of private types of governance? How have developments in the regulatory state impacted on the seafood supply chain? How have changes in the way the state in Britain operates affected food supply chains generally and that for seafood in particular? Which actors, public, private or from civil society, have been involved in exerting governance impacts or have wielded power in affecting the changes that occurred and how have they inter-related? Which of the models outlined in the various bodies of literature which have been considered are the most useful for understanding the British seafood chain? What part has the development of standards played and which actors have been involved? How has seafood consumption been influenced and changed and has it in turn been a factor of change upstream in the supply chain? In summary, what are the governance factors material to changes in the production, processing and consumption of seafood in Britain over the last six decades?

The modes of governance that have been highlighted in this chapter are state (and supra-state) regulation, private governance through supply chain relationships, more formal means of private governance exerted through standards schemes, sometimes with civil society involvement and direct and indirect ways of exerting influence on consumers. They involve different ways

of exerting power, whether the state's legitimising expression of public interest as well as its potential use of coercive powers, the relative market power of different parties in supply chains and the arguable force of consumer (potentially withheld) buying power.

Equally important is the question of what interests are actually served by different modes of governance in food systems. All in fact serve both business and public interests to different degrees in different situations. Private food businesses work to a profit-seeking imperative but also fulfil socially essential functions and serve the public interest equally with their own in relation to key objectives like hygiene. They may well provide healthy and safe food in a socially and environmentally responsible way at reasonable prices - but cannot always be relied upon so to do. Hence there is the necessity for state regulation and enforcement. State action, however, may also be promotional and facilitative to the food industry or may at times be most concerned with mediating a balance between different interests that bear on the food system. Finally, the civil society organisations which have had an impact on the food system all act in the name of a public interest or ethical objectives but those who have chosen to collaborate with business are bound to an extent to the interests of those companies. Therefore, in considering modes of governance in play for the seafood supply chain it will be relevant to ask in each case whose interests are served.

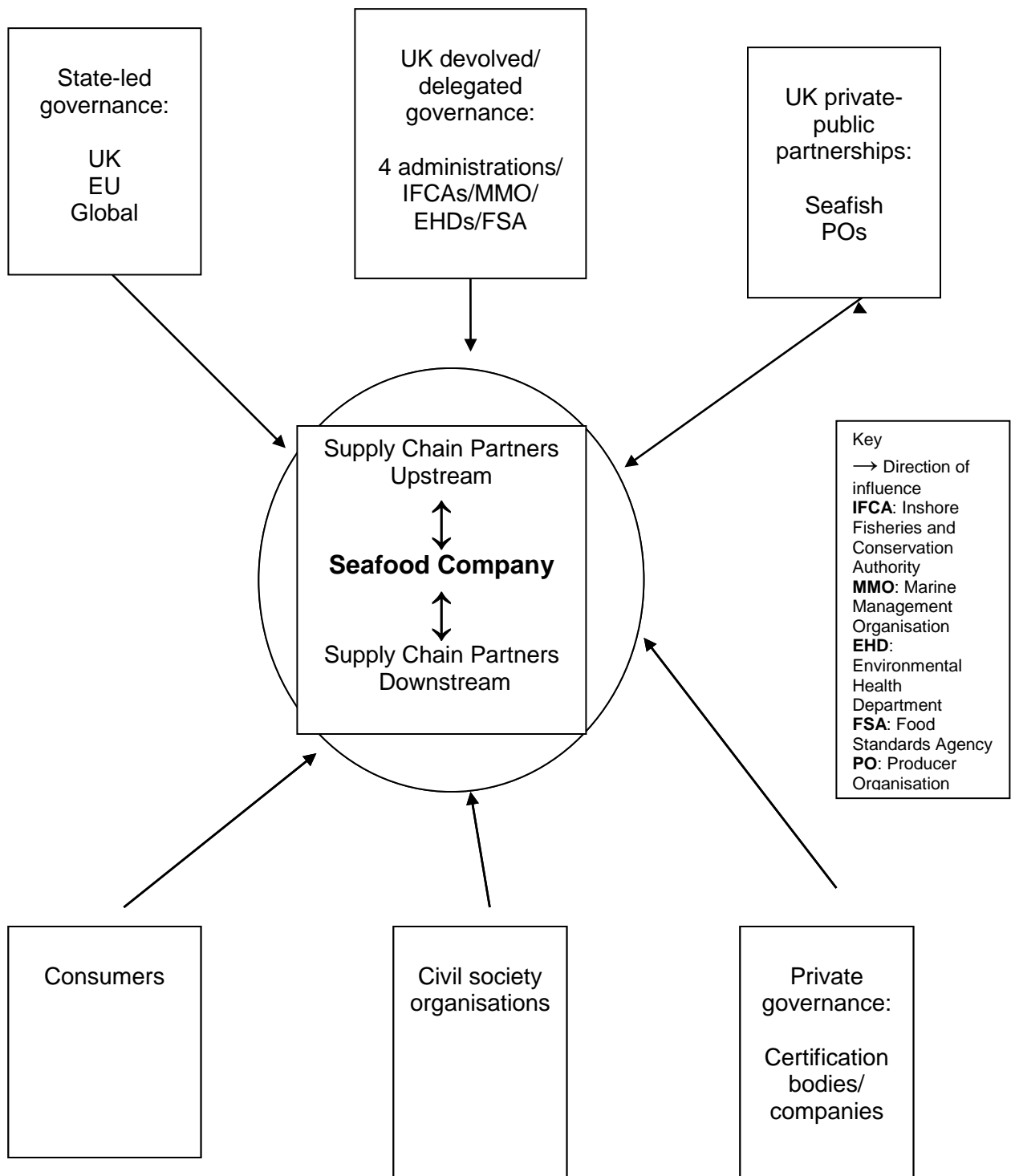
As noted in the section 2.2 review, state functions are increasingly shared and delegated and each of the agencies concerned will have its own realm of interests. Two such bodies exercising delegated public functions related to food have featured in this chapter: the Advisory Committee on Organic Standards is without executive powers and has the public interest role of advising the government but could also be described as indirectly supporting the organic food industry; the FSA was established with considerable delegated powers and a mandate to prioritise the interests of consumers but since changes made in 2010 has more limited powers and in the view of many observers serves consumer interests less well than previously. Later chapters will consider the roles of other examples of delegated power which are

particularly relevant to the seafood industry, the Marine Management Organisation and two introduced in chapter 1 as 'mixed public-private governance' bodies, Seafish and Producer Organisations while the FSA will be examined with particular reference to seafood nutrition.

The conceptual framework adopted for the study is a modified form of commodity systems analysis, selected as providing a comprehensive structure which includes both consumption and the role of the state (at least in some formulations). The main modifications are the emphasis on governance, which owes much to the GCC and GVC approaches, and the incorporation of insights from the power-based framework put forward by Cox and his collaborators as outlined in section 2.3 of this chapter which is convincing for understanding supply chain relationships. But unlike the most common usage of GCC and GVC analysis, here governance does not highlight relations between buyers in developed and suppliers in developing countries but concentrates on the nature of supply chain ties within a single rich country. Also, while following a commodity systems approach this research is not inclusive of all its possible elements due to capacity limitations and in particular does not extend to labour processes nor discuss in detail scientific and technological inputs into production.

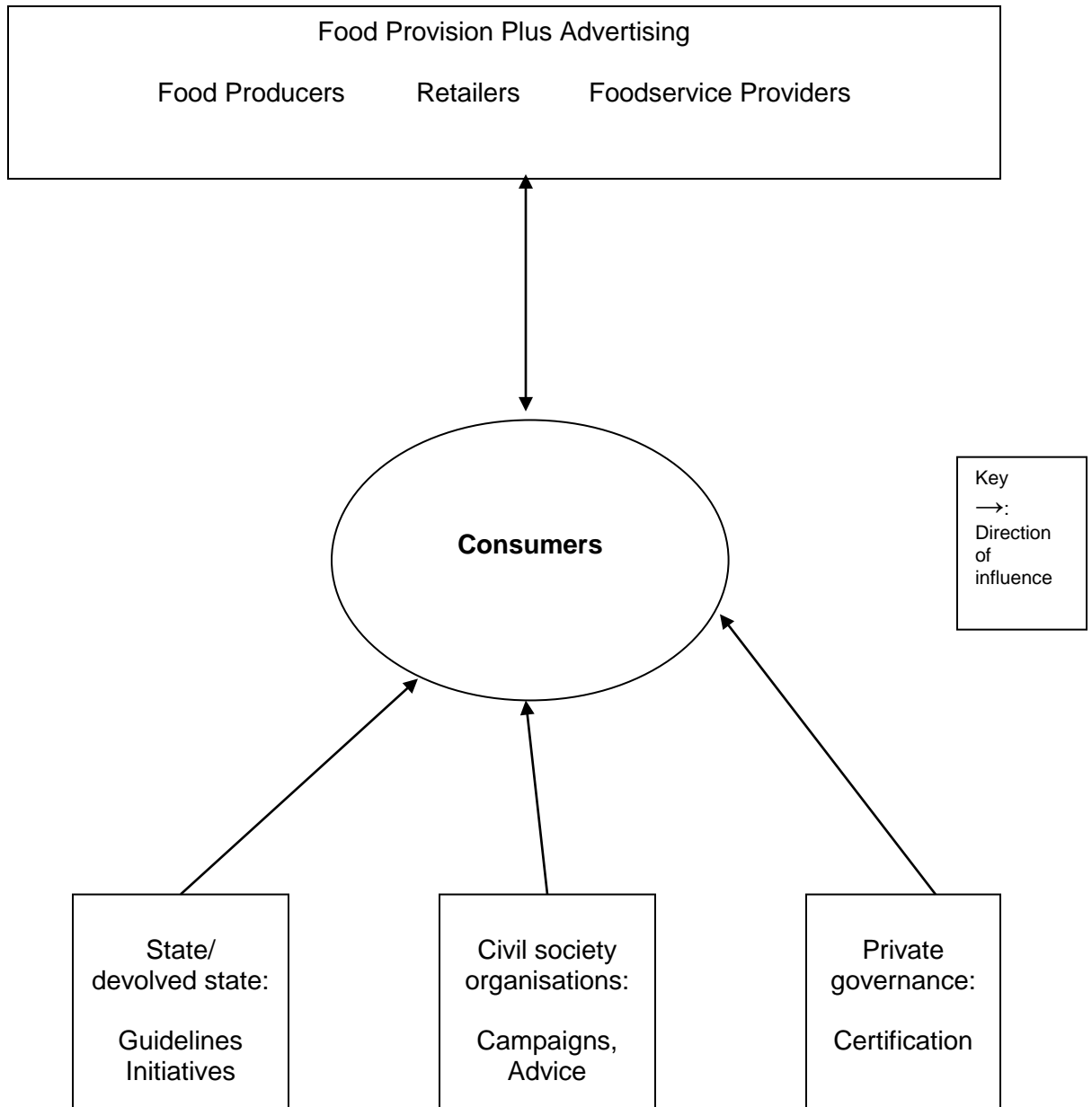
In this framework seafood companies are seen to experience or exert governance impacts in relation to their transactions with supply chain partners (sometimes adversaries) while the conduct of their business generally may be affected by governance exerted externally by state regulation, the actions of various state and private actors, by consumers and sometimes by others including civil society organisations; different forms and extent of power are involved in these various relationships. Figure 2.1 illustrates the two levels. Supply chain relationships indicated by double arrows are where the various types of governance reviewed in section 2.3 and 2.4 may take place; in the framework adopted, this is where the power relations of the Cox power model and/or the buyer-driven control of the GCC and GVC would be posited, possibly involving standards regimes. Externally to the supply chain are shown the various actors introduced in chapter 1 who may have an impact upon it (of

Figure 2.1 Levels and Key Sources of Governance for Seafood Companies



Source: Author

Figure 2.2 Governance Influences on Consumers



Source: Author

course a greatly simplified representation since these in reality also impact on each other) as indicated from the perspective of commodity systems, some of whom also to some extent enter into GCC/GVC analyses. The thesis examines the nature and impact of governance both inside seafood supply chains and as exerted by external forces on the seafood supply chain as a whole. While there is no means of obtaining historical data relating to the former aspect, it aims to cover changes in external governance forces over the period covered by the study.

Governance in relation to consumers takes a different form, a matter more of influence than direct power, as indicated in the section 2.5 review. Its sources are shown in Figure 2.2. On top is the food provisioning system which by virtue of what it makes available has a powerful direct impact on consumption to which is added the influence of advertising (which may include health claims). It should be noted here that agents in the food provision box are subject to the same governance factors as shown for seafood companies in figure 2.1 though with differential impacts. However, this is not a one-way process and the double arrow here reflects the impact exerted on provisioners by purchase decisions. At the other end, various actors aim to affect consumption, involving such means as official promulgation of nutritional guidelines, the maintenance of consumer-facing certification systems and the urging of various types of ethical purchasing. The way all these factors play out in relation to seafood consumption is explored in chapter 6.

In what follows, after the methodology for the study has been set out, the impacts of different types of external governance are examined in relation to a historical account describing the development of the seafood situation in the period under discussion. In chapter 4 it is in relation to the seafood supply situation and how this has evolved. Chapter 5 turns the spotlight on the safety and quality of seafood and here governance factors within as well as upon the supply chain are examined. Then both governance impacts on retail and foodservice actors and seafood consumption governance factors are considered in chapter 6.

CHAPTER 3: METHODOLOGY

3.1 The Research Questions

The research has aimed to produce an understanding of how and why the systems for supplying seafood for consumption in Britain have changed over the last sixty years using the concept of governance as the key tool. The choice of this concept emerged initially from the first stage review due to its centrality in both the transaction cost economics and the global commodity/global value chain literatures. Subsequently as the collection of empirical evidence began it became clear that these approaches should be supplemented by considering the impact of state and civil society governance and the review was extended accordingly. As shown in the previous chapter, the various strands of writing about governance and regulation have become progressively more enmeshed over time.

The review of these various literatures indicated that both public and private forms of governance, increasingly overlapping with each other and interconnected, are important in explaining food chains and it gave certain indications of where these might apply to seafood. In relation to the functioning of supply/commodity chains and networks, it also highlighted the importance of understanding the power dynamics at work. Power relationships are intrinsic to governance, both public and private.

This raised the question of whether or how to examine governance and power together or singly as the focus for the research. The answer was also given by the literature review. It showed that governance had been used in relation to food chains by many analysts. By contrast while power was often mentioned as far as food research was concerned, frequently in relation to retailers, it has only been the central focus in a part of the power-centred work of Cox and collaborators on supply chains and was dependent on specialist analysis of accounts to assess the relative values obtained in different dyadic relationships; this would not have been feasible for the present research. Further, governance is tied up with the development of standards and audit

schemes, hence capable of being identified and assessed. Power, as already discussed, is more variable and dependent on contingent factors and except through relative profits taken from a given supply chain difficult to pin down objectively. Therefore while power relationships continued to be one aspect of the enquiry, the decision was taken to consider governance as the dominant variable.

But this still left the issue of how governance could be identified in the workings of the seafood chain. Public governance in the form of regulation is uncomplicated to document but the impact may not be straightforward. Private forms of governance include market mechanisms and requirements that are expressed in various ways. Lower level attributes were needed in order to pin down what is occurring. The decision was made to concentrate on three characteristics which food may be expected to provide: safety, quality and sustainability, taking into account the closely connected mechanism of traceability, needed to support the other ones.

As demonstrated in chapter 2, systems for assuring quality standards, food safety and traceability have been seen as increasingly central to the functioning of food chains and so a very appropriate means of understanding them. In addition, the safety of food has been recognised as an important public problem of great concern to consumers and public authorities alike. Seafood has not caused as much anxiety as some other foods but the impact of various food scares has heightened general awareness among both producers and consumers. Sustainability has much more recently become recognised as an important issue both publicly and in commodity studies but concerns on this subject about both fishing and farming have become increasingly significant in both public discourse and as a requirement for seafood supply.

Thus the choice of food safety and quality came out of food industry concerns and are the usual objectives of the standards and audit schemes. Traceability was an especially live issue for food producers at the time when work began on the present project not long before new EU rules requiring it were due to

come into force. Sustainability was added later as environmental issues relating to both fishing and aquaculture were becoming increasingly recognised both publicly and by the industry. With the four selected indicators - food safety, quality, sustainability and traceability - the governance questions would be about who decides the levels to be achieved, what means are involved and how they are monitored and enforced.

A second preliminary issue to be considered was the timeframe. In order to understand change in systems it is essential to have a historical approach but the question to be decided is what period of time to examine. The literature gives no guidance on this point. While food regime theory does apply a periodisation scheme, the criteria based on grain and meat commoditisation do not seem relevant to seafood (Friedmann H & McMichael P 1989). Commodity studies have ranged over the timescales pertinent to the particular developments being examined, different in such cases as studies of the American chicken industry (Boyd W & Watts M 1997) and the tomato as consumed in Britain. But for the most part apart from regime theory agri-food studies have concentrated on a contemporary situation or on recent developments and have lacked an historical dimension.

The decision was made to look at the evolution of seafood provisioning in Britain from 1950 to date which in practice was up to 2013. While the mass supply and consumption of fish in Britain goes back to the second half of the nineteenth century and the impact of certain developments from that time both in the fishing industry and in the distribution system are still with us, it would not have been feasible to cover the full expanse of one and a half centuries of change. The second half of the twentieth century which seen transformations in relation to the industrialisation of fishing, the burgeoning of aquaculture and increase in global trading certainly merits the examination of change and was assessed as being a manageable period to examine.

These considerations have led to the following research questions:

1. How has the seafood supply chain for British consumption changed over the period since 1950?
2. What forms of public and private governance, separately or jointly, have affected supply, processing and consumption in the seafood supply chain and in what ways have they driven changes over the period?
3. What governance mechanisms have been used to pursue safety, quality, sustainability and traceability in the seafood chain and how successful have they been?

In terms of the way research questions are generally characterised, these ones firstly have an exploratory purpose, aiming to produce a systematic account of developments which has not previously existed. They also have a strong descriptive aspect since basic information about the seafood industry is necessary as a foundation for understanding change. Questions 2 and 3 seek explanations of the dynamic of this particular food chain and are intended to test existing supply chain theorisation and thus produce an explanatory outcome; they are also capable of inviting reflection on policy issues.

3.2 Approach to Methodology

An appropriate methodology for the research has been approached from two directions. First is the need to clarify the ontological and epistemological perspectives from which the study will be carried out. This broad framework having been established, the range of potential methods have been assessed in relation to the research questions (McNeil P 1990; Silverman D 2000).

Any study of food provision has to have a realist basis - its material nature is very evident. However, the systems in which food is embedded are comparable to any social phenomena. They are produced and reproduced by social actors in a dynamic process which means that alteration and revision are continually possible. This is a position which describes the social world

from a constructionist perspective. It is also one which provides a better basis for understanding change than the objectivism of simply seeing social phenomena as external realities. This viewpoint is detailed in Table 3.1 in relation to the proposed research. It can be regarded as similar to other synthesising positions by which the meaningfulness of human action is recognised in tandem with the acknowledgment of social reality (May T 1997).

Table 3.1 Theoretical Orientations for Research

<i>Principal orientation to theory</i>	Deductive - testing of theory	Inductive - generation of theory
Seafood research	Yes - theories about supply chains tested and possibly modified	May lead to theory generation in relation to areas where little previous research but modification of existing theory more likely
<i>Epistemological orientation</i>	Natural science model/ positivism	Interpretivism - include understanding, meanings of social actors
Seafood research	Some factual aspects for which reasonably secure knowledge can be established eg changes in the production of farmed fish, legislation, growth of supermarket chains	Some aspects will be considered from the viewpoint of different actors eg over impacts of food safety governance and fisheries management
<i>Ontological orientation</i>	Objectivism - social phenomena have independent existence	Constructionism - social phenomena are produced through social action & are in constant revision
Seafood research	Organisations in seafood industry and seafood supply chains exist independently of meanings	But how they function is dependent on social interaction and therefore part of a dynamic process

Source: Framework adapted from (Bryman A & Bell E 2007).

Given the position taken, the method of enquiry needs to establish facts about how seafood is moved through supply chains from production to consumption. It also needs to ask from an interpretivist perspective how supply chains and systems integral to their functioning such as quality assurance schemes are understood and enacted by those involved. Conventionally, the first objective is

often seen as the province of quantitative methodology, the second as requiring a qualitative approach.

Comparison has been noted as valuable in deriving explanations (May T 1997). The research aims to examine contrasts where different factors are at work in the supply chain. Thus it compares governance of supply, quality and safety in wild-caught and farmed seafood, between the way governance impacts small and large seafood companies and in retail as against foodservice delivery to consumers. It also aims to examine and compare changes over time within the period selected.

In classifying research options one line is to distinguish research approaches or strategies from techniques and methods (Blaxter L, Hughes C, & Tight M 1996; Denscombe M 1998). Here the subject lends itself only to the survey strategy. The options of action research, experiment and ethnography are rejected as unsuitable for addressing the research questions because the need to cover broad areas across time and across the supply chain could not be satisfied by methods which produce depth in parts. At one level any specific food chain could be considered as a case study in the sense that it is just one example of supply chains in general but this overstretching the usefulness of the approach as generally employed. The study is therefore regarded as based on a survey strategy.

The next step was to decide which techniques should be selected. A range of survey methods were assessed in relation to the research questions taking resource limitations into account. The results are set out in Table 3.2, concluding in favour of two methods: the use of documents and semi-structured interviews. These are generally seen as constituting a qualitative approach to research. It would ideally be useful to supplement these with a quantitative survey approach thus comprising the type of mixed method strongly supported by some methodology advice (Bryman A & Bell E 2007; Tashakkori A & Teddlie C 1998). Such an undertaking was assessed as being infeasible within the constraints of this small scale research. Nevertheless, a form of triangulation could still be achieved by examining the

two form of data in relationship to each other in the analysis to improve the validity of the findings (Jonsen K & Jehn KA 2009). Further, there are differences within each of the chosen categories: documentary sources range from the objectivity of official statistics to the self-publicising nature of seafood company websites while interviews included both the views and subjective experiences of the respondents and factual information such as about procedures followed.

Table 3.2 Review of Research Method Options

<i>Type</i>	<i>What Can This Tell Me?</i>	<i>Research Question Relevance</i>	<i>Accept/Reject for Seafood Research</i>
Document analysis (including website material)	General and historical knowledge of seafood industry. Regulatory policy developments. Information about seafood companies.	General developments in the industry. Information about public regulation and private governance. Information about companies' food safety, quality assurance and sustainability policies.	<i>Accept</i>
Secondary analysis of data	Information about the seafood industry over time eg production and imports. Information about consumption.	How the industry has developed and changed over time. How consumption has changed over time.	<i>Accept</i> - use of official statistics
Naturalistic observation/ Participant observation	How supply chains are actually managed on a day-to-day basis. How quality and traceability systems operate in practice.	How relations in seafood supply chains are seen by participants, how they act in relation to food safety, quality & sustainability.	Although it would provide depth and interpretivist understanding this would be for a very small part of the seafood industry system unless it was carried out in a variety of settings - not feasible for a small-scale study. <i>Reject.</i>
Survey Questionnaire	Views of actors in organisations whose role in seafood supply chains little documented. Views of consumers.	How governance of food safety, quality and sustainability are understood. Changes in seafood consumption plus reasons.	Could provide useful information but resources to carry it out are not available. <i>Reject.</i>

Interview (Open/ semi-structured)	Stakeholder interviews central to research for: Information & views not available elsewhere In-depth qualitative understanding.	How relations in seafood supply chains are seen by participants, how they act in relation to food safety, quality & sustainability, views about industry changes and consumption.	Well-trying and commonly used methodology in food system studies. <i>Accept.</i>
Focus group	Consumer focus groups could provide information on consumption attitudes and practice.	Attitudes to and changes in seafood consumption and reasons.	Could provide useful information but resources to carry out were not available. <i>Reject</i>
Experiment/ quasi-experiment	Experimental designs have been used in seafood consumption research but are not relevant to this set of research questions		<i>Reject.</i>

Source: Author using types of research design/methodology from Vogt's list of types²⁷ and criteria in (Mason J 1996)

The material on which the study is based therefore comprises two types of data: firstly publicly available information and secondly the generation of new data by means of semi-structured stakeholder interviews.

The publicly available information used can be categorised into four groups. The first is legislation, both primary and secondary, which is clearly fundamental to the understanding of public governance. The use of legislation has necessarily been selective and the aim has been to identify the most important items both domestic and European which have borne on the functioning of the seafood supply chain over the period being considered. For ease of reference Appendix 2 lists all the legislation to which reference is made in this thesis and indicates the relevant chapter(s).

The second source consists of publications both formal and in the category of 'grey literature' which have been used to provide historical and contextual

²⁷ List of types in handout connected to lecture given by Paul Vogt, 'Choosing research methods: dictatorship of the problem' given at City University London on 18 April 2007.

information about the seafood industry and the development of quality assurance and traceability systems affecting it, including reports and printed trade press productions. Such information has been produced both from within the industry and by those commenting upon it, particularly by certain NGOs. One issue with this material is that though ostensibly it should be covered by the legal deposit scheme, this has not necessarily applied even when the publisher is a quango such as Seafish (Sea Fish Industry Authority). Several of its reports, referenced in its own subsequent publications, are neither in the British Library nor kept by the organisation itself so could not be consulted.²⁸ Nevertheless, the Seafish publications that are now available on its website in digital format and including a limited number produced by its predecessor body, the White Fish Authority, have been a valued source.

The third category consists of official statistics which have been particularly relevant in two areas: recording the supply of seafood produced by the British fishing industry and tracking seafood consumption. The special importance of official statistics to a study aiming to consider change is the availability of time series. However, in practice these have limitations due to changes in definitions, in the type of data collected or reported and even because of wholesale replacement as when the Expenditure and Food Survey substituted for the National Food Survey from 2001/02 (though ameliorated by long series incorporating data from both surveys being made available).

The fourth type consists of the products of the burgeoning internet sources. Use has been made of material issued by organisations and companies relevant to the research, online trade publications (the FishSite and fishnewseu.com) and of the BBC and websites attached to what used to be called 'broadsheet' newspapers, considered as acceptable sources of record.²⁹ During the study some material has proved to be ephemeral; websites are a tool for organisations related to their existing and future activities and

²⁸ In relation to the Sea Fish Industry Authority, elucidated through personal communications with Roger Forbes, Marketing Communications Executive, Seafish.

²⁹ The newspapers mainly cited have been *The Guardian* and *The Independent*; *The Times* has been less used since the charging policy for using its website has reduced its accessibility.

understandably what has ceased to be current is often discarded. The legal deposition requirement for digital material only came into force in April 2013, too late to be relevant to this project. Further, compared to print, website material is vastly more open to constant revision, making it potentially difficult to fix a record or pinpoint a view. Thus referring to such material cannot ensure validity because the reader at a future time might only find the material in a changed form or not find it at all.

During the research, items have come and gone from continuing sites while some websites from which items had been taken, subsequently ceased to function. In addition web pages may alter and therefore in general such references have been given here simply for organisational website addresses. Sources and dates when material has been accessed have been recorded and where it is known that material is no longer available or websites no longer function this has been indicated.

A particular use of electronically available material was the compilation of a database of seafood companies, based on their websites. This is detailed in the following section.

3.3 The Seafood Companies Database

The decision was taken to produce a database of information about companies in or with special connections to the seafood industry with two purposes. The first was to provide a broad picture of the operation of the seafood industry in Britain. The second use was as a sampling frame for selecting interview targets; the way this was done is detailed in the next section dealing with the interviews.

The record of companies was produced using a software database with a corresponding set of hard copy files containing printed descriptive material. The aim was not to compile a complete list which would not have been feasible with the resources available but one that would reasonably represent the

functioning of seafood supply chains and cover different production and regional aspects. Companies were identified from various sources including business databases available in the British Library's Business Centre, the Seafish supplier database and certain regional associations.

Some content information came from two business databases, FAME and One Source, but the websites of individual companies were the main source. Indeed, a general criterion for inclusion was that the company did have a functioning website of its own (or in a few cases that information about it was included in a parent company website) for the practical reason that this made information accessible. The assumption is that this produces a certain bias. It was initially thought that the bias would be towards relatively larger companies with the resources to maintain a website. However, it turned out that a large number of small companies do have websites, probably because they are needed for customer interface purposes. Rather, as the collection of data proceeded it seemed likely that there was a bias against producer companies which may have less need than those further downstream to advertise their activities as they have adequate trade connections. Hence the website rule was relaxed in some cases for companies concerned with fishing in particular where information was obtained from the business websites and other internet sources. Even so, the database cannot provide a picture of the capture fishing side of the seafood industry because a high proportion of the vessels engaged in it are in single operator ownership, not forming a company and not needing a business address which could be picked up in internet searches.

The main part of the database consists of companies which are primary producers, processors and/or distributors and merchants in the seafood industry. Some also have retail functions. A small secondary logistics database covers companies with servicing functions including management and support of fishing vessels, freezing and storage, auctions and specialist transport. It is not unusual for vessel management and associated services such as chandlery to be combined with fish selling. An additional subsidiary database deals with foodservice, containing general fish restaurant chains, fish and chip chains and specialist suppliers to fish and chip shops.

Since the focus of the research was about supply chains in Britain, the decision was made to include only British companies or those with significant primary production or processing operations in Britain (which could be in non-British ownership). Certainly seafood supply in this country involves substantial levels of imports and hence companies based elsewhere but for the purposes of this research it was necessary to set boundaries to what was covered.

It was noted earlier that occasionally information came from separate webpages within a parent company site. This obviously begs the question of how decisions were made as to what entity should have an individual entry. The rule adopted was to make a separate record if individualised information was available such as separate financial data or about a distinct sphere of activities. In some cases certain corporate policies such as on the environment were understood to apply to all companies in the group and were applied to each of them. The decisions taken about what companies within large groups should be included or excluded and the reasons in each case have been documented.

The main search and compilation took place in 2008. Subsequently, further companies were added and alterations made to existing entries as additional information was obtained. The database has therefore been a continually updated resource, including the date when each entry was made but information has been taken from the database at certain dated points. During the period of the research new companies started, changes of ownership took place and one major group went into administration.

Information collected covered the activities of the business, its range of products, location (or that of its headquarters if it had more than one address) and policies on quality, food safety, sustainability and traceability if mentioned. Where available, turnover information and numbers of employees were included. Turnover details from the business databases consulted had been sourced from accounts deposited at Companies House, a requirement limited

to larger enterprises and only available in arrears that meant that usually the most recent year was 2006. Turnover and the number of employees could be obtained, checked or updated during the interviews but this applies to only a small proportion of the database. The companies were classified into regions and by size, both factors relevant to the use of the database as a sampling frame.

The company entries were categorised under the following seven regions/countries: Central/Southern England, East/North East England, North West England, South West England, Northern Ireland, Scotland, Wales. The England breakdown takes into account areas with distinct fishing identities, especially the South West and the importance of the Humberside area in the east for processing activities.

The numbers of companies engaged in primary production (fishing and farming) and in processing and/or distribution are shown in Table 3.3. The processing and distribution categories were combined because merchant companies very often carry out primary processing, that is preparation of raw fish and seafood, while all the processing companies carried out some distribution functions. Processing may refer to primary or to secondary processing or both. As a number of companies combine production with processing and/or distribution activities the total of both columns is greater than the total number of companies which was actually 191 (not the columns total of 220).

The table illustrates the dominance of Scotland in the British seafood industry with more than half the production companies (thanks to salmon farming and some large fishing enterprises) plus one-third of the processing/distribution firms in the database. The fact that South West has the biggest share in England of fishing activity does not show up on the table because most of it is carried out by small boat owner-operators but the region's number of processing and distribution companies reflects their connection with the fishing industry. The Central/Southern and East/North East regions, however, have much less fishing activity, which is also mainly carried out with small vessels,

but have relatively large processing/distribution sectors for market and historical reasons.

Table 3.3 Regional Distribution of Database Seafood Companies at 2013³⁰

<i>Region</i>	<i>Fishing & Aquaculture Companies</i>	<i>Processing/ Distribution Companies</i>
Central/Southern England	5	35
East/North East England	4	31
North West England	1	12
South West England	6	26
Northern Ireland	3	3
Scotland	27	64
Wales	1	2
<i>Total</i>	<i>47</i>	<i>173</i>

Source: Author

Companies were placed in a fourfold size classification based on turnover as large, medium-large, medium or small. Companies for which no turnover information was available were generally allocated to the small group on the grounds that in most cases the lack of turnover information was because they fell within the class exempted from the requirement to deposit detailed accounts but it was recognised that there are some companies that do not fit the definition for the smallest companies but where financial data was unavailable for other reasons. The criterion used was the highest figure given in any of the three years for which it was available, 2005, 2006 and 2007 but it should be noted that the information was not obtainable on a consistent basis and often was not available for all of the years.

The size criteria were decided upon solely to make comparisons within the world of the seafood industry and they were not chosen to conform with official

³⁰ One business has been omitted from this table because it is an international company with operations in both England and Scotland but does not have a headquarters office in Britain so could not be allocated to a region.

definitions such as of small and medium size businesses which are generally based on the number of employees. This is justified by the fact that it was not relevant to the study to compare seafood companies with those in other industries and the classification was used simply to support understanding of the industry and to produce an appropriate framework for sampling.

The number of employees could have been an alternative to turnover as the variable on which the size definition was based. At the time of the decision to use turnover it seemed that this datum was the more often available for entry on to the companies database. At a later stage and after the completion of the interviews a check was conducted on the database which by then was larger because of the continuing entries, as indicated earlier, and it showed that while there were a number of entries which had turnover but not employee information there were somewhat more where the converse applied so that using the latter criterion could have been a preferable choice. However, the key issue is whether this would have made a difference to the way companies were categorised and hence the sampling process. From the experience of the interviews during which any details not previously obtained for the database could be obtained and given the similarity of the overall categorisation to the general structure of the industry, it seems extremely unlikely that using a different criterion would have changed the sampling or the type of companies selected for interviewing in any significant way.

The overall size distribution of the database companies on the basis of turnover is shown on Table 3.4. About seven in ten in both the primary producer and the processor/distributor groups have been classified as small. At the other end there are a few large companies. This conforms to the known industry structure for the sector (Curtis H & Barr R 2012).

Table 3.4 Size of Database Seafood Companies at 2013

	<i>Fishing & Aquaculture Companies</i>	<i>Processor/Distribution Companies</i>
Large: £60m+ Turnover	2	13
Medium-large: £20-59m Turnover	4	19
Medium: £1-19m Turnover	8	24
Small: Less than £1m turnover/ No Information	33	118
<i>Total</i>	<i>47</i>	<i>174</i>

Source: Author

Prior to the production of the companies database the question of looking at supply chains in terms of certain individual species was considered and examined. There are some aspects of the industry which appeared to lend themselves to this type of enquiry, particularly when one focuses on the primary production stage where it is easy to see specific aquaculture activities and different types of fishing. The proposed species, cod, salmon, mussels and nephrops (langoustines) would have provided a balance of finfish and shellfish and of fishing and farming primary production. However, what can be seen from the companies database is that there is certainly no separation of individual species of fish or shellfish in supply chains and very many companies appear to deal with both wild and farmed, finfish and shellfish, mass catering and specific markets. Hence it would have been both impossible and pointless to document activity in relation to any particular species individually.

At the same time the database shows that there are certain sources of differentiation, which should not be lost from the investigation. The first point is that entry into the supply chain is via different routes depending on whether production is through capture or farming. There are companies specialising in farming salmon or shellfish while separate fishing arrangements target pelagics, demersal fish or specific types of shellfish. Global sourcing carried out by some companies overrides these routes but they remain relevant for some more localised purchasing. The second point is that within the

processing sector there are some specialist areas such as the smoking of certain species, shellfish preparation and the industrial processing of pelagics. Finally, although there is generally little differentiation by species at the retail or foodservice stage, there is one more identifiable chain which supplies a limited range of whitefish, often as frozen-at-sea fillets, for fish fryers. There are also regional differences. The South West England industry is characterised by day boats catching a wide range of species and a considerable number of small merchant-processors. In Scotland certain fishing operations are on a much bigger scale and linked to larger processing companies. In processing, smoking is carried out mainly by companies in Scotland and East/North East England with none known as far as the database is concerned in the South West. These considerations were relevant to choices made in relation to the interviews.

With its particular coverage of processing and distribution companies, the database provided a helpful platform for further investigations concentrating on the middle of the supply chain. This was developed in relation to the interview stage of the project.

3.4 The Stakeholder Interviews and Visits

Interviews have been used to obtain information about the companies concerned, about their upstream and downstream relationships and what they did in relation to safety, quality assurance, traceability systems and sustainability of supply so that governance issues could be assessed. The interviews have also been a resource for understanding the experience of supply chain actors, their individual understanding of relationships and pressure points and their views on key issues. In addition those who had worked for a long time in the industry provided some personal experience of change at least for the more recent period covered by the study.

The initial plan was to interview representatives of all stages of seafood supply chains. An outline interviewing structure was produced at an early point in the

development of the project when consideration was being given to studying supply chains for four seafood species individually as previously noted. The intention was to cover all stages of the supply chain (that is production, processing and distribution) for each of them, together with retail, food service plus other organisations including wholesale markets, state agencies and NGOs. Given the limitations of a study based on a single researcher this would have resulted in a scatter-gun approach because to keep the overall number of target interviews within manageable bounds, there would be a very small number in each group. In addition the small numbers in each category would not provide scope for regional or size differentiation of seafood companies.

The approach was changed after the compilation and first analysis of the seafood company database and the conclusion that there was no basis for trying to examine separate supply chains for different species. However, the database also made clear the complexity of the industry in terms of company sizes and activities as well as indicating regional concentrations and differential regional structure. For reasons already explained, the number of primary production companies in the database was small and the majority carried out processing and/or distribution.

The database thus afforded an opening for the research to be used to provide information on what had been established in the literature review as the least well documented part of the seafood chain (and indeed of food studies generally) namely the processing sector. It was therefore judged to be more productive for the interviews to be concentrated on the middle of the chain, that is on companies undertaking the processing and/or the distribution of seafood rather than for them to range over the whole supply chain.

This reconsideration also led to questioning the inclusion of the previously suggested non-supply chain actors. The decision was taken to retain relevant trade organisations and also (a reduced number of) retailers to obtain the views of these parties who know the seafood industry well. However, instead of the initial proposed interviews covering a wide range of foodservice

concerns, it was resolved to focus on the fish and chip sector through a sample of specialist supply companies plus its own trade organisation. Finally and related to the ongoing accumulation of material as described in the previous section it was judged that the researcher would have sufficient evidence to fully cover the activities and viewpoints of both state and NGO actors in relation to the seafood industry without requiring interview information. The result was that the limited research resource could focus in depth on the middle of the chain.

Concentration on the processing and distribution sector has had several advantages. The middle of seafood supply chains has received relatively little consideration as most attention has been paid to production and its associated sustainability questions and to consumption in relation to those same questions and because of nutritional issues, so a focus here was considered to be particularly valuable. The middle of the chain is a vantage point from which other stages in the supply chain can be observed so it was expected that the interviews would also provide information and views on production and consumption and how they influence processing and distribution, thus providing a basis for assessing governance both upstream and downstream. Finally, concentrating the interviews on one section of the supply chain enabled the research to obtain fuller and more representative coverage of that area than would have been possible otherwise.

In approaching the issue of sampling for the interviews the initial stage was to consider regional and size coverage using information from the database of seafood companies at the relevant point of time, November 2008. The breakdown is shown in Table 3.5. At that point, there were 106 processing/distribution companies in the main part of the database. The larger number shown earlier on Table 3.3 which was 173 includes companies added to the database after the sampling stage had passed as well as producer companies that also had processing and/or distribution functions. The latter were excluded from the sampling process in accordance with the decision to focus on the middle of the chain. However, there were a couple of cases

where due to incomplete information, companies with mixed producer-processor/ distribution functions were unintentionally selected and interviewed.

Table 3.5 Size and Regional Grouping of Processing/Distribution Companies in the Seafood Database in 2008 Used for Sampling

<i>Region</i>	<i>£60m+ Turnover</i>	<i>£20-59m Turnover</i>	<i>£1-19m Turnover</i>	<i>Lower Turnover/ No Information</i>	<i>Total</i>
	<i>Largest</i>	<i>Large</i>	<i>Medium</i>	<i>Small</i>	
Central/ South England	2	4	4	7	17
East/North East England	7	3	1	10	21
Northern Ireland	0	0	0	2	2
North West England	1	2	1	4	8
Scotland	1	6	7	29	43
South West England	0	0	0	14	14
Wales	0	0	1	0	1
<i>Total</i>	<i>11</i>	<i>15</i>	<i>14</i>	<i>66</i>	<i>106</i>

Source: Author

As is clear from the database information, the seafood industry is more concentrated in certain parts of the country and as already noted has certain regional characteristics. With a limited interviewing resource the decision was taken to target companies in the four regions with the greatest number of processing/distribution companies, that is Scotland and three English areas, Central/South, East/North East and South West. Together, these include the zones with the most important fishing sectors, Scotland and South West England plus the major Humberside processing conglomeration.

The next decision was to structure the sample to provide a balance of larger and smaller companies. The intention was to gain insights from companies

with a range of different functions. In addition, different governance considerations were expected to arise for different size companies oriented to different markets. With the small numbers involved, the four size categories could not have each been covered so they were combined into two for this purpose: Medium-large/Large and Small/Medium.

The resulting sampling framework is indicated in Table 3.6 which shows the number of companies known at the time from the database in each size-regional category. Generally there are fewer companies in the larger group and indeed none at all for the South West. With an initial target of a minimum of 20 company interviews, the planned interview structure was to undertake three for each size category in each of the four regions. Taking the lack of larger companies in South West England into account, this produced a target of 21 interviews.

Table 3.6 Size and Regional Grouping of Processing/Distribution Companies for Sampling

<i>Region</i>	<i>£20m+ Turnover Medium-large/ Large</i>	<i>£19m or Lower Turnover/No Information Small/Medium</i>
Central/Southern England	6	11
East/North East England	10	11
South West England	0	14
Scotland	7	36
<i>Total</i>	26	80

Source: Author

In addition to size and region, there were several other criteria which were set for the sampling process so as to cover a wide spread of activities. This needed to include processing and distribution of both wild and farmed seafood, companies with only distribution roles as well as those where these were combined with processing and suppliers of both retail (including the major supermarkets) and foodservice sectors. An exclusion factor was also applied

to large groups to avoid interviewing more than one of its constituent companies which might have produced some policy duplication.

Companies from the database and their key characteristics were listed for each of the regional and size groups. The sampling process then took place on a two-stage basis. In accordance with the aim of covering a diversity of functions, an initial purposive sampling approach was adopted for each region (Denscombe M 1998). Companies with relatively unique characteristics were nominated for targeting or if there was more than one with the same features, a random selection process between them was carried out; the exclusion factor was applied if relevant. For the remainder which generally covered the bulk of the smaller company group, a random sampling method was applied; for example to arrive at the target three in the smaller Scotland group of 30 plus companies, every tenth company was sampled with the starting number chosen at random by a third party, not the researcher. Subsequently, if an interview was declined, a replacement target was selected or sampled as far as possible on the same basis as for the previous determination.

To summarise the approach taken, it consisted of mainly random sampling of the medium/small companies group but a more selective tactic for larger companies having particular characteristics which were expected to be relevant to the enquiry but still using randomisation where possible, that is if more than one company satisfied the specific criteria for each category.

A separate, simpler exercise was undertaken to select targets for the specialist suppliers to the fish and chip trade. Two companies were sampled randomly out of the top four suppliers to this sector; information on the identity of these prime companies had previously been provided by a trade organisation.

The sampled companies and selected organisations were then approached on a cold-calling basis with a small number of exceptions where the researcher had previously made or been provided with a contact. Calls were followed up with written information about the project, including the commitment to

confidentiality for both the individual and the company/organisation, usually sent by email.

Once the contacts and interviews started, some adjustments were needed. In certain cases, the region attributed had to be changed. Thus a company selected on the basis of an address in Central/South England had to be re-allocated to East/North East England because it turned out to be a subsidiary of a larger company; another re-allocation from South West again to East/North East was because the company offered an interview with its processing arm which had a different location from the headquarters address. Two companies assumed to be small because no financial information was available turned out to be in the medium-large category. Despite the intention to exclude primary producing companies, one was interviewed when the marketing arm of an aquaculture enterprise, previously understood to be a standalone company, was targeted and another when a processing company turned out to also have fishing interests.

Eight of the companies approached declined to participate in the project. Owing to the sampling method adopted, this did not affect the number of interviews because of the replacement strategy which has been explained but it could have affected the overall representativeness of the final cohort. It was most difficult to achieve interviews with the larger companies in Scotland particularly the major pelagic processors. On the question of response, while some non-response is to be expected, there may be an unusual contributory reason in relation to this project. It is possibly not a coincidence that three of the eight refusals were from companies subsequently prosecuted for illegal fishing activities. A fourth refusal company later went into administration.

Apart from companies, additional interviews were sought with a range of seafood trade organisations, selected by function; all agreed to participate. Finally contacts for two major retailers were approached and in each case this resulted in an interview.

Three company interviews were undertaken on a pilot basis in late 2008. Each of them turned out to be problematic from some aspect including last minute non-availability of the person with whom the arrangement had been made and technical recording difficulties. In two cases a subsequent satisfactory telephone interview was carried out with the correct person. In the third case the interview was discarded as providing insufficient information and a replacement sampled.

The resulting record of targets and interviews achieved is in Table 3.7. It shows that the general seafood company target of 21 was exceeded by two; one because of a regional re-allocation, the other because one interviewee took the initiative of arranging an additional interview for the researcher with the managing director of another local company. The specialist suppliers to the fish and chip trade were added to make a total of 25 company interviews. Totalling these and the sessions with trade organisation representatives and retailers made a grand total of 33. Of these, 27 were face-to-face (taking place in all four regions), four were telephone interviews and in two cases a visit was followed by a telephone interview with the main target who has not been available initially. Although telephone interviews mean time and cost savings, particularly relevant with the wide geographical spread of the companies, it was preferred where possible to interview personally because of the gains in empathy, better management of the interview and the advantage of seeing the interviewee in his or her own milieu. An additional advantage was the potential for premises visits. Where the interviewee was seen in the location where processing took place a tour of the facility was usually requested at the end of the session; this was more likely to be agreed by small companies, least likely with those serving the major retailers.

In terms of representation, the small/medium companies carrying out primary processing and distribution or which produced smoked fish were well covered. In addition to the specialist fish and chip wholesalers two other companies supplying fish to fish fryers were interviewed plus a major supplier of seafood

Table 3.7 Interview Record

<i>Region/Organisation Type</i>	<i>Company Size</i>	<i>Target</i>	<i>Interviews Achieved</i>
Central/Southern	Medium-large/ Large	3	3
	Small/Medium	3	3
East/North East	Medium-large/ Large	3	3
	Small/Medium	3	4
SW England	Small/Medium	3	4
Scotland	Medium-large/ Large	3	3
	Small/Medium	3	3
Fish & chip trade wholesalers		2	2
<i>Sub-total companies</i>		23	25
Trade organisations		6	6
Retailers		2	2
<i>Total</i>		31	33

Source: Author

to the foodservice sector in general. Six of the interviewed companies manufactured for supermarket chains. However, although the selective sampling process aimed at three companies which were understood on the basis of website information to serve institutional caterers, only one of them when interviewed turned out to do so and therefore this part of the foodservice market is not well-covered. As previously noted, there was no interview with the largest pelagic processors because there are only two and both refused but two other companies which specialised in smoking pelagic species were included. The non-involvement of large pelagic processors was a limitation to coverage insofar as this is a section of the industry with a particular character, geared to exports but was unavoidable. Nevertheless, it is concluded that the method of sampling adopted was reasonably successful in its aim of leading to interviews with a range of companies serving different parts of the seafood market.

The positions of the interviewees were varied. Thirteen of them were managing directors of their companies (although they did not necessarily choose to be described as such); other roles included trader, site manager and technical manager. Interviews were digitally recorded except for the one person who did not give permission. In a small number of cases, more than one person contributed to a given company interview; if so, each has been quoted individually. The main interviewee was asked to sign a consent form; in the case of telephone interviews the consent form was emailed with a request to post it back signed, which was acceded to in some but not all cases.

The interviews were on a semi-structured basis, guided by a few broad questions which were asked consistently. Slightly different versions were used for seafood companies, trade-related organisations and retailers and are reproduced in Appendices 3a, 3b and 3c. For certain companies known to have the relevant trading relationships, for example because of website information or comments made during the interview (and in one case when the large lorry of one of the major retailers was seen outside the window of the room where the interview took place) a subsidiary question was asked on relationships with supermarket customers which it would not have been pertinent to put generally.

Another question treated variably related to the interviewee's experience. The start of the question about changes in the industry, 'You have probably been in the business for some time' elicited clarification about how long this had in fact been and the question was only pursued if appropriate.

The relationship between the research questions and the interview questions for company participants is shown in Table 3.8.

Table 3.8 Interview Questions for Companies Related to Research Questions

<i>Interview Questions for Companies</i>	<i>Related Research Question</i>	<i>Comment</i>
1. First I'd like to ask about your role in the company - how would you describe it?	None	General background question assisting understanding of the respondent's perspective & the function of the company.
2. Thinking about your supplies, there can be lots of pressures about where to source, problems with some species, standards, sustainability questions - What problems do you have in getting what your company needs?	2. What forms of public and private governance, separately or jointly, have affected supply, processing and consumption in the seafood supply chain and in what ways have they driven changes over the period?	Question to elucidate governance exercised by interviewees upon their suppliers and views about sustainability issues.
3. Coming to your customers, companies can experience all sorts of demands, different demands from different customers, perhaps differences between what customers want and are willing to pay for - What sort of requirements do your customers have? What problems do you have with your customers?	3. What governance mechanisms have been used to pursue sustainability, safety and quality in the seafood chain and how successful have they been?	Question to elucidate governance exercised on interviewees by their customers and views about food safety, and quality. Also provided some consumption input, indirectly via customers' views but direct information about consumers from interviewees with a retail function.
4. You're affected by a lot of legislation and government requirements generally - Is it helping or hindering what you do?		Question about the specific impact of public regulation.
5. You have probably been in the business for some time - How have things changed from when you started?	1. How has the seafood supply chain for British consumption changed over the period since 1950?	Information sought for the more recent part of period, as relevant to each respondent
6. What do you feel are the key challenges that your business (company) faces at the moment?	None	Opportunity to obtain unstructured input about issues important to the respondent

Source: Author

The first and last of the interview questions do not relate specifically to the research questions. Their purpose was to obtain background information or to give an opportunity to the interviewee to raise issues of subjective importance

in a relatively free and unstructured way, thus assisting the interpretivist aims of the study, and also in the case of the first question to provide a relaxed start to the session. In relation to the research questions about governance, the issue of public regulation was addressed directly (Q4) but private forms of governance were approached more obliquely by asking about factors relevant to supply and suppliers and about customer requirements (Q2 and Q3) and the latter served to draw out observations about consumers and consumption as well. The word 'governance' itself was not used in the questions; as a term of academic analysis, not of everyday language, it could not have been expected to be meaningful to most of the interviewees or represent comparable understandings between them. The interview question about personally-experienced change related to the objective of the first research question and the historical overview.

While the interviews have been extensively quoted in the following chapters, the context can be invisible. To compensate and provide some background and scene-setting, eight brief vignettes have been produced for selected companies; these are presented in Appendix 4.

Given the relatively small number of interviews it was concluded that computer-assisted data analysis would not be appropriate, that is it would not be particularly time-saving. Instead, a comparable approach was used in that the interviews were broken down into the topics that arose in the conversations. This was facilitated by the fact that all the interviews had been transcribed by the researcher, thus giving a very thorough familiarity with the material. Working from the transcriptions, a separate sheet was compiled for each relevant topic mentioned in any interview. In these the verbatim quotes were fully reproduced together with the respondent identifier. The list of topics is reproduced at Appendix 5. They include items like standards, sustainability and quality which were directly raised by the interviewer whether in the introduction, the questions or associated probing but others such as size standardisation, fisheries science, pricing and profitability arose from comments made by the participants. The topics were then written up descriptively in several papers in which all relevant quotes were again

reproduced. These papers subsequently provided a key resource for the writing-up stage of the research. The process ensured that the analysis was based on the points that interviewees themselves made; while these of course had a starting point in the content of the questions asked, there was considerable scope for other issues to be raised.

Quotations are attributed on the basis agreed at the interview (or if this was not explicit as the self-identified job title) and none of the companies have been named.

In addition to the interviews a small number of visits to seafood companies were undertaken as part of certain group activities. Commentary and information by key personnel were thus given in public and not covered by the confidentiality commitments made to the interviewees. However, in these cases specific agreement was requested to record the comments made which was granted in each case.³¹ Material from these visits has been analysed in the same way as for the process used in relation to the interviews and is similarly presented in an anonymised form.

The inclusion of interviews in the study design necessitated approval from the City University Senate Research Ethics Committee. The submission explained how the principles of confidentiality and anonymity would be upheld in the management of data obtained. Approval for the study was granted in February 2008 (copy appended at Appendix 6).

Subsequently, the study plan and conclusions from the review of literature were submitted in the transfer paper *An Introduction to Supply Chains for Seafood*, September 2008. The upgrade to PhD student status was approved in April 2009.

³¹ Visits to two companies in South West England were laid on as part of a course at the Padstow Seafood School taken in September 2008. Visits to a salmon farm and a trout farming enterprise were included in the additional programme offered to delegates at the Scottish Aquaculture: A Sustainable Future International Symposium, held in Edinburgh, April 2009. A tour around Billingsgate Market was provided for a meeting there of the Council of Food Policy Advisors in November 2009 which the researcher accompanied.

3.5 Reflections on the Companies Database and the Interviews

There were two aspects of the methodology which involved new data collection, the database and the interviews, each of which involved a considerable time commitment. Consideration therefore needs to be given as to their value.

Certain limitations of the database of seafood companies have already been noted in section 3.3. It is dependent on website information which reflects the image that companies wish to present to the external world and is inevitably partial in several ways. Content, especially the extent to which detailed information is provided varies considerably on different sites and cannot be interrogated (except for companies where an interview subsequently took place). However, while information about a firm's activities and products is likely to be fairly reliable for obvious commercial reasons, statements on websites about the company's credence attributes are often better understood in terms of the image it wishes to present; there may be little which could be used to assess the actual extent and implementation of policies to enhance food safety, quality or sustainability unless certifications have been achieved. In addition, there are limitations to the software used as the Access programme is the least well-developed of the Microsoft Office suite but it had the advantage of being readily available and familiar to the researcher.

One further major limitation was the failure to build into the structure of the database from the start systems to record change. It was set up to provide an immediate picture of the industry but with hindsight provision should have been made to systematically record further developments. Although there was awareness that changes in companies was to be expected over the research period, the database was not designed sufficiently well to accommodate them. However, continuing general oversight of the industry was maintained and further information about companies was obtained, kept in the paper records and added to the database.

All the same, the production of the companies database was a crucial stage in the research, not so much because of the use of the data in development of the arguments of the thesis but rather as a discovery process. It provided an invaluable insight into the range of activities carried out and the products made by the seafood industry, particularly companies in the middle of the chain which have to date received less attention.

In addition, the database was the basis for the interview sampling. Without it, contacts for the interviews would have had to be obtained in some other way such as 'snowball sampling' which would not have allowed the structuring of the sample in the same way and the results would probably have been much less representative.

Turning to the interviews, they have certain intrinsic variabilities. Given the diversity of the seafood industry, it cannot be assumed that random sampling produces a representative selection. The selection could have easily resulted in a different set of firms and different views being presented at least in relation to the smaller companies. Much depended on the knowledge, experience and articulateness of respondents, all of which varied considerably. Another issue is that the interviewer, while trying both to be consistent across the interviews and to have an empathic interchange with each individual, may have unintentionally influenced what was said.

A distinction can be drawn between information given in the interviews that can be regarded as factual and what was rather an opinion held by the respondent. When the interviewees talked about what they and their companies did, for example in relation to sourcing or their food hygiene systems it can be considered as fairly reliable information. They also provided a range of views on many issues such as fisheries management, influences on consumption or the nature of quality in seafood which are equally valuable but have to be understood as reflecting the perception of individuals about how the industry functions and therefore used on that basis. In relation to governance, what people think is influential *is* influential so such views do have an important place in the analysis.

The strategy of using the middle as a vantage point is assessed as having worked fairly well, giving insights in relation to all parts of the chain. It was supplemented by input in relation to production from two aquaculture companies (one interview and one visit) and to an extent for consumption by the two retailer interviews and special attention given to operations in the fish and chip sector. In addition, interviews with trade organisation representatives supplied a broader perspective.

The result of concentrating the interviews on companies in the middle of the chain was a certain variation in the type of information produced. A higher level of factual information was obtained about this part of the seafood chain compared to what was acquired in relation to the production and consumption sections. This is positive in view of the more limited sources of information about the processing and distribution sector elsewhere. Moreover, issues of governance within seafood supply chains were mainly pursued through information from interviews with these companies in the middle of the chain whereas it was external governance that was the main subject when dealing with the production and consumption sectors.

However, distinctions between what is regarded as factual information for example about the workings of the respondent's own company and opinions or personal assessments of issues connected to the seafood industry cannot be clear-cut and come down to the judgement of the researcher so this is not an absolute distinction but simply an indication of how the interview material has been understood and used. Further, the quotations themselves are an extremely limited selection from the mass of the interviews and again down to the researcher's choice of what was viewed as most interesting or illuminating in relation to the chapter contents. On this basis, it is possible to compare the material used in considering different parts of the chain. In chapter 5 which deals with processing and distribution, that is the middle of the chain, of the direct interview quotes reproduced in the text of the thesis, the great majority, 80 out of 90 are factual in nature of which 67 came from the companies, eleven from trade organisation interviews and two from a retailer. By contrast,

in chapter 4 which deals with supply and production issues, there are just thirteen factual quotes, all but two from companies, and twenty-five categorised as opinions, mainly about fishery management and about sustainability more generally. Chapter 6 covering retail, food service and consumption contains 46 quotes rated as (at least partially) factual, 26 from companies, 11 from the two retailer interviews and nine from trade organisations while a further 21 can be considered as opinions, most from companies with just one from a retailer and four from trade commentators. These numbers may include more than one extract from some interviews.

Thus the balance of the material used in the various chapters differs. This accords with the intention of using the interviews particularly for information about the middle part of the chain and the interrogation of relations within it and the complementary greater use of available documentary sources for the other sections. In this way the interviews have yielded both factual information, richest on but not confined to the middle of the chain, and opinions reflecting the understandings of participants in the seafood industry, thus contributing to both objectivist and constructivist readings.

The question about changes seen in the respondent's career was intended to aid the historical aspect of the study. Some of the interviewees had worked in the seafood industry for a considerable time and could recall alterations in their own working lifetimes. Of the thirty-one individuals who either gave exact information on how long they had worked in the seafood business or who provided sufficient circumstantial information for this to be estimated, thirteen (a third) had more than twenty years such experience; five of them had more than thirty years and two as much as forty. Bearing in mind that the interviews were carried out in 2009 and the early part of 2010, a very small number of informants had personal knowledge of the situation in the 1970s and 1980s and a larger number from the 1990s onwards. Such memory was valuable and could be contextualised against the chronology of key developments affecting the seafood industry obtained from documentary sources.

The total number of respondents being low compared to the result of quantitative research it was important to avoid incorrect generalisation. Only occasionally was it appropriate to draw a conclusion from the expression of similar views about an issue. Otherwise comments made have been used as illustrations of views held in and influences upon the seafood industry.

More generally, there is a question about whether the level of effort devoted to the whole interview process with its geographic logistical complexities and time needed for transcription and analysis was disproportionate compared to the use of secondary sources. Much of the analysis in fact rests on the latter. Part of the benefit of the interviews was, as with the companies database, the discovery process for understanding the industry. But the interviews also provided perspectives and insights which have been material to the analysis and not obtainable by other means so are judged to have been a worthwhile contribution to the study.

The objectives of achieving validity in representing the situation and reliability in the way research has been conducted while relevant whatever methods are used are particularly challenging in relation to qualitative types of research such as the present exercise based on semi-structured interviews (McNeil P 1990;Silverman D 2000;Yin RK 2003). These attributes have been sought by establishing a knowledge basis for sampling through the companies database, by carrying out the sampling process in a systematic and documented way which combined purposiveness toward specific characteristics with as much random selection as possible, by managing the interviews on a uniform basis, analysing them consistently and by examining the output from the interviews against a wide range of other material.

CHAPTER 4: SEAFOOD SUPPLY - PROVISION AND GOVERNANCE

4.1 Changes in Supply for the British Market

This chapter describes the changes that have taken place in the supply of seafood for consumption in Britain in the last sixty years, outlines the growing importance of sustainability considerations and considers the governance mechanisms which were material to these developments. The supply position results from the economic activity of supply chain actors but has been heavily influenced by state and supra-state regulatory activity in both constraining and facilitating ways. Private self-governance has been more important in some production sectors and in more recent years there has been some involvement of civil society actors.

Early in the period being considered, in the mid-1950s, Britain with its large fishing fleet had a plentiful supply for the domestic seafood supply chain plus significant export markets, having recovered from Second World War problems. By 2012 Britain still had a relatively large fleet of 6,457 registered vessels, second in the European Union by capacity (gross tonnage) and fourth measured by engine power, and is still an exporter of seafood (Almond S & Thomas B (Eds) 2011; Anderson J et al. 2012). However, it supplied only a small part of domestic demand, now met to a considerable extent through imports but also supplemented by aquaculture. Thus there has been a revolution in supply.

One informant with twenty years of experience had personally experienced a marked change:

‘When I was in my teens to my twenties sort of thing the fish market down here, one end to the other shots, each boat’s landing is a shot. You had them laid out side by side and you basically just walked up and down and took note, mental note, the ones you wanted or thought better quality.’ ‘Now there is none of that at all. You went from, say 100 to 1000 boxes, maybe twice a week on this market to something like 20 or 30, huge difference, huge.’
Managing director, small company 6

Another could refer to a decade earlier:

‘The biggest change without doubt is the changes to the catching side, the supply of fish to the UK market. Thirty years ago there was as much fish as you wanted on this market on a daily basis, it was a thriving industry and lots and lots of big processors processing fresh fish on a daily basis. Today there’s probably none, not big ones.’ Managing director, large company

Even someone with only seven or eight years experience as a fish merchant could notice a difference in this relatively short span of time as well as referring to what he had heard about the local scene before his arrival:

‘From what I hear before I moved down here, they were catching a lot more. We have seen a change in the last five, six, seven years I suppose. That the stocks of certain species, not all species, stocks of certain species are in slight decline. They’re not as prolific as they were.’ Director, medium company 1

But it is equally interesting to note that most of those interviewed for this research did not mention such issues about the volume of supplies when asked about change they had experienced. Those informants most likely to speak about a reduction were those that continued to be reliant on local fishing activity as their resource or in the case of the second person quoted above, had done so in the past. For others, they had changed the source of supply and appeared to be satisfied with current arrangements.

Thus one interviewee recalled the ending of local supplies of herring when a seven year fishing ban was imposed in the 1970s. Several other regional kipper producers had closed as a result. This firm, however, had tried various alternative sources, concluding with the current very adequate solution of frozen Norwegian herrings which provided reliable and steady supplies, highly preferable to the previous unpredictability:

‘When you were relying on fresh fish, fresh herring landed on this coast, the Scottish boats didn’t fish on a Sunday night because of their religion so if there were no English boats fishing, you didn’t get herring on a Monday morning and if it was blowing a gale on a Monday the boats couldn’t go off, you didn’t get any, might only get herring three times a week if you were lucky.’ Director, medium company 2

Supply options had widened in various ways such as an increase in salmon (as a result of farming) and the availability of fresh tuna:

'Much of the trade of many of our customers is based on salmon now. Thirty years ago it wouldn't have been, it wasn't there.' Trader, medium-large company

Global sourcing could be very welcome:

'One of the other biggest changes with globalisation and easy communication has meant that it's very easy to buy fish from all over the world.' 'The globalisation change has added to supply.' Site manager, medium-large company

So the changes on the supply side are variously seen as: reduced British fleet landings, a bigger range and more reliability. This chapter discusses the reasons for these changes and the governance mechanisms at work.

In doing so it deals separately with three categories of supply: capture (wild) seafood produced by fishing, farmed fish and shellfish. In reality they are not distinct for various reasons. Shellfish may be fished or cultivated so overlaps with the other two. In addition, there are a large number of practices which are intermediate between the taking of entirely wild fish and complete domestication. These include the augmentation of natural populations with the products of hatcheries or control of their predators on the one hand and on the other basing cultivated stock entirely on wild spat and/or avoiding artificial feed. The former type is acknowledged in the acceptance of the concept of 'enhanced fisheries' while such practices overall are sufficiently widespread for some to have suggested the adoption of a new hybrid category (Klinger DH et al. 2013; Sainsbury K 2010). However, this has not happened so far and the tripartite grouping is convenient for analysis because most material, not least official statistics, is available in terms of this classification.

4.2 Capture Fish: Supply, Governance and Sustainability

The British fishing industry was barely regulated at the outset of the period under consideration. Changes have come from two directions. The conditions under which fishing takes place have become highly regulated and the fleet itself has changed from being constituted purely by commercial decisions to

also being regulated (regulation referring here as elsewhere in this thesis to governmental action). These shifts have substantially impacted on seafood supply for the domestic food chain. This section first describes the supply situation over the period and the role played in it by domestic fishing, then analyses in turn the impact of European and domestic state regulation and then of eco-labelling governance, while also considering their effects on sustainability.

4.2.1 Domestic Supply and Domestic Fishing

Following fishing disruption during World War II and some exceptional catches immediately after it, British fishing production had returned to something like the pre-war situation by the 1950s and 1960s. Although there had been changes in capture methods, catch composition and ports, the size of whitefish catches were similar at the end of the 1950s to the position twenty-five years previously (Taylor RA 1960).

The fleet's operations then ranged over three groups of fishing grounds: the distant water fishery (including Icelandic waters and the Barents Sea), the near and middle water fishery including the North Sea and finally the inshore fishery of smaller boats around the coasts (White Fish Authority 1959). During the 1960s, UK boats landed between 843,000 and 954,000 tonnes of fish per annum, a range indicating considerable variation but all the same accounting for between 83% and 86% in each year of the total available for domestic consumption. A high proportion of this catch, never less than three-quarters and sometimes reaching 85%, consisted of demersal species, predominantly cod and haddock, the whitefish well-established by then as the preference of British consumers. A similar picture continued through most of the 1970s but began to change at the end of the decade. In 1978 British vessels landed a reduced 77% of consumption supply, in 1979 it was down to 70% and

thereafter the proportion continued to decrease steadily.³²

The course of decline is summarised in Table 4.1. By the end of the 1990s less than half of the seafood eaten in Britain came from UK vessels. In 2010 it was down to just 37%. Landings of demersal species reduced in parallel and were indeed the reason for the growing gap.

Table 4.1 Total and Demersal Landings from UK Vessels into the UK 1960-2010

<i>Year</i>	<i>UK Vessel Landings into the UK in 000 Tonnes</i>	<i>UK Vessel Landings as % Total Supplies</i>	<i>UK Demersal Landings as % Total Demersal Supply</i>	<i>Demersal as % All UK Vessel Landings</i>
1960	843	86%	86%	82%
1965	926	83%	82%	86%
1970	975	85%	82%	75%
1975	869	88%	84%	67%
1980	759	67%	NA	NA
1985	762	69%	54%	53%
1990	662	57%	44%	47%
1995	726	60%	44%	45%
2000	440	44%	31%	46%
2005	475	40%	19%	30%
2010	411	37%	NA	NA

Source: Author based on Sea Fisheries Statistical Tables/UK Sea Fisheries Statistics issued by Ministry of Agriculture, Fisheries & Food/DEFRA/Marine Management Organisation

However the total fishing take, that is landings both in the UK and elsewhere, told a different story, maintaining fairly high levels through much of the 1980s and 1990s then decreasing to landings of 581,000 and 606,000 tonnes in the most recent years known at the time of writing, 2009 and 2010. What this

³² The sources of information about seafood landing and imports are the (mainly) annual Sea Fisheries Statistical Tables produced by the then Ministry of Agriculture, Fisheries and Food. However, information relating to the 1950s is restricted and in particular it was not until the 1965 Tables (published 1966) that they covered the whole of the UK whereas previously they dealt mainly with England and Wales. Quantities originally given in hundredweights for the earlier years have been converted into metric tonnes.

meant is that much of the UK fishing effort became directed at production for export, both shellfish and pelagic fish, mainly herring and mackerel.

British herring fishing had contributed supply for domestic consumption in earlier periods and this was the case immediately postwar when it had the advantage of not being rationed. Later the herring fisheries declined and the fish had to be imported; part of the fleet diverted to catch mackerel which produced plentiful supplies though domestic demand was low (Whittle KJ & Wood CD 1992).

As the supply of whitefish for the British market from British boats decreased, imports went up. From 1984 the UK has been a net importer of fish (Ministry of Agriculture 1993). Thus in the second half of the twentieth century the supply of most fish for consumption went from being a matter of domestic production to being a matter of trade. A disconnect had developed between much of what was caught by the British fleet and the seafood predominantly consumed in this country.

4.2.2 Policy and Regulation

The background to these changes involved a number of state and supra-state activities. First of all in the food productionist period following World War II, the British fishing fleet was substantially modernised with state support. The support was organised via the delegated body the White Fish Authority, established by the *Sea Fish Industry Act 1951*. Its mandate to reorganise, develop and regulate included the provision of grants and loans for fishing boats and equipment as well as for quayside requirements, fish processing plants and specialised transport. A substantial programme of vessel modernisation was underway by the end of the 1950s; in addition, prices were subsidised by additional payments related to catches (Coull J 1996; Foreman S 1989). A similar role during the post-war period was carried out by the Herring Industry Board (established at an earlier stage in 1935) using grants and loans to support fleet modernisation and providing a subsidised minimum price scheme (Reid C 1998). State promotion of the fishing industry through such

mechanisms has had a long history going back to the Fishery Board set up in 1809 (Coull J 1996).

At the same time international regulation of sea fisheries was developing with Britain closely involved. This had been initiated back in the nineteenth century with a 1839 Anglo-French accord relating to the English Channel and later the 1882 six country North Sea Convention which established the principle of three mile territorial waters (Oddy DJ 1971; Steinberg PE 2001). A shared scientific basis for management started with the inauguration of the International Council for the Exploration of the Sea (ICES) in 1902, the UK being one of the eight founding members. The 1937 agreement on an International Convention for the Regulation of the Meshes of Fishing Nets and the Size Limits of Fish was stalled by the Second World War but renewed subsequently during the UK-organised 1946 International Conference on Overfishing in the 1946 Convention with the same title, now covering only the North East Atlantic but adding the establishment of a permanent commission; however, the British proposal to restrict overall vessel capacity did not obtain the consent of the other parties (Foreman S 1989). The agreement was superseded by the North East Atlantic Fisheries Convention which came into force in 1963 with its North East Atlantic Fisheries Commission (NEAFC) headquartered in London (Bjørndal T 2009; Halliday RG & Pinhorn AT 1996). Thus there has been a long-standing recognition of the need for shared conservation measures to protect fish resources in principle but the extra powers of NEAFC did not have much impact on fishing activity because of the difficulty of getting all the signatories to agree relevant measures (Lee AJ 1992).

The sphere of regulation beyond the control of a British government expanded immensely in the 1970s through various linked events. The 'Cod Wars' started when Iceland declared a twelve mile territorial zone in 1958, followed by 50 miles in 1972 and finally 200 miles in 1975, each step vehemently protested by Britain but eventually accepted (Foreman S 1989; Kurlansky M 1999). This proved to be just one part of a series of international developments which resulted in such claims being recognised globally in the United Nations Convention on the Law of the Sea (UNCLOS - concluded in 1982 and fully into

effect in 1994); eventually nearly all of the world's coastal countries declared Exclusive Economic Zones (EEZs) of 200 nautical miles.

With the acceptance of the EEZ principle the British distant water fleet lost most of its access to what had been the largest source of whitefish and was drastically reduced, resulting in a traumatic change for the fishing and processing industries. The impact on British fish supply was sharp. Direct landings of cod were greatly reduced and imports increased. The east coast ports of Hull and Grimsby where the main whitefish landings had taken place managed to maintain their seafood processing plants but now they depended greatly on imports from the 'Nordic countries', that is Iceland, Norway, the Faroes and Greenland. The fish was coming to a large extent from the same marine sources but now it was a foreign not domestically produced supply (Symes DG 1985a; Symes DG 1985b; Symes DG 1991; Symes DG & Haughton GF 1987). This dependence continues (Garrett A et al. 2010).

As well as the UNCLOS-related changes, Britain by becoming a member of the European Economic Community (EEC) in 1973 also became a partner in the Common Fisheries Policy (CFP). Britain's own 200 mile EEZ was declared in the *Fisheries Limits Act 1976* but it effectively became part of European Community waters. The only exception has been the twelve miles zone where member states retained exclusion rights. Originally intended to be a short-term transitional measure it has been maintained in every successive round of CFP reforms though limited by the provision for other member states' historic fishing rights in the six to twelve mile zone to continue.

The CFP is a set of principles, rules for a common market and a continually adapting and complex set of specific fisheries management policies ranging over several seas and the North East Atlantic Ocean. Although as a formal structure with fisheries management responsibilities the CFP was not established until 1983, certain key principles were agreed in 1970, particularly equal access to other member states' waters and a common market, and importantly this agreement coincided with the start of Britain's EEC accession negotiations, that is before the UK could participate in these decisions. It has

been seen as deliberate policy-making to present Britain and other then applicant countries possessing major fishing industries with a *fait accompli* (Lequesne C 2004). However, subsequent resolutions took place after Britain's 1973 entry, notably the 1976 Hague Declarations agreement on extending jurisdictions to the 200 mile level and on principles for fisheries policy and the 1983 'relative stability' agreement establishing member states' shares in allocations (Halliday RG & Pinhorn AT 1996; Urwin D 1995). These were developments with great implications for the fishing industry but it has been argued that the objectives behind the CFP were more about European unity than effective fisheries management (Crean K 2000) even though the first Regulation establishing management rules (EEC) No. 170/83 did put conservation first.³³

Reviewed in 1992 and more substantially following 2001 and 2009 reform Green Papers (European Commission 2001; European Commission 2009b) with legislation and a stream of formal communications on different policy areas the CFP has frequently been in a dynamic state.³⁴ Its policies have included fleet reduction in order to shrink capacity and various technical measures such as specifying minimal landing sizes, types of net and other gear and close seasons but the defining one in most eyes is the system of Total Allowable Catches (TACs - 'quotas') for individual fish stocks shared between member states on the basis of historic catches, that is the relative stability policy (European Communities 2009). Since the 2002 reforms a growing feature has been species-based multi-annual management plans with the objective of achieving the maximum sustainable yield (MSY) within specific time periods.³⁵

³³ (EEC) No. 170/83 *Establishing a Community system for the conservation and management of fishery resources.*

³⁴ See key regulations (EEC) No 3760/92 *Establishing a Community system for fisheries and aquaculture* 1992; (EC) No 2371/2002 *On the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy* 2002; and (EU) No 1380/2013 *On the Common Fisheries Policy* 2013 which embodies the latest reforms.

³⁵ MSY is the largest catch that can be taken from a stock over an indefinite period without impairing its ability to reproduce itself.

In addition, the CFP has always had development funds to support its various objectives. The first provision for a financed programme came in 1983 with Regulation EC/2908/83 *On a common measure for restructuring, modernizing and developing the fishing industry and for developing aquaculture*³⁶. After the first CFP reform this was systematised into the Financial Instrument for Fisheries Guidance (FIFG), subsequently replaced by the European Fisheries Fund (EFF), in turn replaced by the European Maritime and Fisheries Fund (EMFF) in 2014. Formalising a Community contribution to the enforcement side of the CFP came when as part of the 2002 reforms the European Fisheries Control Agency was established in 2005 to work with member states which have primary responsibility in this area. Subsequently, further measures have been passed to deal with illegal, unreported and unregulated (IUU) fishing and to strengthen compliance generally.³⁷

Scientific advice for the CFP on the marine environment and its seafood resources comes from external bodies of which ICES is the most relevant for the seas important to the British fishing industry and wider advice including on fishing gear and fishery economics from the Scientific, Technical and Economic Committee for Fisheries which was established in 1993 and reports to the European Commission. Further input to the Commission is from the Advisory Committee on Fisheries and Aquaculture (ACFA), intended to represent stakeholders and dominated by fishing industry representatives but with some environmental NGO involvement.³⁸

³⁶ Earlier, grants relating to fisheries were available under EC/355/77, *On common measures to improve the conditions under which agricultural products are processed and marketed*.

³⁷ See Regulation (EC) No 1010/2009 *Laying down detailed rules for the implementation of Council Regulation (EC) No 1005/2008 establishing a community system to prevent, deter and eliminate illegal, unreported and unregulated fishing*, Regulation (EC) No 1224/2009 *Establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy* and Regulation (EC) No 404/2011 *Laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a community control system for ensuring compliance with the rules of the Common Fisheries Policy*.

³⁸ ACFA was established in 1999, replacing the previous Advisory Committee on Fisheries which dated back to 1971, and only then including NGOs which represent environmental, development and consumer interests (COWI 2008). The Committee's website www.fishsec.org notes that 18 of the 21 members are from industry and three NGOs (accessed 24 March 2011).

The CFP is a political instrument and most of its key decisions have been made by member states, albeit with intervention from and use (or misuse) of scientific information; hence it has been a site of contestation. In this, British fisher interests are promoted by the National Federation of Fishermen's Organisations (NFFO), formed in 1977 specifically to influence the process that eventually resulted in the 1983 CFP regime³⁹ and by the Scottish Fishermen's Federation, founded earlier in 1973. More radical activity has been undertaken on behalf of fishing interests with the goal of complete exit from the CFP, first by Save Britain's Fish in the early 1990s for about a decade and from 2003 to 2007(?) by the dual campaign the United Fishing Industry Alliance and Cod Crusaders, all these being based in Scotland.⁴⁰

Responding to general criticism of the CFP and with recognition of the need for more participation, the 2002 reform process included a series of consultative activities which successfully involved interest groups, that is the fishing industry and environmentalists but not the general public, and which is credited with improving the resulting package (Coffey C 2005). Participation was further facilitated by an important innovation of the 2002 reforms, the Regional Advisory Councils (RACs), established in 2004 with both EU and member state funding, bringing a wider range of stakeholders into the CFP and broader influences to bear on the policy (Aanesen M, Armstrong CW, & Van Ho L 2012). UK fishing interests are involved in the North Sea, North Western Waters and Pelagic RACs and to a lesser extent in the Long Distance Fleet Council. Fishing industries of the relevant countries are the best represented category in the Councils but environmental NGOs and scientists are among those also involved. Though with limited powers, RACs have had a valuable function in breaking down barriers and developing trust between the different

³⁹ This is explained in 'NFFO Chairman Fred Normandale' in *NFFO News*, September 2007.

⁴⁰ These activities are not well documented and the campaign websites no longer function but see the undated (2002?) account by Ian Geldard, 'Save Britain's Fish: how it all began' on <https://groups.google.com>, 'Crusaders catch lands in Brussels'. 21 December 2004 on www.scotsindependent.org and 'Tribute for Carol, the leading Cod Crusader', 9 November 2007 in Fishupdate.com. A petition variously reported to number 162,500 and 250,000 signatures was submitted to Brussels and Westminster and a Fisheries Jurisdiction Bill to withdraw the UK from the CFP was introduced at Westminster by an SNP MP in 2004 as a Ten Minute Rule Bill.

representative groups albeit there are mixed views about how much impact they have had on developments (Griffin L 2013; Long R 2010; Ounanian K & Hegland TJ 2012). Some evidence has been adduced of EU decisions which did follow RAC advice (DEFRA 2006).

More general public input into fisheries governance has been lacking until recently. Environmental NGOs only started to become involved in the issue from the mid-1990s onwards but have influenced the increasing emphasis on conservation (Dunn E 2005; Todd E & Ritchie E 2000). Media coverage and environmental campaigning in Britain has raised awareness and there has been more public and NGO involvement in the process following the 2009 CFP Green Paper which eventually led to the 2013 reforms compared to the previous occasions. One approach to raising awareness of issues was through a survey (Green Budget Europe 2012).⁴¹ The Fish Fight campaign against fish discards started in the UK by celebrity chef Hugh Fearnley-Whittingstall which gained supporters in eleven other European countries involved people directly through its petition and claims to have had a significant impact on what was finally agreed.⁴² WWF too in 2012 organised a petition presented to the European Parliament in pursuance of specific aims connected to the CFP reform debate.⁴³ Much of the funding for environmentalist participation in the reform debate including US as well as European organisations (said to amount to \$75m) apparently came from five American

⁴¹ The survey on subsidies to the fishing industry covered six EU countries including the UK; it found that large majorities favoured making them conditional on fleet assessments and to prioritising stocks over fleets but it also showed that a high proportion did not see a link between the funding and over-exploitation.

⁴² Information on the Fish Fight campaign is on its website www.fishfight.net. The campaign started in 2011 but it is interesting to note that the European Commission had published a policy to eliminate discards a few years previously (European Commission 2007a). Discards take place to avoid above-quota landings but also to avoid landing fish with lower market value. When the European Parliament voted in favour of a CFP reform package, including the ending of discards, in February 2013, it was reported by the BBC as 'a victory for citizen power' following lobbying by individuals, celebrity chefs and environmentalists in the item 'Euro MPs back large-scale fishing reform to save stocks', 6 February 2013 on the BBC website.

⁴³ The petition of 150,000 signatures was presented to the European Parliament in November 2012, as documented on www.worldfishing.net.

philanthropic trusts, something which has raised questions about the motives for their interest.⁴⁴

The CFP has been in existence during a period where technological developments greatly increased the intensity of fisheries exploitation, not just in European waters but in other parts of the world, threatening the viability of many stocks (Whitmarsh D et al. 1995). In addition, EU waters contain extremely complex multi-species and multi-jurisdictional fisheries which are inherently very difficult to manage (Cabinet Office 2004). Overfishing in European waters and by British fishers had been known for decades before the CFP came into existence (Graham M 1943; Lee AJ 1992; Roberts C 2007). A study of demersal landings from England and Wales-registered trawlers going back to 1889 found that most of the stock collapse predated the 1983 start of the CFP (Thurstan RH, Brockington S, & Roberts CM 2010). The British herring fishery had to be closed from 1977 to 1983 because of overfishing (Reid C 1998; Smith H 2011).

However, the CFP has been widely criticised for failing to stem the tide of decline, summarised under such eye-catching statements as that '75% of Europe's assessed fish stocks are overexploited' (Schacht K et al. 2012) (p22). The main reasons adduced have been micro-management by politicians who are said to disregard scientific advice to please their fishing industry constituents, the overcapacity of fleets in relation to fish availability, inappropriate subsidies and poor enforcement (Boude J-P, Boncoeur J, & Bailly D 2001; Brown J 2006; Coffey C 2006; Froese R & Quaas M 2012; González Laxe F 1999; Khalilian S et al. 2010; Oceana 2011; Schacht K, McLachlan H, Hill L, Hart P, & Landman J 2012). The limitations of scientific input and the lack of fisher involvement in producing it have also been critiqued (Daw T & Gray T 2005; Hawkins T 2005). The EU's own audit body has condemned the way policy to reduce overcapacity has been carried out

⁴⁴ See the NFFO article 'Oak Foundation and fisheries policy', 26 November 2012 on www.nffo.org and (Giron Y, Le Sann A, & Favrelière P 2012). The latter is a paper published by the French fishing collective Pêche & Développement of which only a summary has been translated into English. Both organisations of course represent fishing interests but it may be that there are questions to answer about why some US environmentalists have put so much resource into lobbying over the CFP.

(European Court of Auditors 2011) while the Commission itself has criticised various failures in how the CFP has been implemented (European Commission 2007c). There have been calls for decentralisation of decision-making which more recently has tended increasingly to be under the banner of regionalisation (European Commission 2007b; Gray T & Hatchard J 2003; Hambrey J & Carleton C 1994; Sissenwine M & Symes D 2007; Smith H 2011; Symes D 2012). This has had wide British support (House of Commons Environment Food and Rural Affairs Committee 2012; Scottish Government 2009c; UK Government 2009). The failure to achieve stock sustainability has been a theme in each of the Green Papers on CFP reform.

Nevertheless there has recently been clear progress towards a more sustainable situation in certain EU fisheries. Stock improvements have been documented and recent assessments have concluded that the enhanced status of many (at least Northern) European stocks has resulted from actions taken under the CFP over the previous decade, that is since the 2002 reforms.⁴⁵ (Cardinale M et al. 2013; Fernandes PG & Cook RM 2013).

Further significant reforms to the CFP were agreed in 2013 following a lengthy process subsequent to the 2009 Green Paper (European Commission 2009b) and are set out in EU No 1380/2013 *On the Common Fisheries Policy* 2013. Particularly significant measures are that discards will be phased out over 2015-2019 and quotas set on the basis of scientific advice at sustainable levels by 2015 or 2020 at the latest. Greater regionalisation of decision-making is another aspect but as yet its impact and effect on the role of what will in future be termed Advisory Councils (instead of RACs) is unclear. A notable feature of the reform process and change from the previous one was that for the first time

⁴⁵ The magazine of the European Commission Directorate-General for Maritime Affairs and Fisheries, *Fisheries and Aquaculture in Europe*, reported in issue 57, August 2012, that in the previous 10 years the share of Atlantic stocks fished within safe biological limits rose from 29% to 56% and that quotas set above sustainable levels have gone down from as much as 46% in 2003 to 11% in 2012; by issue 63, January 2014 it was up to 61% of stocks in northern waters fished sustainably. Another version of the improvements in a European Commission press release of 30 May 2013, 'Fishing opportunities for 2014: further phase out of overfishing' states that overfished stocks have reduced to 39% from 47% a year previously and 95% in 1995; conversely there are 25 stocks known as not overfished compared to only two in 2005; (of course 39% stocks overfished still constitutes a significant problem).

the European Parliament as co-decision maker with the Council of Ministers had a major input, which seems to have been exercised in favour of deeper reforms than would otherwise have been on the table; the public activity mentioned earlier may have been an influencing factor.

The 2013 reforms intend a shift away from political micro-management in CFP implementation, taking this a further step compared to the 2002 reforms. The process illustrates the trend for states to delegate more and increase the involvement of stakeholders, something which is clearly essential for compliance and effectiveness in fisheries management.

However when interviewees in the research expressed opinions about the CFP which was some time before either the latest reforms were agreed or the beneficial effects of the previous one had been published, they were sharply negative, showing that criticisms were far from confined to the world of academics and of environmental NGOs cited above; the discard issue evoked particularly strong views:

‘That is the fisheries policy, that is something that is in desperate need for overhaul because there are too many anachronisms because based on historical fishing effort, not robust. Designed to carve up the seas, it wasn’t designed for sustainable fisheries. It was designed on the basis of rubbish information, so it should be re-set, it was designed around a fishery effort that is not the fishery effort we have today. So there are so many things about it that are crying out for reform. Of course you have 26 fisheries ministers now all involved with their fingers in the pie and trying to get 26 countries around Europe to agree to any particular programme is nigh on impossible.’ Group director, large company

‘You’ve got the Common Fisheries Policy which has failed on every front, every objective set for the Common Fisheries Policy has failed, it’s failed socially, it’s failed on economic grounds, it’s failed on conservation grounds. It annoys the life out of me that we go around the world telling people how to manage fisheries and we are the worst managers of our fisheries that exist in the world.’ Trade organisation representative 3

‘I feel really passionately about discards, chucking away perfectly good fish.’ Managing director, medium-large company

There is a widespread opinion in the British fishing industry that its interests were sold out in negotiations over entry into the then European Economic Community, typified by comments like ‘When Mr Heath joined Europe years

ago, he gave a lot of our fishing rights away' (Managing director, small company 7) notwithstanding the chronology as outlined above clarifying that the allocation of quotas based on the relative stability principle did not take place till 1983, long after accession, and forgetful also of the fact that Britain was a reluctant acceptor of the idea of national ownership of the 200 mile resource, having so much to lose for its distant water fleet. Many in the industry consider that it continues to receives much less positive government involvement compared to other European countries although the level of UK state investment in the industry is considerable (House of Commons Agriculture Committee 1999).⁴⁶

However, there were mixed feelings towards fisheries management in general among the research respondents. Recognition of the problems created and anxiety about the overall effects were expressed:

'If you spoke to a fisherman you would absolutely and unequivocally get the view that they are over-regulated and it is very difficult for them because fundamentally their ability to fish is severely restricted and their capacity to fish continues to grow. There's always going to be a tension there. And these are generally one-man businesses, owning their own boats, and so it's really going directly to the heart of their livelihoods.' Director, large company

'Legislation has forced vessels down to very narrow paths because if that's all they have quota so if that's all you have quota for, that's all you can fish for if you want to be legitimate. And if that's all you can fish for, a boat that was making a living on the back of 20 species is now making a living out of three or four. That's not good for stocks. Albeit the pressure's been relieved from that stock by the fact that there are so few boats.' Partner, medium company

But there was also understanding of the need for such measures to maintain supply and even the view that they have worked:

'I don't have a lot of issues with quota management, it's one of the bulwarks against over-exploitation to be quite honest with you.' Managing director, small company 1

'I think there are some very robust measures in place. Like Total Allowable Catches which are policed very well, like very good monitoring of illegal captures, you know illegal capture is not allowed in all the major fishing countries and they work very, very well and that will sustain the catches that are there.' Site manager, medium-large company

⁴⁶ This 1999 report found that £108m of public money was spent on the fishing industry including on enforcement, research and grants, noting that this seemed out of proportion to the contribution it made to the economy.

‘The general trend of the direction is the right way. We’ve taken the medicine, things are on the road to recovery.’ Manager, trade organisation 1

The interviewees were responding not only to CFP policies but to the particular ways they have been translated into British practice as there are still many areas for individual state action. Starting with strategic oversight, the fishing industry and the marine environment received increasing attention from the mid-1990s by which time concern about overfishing had become widespread and competition for marine uses significant due to the development of aquaculture and offshore energy installations (oil, gas, renewables) (Cabinet Office 2004;DEFRA 2002;DEFRA 2005;DEFRA 2007;House of Commons Agriculture Committee 1993;House of Commons Agriculture Committee 1999;House of Commons Environment Food and Rural Affairs Committee 2005;House of Commons Environment 2002). Devolution has led to strategic planning for the fishing industries in Scotland and Wales (Marine and Fisheries Division 2013;Scottish Executive 2005;Scottish Government 2010b;Welsh Assembly Government 2008b).

Moving to implementation, in England and Wales much was delegated from DEFRA to the executive Marine Fisheries Agency from 2005 (renamed the Marine and Fisheries Agency in 2007) following a review (DEFRA 2004;Marine Fisheries Agency 2007). In Scotland it was a responsibility of the Scottish Office and delegated earlier, to the Scottish Fisheries Protection Agency from 1991. Since 2010 implementation has been at a further remove for England with the transfer of responsibilities, including fishing vessel licensing and administration of CFP grants, to an ‘executive non-departmental public body’ (quango) the Marine Management Organisation (MMO), but in Scotland the functions were in 2009 brought back into the Scottish Government as part of Marine Scotland and there are similar non-delegated arrangements to these for devolved responsibilities relating to inshore waters in Wales and Northern Ireland. Implementation of the CFP within the UK is a devolved matter, with co-ordination mechanisms specified in concordats dating to 1999; a development in the 2012 concordat between the four UK administrations

provides for the annual division of fishing quotas between them for subsequent assignment to vessels (UK Fisheries Administrations 2012).

The greater part of this assignment has continued to be via fishermen's Producer Organisations (POs), the rest being through the publicly managed pools. POs were mandated as part of the CFP arrangements for a common market in fishery products by *Regulation (EEC) 3759/92 of 17 December 1992* in order to carry out marketing functions and administer the EU's seafood minimum pricing scheme under government supervision, so the mixture of private and public governance they represent is rooted in European legislation. The role they take varies in different member states and Britain has chosen a delegated quota model (Symes DG & Phillipson J 1999). Quota management has arguably become the main function of the UK fishery POs rather than the activities connected with marketing set out in the original European regulation (Marine Scotland 2012). The POs not only manage quotas on behalf of their members, they also have an enforcement role, penalising infringements with quota deductions independently of the role of the public agencies (National Audit Office 2003). A later development in Scotland is an agreement that if POs wish to suspend a member for breaches of the rules, the operator will be transferred into the 'non-sector' (that is vessels fishing against quota not in a PO) (Marine Scotland 2012); in other words it would involve a combined PO and state enforcement exercise. A more general and significant enlargement of the fishery POs' role at European level has come with Regulation (EU) No 1379/2013 *On the common organisation of the markets in fishery and aquaculture products*, part of the 2013 CFP reforms. This links POs with the general focus of the reform programme in making them responsible for fishing (and also aquaculture) activities being carried out sustainably, including the avoidance of 'unwanted catches' (discards) and of illegal fishing. Further, they are now required to produce production and marketing plans and to report on their fulfilment annually, involving collective planning and management of members' fishing activities, avoidance of unwanted catches through technical measures (such as gear changes) and the marketing task of making use of

such catches.⁴⁷ This development could be seen as an extension of public-private co-regulation but is interpreted here as POs becoming more heavily regulated and obliged to play a full part in working for the general objectives of the reformed CFP and not just their members' immediate economic interests.

Returning to British implementation of the CFP, a second area of member state control concerns the inshore waters where there is another form of delegated model with management of their fisheries carried out by various local agencies in England and Wales. These were Sea Fisheries Committees (SFCs) until 2011 when replaced by the Inshore Fisheries and Conservation Authorities (IFCAs) in England and three Inshore Fisheries Groups (IFGs) reporting to the Wales Marine Fisheries Advisory Group.⁴⁸ In Northern Ireland and Scotland these functions are performed by agencies of the respective administrations and are not delegated more locally (Symes D & Boyes S 2005).

A different kind of delegation is the adoption of a form of semi-privatised, ownership-based rights management model for much of the fleet. This approach which has developed from economics thinking about fisheries management has gained ground in many countries. It is often seen as the solution to the widely promulgated thesis of the 'tragedy of the commons' according to which a public resource is inherently liable to over-exploitation (Gordon HS 1954; Hardin G 1968; Iudicello S, Weber M, & Wieland R 1999). There are counter-arguments to this paradigm which have pointed to various examples of communal solutions to the commons issue (Berkes F et al. 1989; Feeny D et al. 1990). An English illustration is a zoning approach for the

⁴⁷ The previous Regulation EC 104/2000 *On the Common Organisation of the Market in Fishery & Aquaculture Products* only asked POs to facilitate sustainable fishing and work for a better match between supply and demand. Details of the content of the now required production and marketing plans are in Regulation (EU) No 1418/2013 *Concerning production and marketing plans pursuant to Regulation (EU) No 1379/2013 of the European Parliament and of the Council on the common organisation of the markets in fishery and aquaculture products*.

⁴⁸ SFC functions were consolidated under the *Sea Fisheries Regulation Act 1966* with additions under the *Sea Fish (Conservation) Act 1967* and the *Environment Act 1995* but in many areas originated in nineteenth century arrangements. IFCAs were mandated in the 2009 *Marine and Coastal Access Act*. SFC functioning was assessed as conforming to many principles of good governance but vulnerable to decisions being taken in the interests of individual fishing interest members and operating with outdated legislation in (Knapman P 2005).

South Devon crab fishery, decided on a community basis (Woodhatch L & Crean K 1999). In an alternative analysis capitalist industrialisation rather than common property is posited as the cause of overfishing (Longo SB & Clark B 2012).

Despite this diversity of views on the commons question there has been a convergence of policy-making based on property rights (Costello C et al. 2012; Mansfield B 2004a; Willman R, Arnason R, & Franz N 2009). Analyses of implemented rights-based regimes have on the whole been positive (Costello C, Gaines SD, & Lynham J 2008; Sutinen JG 1999) but have sometimes shown mixed results (Van Ginkel R 1999) and where systems have allowed high levels of non-fisher absentee ownership various social disbenefits have been the consequence (Bradshaw M 2004; Pinkerton E & Edwards DN 2009). In any case, for sustainable functioning such arrangements must operate within a framework of state rules which prescribe quotas and other conservation measures so they do not replace but rather complement formal regulation (Beddington JR, Agnew DJ, & Clark CW 2007). The key purpose of rights-based systems from a conservation point of view is to offer positive incentives to fishers to protect a resource in which they have an investment.

The rights-based approach has been adopted in the UK in a particular form. The starting point was the quota allocation to vessels, that is distribution of the CFP national allocation. This led to the requirement for all fishing boats to be licensed, thus increasing the level of regulation, whereas previously, starting in the 1970s, licences had only been required for specific reasons connected to the management of certain fisheries. The system of allocating quota to vessels gradually changed to a rights-based regime. Initially, it was based on landings over the previous three years, an incentive to overfishing, but in 1999 it changed to Fixed Quota Allocations (FQAs) calculated from records over a reference period in the mid-1990s. POs, as already explained, manage the quota allocation system for their members on a pooled or individual vessel basis or hybrid of the two while the fishery administrations deal with non-members. From the early 1990s UK quotas have been traded and since 2002 FQAs can be transacted separately from vessel licenses; FQA leasing is also

practised. Thus there are property rights over quotas and the system has been classified in one report as an Individual Transferable Quota (ITQ) scheme though this is considered by others as arguable as ultimate title remains publicly owned (Anderson J 2008;Hatcher A & Cunningham S 1994;MRAG Consortium 2009). A major government review of the fishing industry in the mid-2000s recommended a full-blown ITQ system but it was not adopted (Cabinet Office 2004). Nevertheless what has occurred is a significant change affecting ownership of a major public resource which has been implemented gradually and without a public debate; most British voters are probably quite unaware that such a momentous development has taken place.

The relationship between quota holdings and fishing vessels means that purchase of the latter within the EU carries acquisition of the former, resulting in a significant share of the UK quota being owned by non-British companies, termed 'quota-hopping' (Lequesne C 2004). After the failure of an attempt to protect British ownership legislatively, a 1999 requirement sets certain conditions for foreign concerns, intended to benefit the British economy through the 'economic link' mechanism but a review has concluded that the actual economic contribution is low in comparison to the relevant vessel turnover and may even be zero (DEFRA 2009) so partial privatisation has led to the effective reduction of the national quota from the viewpoint of the British fishing industry and the loss of related economic benefits. It is also worth noting that in this instance the European common market has superseded the state-based 'relative stability' principle of quota allocations in the CFP.⁴⁹

⁴⁹ The series of Factortame case rulings over 1989 to 1991 which established that European law took priority over UK law meant that the provisions of the *Merchant Shipping Act 1988* requiring fishing vessels to be 75% British-owned could not be upheld in relation to EU nationals. There are four options for demonstrating an economic link with the UK: at least 50% of EU quota landings to be in British ports; at least 50% of crew to be normally resident in UK coastal areas; at least 50% of operating expenditure net of wages to be spent in British coastal areas; or benefit demonstrated by quota donation to the UK under 10m fleet. Following the recent publication of a register of FQA holdings, Greenpeace has concluded that a high proportion of the English share of quota is held by foreign-owned vessels; see its press release 'Secret fish quota list reveals foreign giants' stranglehold on Britain's seas', 19 December 2013. The FQA register can be viewed at www.fqaregister.service.gov.uk.

Most under-10 metre vessels are not part of the PO system but have been allowed under certain specific schemes to lease FQA units. More recently the government has consulted over a proposal and organised a pilot project for the introduction of community quotas which would extend a rights-based approach to the under-10 metre fleet but the response by this fleet segment in the consultation was unfavourable (DEFRA 2011).⁵⁰ This sector which also fishes a range of non-quota species has access to a tiny share of the national pool which their relatively new representative organisation argues is unfair and should change.⁵¹ A modest government redistribution has been made by reallocating unused quota to the small-scale sector in one year, subsequently repeated. This was legally challenged by the UK Association of Fish Producer Organisations but upheld in the High Court in 2013. The case can be seen as a test of whether fishing quota constitutes a public good or has been fully privatised and the judgement which included the statement 'No one can own the fish of the sea' favoured the former interpretation.⁵²

Another strand of British government action implementing the CFP is a policy of fleet reduction to reduce excess capacity which is widely considered to be a major cause of overfishing. It represents a striking change from the productionist approach typified by subsidies for new vessels of the post-war years up to the 1980s. Starting in 1993, there have been several subsidised

⁵⁰ The information that most of the under-10 metre sector rejected the idea of extending rights-based management is in the National Federation of Fishermen's Organisations paper, 'Under-10 stalemate: NFFO perspective', 25 March 2013, on www.nffo.org.uk which also puts forward an alternative approach to the quota problems of the small-scale sector with a number of elements including different status for the 'high-catching under 10s' and decommissioning.

⁵¹ See www.nufta.org, the website of the New Under Ten Fishermen's Association (NUFTA) and Harris J and Harvey F, '“Fair fishing” manifesto calls for greater quota share for smaller boats', *The Guardian*, 8 August 2012. Greenpeace too has been campaigning for a larger share of quota to go to small-scale fishers throughout Europe and commissioned a YouGov poll which found that a majority supported prioritisation of quota to those who fish sustainably or bring direct economic benefits to their local communities; the campaign and poll are described in the Greenpeace press release, 'Overwhelming public support for “reshuffle” of UK fishing quota, poll shows', dated 9 June 2013, on www.greenpeace.org.

⁵² The court case is reported in Clarke T, 'Fishermen in court over battle for fairer quota', 1 May 2013 on www.channel4.com and the judgement in 'Fishing quota: big producers lose reallocation battle', 10 July 2013, BBC News and in Harvey F, 'Fishing quotas can be redistributed to favour smaller vessels - High Court' (which contains the quote about ownership of fish), 10 July 2013 in www.guardian.co.uk.

decommissioning initiatives. The number of registered UK fishing vessels reduced from 11,411 in 1991 to 6,444 in 2011 and over the period from 1996 to 2011 capacity (gross tonnage) and engine power have each fallen by around a quarter.⁵³ These changes have been supported through the CFP financial programmes mentioned above.⁵⁴ The rights-based approach to quota is also considered conducive to fleet reduction as it incentivizes those with less efficient boats to sell their quota and leave the industry but as the more efficient vessels remain little reduction of capacity may result.

A recent government project in England to assist policies of reducing or eliminating discards has been the organisation through the MMO of catch quota trials in which the objective is to land the entire catch with fishers given additional quota to help manage the situation. Onboard activity is electronically monitored and results have shown very low discard rates (Marine Management Organisation 2012).⁵⁵ Another approach, sponsored by DEFRA as the programme 'Fishing for the Markets', has been to develop outlets for species that have been discarded as having no or limited sales value.⁵⁶ For its part, the Scottish government has implemented a Catch Quota Scheme (everything caught must be landed and monitoring devices on board with additional quota as an incentive) and the Scottish Conservation Credits Scheme (extra days at sea awarded in return for observing real time closures and other protective measures); fishermen have been actively involved in these developments, making them examples of successful mixed public-private action under state aegis (Carter C 2013;WWF 2009). The success of these schemes in part reflects a long-term change in the sentiment of fishers who have come to actively support sustainability policies (Scottish Fishermen's Federation 2011).

⁵³ Information from 1996 MAFF *Sea Fisheries Statistics* and the 2102 Marine Management Organisation, *The UK Fishing Industry in 2011: Structure and Activity*.

⁵⁴ It is of interest that this was not the first time British capacity had been reduced because it had outrun profitable fishing: in the 1930s the Herring Industry Board scrapped herring drifters while owners co-operated to lay up distant-water whitefish trawlers (Graham M 1943).

⁵⁵ The trials which have been run in 2011, 2012 and 2013 are reported on the Marine Management Organisation website, www.marinemangement.org. A press release dated 30 November 2012 reports 'Fishermen demonstrate almost zero discards in latest MMO trial'.

⁵⁶ The results of the Fishing for the Markets research programme are on www.fishingforthemarkets.com.

Indeed management of fisheries cannot be effective on a purely top-down rules basis because of their complexity, the ability of those involved to resist the rules and limitations on resources to enforce such rules (Van Vliet M & Dubbink W 1999). Research with fishermen has suggested that negatively the likelihood of exposure and consequent penalties and positively a direct involvement in the regulatory process both increase compliance with the rules (Hatcher A et al. 2000). Hence more participatory types of governance and even co-management of fisheries have been advocated (Gray T 2005; Phillipson J 1996) and to a limited extent put into operation in CFP arrangements described above.

On the environmental side the UK statutory nature conservation agencies participate in fisheries governance through their ability to designate protected sites and by general impacts on policy (Eno NC & Gray M 2005). Recent attention has focused on the declaration and maintenance of marine protected areas (MPAs) which promise general ecological benefits plus potential advantages but also restrictions in relation to fisheries and fishers. Following legislation, particular attention has been given to one type of MPA, the marine conservation zone (MCZ). A three year project jointly led by two non-departmental public bodies and involving national and international stakeholders recommended a network of 127 such zones for English waters in 2011 (JNCC & Natural England 2014). DEFRA held a further consultation after which just twenty-seven marine conservation zones were announced in 2013 with the promise of two further tranches in subsequent years. This has been a highly disputed process attracting criticism of the Department from environmentalists and a Fish Fight campaign in favour of the full 127 but also organised action to limit the number from the fishing industry which formed the MPA Fishing Coalition for the campaigning purpose. Commentators have in fact criticised rigid targets and advised that MPAs will only be successful if designed in conjunction with local communities and fishers so the issues are

not straightforward (Agardy T et al. 2003;Kelleher G (Ed) 1999).⁵⁷ Governance here has been very complex with two delegated state bodies orchestrating a scientific and consultative process followed by the state more directly through DEFRA organising another consultation in which different interests have apparently predominated as the decisions made vary so greatly from the first set of recommendations. While contestation has centred on these English proposals, separate procedures are also in train in Northern Ireland, Scotland and Wales for the designation of MCZs.

State control has become tougher in recent years in the area of enforcement where the British state has intensified its work in line with generally firmer CFP attention to this activity. 'Black' landings resulting from illegal fishing contrary to management rules, particularly as excess to quota, had been a long-standing problem (Lequesne C 2004;McDiarmid H 1990). A survey in one region found that only 20% of fishermen said they never landed illegally (Cabinet Office 2004) and illegal trade has been so well-developed that it was known that non-traceable cod could be purchased at a 20% discount.⁵⁸ The interviews carried out for this project indicated that some illegal fishing was still taking place. In one area it was described as 'substantially reduced' (Manager, trade organisation 1). In another, a regular black fish sales arrangement was described to the researcher off the record.

Various state agencies have been responsible for enforcing fisheries regulation. They have carried out investigations on land and at sea, by aerial

⁵⁷ MCZs are mandated in the 2009 *Marine and Coastal Access Act*, the *Marine (Scotland) Act 2010*, and *The Marine (Northern Ireland) Act 2013* in keeping with EU Birds, Habitats & Marine Strategy Directives as well as global governance such as the *Convention on Biological Diversity*. The Marine Conservation Project which ran from 2008 to 2011 was managed by both the Joint Nature Conservation Committee and Natural England; see <http://jncc.defra.gov.uk> for further details. For the MPA Fishing Coalition see 'MPA Fishing Coalition launched in London', 24 February 2010 on www.fishnewseu.com. The announcement of the first tranche of marine conservation zones is reported in Carrington D, 'England names 27 new marine conservation zones', *The Guardian*, 21 November 2013 which also records that 86 marine scientists had criticised the government earlier in the year for not proceeding with the 127.

⁵⁸ The statement about non-traceable cod was made by Cliff Morrison, speaking as Chair of the Food and Drink Federation's Seafood Group at the Third Chatham House Update and Stakeholder meeting on 8 May 2007, available on <http://www/illegal-fishing.info>.

surveillance and increasingly by use of satellite technology; those suspected of infringements have been prosecuted in the courts (National Audit Office 1995; National Audit Office 2003).⁵⁹ Enforcement was considerably strengthened by *The Registration of Fish Buyers and Sellers and Designation of Fish Auction Site Regulations 2005* covering England and similar regulations for the other administrations which extended responsibility further up the supply chain beyond the catching sector for ensuring that only legally caught fish enters the market.⁶⁰

Some recent prosecutions have resulted in very large financial penalties being imposed on the skippers and owners concerned. Two linked Spanish companies holding UK quota and flying the UK flag were fined a total of £1.62 millions for disguising illegal fishing in falsified log-books and landing declarations. In the most spectacular case a sophisticated scam involving seventeen pelagic boats and three Scottish land-based processors who maintained secret conveyor belts and weighing devices is estimated to have laundered fish worth £100 million between 2002 and 2005⁶¹. It appears that more effective enforcement has had a big impact on illegal British fishing as indicated by processors in a recent survey saying that the supply chain no longer contains black fish; even though the information obtained in the present research, as previously noted, indicates that this is not totally the case it is

⁵⁹ The bodies responsible for enforcement have been the Sea Fisheries Inspectorates (under MAFF/Defra till 2005 then in the Marine Fisheries Agency) for England and Wales, under the Scottish Office but from 1991 delegated to the Scottish Fisheries Protection Agency and recently in the Northern Ireland Department of Agriculture and Rural Development); Sea Fisheries Committees also had a role and some sea inspections have been contracted to the Royal Navy. In Scotland responsibility passed to Marine Scotland Compliance within Marine Scotland in 2009. Responsibility in relation to English waters having transferred to the MMO, sea inspections are currently wholly carried out by the Royal Navy Fishery Protection Squadron while aerial surveillance is purchased from a private company.

⁶⁰ Statutory instruments with the same title were also passed for Northern Ireland and Scotland in 2005 and for Wales in 2006.

⁶¹ Six press releases about cases with various dates in 2007 and 2008 were accessed from the website of the then Marine & Fisheries Agency but these are no longer available from the website of the successor Marine Management Organisation. For the Spanish-owned companies case see Morrison S, 'Spanish fish barons admit taking illegal catches in UK waters', *The Independent* 22 July 2012 and Harvey F, 'Spanish fishermen receive some of biggest fines in UK maritime history', *The Guardian*, 26 July 2012. For an account of the pelagic case see Carrell, S, 'Hidden pipes and secret scales: the story of Britain's biggest fishing scam', *The Guardian*, 25 Feb 2012.

clear that levels have greatly reduced (Brown A 2009). It may also be a factor that as fishermen have become more appreciative of the need for conservation measures, there could be reduced social acceptance within the fraternity for illegal fishing.

The strengthening of controls and enforcement reflects the increasing emphasis on the goal of sustainability in British fisheries policy as in the CFP. But it is an aim that has been interpreted partially, that is in terms of environmental and to some extent economic benefits, that is for conservation of stocks and a profitable industry. The third aspect, social sustainability, particularly the needs of fishing communities, has been largely ignored (Ross N 2013; Symes D & Phillipson J 2009). However, the recent CFP reform Regulation (EU) No 1380/2013, states that 'The CFP should ensure that fishing and aquaculture activities contribute to long-term environmental, economic, and social sustainability' (preamble, para 4) and specifies the needs of the small scale sector; whether this can make a difference remains to be seen.

Summarising the impact of these various strands of state policy, both the locus and organisation of British fishing have changed greatly in the last sixty years. Where to fish and how much of particular species may be landed have been strictly circumscribed by global, supra-state and state governance decisions particularly the creation of EEZs and CFP policies. Boats must be licensed and quotas have a tradable value. Thus fishermen carry out their commercial activities in a very different environment from the situation in the middle of the twentieth century.

But as well as regulating, the British state has also maintained its interest in promoting and developing the fishing industry via a delegated mechanism. The quango Seafish (the Sea Fish Industry Authority) was established to succeed the White Fish Authority and the Herring Industry Board in the *Fisheries Act 1981* and is financed by a business levy. It is required to present its annual report and accounts to Parliament each year. Like its predecessor bodies it was set up with wide powers including the ability to make loans or

otherwise provide financial assistance for capital projects connected with the fishing and seafood processing industries as well as promotion of training, marketing and research.⁶² Seafish advises and supports the industry in various ways and promotes it externally; many of its activities past and present are included in chapters 5 and 6. In the context of this chapter it is relevant to note that its training activities have had a particular focus on safety at sea as well as on skills for fishermen. Since 2007 the organisation has operated an Industry Project Fund which has provided finance for a wide range of undertakings including research, safety training for fishermen, processing innovations and activity by trade bodies including the National Federation of Fishermen's Organisations (NFFO) and the Shellfish Association of Great Britain (SAGB).⁶³ There are also linked regional bodies, Seafood Cornwall/Seafood Cornwall Training and Seafood Scotland, and in addition support has been given to the Invest in Fish South West and South East Seafood projects; unlike Seafish all these are simply industry groups, not publicly constituted.

The usefulness of Seafish to the seafood industry was tested when one company challenged its right to levy funds based on imports, arguing that the system had been designed in relation to domestic landings. While the resulting court case was in train from 2009 to 2011, the disputed part of the levy was suspended, reducing the organisation's activities considerably and its continued existence was in doubt. However, the Supreme Court finally found in favour of Seafish. It then emerged that a government-commissioned review on the future of the agency had been completed but kept under wraps while the case proceeded, which turned out to be a critical report recommending significant reforms (Cleasby P 2010). Seafish subsequently carried out a consultation with its stakeholders and having received sufficient support to continue, restructured and developed a new work programme with strong

⁶² Many Seafish research publications available on its website have been valuable to this study.

⁶³ Information about the organisation's work is on its website www.seafish.org.

industry leadership.⁶⁴

The position of Seafish, established as a public body but working for the benefit of the seafood industry is an intriguing example of the private-public interface which in terms of a recent analysis of delegated British state governance is at one extreme end of the ‘spectrum of autonomy’: working for private interests and with a low degree of control by ministers, although the organisation is not specifically mentioned in this book (Flinders M 2008) (chapter 1, fig 1.1). It is characterised here as a mixed public-private governance body and unlike the more common situation of private organisations taking on public roles as do the fishery POs, it is a public body nourishing private interests. Compared to many agencies with delegated governmental responsibilities, Seafish not only dates back earlier than most, it is the successor body to similar organisations that in the case of the Herring Industry Board go back to the pre-Second World War period. So rather than exemplifying a new type of state governance, the existence of Seafish reflects long-standing government support for primary food producers which is also apparent in relation to the agriculture levy bodies.⁶⁵ By contrast, the delegation of fishing quota responsibilities to the POs does conform to a more recent change in the state’s mode of governance.

Seafish has a publicly appointed board, in which the seafood industry interest strongly predominates while the legal case showed that in the last resort the organisation depended on the coercive power of the state in the form of the courts. The Act establishing Seafish states its role to be ‘promoting the

⁶⁴ The revised Seafish structure consists of three high level panels, established at ministerial behest: Domestic & Exporters, Importers & Processors and Consumers & the Supply Chain, each with an industry chair. The Seafish Board is appointed by the four fisheries administrations. Details are on the organisation’s website, www.seafish.org.

⁶⁵ The seafood industry is far from unique in having a publicly constituted body acting on its behalf. Similar functions are fulfilled by other bodies financed through industry levies: the Agriculture and Horticulture Development Board, like Seafish a non-departmental public body albeit established by secondary rather than primary legislation (which replaced five predecessor bodies the British Potato Council, the Meat and Livestock Commission, the Milk Development Council, the Horticultural Development Council and the Home Grown Cereals Authority), by Quality Meat Scotland, an executive non-departmental public body and by Hybu Cig Cymru - Meat Promotion Wales.

efficiency of the seafood industry ... so as to serve the interests of that industry as a whole' while having 'regard to the interests of consumers' but the organisation now views its purpose as 'securing a sustainable and profitable future for the UK seafood industry' (quote from the *Seafish Corporate Plan 2013*). The 1981 Act also states that ministers may give the organisation directions consistent with its defined purpose or as 'requisite in the public interest' (para 1.2.3) and require it 'to act as [*the Minister's*] agent in any matter relating to the sea fish industry' (para 1.2.5). The 2013 Plan goes on to state that as a levy body, the organisation takes direction from industry but that within that focus it seeks to support government policy, that is policies of the four fisheries administrations, arguing that there is actually much overlap of these with its industry aims, but by omission seeming to indicate that ministers although they formally have powers to direct the organisation do not in fact act on this and indeed there is no evidence that they have ever done so. There may well be top-level informal contact with government departments but this is also known to occur with other trade organisations which do not have a public framework. An indication of the relative distance of the organisation from the state is that it has not been required to participate in the Civil Service Reform Programme instituted in 2012 which by contrast has been mandatory for other quangos discussed in this study such as the Marine Management Organisation and the Food Standards Agency.

The arguable anomalies of the Seafish position were recently made more public in a critical blog by the environmentalist George Monbiot who attacked the organisation specifically for promoting the consumption of North Sea cod and more deeply as a body lobbying on behalf of the seafood industry while being publicly constituted and funded by what was termed a 'consumption tax'. In its reply to the blog, Seafish emphasised that the major part of its finance, the industry levy, is not the product of public taxation (and defended its position regarding North Sea cod). The industry levy is indeed not a tax in the usual sense; in the Monbiot critique there was presumably an assumption that in the end it is bound to be incorporated into final prices to consumers although whether or not this has actually been the case is a function of supply chain

relations.⁶⁶ Prior to this exchange, however, the position of Seafish had not given rise to any public questioning of its role of furthering the interests of the seafood industry on behalf of the state.

Further state input has come from publicly funded marine and fisheries research which serve various purposes some of which are of benefit to the seafood industry. In the post-war period the Directorate of Fisheries Research within MAFF has provided input for regulation and advice for international negotiations, support for the fishing industry including new fishing ground search voyages and cultivation research (Lee AJ 1992); its equivalent organisation was the Scottish Office Agriculture and Fisheries Department. In parallel, the work of the Torry Research Station within the Department of Scientific and Industrial Research⁶⁷ included freezing fish at sea, thawing methods and improving quality onboard and it developed various types of processing machinery and a mechanical smoking kiln (Waterman JJ 1979). Of the current bodies the Centre for Environment, Fisheries and Aquaculture Science (Cefas) is an executive agency of DEFRA while Marine Science Scotland, previously the Fisheries Research Services and an executive agency of the Scottish Executive is now part of the Scottish Government.⁶⁸

Competition regulation has impinged little on the seafood industry but in the 1960s the Monopolies Commission examined the proposed merger of Ross Group Limited and Associated Fisheries Limited (The Monopolies Commission 1966). It concluded that the merger would not be in the public interest, albeit

⁶⁶ The critique, Monbiot G, 'The stealth tax that says to hell with North Sea cod stocks', 25 November 2013 is on www.theguardian.com and the reply 'Seafish response to the George Monbiot blog' was published on the organisation's website on 26 November 2013. If the levy acted as a tax it would be logical to assume that at the time when much of it could not be charged during the duration of the court case, prices would have gone down but no evidence has been seen to suggest this was the case. In relation to North Sea cod, Seafish made the reasonable point that as what is caught is in accordance with the cod recovery plan it can be eaten with a good conscience.

⁶⁷ When the Department of Scientific & Industrial Research was dissolved in 1965, Torry RS passed to the Ministry of Technology which subsequently became part of the Department for Trade and Industry but in 1972 the Research Station was transferred to MAFF. It was closed in 1996.

⁶⁸ The Fisheries Research Services became an executive agency of the Scottish Executive in 1997, incorporating the Marine Laboratory, Aberdeen (Kjæmpenes WM 2004) and was incorporated into Marine Scotland in 2009.

with a dissenting minority. The report gives a snapshot of the state of the industry in the mid-1960s when each of the companies concerned owned a large number of trawlers plus considerable processing and distribution interests while Ross also owned a shipbuilding company so there was considerable vertical integration (and in addition the Ross company had extensive non-fish interests). Forty years later there are no such large British-owned integrated businesses.

The contribution of the UK fishing industry to fish supply after all these developments is now from three sectors. The trawler fleet, mainly Scottish-based, still provides demersal species but quantities are limited by quotas and dependent on longer-term policies especially the recovery plan for cod; (this fleet is also the main producer of langoustines relevant to a later section of this chapter). The pelagic fleet, entirely Scottish-based and mainly producing for export does provide mackerel and herring for domestic consumption. Finally there are the smaller boats working the inshore waters and often described as 'day boats' all round the English and Welsh coasts which fish a wide range of species (including shellfish which is discussed in more detail later in this chapter and which is also the main input to supply coming from Northern Ireland and western Scotland fishing.)

As already shown, these supplies have come to be extensively supplemented by imports. As well as the whitefish that has replaced what was previously caught by the home fleet, supply has greatly diversified into other species. The EEZ declarations provided impetus for more trade by coastal states, assisted by liberalisation through further global governance, seafood tariffs being reduced in the Uruguay Round in operation from 1995 (Macfarlane A 2007; Organisation for Economic Co-operation and Development 2003). New market opportunities have resulted in fish and fishery products becoming internationally the most highly traded food commodity (this includes farmed produce), facilitated by low air freight costs and advances in refrigeration and freezing (Ababouch L 2006; Asche F & Smith MD 2010; Washington S & Ababouch L 2011). One major example is tuna, which in 1960 was imported into Britain only in tinned form and in lower quantities than sardines and

pilchards, but had by the mid-2000s become one of the top five species consumed, with a new segment of the trade in fresh form of which in 2011, 98 thousand tonnes were imported, most of it available for domestic use (Elliott M, Hargreaves J, & Pilgrim S (Eds) 2012;Garrett A & Brown A 2009). (The corresponding changes in consumer taste are discussed in chapter 6.)

Given the diverse sourcing described, an essential question is how sustainable is the current supply situation? This was put to the interviewees, to be answered in relation to their own particular company or organisation.

This chapter started with the experience of some of the research participants that there is reduced availability of fish. There are several possible reasons, one being changes in the distribution system (discussed in chapter 5) which means that a high proportion of supply goes direct to major buyers, bypassing the local auctions on which some companies rely. But in relation to capture fish production the thoughts of many interviewees revolved round a basic question: was the experienced reduction a result of essential problems with the stock, that is overfishing, or due to restrictions on British vessels because of international governance changes or down to management measures that had no regard to actual availability of fish? Some people were sure it was the last of these and that the scientific assessments behind them were deeply flawed:

'We get scientists come and hire a boat for a day, a fishing boat. They'll get on the co-ordinates, the boat will go out and fish there and they pull the net up, nothing in it, the sea's empty, that's your proof. But if that same scientist were just to go in a boat for a day's fishing, the fishermen would go over here and get the fish, plenty of fish. So they're only doing their job, they know there's no fish there. Whereas the fishermen know there's no fish there so they wouldnae go there.' Managing director, small company 6

'Somewhere the role has to reverse and the science has to catch up with what's really happening out there with the stocks.' 'What's happening at the moment is because the science is not in tune with nature and what's physically out there at the moment.' Partner, medium company

This industry view that scientific assessments of stocks are out of date and inconsistent with fishermen's knowledge has been found elsewhere (National Audit Office 2003). Other respondents did not totally discount the science but thought it inadequate:

'You can look at one report which says that tuna is below its maximum sustainable yield and still OK, getting challenging but it's still OK. Other reports that say you've got to slow down because we're now getting beyond the tipping point.' Managing director, medium-large company

'I think in overall terms, overall the scientific advice on a broad spectrum is generally reasonably correct. But having said that, I don't actually think that the scientific community are quite as understanding of the complexities and interactions in the oceans as they profess to be and I think that ministers tend to rely on them for advice when that advice is not always possibly as clearly defined as it should be. In other words it might be the scientific knowledge is still evolving about how things react and interact in the sea. I don't think it's totally understood and I think that most professional scientists would admit that, they don't understand how if you exploit one species what effect that has on other species, what kind of synergies that you are disturbing by prosecuting fisheries.' Managing director, small company 1

But there was also recognition that overfishing had been or in some views always would be a potential problem:

'We're getting to the point where it's unequivocal, that yes there was overfishing in the past, yes fishermen were badly managed for many, many years,' Manager, trade organisation 1

'If you've got a resource and it's a valuable resource, the pressure is always on it to over-exploit it. There isn't an alternative to that. That's what it will continue to be and that's what should continue. Open access resource, pressure always on it, that's how it is.' 'If the forms, the fish have sufficient recuperative, reproductive methods to build up again, well and good but if they haven't, you will severely damage it, no doubt about that, that's just reality.' Trader, medium-large company

So there were certainly anxieties about sustainability, some general, some specific:

'I think there are always concerns about the sustainability of all fisheries. Some are more of a concern than others.' Category technologist, major retailer

'A purse-seiner will go out for 28 days and catch 7,000 tons of fish, including juveniles and quite a lot of by-catch because they're getting better ... because more targeted. Fundamentally they take the whole shoal whereas we'll pick bits off the shoal.' Managing director, medium-large company

But there were also many positive evaluations, some about certain stocks, some about their own particular sourcing:

'The species that we are dealing in are stocks ie mackerel, herring that are controlled by ICES which is the international of the seas [*International Council for the Exploration of the Sea*]. Which is controlled by the scientists. Which do

various studies on the biomass, eggs blah, blah, blah. And as long as the fishermen fish to these quotas, we believe as an industry, that we have got sustainability.' Director, medium-large company

'Everything is cyclic, everything has cycles but every year passing, fewer boats and really plentiful crops. The sole crop is excellent this year, the last three years, absolutely excellent. Plaice, we've got more plaice this year anywhere from Denmark through to Lands End, there's more plaice this year than there's been for generations.' Partner, medium company

'The majority of the boats in [*this area*] are day boats so they don't harm the seabed as much as trawlers would do. That's why we feel that the fisheries that we represent are relatively sustainable. And also a lot of the smaller fishermen actually use gill nets to catch flat fish. Which is you put nets out in the evening, come back the following day and then come and take it in. Compare it to trawlers, it's obviously a lot more sustainable.' Manager, trade organisation 2

And from two whose companies sourced globally, supply did not seem to be a problem:

'Supplies are always available, it's usually a question of price.' Managing director, large company

'What I see is the increasingly positive results coming from long-term better management of fisheries. I mean these things take time, it takes time for fisheries to recover. But generally most fisheries around the world are being managed on a precautionary principle.' Director, large company

However, within the scientific world there is a major debate about the sustainability of fishing world-wide, much of it pessimistic in tone, which emphasises the determined action needed to rescue the situation: (Branch TA 2008;Branch TA et al. 2011;Daan N et al. 2011;Pauly D et al. 2002;Pauly D 2009;Roberts C 2007;Swartz W et al. 2010;Worm B et al. 2006;Worm B et al. 2009). The last of these references does, however, say that fisheries are being rebuilt and that recovery is possible. There are also issues about the adequacy of scientific approaches used as a basis for fisheries management (Holt S 2007;McGlade J 1999;Roberts C 2007). A recent review covering fisheries which provide four-fifths of the global supply of whitefish found a mixed picture: much of the fish is produced by a small number of well-managed fisheries but the majority are not well-run (Sustainable Fisheries Partnership 2013). While this is moderately reassuring from the viewpoint of British whitefish consumption, another more comprehensive view of global fisheries was more pessimistic, noting that most are poorly managed and that

70% of all fish populations are over-exploited (Pitcher TJ & Cheung WWL 2013).

These analyses are a commentary on results of the state-led fisheries management deployed around the world. It has had varying impacts, until recently inadequate in the case of the CFP, more effective in certain other jurisdictions. The global governance element has also been important with the 1995 *Code of Conduct for Responsible Fisheries* (CCRF) and other important agreements from the Food and Agriculture Organisation of the United Nations (FAO) covering precautionary and ecosystem approaches, conservation obligations of flag states, measures to deal with illegal fishing and straddling stocks (those moving between national EEZ boundaries and the high seas outside them) but implementation depends on national states and Regional Fisheries Management Organisations (FAO 1995; Garcia SM & Rosenberg AA 2010). The CCRF specifies various environmental and trade-related obligations for states (Deere C 1999). A recent development has been the issuing of guidelines for reducing bycatch and discards (FAO 2011b). While the *Code of Conduct* and other FAO guidelines do not have legal force in the same way as the UNCLOS, they have been characterised as 'soft law' which has effected real changes in policy goals (Sainsbury K 2010).

A further element of global governance is the system of Regional Fisheries Management Organisations (RFMOs) including the North East Atlantic Fisheries Commission which has already been mentioned, most of which have management powers. Although these have had variable impacts and as consensus organisations have to move at the pace of the slowest and most reluctant member states, some have put changes into effect and have achieved improved fisheries management (Macfarlane A 2007; OECD 2009).

4.2.3 Capture Fish Eco-labelling

A significant attempt to intervene in the world of state and supra-state governance of fisheries has been made by the introduction of eco-labels to provide a market incentive for improved management. While 'dolphin-friendly'

tuna had led the way, the Marine Stewardship Council (MSC) was the first general scheme, established in 1997 jointly by WWF and the company Unilever, then owner of major fish processor Birds Eye. A small number of other schemes started subsequently of which Friends of the Sea has the largest number of certifications but since the MSC is widely recognised as the global leader and particularly because it is almost the only one that has been relevant to the supply chain in Britain the discussion here will focus on the latter. (Types of certification and labelling schemes addressed to issues wider than fishery sustainability are discussed in chapter 5.)

The motivations for establishing the MSC were a perceived failure of state governance and frustration at lack of progress with its 'endangered seas' campaign from WWF's viewpoint and Unilever's commercial concern for security of supply (Flower P & Heap S 2000;Howes R 2008). Unilever's apprehension can be regarded as a judgment on the ability of government regulation at the time to secure future supply so also a governance issue. More generally the development of market based incentives in the form of information for consumers, not just eco-labels like the MSC scheme but also advice lists, has been described as reflecting failures of state-led regulation to deal with overfishing (Gulbrandsen LH 2006;Oosterveer P 2005;Oosterveer P & Sonnenfeld DA 2012;Parkes G et al. 2009).

Many of the initial responses to the establishment of the MSC went directly to the question of governance. Some Nordic governments objected to a non-state body intervening in this way, seeing the MSC as 'an attempt to create a private transnational management regime beyond national jurisdiction' (Gulbrandsen LH 2009) (p656) and as deliberately bypassing states to appeal directly to consumers, pre-empting what should be the role of each government to secure a broad national benefit (Steinberg PE 1999). In doing so it could also be seen as exemplifying a neo-liberal approach to governance in a globalised world and as such embodying the interests of the richer Northern countries (Constance D & Bonanno A 2000;O'Riordan B 1996).

From another direction, certain Latin American governments, Mexico having already protested against US state rules on dolphin-friendly tuna, were anxious about possible uses of certification as a constraint to trade although voluntary certifications do not come under WTO rules (Deere C 1999).⁶⁹ Nevertheless, one line of criticism has continued to be that the MSC programme largely excludes developing country fisheries (Ponte S 2008;Ponte S 2012).

The concerns of some members expressed in its Committee on Fisheries spurred the FAO to produce its own eco-labelling guidelines, in two forms for marine and inland fisheries respectively (FAO 2009;FAO 2011a;Willmann R, Cochrane K, & Emerson W 2008); (the FAO has also produced guidelines on aquaculture certification, covered in chapter 5). Further, the FAO followed the fisheries guidelines with an evaluation schema for assessing eco-labelling programmes (FAO 2011c) though when checked no specific application of the FAO evaluation framework seemed to have been made. These developments have been intended to counter the position of eco-labelling schemes standing completely outside any state governance framework (Gulbrandsen LH 2009;Washington S & Ababouch L 2011).

The MSC has in fact explicitly aimed to make its scheme compliant with FAO rules. At the outset its objective was to meet the requirements of the FAO *Code of Conduct for Responsible Fisheries*. After publication of the draft FAO eco-labelling guidelines the MSC undertook certain changes to make its programme conform (Auld G 2007;Gulbrandsen LH 2009). In addition, the FAO documents have been used by other organisations as benchmarks against which to assess the MSC and other schemes (Food & Water Europe 2010;Parkes G, Walmsley S, Cambridge T, Trumble R, Clarke S, Lamberts D, Souter D, & White C 2009). Thus the global governance represented by FAO rules, although without legal force, has clearly impacted on the private MSC (Gulbrandsen LH 2010).

⁶⁹ The Mexican complaint against US legislation on dolphin-friendly tuna legislation goes back to 1991. A formal complaint was made through the WTO in 2008; the panel ruled in favour of the US in 2011 but the WTO Appellate Body reversed the decision in May 2013. An account is given in Miles T, 'WTO rules against US "dolphin safe" tuna', 16 May 2013, on www.reuters.com.

Even more fundamentally, the MSC 'needs states to ensure management arrangements are in place'.⁷⁰ The third of the three principles underlying its scheme is 'effective management' specified as 'The fishery must meet all local, national and international laws and must have a management system in place to respond to changing circumstances and maintain sustainability.' For this to be the case requires a framework of state regulation whether by a single country within its own EEZ (or the EU acting as such) or for fisheries which encompass the zones of different countries and/or the high seas by means of treaty arrangements between countries. It is possible that the MSC's programme has a bigger impact on high seas fisheries than those under state jurisdiction in EEZs but by the same token there will generally be much less enforcement action in the former, affecting the ability to meet scheme management principles.

There are differing views about the benefits of the MSC programme. In some comparative assessments of schemes for capture fish the MSC has scored well (Accenture Development Partners 2009;James Sullivan Consulting 2012;Leadbitter D & Ward T 2007). However, certain commentators are critical of what they consider to be inadequate environmental standards and governance weaknesses (Hoel AH 2004;Jacquet JL et al. 2010;Kalfagianni A & Pattberg P 2013). For these reasons, Greenpeace does not endorse the MSC scheme (Greenpeace 2009). A key governance issue with the MSC model is that certifiers who score and therefore interpret its standards tender for this work to fishery clients on a commercial basis with potential for differentials in ratings and conflicts of interest to arise (Ward TJ 2008). Eco-labelling schemes generally face the quandary that while higher standards would represent better environmental protection, if few producers can meet such standards there cannot be output levels sufficient for a market in certified products to be maintained and without a certain level of market penetration an eco-labelling scheme cannot have an impact (Gulbrandsen LH 2009;Parkes G,

⁷⁰ Quoted from personal communication (email) from James Simpson, UK Communications Manager, MSC.

Walmsley S, Cambridge T, Trumble R, Clarke S, Lamberts D, Souter D, & White C 2009;Volpe JP et al. 2011;Ward T & Phillips B 2008b).

The MSC's argument is first of all that improvements that take place both during the assessment process and after certification are worthwhile even if the fishery does not score highly on all indicators and secondly that while the scheme initially encouraged the better-managed fisheries to become certified, once a market had been generated and there was buyer pull for eco-labelled product, other fisheries that need to make more extensive changes have been drawn into the programme (Marine Stewardship Council 2011). The model is therefore based on, or has evolved into, one based on the idea of continual improvement (Ward T & Phillips B 2008a). This is certainly a different sort of governance to the rule-setting typical of state-led regulation. Further thinking along adaptive lines has suggested replacing the pass/fail (certified or not) basis of the scheme with a tiered approach and also proposed that a different standard would be appropriate for small-scale developing country fisheries, flexibilities that would probably be much less likely in a publicly governed system (but that also do not seem to be within the current MSC view) (Bush SR et al. 2013b;Kaiser M & Edwards-Jones G 2006;Ward T & Phillips B 2008a).

At 2012 the MSC had 10% of the world's fisheries in its programme (certified or undergoing some form of assessment) and while this is a small overall proportion, it is certainly relevant for the British seafood supply chain. Although a couple of small British fisheries were involved early on, hostility to the scheme from at least part of the UK fishing industry was identified at the initial stages (Flower P & Heap S 2000;MacMullen P 1998). However, this changed subsequently and several important Scottish fisheries producing herring and haddock have been certified.

The majority of British fisheries have chosen Moody Marine as their certifier (Potts T et al. 2011); the company was part of a UK-based global technical services organisation serving many industries including oil and gas, mining and engineering which in 2011 was acquired by Intertek, a similarly varied US-

based conglomerate. Potential for conflicts of interest to arise in relation to the considerable decision-making role taken by certifying companies in the MSC scheme was noted above and when the certifier is large and has such diversified activities the issue of how conservation and commercial interests are balanced calls for examination but as yet there does not seem to be any study of exactly how this company (or others involved with the MSC) work and make their judgements in practice.

The MSC is engaged in a joint programme with Seafish (and other partners) that having profiled all the English coastal fisheries has carried out MSC pre-assessments on a large number of them, concluding that about fifty could go to the stage of full assessment in the short to medium term (Southall TD et al. 2013). Hence the proportion of certified seafood in the UK system may be expected to rise in the future. British supply chains also make considerable use of certified product from other parts of the globe such as the Alaskan salmon fisheries.

The essential test of governance in relation to private certification is whether it has been more effective than states alone in protecting fish stocks and the marine environment. There is considerable disagreement on this point which has largely focused on MSC certified fisheries. Some evaluations have found environmental gains as a result of the certification process (Agnew D et al. 2006; Cambridge T et al. 2011) and unsurprisingly the MSC's own self-evaluation is positive (Marine Stewardship Council 2013b). Others stress that certified fisheries have tended to be those that were already well-managed (Gutiérrez NL et al. 2012; Washington S & Ababouch L 2011). And there are claims and counter-claims on whether the MSC has certified over-fished stocks (Agnew DJ et al. 2013; Froese R & Proelss A 2012; Froese R & Proelss A 2013; Jacquet JL, Pauly D, Ainley D, Holt S, Dayton P, & Jackson J 2010). A further point is that there are a number of other environmental issues such as use of energy and chemicals which the MSC system has failed to incorporate (Thrane M, Ziegler F, & Sonesson U 2009). The overall judgement so far is that while it has achieved some environmental improvements, certification has

not resulted in a significant ecological benefit (Gulbrandsen LH 2010;Ward T & Phillips B 2008a;Washington S & Ababouch L 2011).

Although certification has, as indicated, made considerable headway in the British industry, scepticism about the MSC continues as reflected by some of the research respondents:

‘I’m not saying I’m against it because I think you have to have something but I don’t think it’s the panacea that it purports to be, I think there’s a lot of problems with it. But having said that of course, we do have to have something.’ Trade organisation representative 1

‘Personally I believe it should be, these things should be policed properly and you shouldn’t need a thing like MSC to be involved in it. It’s another body taking money out of the system and shouldn’t be there.’ Director, medium-large company

Sixteen years later, both the hype and the fears about private rules replacing state government touched off by the founding of the MSC have ameliorated. States have come to accept the MSC and the FAO has asserted its influence over eco-labelling (Gulbrandsen LH 2006). The central role played by state and supra-state regulation of fisheries, not least those in certification programmes, has been restated (Eden S & Bear C 2010;Sainsbury K 2010;Washington S & Ababouch L 2011). The MSC acknowledges that its work is complementary to that of others, starting with governments (Marine Stewardship Council 2011). Most MSC certified fisheries are managed by the richer countries. Should the MSC succeed in expanding coverage to many more small fisheries in developing countries, fisheries which are less likely to benefit from a state-organised and enforced management system, the scheme could be a means of adding privately based management arrangements not otherwise in place. However, for the most part and for fisheries relevant to British supply, MSC eco-labelling is complementary to state fisheries management. It adds an incentive for compliance but does not replace public regulation.

Rather than contesting public regulation, the governance exerted by certification has been strongest internally within supply chains. Soon after the establishment of the MSC, retailers in Britain were reported as having

'overwhelming desire' for such a scheme (MacMullen P 1998) (p36). There is considerable agreement that supermarkets have been the driving force pushing upstream for eco-labelling (Hoel AH 2004; Macfadyean G & Huntington T 2009; Potts T, Brennan R, Pita C, & Lowrie G 2011; Roheim CA 2009). Their demands are reshaping the market for seafood in parts of which certification may soon become an entry requirement.

With the creation, largely by the MSC, of a market in sustainable seafood, certification has become a valuable resource and can be used as a commercial tool (Foley P 2012; Ponte S 2012). The processing company Young's sponsored the certification of a Scottish langoustine fishery that was a major supplier of the raw material for its scampi products.⁷¹ Certification has been a means of changing the image of certain fisheries associated with illegal fishing. The Barents Sea, a key source of whitefish for the British market was the subject of an illegal fishing exposé in 2006 which led to a headline 'Cod sold in hundreds of chippies linked to Russian black market'. Subsequent determined action taken to deal with the issue was sufficiently successful that Barents Sea cod and haddock fisheries received MSC certification in 2010 and it was reported in 2013 that no illegal fishing in the Barents Sea has been detected for several years.⁷² Another example is that of the Scottish pelagic fisheries which had been the object of the huge levels of illegal takes that led to the court cases mentioned above; although not explicitly connected, the certifications of Scottish herring fisheries in 2008 and 2010 and of the Scottish mackerel fishery in 2009 allow a veil to be drawn over the previous

⁷¹ Young's involvement with the certification of the Stornaway nephrops fishery is described in www.fishforlife.co.uk/wen/case-study-1.asp, accessed on 26 November 2012. The certification took place in 2009 and the certification report is available on the MSC website. However, in 2013 Young's sold its Stornaway operation to another processing company, Macduff Shellfish.

⁷² The headline is of the report by Leigh D and Evans R published in The Guardian on 26 February 2006 which implicated the Birds Eye brand as well as fish and chip shops in a supply chain involving Norwegian-owned but Russian-flagged boats, revealed in investigations by Swedish journalists. Greenpeace also produced a report on this subject, *Findus, Kangamiut, Weak EU Port States and Russian Mafia: Illegal Cod Fishing in the Barents Sea Exposed*, undated but accessed on 27 February 2006 from www.greenpeace.org. The responsible states for the Barents Sea are Norway and the Russian Federation. The recent positive news is in a press release from the Norwegian Ministry of Fisheries and Coastal Affairs, 'Winning the war on illegal fishing in the Barents Sea', dated 18 April 2013, on www.regjeringen.no.

misdeeds.⁷³ Of course none of these commercial uses is incompatible with real sustainability improvements resulting from the certification process.

The mackerel fishery has added another twist to the issue of governance and certification by involving the MSC in an inter-state dispute over access to stocks. This has arisen following movements of the fish northwards into Icelandic waters and the argument over a quota share for Iceland and the Faroe Islands on one side against the proportions taken by the EU and Norway on the other based on previous agreements. While the dispute has been underway and a series of negotiations unsuccessful, Iceland and the Faroes have since 2010 made unilateral declarations of quota while the other countries have maintained their previously agreed levels with the result that catches have been greatly in excess of scientific recommendations. Consequently, the MSC certification was suspended in 2012, pending a resolution; one of the seven fisheries affected is Scottish. During the dispute some parties urged the MSC to sanction Iceland and the Faroes by withdrawing accreditations which it declined to do, reportedly saying it had to remain impartial. Here an attempt was made to use certification as a weapon in an inter-state quarrel over access to stocks, albeit unsuccessfully. In the meantime the European Parliament actually voted for a range of sanctions against Iceland and the Faroes (not so far put into operation).⁷⁴ The complexity of mackerel movements - the fish are spawned and spend their juvenile years in one jurisdiction before joining the adult migratory stock in other zones - illustrates the inherent difficulties of setting boundaries to a mobile natural resource, a point which has been made in certain commentaries on the MSC enterprise (Bear C & Eden S 2008; Steinberg PE 1999). It is

⁷³ Information about MSC certifications can be found on its website www.msc.org.

⁷⁴ A brief history of the NE Atlantic mackerel fishery and information on recent quotas is included in a recent certification review, (Food International Certification 2013). For a report on the dispute see the BBC news item 'Is Britain braced for a mackerel war?' on 24 August 2010 and for the sanctions vote see BBC News item 'Mackerel sanction plan is adopted by European Parliament' dated 12 September 2012. The desire of parts of the seafood industry for the MSC to sanction Iceland and the Faroes is recorded in Ford R, 'Suppliers urge MSC to get tough on mackerel', *The Grocer*, 22 September 2012. Although sanctions action had not been taken by the EU in relation to the mackerel dispute at the time of writing, they were put in place against the Faroes in another dispute over Atlanto-Scandian herring as reported in Keane K, 'Herring trade sanctions begin against Faroe Islands', 28 August 2013, BBC News.

indeed both a problem for all forms of fisheries governance and one which illustrates the limits of the certification model. While inter-state relations on this issue have hardly been a great success as the failure to reach agreement continued through 2013 with only partial resolution in the early part of 2014, eventually the states involved will have to resolve the dispute and determine future quotas between themselves while the MSC can only be an onlooker.⁷⁵ More broadly, it is not known as yet to what extent fisheries management will be able to rescue the global situation of depleted stocks but solutions will rest on actions taken by states individually and co-operatively, not least by means of the CFP, rather than through the MSC. As one analyst summarises: 'In essence, because most fisheries are under the control of government bodies, fish stocks require government intervention for their conservation' (Gulbrandsen LH 2010) (p140).

The MSC can only supplement and not substitute for state-based governance of fisheries but it can make an impact on downstream supply chains for seafood and has done so. This becomes clear when dealing with retailing and foodservice and the subject is picked up again in chapter 6.

This section has shown how the sourcing of capture fish for the British market was decisively changed by developments in global governance and how it has continued to be affected by state governance involving both the EU's CFP and the British government. There was a shift from the dominance of domestic fleet production to a considerable reliance on imports which in part were eased by changes in global trade rules. Over the period, the issue and objective of sustainability has become steadily more important and has come both to dominate state-ruled fisheries management (carrying the recognition that economic sustainability depends on the health of fish stocks) and, through the development of certification, also to become the focus of a developing input of private governance into the capture fish part of the chain.

⁷⁵ The agreement between the EU, Faroes and Norway but not including Iceland is reported in BBC News item 'Mackerel quotas agreed after dispute', 12 March 2014.

4.3 Farmed Fish: Supply, Governance and Sustainability

Turning to the second source of supply, in a similar timescale to the radical reshaping of capture fishing, in many parts of the world fish and shellfish farming took off. Previously it was limited to freshwater rearing of a small number of species but from the 1970s technical advances gave full control of the reproduction and rearing of many species used for human consumption. For Britain this meant an expansion of home produced supply options, primarily Scottish salmon but also trout, a range of shellfish species and small quantities of other finfish. There were also new import options available.

In Scotland, salmon production increased from modest quantities of less than a thousand tonnes per annum in the 1970s to 32,000 tonnes in 1990, 129,000 tonnes in 2000 and 154,000 in 2010.⁷⁶ Currently just over half of this is exported but a sizable amount of salmon is also imported so that in 2012 the amount available for domestic consumption was about 113,000 tonnes.⁷⁷ Trout, mostly rainbow, production has developed in all four parts of the UK; the table (separate from restocking) volume available for domestic consumption has run at around ten thousand tonnes each year from the late 1980s and twelve thousand from the late 1990s onwards.⁷⁸ Small quantities of other

⁷⁶ Data is from successive editions of the Scottish Fish Farms Annual Production Survey, published successively by the Scottish Office Agriculture and Fisheries Department, Fisheries Research Service (Scottish Executive) and most recently Marine Scotland Science (Scottish Government).

⁷⁷ No statistics are available for the amounts of farmed salmon available for domestic consumption. In principle it should be possible to calculate the figure using export statistics from HMRC trade tables but there are various definitional issues which stand in the way. Only in 2012 did HMRC introduce a code to identify Atlantic salmon, the variety farmed in Scotland, and this has been used to produce the figure of 47% exported; of course this cannot be used to make any assumptions about the situation in previous years. Imports consist of Atlantic and Pacific salmon varieties, both farmed and capture fish and some may be re-exported in a processed form.

⁷⁸ Trout production figures have been taken from successive issues of *Trout News* (July 1990 to July 2005) and then *Finfish News* (Winter 2006 to Winter/Spring 2012), published by the Centre for Environment, Fisheries & Aquaculture Science (Cefas). The earlier editions are not on the website but some sheets from earlier editions were made available to the researcher; there are gaps in the information but the general picture is fairly consistent from year to year. The England and Wales trout production survey started in 1986 so no earlier information is available for the whole of the UK but modest trout production started in Scotland in the mid-1970s and ran at about 2000 tonnes pa during the 1980s. It is assumed that most if not all trout production, which is much smaller than of salmon, is for domestic use.

finfish have also been produced, varying from year to year, including halibut, tilapia and carp; cod production in Scotland after a brief flurry in the 2000s has apparently ended and a barramundi facility in the New Forest closed after just two years. Farmed salmon has had the biggest impact on supply. As the then trade organisation Scottish Salmon Growers Association could already claim two decades ago: 'Whereas Scottish salmon was a luxury, only seasonally available, and with relatively few and privileged consumers, today it is an affordable product, with continuity of supplies of fresh and smoked fish, and widely available in fishmongers, retail stores and catering establishments' (House of Commons Agriculture Committee 1990).

Supply has also been increased by imports of farmed fish. In 2012 this included over thirteen thousand tonnes of sea bass and sea bream, three and a half thousand tonnes of tilapia and six hundred tonnes of pangasius (catfish).⁷⁹

While less subject to regulation in Britain than capture fisheries (regulation affects certain aspects of production but it does not encompass anything comparable to quota limits), aquaculture is more highly regulated on a routine basis than is agriculture. Certain exemptions from planning control enjoyed in relation to agricultural developments have been removed from fish farming (Howarth W 1993). However, legislation over feed, veterinary medicines and pesticides apply to both sectors (Spreij M 2005).

The area of animal health is the closest in principle to the agriculture situation and legislation, *The Aquatic Animal Health (England and Wales)* and *The Aquatic Animal Health (Scotland) Regulations 2009* implement EU directives. They require all commercial aquaculture production and processing units to be licensed and specify a wide range of measures that may be taken when disease is present or suspected including movement control and slaughter.

⁷⁹ This data comes from the HMRC tables which do not contain comparable figures for earlier years.

The movement of live wild fish is also controlled.⁸⁰ Implementation is through the Fish Health Inspectorates in the various administrations.

The key European regulation on animal feed is Regulation (EC) No 1831/2003 *Laying down requirements for feed hygiene* which includes aquaculture in its remit.⁸¹ An important development in relation to aquaculture took place in 2013 when a Commission regulation allowed non-ruminant animal protein, that is derived from pigs and poultry, to be used in fish feed when previously this had been prohibited under safeguarding rules to prevent transmissible spongiform encephalopathies.⁸² Inclusion of protein from such sources has the potential to reduce the level of wild fish needed for feed and hence to be beneficial from the viewpoint of sustainability (but is more problematic from a consumer viewpoint as discussed in chapter 6).

Regulation is strongest in relation to sea-based salmon farming, connected to issues such as the shared uses of the marine environment, the potential for fish mobility and the low barriers to environmental effects. Salmon farming in Scotland has been involved in the most complex regime of any other type of aquaculture in Britain due to its marine locations, involving many legal and environmental complications. As the Crown Estate (except in the Shetlands) is the owner of the seabed and foreshore all round the coast, a lease must be obtained from the Commissioners to operate a marine farm and after salmon farming started in Scotland this functioned as a quasi-planning authority for many years. Only in the late 2000s was marine aquaculture brought under local government planning control under the *Town and Country Planning (Marine Fish Farming) (Scotland) Regulations 2007* (recently superseded by the *Town and Country Planning (Marine Fish Farming) (Scotland) Regulations*

⁸⁰ The previous legislation consisted of the 1937 and 1983 *Diseases of Fish Acts* and associated regulations.

⁸¹ The implementing UK regulations are SI No 3280 *The Feed (Hygiene and Enforcement) (England) Regulations 2005*, SR No. 546, *The Feed (Hygiene and Enforcement) Regulations, (Northern Ireland) 2005*, SSI No 608, *The Feed (Hygiene and Enforcement) (Scotland) Regulations 2005*, SI No 3368 (W265) and *The Feed (Hygiene and Enforcement) (Wales) Regulations 2005*.

⁸² This is Regulation (EU) No 56/2013 *Amending Annexes I and IV to Regulation (EC) No 999/2001 of the European Parliament and of the Council laying down rules for the prevention, control and eradication of certain transmissible spongiform encephalopathies*.

2013) while other issues such as containment and parasite control have been covered by the *Aquaculture and Fisheries (Scotland) Act 2007*. To obtain planning consent, various environmental conditions must be satisfied (some under legislation such as control of pollution, coastal protection and provisions under the European Birds and Habitats Directives) and the Locational Guidelines in (Scottish Executive 1999) followed while agencies must mediate potential conflicts with commercial and recreational fishing interests. Prior to the more recent planning legislation, guidance was issued in the form of Advice Notes by the then Scottish Executive. Planning applications may require an environmental impact assessment (under 2011, previously 1988 and 1999 regulations).⁸³ In addition farmers require authorisation under the *Water Environment (Controlled Activities) (Scotland) Regulations 2011* which deals among other matters with pollution and water abstraction for which the implementing body is the Scottish Environment Protection Agency (SEPA); previously the same agency administered regulations under the *1974 Control of Pollution Act* (as amended by the *1989 Water Act*). There are reporting requirements relating to pollution and water abstraction and record-keeping requirements regarding escapes. (Henderson AR & Davies IM 2000; Scottish Government 2010c; SEPA 2011; Spreij M 2005; Thompson M & Side J 2002).

Controls on sites as well as policies in favour of relatively lower stocking densities and smaller sea cages than used in some other countries are seen by producers as limiting the scope for increasing production, as one of the research respondents explained:

‘Yes we have problems getting volumes, yes. Unfortunately Scotland is more heavily regulated than other salmon production in Chile and Faroe and Canada. There is very, very little [space] to expand in Scotland because of very restrictive government rules and regulations. We’ve been looking for new

⁸³ These were SI No 1218, *Environmental Assessment (Salmon Farming in Marine Waters) Regulations 1988*, subsequently SI No 367, *The Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations 1999* and SSI 1999/1, *The Environmental Impact Assessment (Scotland) Regulations*, currently SSI 139, *The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011*. Specific provisions for N Ireland are in SR 23, *The Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations (Northern Ireland) 2007* and most recently in SR No 59 *The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2012*.

sites for years and haven't achieved it yet.' Managing director, medium-large aquaculture company

In fact the economic impact of environmental policy is not confined to Scotland. It has been acknowledged as the main factor holding back the development of European aquaculture as a whole in one report though competition with lower cost exporting areas and administrative delays in getting approvals have also been blamed (Guillen J, Contini F, & Doermer H (Eds) 2012; Guillen J & Motova A (Eds) 2013). Another way of putting it is that some countries are in a position to give greater priority to coastal amenity and the protection of native bio-diversity rather than only the economic development represented by aquaculture (Macfarlane A 2007).

But while salmon farmers in Scotland may feel that their industry is heavily regulated, environmental NGOs and other commentators have been very critical of its impacts. A number of unfavourable reports have been published pointing to issues such as contamination of the seabed with excess nutrients and waste products, wider contamination with chemicals used for treatment and the impact on wild salmon of both sea lice infestation and the many large-scale escapes (Berry C & Davison A 2001; Friends of the Earth Scotland 1988; Ross A 1997; SIFT 2013; Staniford D 2002) and for some years frequent attack bulletins were issued by the Salmon Farm Protest Group (active from 2002 to 2007).

Despite the controls on site usage, it has been argued that the governance regime in Scotland has been favourable to farming because the Crown Estate with its powers over the marine shore granted salmon farmers rights similar to property rights held by landowners, contrasting with the situation in Ireland and Canada where only access was given. In addition it is argued that court judgements have been more favourable in Scottish cases. Salmon farming was also encouraged by the regional development agency Highlands and Islands Enterprises (formerly the Highlands & Islands Development Board) and indeed the Crown Estate had a positive interest in economic uses which would enlarge its own income (Phyne J 1997).

Scottish administrations after devolution took effect in 1998 were soon much more active in acting over both aquaculture strategy and regulation than the national British government had been previously. Much of the emphasis was on salmon farms, their siting, their potentially adverse environmental impacts and action for control of disease (Environmental and Rural Affairs Department 2003a; Environmental and Rural Affairs Department 2003b; Scottish Executive 1999; Scottish Executive 2000; Scottish Executive 2001; Scottish Executive 2003; Scottish Executive 2007; Scottish Government 2009a; Scottish Government 2010a). Thus Scottish executives and governments have taken a keen interest in the aquaculture industry and have wished to encourage it but this has not involved financial support; rather it has been about encouraging co-operation between farmers and companies to strengthen disease control and equally about balancing farming, environmental and angling interests.

The governance activity continues and there was a second *Aquaculture and Fisheries Act (Scotland)* in 2013 containing various provisions relating to the relationship between aquaculture and freshwater fisheries. The preceding consultation exercise indicated a division of views in which the aquaculture industry was very negative about proposed tightening of regulation in various areas where other stakeholders were more positive; thus balancing different interests continues to be a key governance task (Scottish Government 2012).

Aquaculture in the rest of the UK is less actively regulated and also less promoted but environmental impact assessment regulations apply as already indicated for Scotland and Northern Ireland.⁸⁴ Some scope for promotion was provided in the past as the 1981 *Fisheries Act* included provision for grants to be made to develop fish and shellfish farming while the remit of Seafish established by the Act included aquaculture. Indeed both the White Fish Authority and Seafish early in its history, when it possessed a marine farming unit, undertook development work with species such as Dover sole, halibut and turbot towards new farmed species (Dye JE 1982; Dye JE 1987; White Fish Authority 1977b).

⁸⁴ The current legislation for England is SI No 735 *The Marine Works (Environmental Impact Assessment (Amendment) Regulations 2011* while Wales is still covered by SI 1518 *The Marine Works (Environmental Impact Assessment) Regulations 2007*.

England has a low level of fish farming compared both to the rest of the UK and to other European maritime countries. A strategic planning document about promoting aquaculture in England has been put out for consultation; tellingly, though supported and published with DEFRA support it did not originate as a government activity but rather as an industry initiative with other stakeholder involvement (England Aquaculture Plan Consultation Group 2012). Among other issues it argues that aquaculture is more constrained by regulation than other industries. Although the consultation took place during the first three months of 2012, the response to it from DEFRA was still awaited at the end of 2013 which must indicate that the Department accords the subject a low level of priority.

However, there has been assistance in other ways. Government supported research mentioned in the previous section under the aegis of the Directorate of Fisheries Research included aquaculture developments. Certain academic institutions have specialist centres which have made particular contributions, notably the Institute of Aquaculture at Stirling University and the Centre for Sustainable Aquaculture Research at Swansea University.

Returning to the UK as a whole and considering another aspect of regulation, the competition authorities in Britain have been asked to intervene in two proposed aquaculture company mergers. In 2000 the government blocked the purchase of Hydro Seafood by the Nutreco feed and farming conglomerate, following the recommendation of a Competition Commission report (Competition Commission 2000a). Both the seller, Norsk Hydro ASA, and prospective purchaser were based outside the UK but owned Scottish production units. The Scottish salmon businesses thereby excluded from the deal were purchased jointly by two different Norwegian companies and became Scottish Sea Farms in 2002, continuing in 2013 to be one of the largest producers of Scottish salmon and still in the same ownership. Government action here had a noticeable impact on the organisation of the salmon industry. A few years later in 2006, The Office of Fair Trading referred a proposed acquisition by Pan Fish ASA of Marine Harvest NV to the

Competition Commission. On this occasion the Competition Commission concluded that the proposed deal would not reduce market competition significantly and cleared the merger (Competition Commission 2006;Office of Fair Trading 2006).

While supra-state activity has impinged far less on aquaculture than on capture fishing this activity is within the remit of the CFP. The European Commission (EC) has produced strategic thinking about development of the sector (European Commission 2002a;European Commission 2009a) and the European Parliament has commissioned further research focusing on competitiveness (Bostock J et al. 2009). In the 2002 document the EC noted that there was no coherent EU legislation for aquaculture which is regulated by member states and influenced in complex ways by various Community Directives, potentially resulting in competition issues. European legislation relating to dioxins and antibiotic residues is relevant to aquaculture in addition to the aquatic animal health regulations already noted. The environmental impact assessment required for proposed aquaculture developments previously mentioned fulfils European Directive 85/337/EEC *On the assessment of the effects of certain public and private projects on the environment* amended in Directive 97/11/EC and codified in Directive 2011/92/EU with the same title. Fish and shellfish farmers are also affected by a range of broad Community environmental measures including the Water Framework and the Birds and Habitats Directives. While not legislated, aquaculture may be affected by the Integrated Coastal Zone Management approach which the European Commission has promoted (Stead S 2005). Financial assistance for aquaculture has been provided through the CFP's successive financing schemes. The 2013 reforms indicate some impetus for aquaculture development. The revised Common Market Organisation provides for aquaculture POs to be formed and the main CFP reform includes the establishment of an Aquaculture Advisory Council to bring together stakeholders on the model of the fishery councils (RACs) and funding for this sector will be available from the new EMFF. Each member state is required to produce a multi-annual strategic plan for sustainable aquaculture promotion in 2014 (European Commission 2013).

Private-led governance started early in the Scottish aquaculture industry. Salmon farmers have successively organised themselves as the Scottish Salmon Growers Association (SSGO - 1982 to 2000), succeeded by Scottish Quality Salmon and from 2006 by the Scottish Salmon Producers' Organisation (SSPO). These organisations emphasised standard setting and positioning for premium markets (discussed more fully in Chapter 5) but environmental and sustainability issues became woven into their schemes. The *Code of Good Practice for Scottish Finfish Aquaculture* (CoGP) has been in operation since 2006 through various revisions, the most recent dated 2010 and covers salmon, trout and other farmed finfish. It includes extremely detailed prescriptions on all aspects of farming, co-operation in disease control and measures to protect the environment. There is third party auditing of compliance. The CoGP was originally produced in response to a recommendation in the Scottish Executive's 2003 *Strategic Framework for Scottish Aquaculture* but it is owned by the industry with the adherence of most Scottish producers and its operation constitutes effective self-governance.⁸⁵

Scottish salmon farmers learned the hard way that limiting stocking densities and allowing fallow periods plus co-operative action between neighbouring farms were all needed to control disease; there were outbreaks over 1989 to 1991 and again in the late 1990s which led to heavy losses (Asche F & Bjorndal T 2011;Greenwood M 2003). Hence the SSGO took the initiative in starting a programme for neighbouring farms to synchronise their sea lice treatments. This was followed by the 1999 establishment of the Tripartite Working Group, chaired by the Scottish Executive which brought together representatives of salmon farming industry, environmental quangos and wild salmon interests and led to the establishment of voluntary area management agreements co-ordinating fallowing and harvesting, a special form of governance to deal with competing interests arising from exploitation of coastal marine resources (Thompson M & Side J 2002;Van der Schans JW 1999). This example of private-led governance with public as well as commercial

⁸⁵ See (Scottish Salmon Producers' Organisation 2007) for industry views. The 2010 edition of the *Code of Good Practice for Scottish Finfish Aquaculture* is available on www.thecodeofgoodpractice.co.uk/publish accessed on 13 September 2012.

benefits involves a striking willingness by companies to yield significant freedom of action. What this means in practice was explained on a salmon farm visit:

'In this area, probably the largest in the country ... where we are at the moment it means that we have one synchronously farmed generation, whether it's [*named companies*] or anyone else farming in that area. It means that we talk to each other, exchange sea lice information, decide on what the fallowed areas should be, every two years whole areas free of any farmed fish. That's quite a good model and these same principles across the west coast are basically underway. It means that we have to have strategies for escapes, escape prevention, recapture strategies and that document will go with the Area Management Group so you talk, this is our strategy, what do you guys think? You'd have fishery trust or fishery board folk and there is an exchange there of sea lice information on what the sea lice burden is on the farms for these Area Management areas. So this is really important in terms of ... actually heading off some conflicts between farming and wild aspects. A good initiative.'

Production manager, large aquaculture company

Interestingly, a few years after the visit took place the *Aquaculture and Fisheries (Scotland) Act 2013* made such local management agreements a statutory requirement.

But regulatory governance had already been in operation through the quango the Scottish Environment Protection Agency as the same guide clarified:

'We are very mindful that we farm with the consent of the environment in a sense. The way we're regulated through the Scottish Environmental Protection Agency is to reward good behaviour where good behaviour is a good clean seabed, a recovering seabed, and penalises you if you're out of kilter with the way things are in the environment. If for example we have a poor situation with waste food, with a degraded seabed, then we will find that our ability to farm will be restricted and cut and reduced - that impacts our business if that's the case.'

Production manager, large aquaculture company

Returning to private-led governance of fish farming there is also a European dimension. Certain British aquaculture trade associations are members of the Federation of European Aquaculture Producers (FEAP). The organisation has supported various research projects and produced its own Code of Conduct for European Aquaculture but unlike the Scottish equivalent it does not contain any auditing provisions; FEAP is primarily a promotional and lobbying organisation. Another body, the European Aquaculture Society also promotes contacts and research, publishing both a magazine and a peer-reviewed

journal.⁸⁶ Most recently the Global Salmon Initiative (GSI) was formed in 2012; covering 70% of the world's production, its producer members have committed to environmental, social and economic sustainability and to publishing full information on relevant indicators including such contentious topics as escapes and parasite transfer.⁸⁷

While the private governance outlined does address many environmental issues, the extent to which fish can be farmed sustainably is problematic. The answer is straightforwardly positive for species and arrangements employing vegetarian diets or cultivation by means of integrated traditional systems but these are not the fish farmed or, with few exceptions, eaten in the UK. The issue in relation to carnivorous finfish such as salmon is their consumption of wild fish, incorporated into feed in the form of fish oil or fishmeal at levels which may be two-and-a-half times or more the fish protein eventually produced (DeSombre ER & Barkin JS 2011; Naylor RL et al. 2000). The sustainability of the species fished for feed is another problem (Huntington T 2004). More generally, aquaculture energy usage and other environmental impacts are also relevant (Hall SJ et al. 2011). On the positive side, conversion feed rates compare favourably with those for land animals raised for meat and continue to improve, non-fish feed components are extensively used and continuing to be researched and in addition aquaculture can be argued to use less resource than commercial fishing (Turchini GM, Torstensen BE, & Ng W-K 2009; Welch A et al. 2010). Taking all these factors into account, whether seafood farming can increase net supply for the long term is considered questionable by many. The answer given in various assessments is mixed: some types of aquaculture of some species may increase supplies while others do not or there may be an increase of supply for human consumption but net fish loss.

Given such environmental issues, it is not surprising that a number of eco-labelling schemes for farmed seafood have developed internationally, mainly

⁸⁶ Information about FEAP is on www.feap.info; at 2012 the British members were the Scottish Salmon Producers Organisation, Shetland Aquaculture and the British Trout Association. The most recent edition of its Code of Conduct was produced in 2008. Information about EAS is on www.easonline.org.

⁸⁷ Information about the GSI is on the website www.globalsalmoninitiative.org (accessed 20 August 2013).

industry or retailer led but with some NGO involvement. As certification schemes for aquaculture deal extensively with quality as well as environmental issues, having wider remits than assumed by the MSC for capture fish, they are discussed more fully in chapter 5. Here it is relevant to note the limitations of such schemes in achieving an impact on sustainability for various reasons including restricted definitions, certification of production units rather than wider areas as with fisheries and the unequal representation of stakeholders in decisions about standards (Bush SR, Belton B, Hall D, Vandergeest P, Murray FJ, Ponte S, Oosterveer P, Islam MS, Mol APJ, Hatanaka M, Kruijssen F, Ha TTT, Little DC, & Kusumawati R 2013a).

This section has outlined a range of both public and private governance measures applied to farmed fish production in the UK. State regulation has been in play particularly to balance competing interests as with environmental impacts and alternative marine uses. While it applies to all forms of aquaculture, regulatory activity has been much more extensive in relation to salmon farming which has been the most contentious form as well as constituting the largest cultivation development. At the same time, private governance has also been most developed in relation to salmon farming. There has also been some state development interest in aquaculture, much more apparent in Scotland which has the most economically significant fish farming sector compared to other parts of the UK. The conclusion to be drawn from these points is that public and private governance are both responses to issues that have arisen from economic developments. Salmon farming created a new situation with both opportunities and problems. The problems were effectively publicised and public and private measures developed in response.

Essentially, a similar trajectory occurred in other countries from which farmed fish has been imported into Britain but the balance of public and private forces in each case has been variable and in addition the power differentials between richer importing countries and poorer exporting ones resulted in much of the private governance activity taking the form of schemes imposed by the former on the latter.

4.4 Shellfish Supply and Governance

Moving to the third type of seafood supply, in the early part of the period under discussion here, shellfish made a very modest contribution but this has grown steadily. The British fishing industry produced about 30 thousand tonnes in 1960, 56 thousand in 1970 and 70 in 1980; there were decreases as well as increases from year to year but the general trend was upwards. Exports were initially very low so landings were almost entirely for domestic consumption. As production went up so did exports but up to the mid-1980s it was still increasing domestic supply. Around this time shellfish imports began to rise at a similar rate with the result that net supply continued to rise.⁸⁸ Later in the period farmed shellfish developed, rising from nine thousand tonnes in 1995 to 45 in 2010, consisting mainly of mussels and both pacific and native oysters.

Underlying the volume picture it is important to understand what will be included in supply chains which end in domestic consumption. A great part of both langoustine (*nephrops*) and crab production are exported and so is much of the scallops, oysters and squid produced. However, langoustines have a specific British market in the form of scampi. Native lobsters are largely exported but balanced by imports of Canadian ones. Prawns, both coldwater and warmwater, constitute the biggest import item; together in the mid-1990s the combined amount was about 25,000 tonnes and it has tended to increase over the following period to more than 34,000 tonnes in 2012⁸⁹. The export and re-importation of much cockle and mussel production is also reported (Bannister C 2006).

In relation to capture fishing, langoustines are the only shellfish species covered by the CFP quota system and its associated gear and effort limits. Others may be subject to a range of measures such as EU or local minimum

⁸⁸ Shellfish landings from capture fishing, export and import figures have been taken from successive issues of the Sea Fisheries Statistical Tables (see Footnote 1) and from various editions of *Shellfish News*. Recent work has shown that shellfish statistics are under-recorded (Bannister C 2006) but they can still be used to show the trend over time. There is also overlap between sources of data for capture and farmed shellfish as the presentation of data in *Shellfish News* always mentions.

⁸⁹ The figures have been taken from the HMRC trade data tables; the data set is only available from 1996 to the present.

landing sizes (brown crab, cockles, scallops), local prohibitions on berried, that is egg-bearing, crabs and lobsters, gear restrictions (such as on certain scallop dredges), vessel licensing and bed closures (Bannister C 2006).

Shellfish is produced by both capture fishing and farming and shares some elements of the management of both of these sectors. For Scottish production, shellfish is governed by the general systems relating to capture and farmed seafood respectively but in England and Wales shellfish has its own legislative regime established by the *Sea Fisheries (Shellfish) Act 1967*. This instituted Regulatory Orders which mainly cover wild fisheries and Several Orders used for cultivated shellfish, both currently issued by DEFRA. The Several Order confers a property right.⁹⁰ Regulatory Orders are a means of improving local management by an Inshore Fisheries and Conservation Authority (IFCA) (previously an SFC). Grantees of Several Orders may also have their cultivation regulated by the local IFCA. Applicants for these orders in the past have had to demonstrate the agreement of the owner of shore rights which apart from some privately owned areas means in England and Wales the Crown Estate or the Duchies of Cornwall and Lancaster.

The Crown Estate's power over shellfish cultivation was tested by the Menai Strait case. Mussel farmers operating under a Several Order challenged the Crown Estate's decision to allow a marina to be built by Anglesey Council on shore areas used for mussel growing. They won their case in the High Court and subsequently in 2009 at the Court of Appeal.⁹¹ This appeared at the time to be a Pyrrhic victory for shellfish farmers. What was at stake was expressed by one of the research interviewees (early in 2009):

'No orders, fishery orders, are being renewed and no new orders are being considered because the Crown Estate have a veto and because there is a possibility they could earn more money from other uses they are not prepared to sign or renew any more orders.' '... in fact it's going to become a complete

⁹⁰ For an explanation of Several and Regulatory Orders and the process of obtaining them see the Defra *Several and Regulating Orders for Oysters, Mussels, Cockles, Clams, Scallops, Queens, Lobsters and Crabs: Notes for Guidance* on www.defra.gov.uk, (with the information that an updated version is in preparation) accessed on 8 September 2012.

⁹¹ For a report on the Menai Strait case see BBC News, 'Mussel farmers win marina appeal', 20 February 2009, on <http://news.bbc.co.uk>, accessed 11 September 2012.

stop, they'll never issue any more. And DEFRA, when we spoke to the minister, he said "Go easy on me, I'm just a junior minister, I can't challenge the Treasury. They've told the Crown Estate to generate as much money as they can and I can't fight that." Trade organisation representative 3

There was a contrast to the more facilitating approach taken by the Crown Estate in Scotland towards salmon farming applications which are doubtless more profitable. However, notwithstanding the scepticism expressed in the above quote, the blockage of fishery orders resulting from the case was recognised as a problem and the *Marine and Coastal Access Act 2009* has removed the requirement for Crown Estate consents to be given though in making decisions about fishery orders ministers must have regard to the duties and powers of its Commissioners. The *quid pro* seems to be that in future the fishery orders may be varied or revoked but with compensation requirements. This whole episode was an interesting example of regulation in action with the government in its legislation balancing the demands of different interests.

Continuing with farming, an area of regulation particularly important to bivalve mollusc cultivators is that dealing with water, within a European regulatory framework. It is currently governed by implementation regulations for the Shellfish Waters Directive 2006/113/EC *On the quality required of shellfish waters*. The original directive 79/923/EEC with the same title dates back to 1979 but seems to have been transposed into UK legislation only in 1997.⁹²

The responsible bodies in relation to shellfish harvesting are the FSA and FSA Scotland while responsibility for maintaining and improving water quality lies with the Environment Agency, the Northern Ireland Environment Agency and the Scottish Environment Protection Agency. Waters used for cultivation are categorised into Class A, B, C and Prohibited Areas, based on the level of E coli contamination found in sampled shellfish. The products of class A waters may be directly used for human consumption, but from B and C areas only

⁹² A summary of successive forms of the legislation may be found on www.defra.gov.uk/environment/quality/water/water-quality/shellfish-directive accessed on 26 December 2012. The current regulations are *The Surface Waters (Shellfish) Classification Regulations 2010* and *The Surface Waters (Shellfish) (Classification) (Scotland) Regulations 1997*.

after specified periods of either relaying in clean waters or of depuration (purification in tanks of seawater) have taken place.

Purification goes back to at least the inter-war period of the twentieth century and together with relaying has long been used to render polluted products consumable, specific legislation starting with the *Public Health (Shellfish) Regulations 1934* (Wood PC 1969). The key European legislation detailing conditions relating to the relevant shellfish species is 91/492/EEC *Laying down the health conditions for the production and the placing on the market of live bivalve molluscs* implemented by the *Food Safety (Live Bivalve Molluscs and Other Shellfish) Regulations 1992*. Depuration systems are subject to inspection and approval by local authorities (environmental health departments) with technical advice provided in the four administrations by Marine Scotland, by Cefas for England and Wales but directly by the FSA for Northern Ireland. So this is a very complex area of European, national and local state regulation. The FAO has produced a manual about depuration which seems to be geared to those importing into and needing to satisfy the legislative requirements of the EU and US, not regulation in the formal sense but part of the regulatory apparatus and potentially relevant to the home supply through imports (Lee R, Lovatelli A, & Ababouch L 2008).

In the published classifications of autumn 2012 more than half the Scotland waters were categorised as A all year round and the majority of the remainder as such for part of the year. But in England and Wales most were only at B with less than three percent given the A rating while nearly a fifth were in the C group. In Northern Ireland nearly all the classified areas were assessed as B. The lower ratings for non-Scottish areas and consequent need for purification may be the reason why much mussel and cockle production is exported and re-imported as mentioned above, so as to be relayed for the required time periods in cleaner waters. The state of waters has significant commercial implications for shellfish farmers but action to improve them is the responsibility of government agencies. Changes in the classification system and sampling arrangements have been advocated but improving water quality is of prime importance (Food Standards Agency 2001). New shellfish waters regulations

are expected in line with the EU Water Framework Directive, portending potentially significant impacts for shellfish producers and production (AWJ 2008).

Government interest in developing the shellfish sector was signalled in the 2004 Cabinet Office Report's recommendation to develop 'the inshore/shellfish industry' (Rec 6). DEFRA and Seafish commissioned an initial study and this was followed by a Shellfish Strategy, though earlier work had been carried out by the trade body, the Shellfish Association of Great Britain (Bannister C 2006; Lake N & Utting S 2007). The latter report identified a number of what were termed 'key' cross-sectoral and sectoral development recommendations to be considered by central government including measures connected with stock management, the implementation of the Water Framework Directive and increasing management control over some sectors while other (that is not 'key') recommendations were for action by industry, local managers and other stakeholders. Subsequently, implementation of the Shellfish Strategy has been led by the SAGB. More recently the strategy for aquaculture in England included shellfish in its remit (England Aquaculture Plan Consultation Group 2012) as has the fisheries and aquaculture strategy for Wales (Welsh Assembly Government 2008b). Thus there is a complex interweaving of public and private roles for shellfish planning.

In another development, the National Federation of Fishermen's Organisations has established a Shellfish Committee and become active in pressing for national strategic shellfish policy with particular emphasis on the crab and lobster fisheries amid concerns that sustainability is threatened by excessive capacity⁹³. The concern about lack of management of shellfish species was flagged up by one of the interviewees:

⁹³ The NFFO Shellfish Policy is on their website www.nffo.org.uk. The capacity issues are both directly in the high volume fleet and about the latent capacity of dormant and underutilised licences in the inshore fleet. A news item of 13 September 2012 reports on a meeting the NFFO held with Defra officials about pursuing shellfish policy. The latter spoke about the government's moratorium on new regulations that burden small businesses; the NFFO responded that 'effective resource management did require a degree of public intervention' (see item on www.fishnewseu.com, accessed 13 September 2012).

'Well, there's not enough management. Everything focuses on the Common Fisheries Policy.' 'There's not enough management in place to deal with that, the industry itself is calling for management, because they'll ultimately lose out so not doing it for halo reasons but we'll take any opportunity we can get. That'll be the issue in the wild corps, it's managing the stock. We're not yet overfishing but it won't be long before we are if we continue with this way ahead.' Trade organisation representative 2

SAGB is not only leading the implementation of the strategy for development of the sector, it has also taken an initiative to deal with the gaps in data collection and scientific advice. This would more usually be a government responsibility but the resources available for shellfisheries in the formal management and research bodies are considered very inadequate so it is the trade organisation that led with the commissioning of an FIFG funded scoping study on the establishment of a new mechanism though it is unclear whether any further action has resulted (Shellfish Association of Great Britain 2008).

Thus there is concern that more action is needed to ensure the sustainability of shellfish capture fisheries. However, some in Britain are already certified; the Burry Inlet cockle fishery was an early MSC label achiever and has been joined by the Isle of Man queen scallop and Shetland inshore brown and velvet crab and scallop fisheries and Exmouth Mussels. Under the MSC's recent enhanced fisheries policies certain types of shellfish cultivation have become eligible for certification. The Menai Strait mussel fishery (specifically the very same company that took on the Crown Estate in the court case mentioned above) was the first enhanced type to achieve certification and in Britain has been joined by the Shetland and Scottish Mainland mussel fishery.⁹⁴ Earlier, Scottish shellfish cultivators had developed their own codes of practice; the Association of Scottish Shellfish Growers established a code in 2005 and Seafood Shetland approved a separate convention in 2007.⁹⁵ Many shellfisheries in Britain are on a small scale, not systematically managed in a way that could easily lead to certification but they may still be sustainable.

⁹⁴ Information on certifications available from the Marine Stewardship Council website www.msc.org.

⁹⁵ The Association of Scottish Shellfish Growers, 2005 Code of Good Practice is documented in (Hervàs A et al. 2012); the Seafood Shetland code is reported in 'Code of Practice for shellfish aquaculture', *Shellfish News*, 23, Spring/Summer 2007, p30.

In relation to imported wild shellfish, much of the cold-water prawn supply comes to Britain from MSC certified Canadian fisheries (Foley P 2012). However, warmwater prawn farming which provides much of the imports has raised specific environmental issues, particularly over the destruction of mangrove forests. Public regulation in the relevant countries may sometimes aim to control the impacts as discussed in some of the work reviewed in chapter 2 but is variable and private regulation through certification has been developing to fill what developed country buyers may perceive as a governance gap.

In this section, a contrast can be seen in the state governance relating to shellfish production compared to that for fish. In relation to capture fishing, only the economically important langoustine fishery is controlled through the CFP, otherwise through devolved British state mechanisms, which at least sections of the industry consider to be inadequate and in need of strengthening. The Several and Regulating Orders regime provides planning control. The main regulatory impact on shellfish generally is the legislation concerned with water quality. There has been little state action on the development front and the most strategic activity has come from the trade association. At the same time, private governance of shellfish production is little developed except for limited MSC certification.

4.5 Future Supply

When asked specifically about the future, uncertainty about supply was reflected in some of the responses from the interviews. A pessimistic tone came from two who used in one case entirely, in the other mainly, local sources:

‘The challenges ... that this and many other businesses like it face is lack of supply because you’ll get to the critical stage reasonably soon, within a 2-5 year period where the supply will not support infrastructure.’ Partner, medium company.

'It's not all about our business, it's the fishermen allowed to be in business. Are they allowed to go fishing? Or are days at sea cut again, the quotas going to be cut again, that's a big factor in it.' Managing director, small company 3

Another emphasised the sustainability challenge:

'There aren't enough sustainable fisheries out there. There are more fisheries under assessment, but that doesn't guarantee supply.' Commercial manager, medium-large company

But others felt positive, particularly about what they saw as the potential of farmed seafood to make up for shortfalls of wild:

'Because 25% of the world's fishing is under-exploited so there still is an opportunity there believe it or not and to make sure we bring on board aquacultured products to make up for the 25% of species that are overfished and carry on supplying the 50% of the species that are fished within biologically safe limits.' Only way you're going to bridge that gap of required protein is through aquaculture, good aquaculture, continue to work with aquaculturalists.' Group director, large company

'If you're looking at the macro-trend, saying that fish is really healthy, we want people to eat as much fish as possible. It's going to be farmed fish that allows people to eat fish. Wild fish is almost going to be marginalised.' Managing director, medium-large company

One questioned the long-term viability of dependence on imports:

'We source a lot of products from around the world to satisfy our craving for food produce. We'll be bidding for that product on the global market and if we can't afford to bid for it or we get outbid for it then it will go elsewhere and then you will start to create more pressure on your domestic stocks again.' Trade organisation representative 1

The potential uncertainty of two major sources of whitefish, Iceland and the Barents Sea fishery, have indeed been recognised to be problematic (Esmark M & Jensen N 2004;Garrett A, Lart B, Snowden J, Vidarsson J, & Margeirsson S 2010) (and the Barents Sea cod stocks did suffer a collapse in the late 1980s (Symes DG 1993)). As outlined in section 4.2 there are strong anxieties about the world's fisheries and whether they can be sustainable. Moreover, regardless of the sustainability of particular fisheries or farming regimes, the situation where such a high proportion of Britain's seafood supply is imported is arguably not sustainable in a world in which the 12% of the world's population in the richer countries consumes 30% of the total supply of seafood but where global population and demand from other countries is growing fast,

in the context of total yield from capture fishing having plateaued and the growth of farmed fish slowing down (Esteban A & Crilly R 2011;FAO 2012;Swartz W, Sumaila UR, Watson R, & Pauly D 2010). Moreover, Britain consumes a particularly high proportion of the world's cod supply, estimated at 25% of the total in 1998.⁹⁶ There has been recent government policy recognition of the need to link British fisheries policy with food security (DEFRA 2013).

Along with certain of the interviewees, some see aquaculture as the solution. A DEFRA-commissioned report assessed seafood supply for the UK in the future looking ahead to 2035 as far from assured, with a very unfavourable position expected in relation to the country's own wild catches and a somewhat or very unfavourable position for imported or farmed sources and so recommended active development of sustainable aquaculture to fill the expected gap (James MA & Slaski RJ 2009). This is an argument readily used by proponents of increased aquaculture production (England Aquaculture Plan Consultation Group 2012). There may be potential for investing in closed recirculation systems in which a variety of species could be farmed (Jeffery K, Stinton N, & Ellis T 2011). Increasing domestic seafood production would be beneficial from the viewpoint of reducing dependence on imports but, as already discussed, whether aquaculture can be sustainable is still problematic. Thus there are certainly challenges for Britain in assuring seafood supplies for the future.

4.6 Governance and Seafood Supply

This chapter has described the way sourcing of seafood for British consumption has changed in the second half of the twentieth century and explored the different governance influences in each of the production sectors.

⁹⁶ The 25% figure is in the Memorandum submitted by the UK Fisheries Departments to the House of Commons Agriculture Committee, November 1998.

There was a step change in the industrialisation of seafood production in two directions. The ability to exploit capture fisheries hugely expanded with more powerful vessels and technology while mastery of the reproductive and rearing needs of many species resulted in the spectacular growth of aquaculture. These were market-led economic and technological processes which initially were uncontrolled. However, they gave rise to anxieties about the environmental impacts of such advances.

The very success of these developments then led to the intensification of regulation to deal with what were increasingly seen as problematic consequences. The preceding review has demonstrated the extensive impact of national and supra-state governance on the supply of seafood for British consumption, interacting with market forces and technical developments. Technological change and economic development of both fisheries and aquaculture as well as producing seafood created certain dilemmas and areas of conflict. There has been state and supra-state response and activity at various levels as this chapter has recounted.

Deepening industrialisation of fishing made such great inroads on fish stocks that recognition of a problem became widespread and with it the realisation that state governance had to be strengthened to ensure the continuation of both the natural resource and the economic and social benefits of its exploitation. This has been the story of the still incomplete development of the CFP from a mechanism to promote the fishing industry and a common market in its products to a system for ensuring sustainability of both the resource and the industry.

In Britain, however, the increase in fishery regulation was accompanied by a countervailing delegatory trend first with POs managing fishing quotas and then the semi-privatisation of shares in those quotas. There was also a strengthening of local management when IFCA replaced Sea Fisheries Committees. In addition there has been delegation affecting the state structures involved in managing fisheries and aquaculture from the mid-2000s with functions shifted in stages from inside the department of state (MAFF then

DEFRA) to an agency within it (initially called Marine Fisheries) and subsequently for England to the quango the Marine Management Organisation (MMO). However, in one area there has been a reversal of earlier delegation with Marine Scotland more recently re-incorporated into the Scottish Government so the re-assignment of responsibilities is not a simple one-way movement but dependent on political choices.

The slowness or perceived inability of state-led fisheries management to deal with depletions of fish stocks incentivized the development of eco-labelling programmes, marking a new kind of governance. The best known MSC had an initial environmental NGO lead and continues to have the involvement of a wider range of stakeholders than had previously been involved in fisheries management. However, while eco-certification may be bringing some environmental benefits it has been increasingly recognised that such success rests on effective fisheries management by public authorities.

While global political and economic developments produced constraints on previous sources of supply, they also created opportunities to develop new ones. The near universal declaration of EEZs following the significant step in global governance represented by the UNCLOS agreement limited British access to fishing grounds. However, the expansion of global trade in combination with technological and transportation developments meant new opportunities for others in the seafood industry to source supply in different ways.

In parallel, in Britain the impact of the swift development of aquaculture, particularly marine farming off the Scottish coasts and social responses to its environmental impacts led to recognition of the need for regulation. This was achieved both by state measures and for the salmon and trout farming industries by self-regulation though this has not been the case in the much smaller shellfish sector.

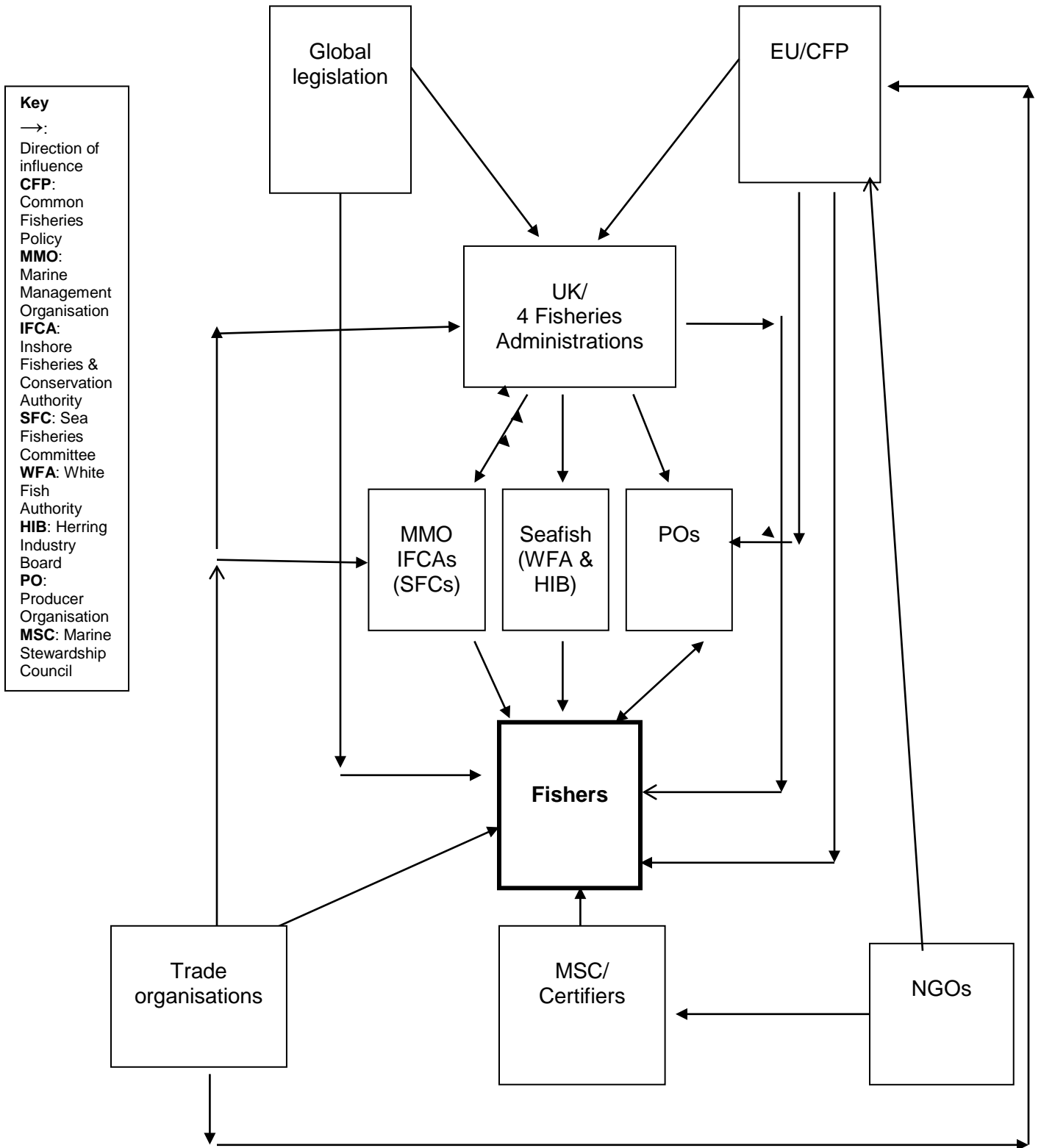
In terms of the framework set out in chapter 2, it is governance from sources external to the supply chain that has been considered in this chapter. The

modes, agents and impacts of governance have been shown to vary between the capture and aquaculture sectors and certain specificities relating to shellfish production have been described. Figures 4.1 and 4.2 illustrate the main governance factors which have been operative over the period reviewed for the fishery and aquaculture sectors respectively, each covering both finfish and shellfish. Arrows indicate the existence and direction of governance relationships which may operate more strongly or weakly at different times.

The diagrams focus on the governance factors impacting on UK production of wild and farmed fish and do not cover all the governance factors in play in relation to the seafood supply chain. One relates to imports, immensely complex and varying with sources and species; the relevant governance factors for British supply chains are concerned with rules coming into effect at the point of importation and indicated in the next chapter. A second important area is that of scientific research which affects the decisions made at global, EU and UK government levels. Even though, as previously noted, scientific advice is not necessarily accepted it should be understood as a governance factor because it has to be respected, not least because when publicly available (as it is on the ICES website) it can be used to evaluate fishery management decisions. Finally the impact of FAO guidelines is not indicated but they have certainly influenced the MSC as previously explained.

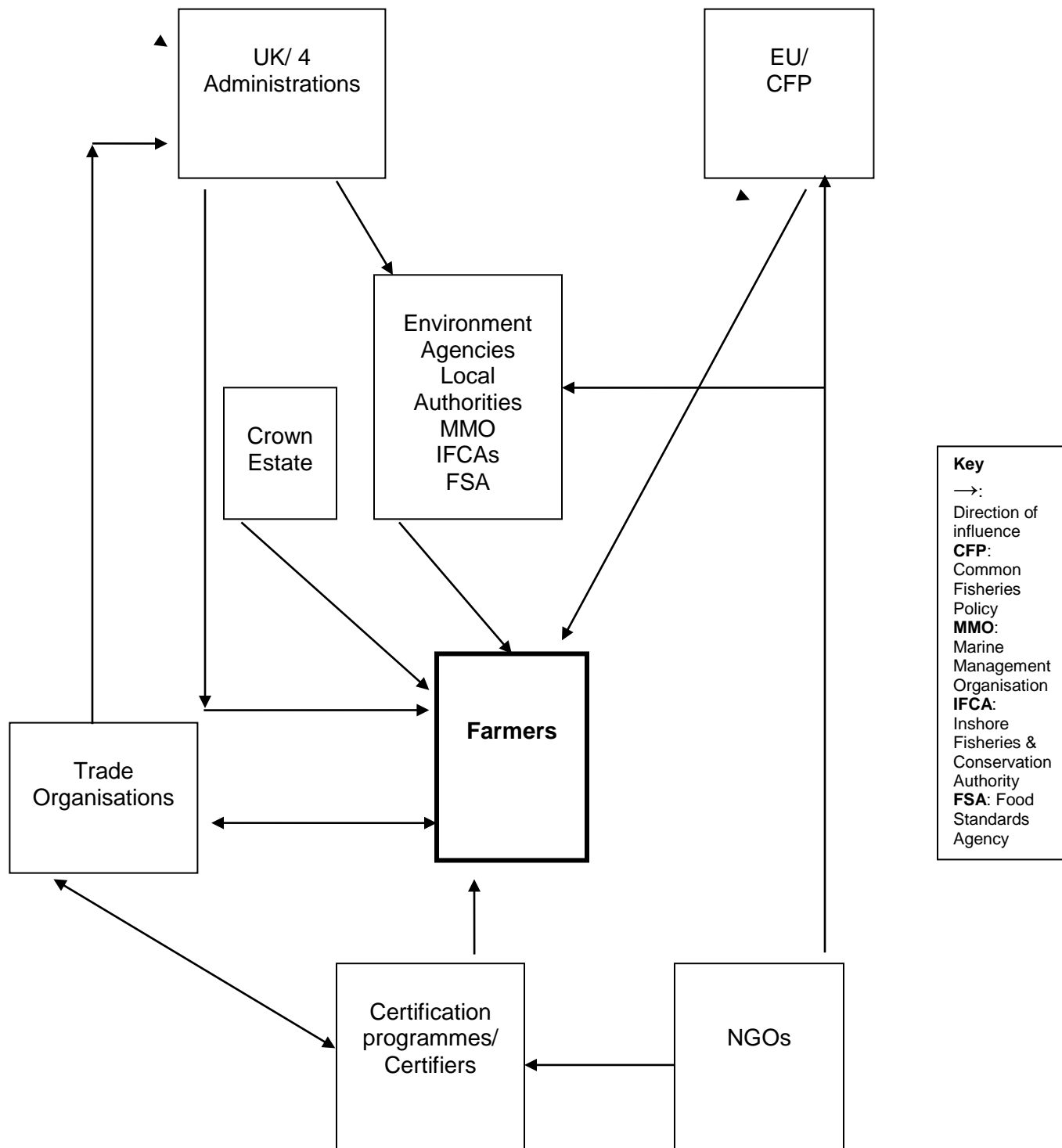
The capture fish diagram (figure 4.1) indicates the direct impact of state and supra-state regulation on fishers. Global legislation in the form of the UNCLOS agreement had one particularly significant impact because the EEZ regime entailed the end of the British distant waters fleet. The EU through the CFP and the UK have huge impacts through fisheries management policy and its associated legislation plus enforcement but also as sources of financial assistance, at different times emphasising vessel modernisation and vessel decommissioning. Various types of delegated state functions are seen in the boxes below. The MMO centrally and IFCA locally carry out state functions for England but the arrangements differ in the other three administrations with less being delegated (and all have predecessor bodies).

Figure 4.1 Governance Affecting Seafood Supply: UK Capture Fish Producers



Source: Author

Figure 4.2 Governance Affecting Seafood Supply: UK Aquaculture Producers



Source: Author

Of the two categories previously characterised as mixed public-private governance organisations, POs with their primary role of representing the private interests of fishing operators, but at the same time constituted under European legislation have also been allocated governmental functions in Britain in connection with fishing quota allocation so have governance arrows from both directions. However, their separation from the state is underlined by the 2013 court case over distribution of unused quota which the Producer Organisations' representative body brought against the government as described above. The devolution of the greater part of national fishing quota allocations to POs and the semi-privatisation of quota holding to individuals and companies has diluted the state's control, even more so given that a significant part of UK quota is currently held by non-British concerns, but the same court case indicates that ultimate state control is still implicit and can be asserted, while general enforcement action over CFP rules also confirms fundamental state control over fishing access rights. In the recent revision of the common market for seafood connected with CFP reforms, POs have been charged with additional responsibilities connected with the now predominant aim of sustainable fishing, apparently bringing them under greater public control and complicating still further the private-public mixture they constitute.

Seafish on the other hand is a quango publicly constituted to carry out delegated state functions of promoting the seafood industry but defines its role in terms of those industry interests, taking its lead from its main funding source, the company levy. That Seafish provides a valued service was confirmed by the support which has enabled it to continue after the Cleasby review but it is subsidiary to the direct governmental functions carried out by the other bodies mentioned, that is the MMO, IFCA's (and their predecessor bodies) and POs, thus producing optional extras in the system, however beneficial they may be. There is an interesting contrast between POs and Seafish, both established by legislation, the former as industry bodies but carrying out delegated regulatory functions, the latter as a public body but entirely devoted to industry support, effectively a public body with private functions.

Fishers as well being objects of governance may on the other hand exert influence on the POs and this mutual relationship also applies to their trade organisations such as the NFFO and NUFTA and to the MSC and certifiers (it is presumed in varying degrees depending on economic strength as well as on specific individual and company interests). The trade organisations in turn have their impacts in terms of influencing government policy, for example in relation to ministers' negotiating position over the annual quota decision, and also directly on the CFP through involvement in the RACs. Finally, certain NGOs have taken on a direct governance role through participation in the RACs and in the MSC's own governance structure as well as having impacts more generally through their campaigning and lobbying activities as has been observable in relation to CFP reform processes.

On the aquaculture diagram (figure 4.2) similar mutual governance relationships between farmers and both their trade organisations and relevant certification organisations as seen with fishers are illustrated. NGOs again play a role, but a lesser one, which relates to EU policy and to some certification activities. The relationship between farmers and state institutions is comparable in some respects to that with fishers in that legislation, funding (under the CFP) and broader development policy come from both the UK and European levels but there is no direct global governance impact. However, it differs in the greater range of delegated bodies of the British state involved in regulation, not only the MMO and local IFCA's but local authorities (for planning control), the environment agencies of the four administrations and, in relation to shellfish producers, the FSA; it also differs in that no specific functions are shared in mixed public-private governance organisations. A separate part of the state, the Crown Estate, has also had in the past exercised a form of planning control in relation to salmon farming and certain shellfish enterprises. A further difference between the two sectors is the relationship between trade organisations and certification bodies for aquaculture, reflecting the strength of privately-led governance here.

It should be noted that as summary representations of the various relationships between social actors, the two diagrams do not model changes over time but

do include some aspects that have been operative at different points in the period covered. In relation to fishing, the major global governance impact was a one-time event (the UNCLOS agreement) which had a permanent impact but became absorbed into new arrangements. By contrast, the European and UK dimensions of the CFP have been constantly shifting and adjusting, in an interaction of those exerting fishery management governance, those experiencing it and the natural world; the discard problem in reaction to quotas and the subsequent public and political responses make up one manifestation of these dynamics. The delegated state structures have changed such as IFCA replacing SFCs and Seafish replacing the White Fish Authority and Herring Industry Board. Another factor is the relative newness of some of the elements of governance in the fishing system such as certification and the wider participation of stakeholders in the CFP through the RACs, their impact still in process of development. For aquaculture, the involvement of NGOs is even more recent while on the other hand the governance role of the Crown Estate has greatly diminished but other elements of the system, both regulatory and self-management through standards schemes have remained fairly constant from an early stage though there have been some internal developments.

The objectives of most of the various actors engaged in governance of seafood production are to varying degrees concerned with both the economic well-being of each sector and its sustainability. Only to a limited extent has the question of food security been a policy factor for the state in relation to seafood, in the immediate post-war period regarding fishing productivity and more recently with some concerns over future supply. However, the Crown Estate has had neither interest, apparently working to a simple objective of maximising income. Economic well-being of the fishing and aquaculture industries is both a private and a public interest. Sustainability and the conservation of the resource is also both a public and private interest but it has taken some time for this to be fully appreciated by all in the seafood industry. CFP development to an emphasis on the sustainability pole has been gradual, this being taken seriously by fishers and fishing concerns more recent still. Both at UK and EU levels, state action is often about mediating a path which

can reconcile these two key aims, as seen in the most recent CFP negotiations and similarly by domestic differences over the designation of marine conservation zones. By contrast, the environmental NGOs and consumer-facing certifiers depend for their effectiveness on being seen to uphold a public interest in marine conservation and environmental sustainability.

State and supra-state governance have had the biggest impact on supply in relation to the domestic fishing industry although there are also private and, in relation to certification, civil society elements but private governance has been more important for aquaculture, particularly in relation to salmon farming. However, the relationship plays out differently in other sections of the supply chain as the next two chapters explore.

CHAPTER 5: GOVERNANCE FOR QUALITY AND FOOD SAFETY - RELATIONSHIPS IN THE SEAFOOD SUPPLY CHAIN

5.1 Introduction

Changes in supply having been examined in the previous chapter, this one deals with the second area of great change in the seafood supply chain, the safety and quality of its products. It focuses on governance impacts on the middle of the chain that deals with distribution and processing, considering what factors were material to the changes that have taken place and how they have played out in supply chain relationships.

What safety and quality mean in relation to seafood is first considered. Seafood safety is a technical issue about avoiding risk factors but quality is a more complex concept and is considered formally and from the viewpoint of those interviewed for this research. The way the seafood industry has regarded both aspects and responded to changing requirements is then examined in relation to primary production, both fishing and farming, and in processing. The chapter establishes that there has been very significant alteration in relation to these two factors over the last sixty years.

There was general agreement among those interviewed for this research that there had been a huge improvement in standards, applying to quality generally and food safety in particular, during their seafood careers.

‘In my youth I went past many a fish shop that had brown curling stale fish in it that people would not want to eat. They used to smoke it because it could stay longer.’ Managing Director, small company 1

‘I think that the major change I’ve seen is that we’ve got a consistently got a much higher quality product that’s going through the system.’ Trade organisation representative 1

‘Obviously the difference between thirty years ago and today, the hygiene standards, which you do have in food factories is a lot better now than it was, is a lot more regulated. I think that people understand it a lot better nowadays.’ Director, medium-large company

Documented sources support the statements about indifferent quality in the past. In the middle of the period covered by this research fish was described as being mostly bland and tasteless with some as of extremely poor quality (Eddie GC 1971;Mills A 1987). In an earlier period, there was a particular problem with fish brought back by the distant water fleet which could be up to sixteen days old with the result that large quantities were condemned as unfit for human consumption (Cutting CL 1955;Graham M 1943).

This chapter examines the varying pathways to higher standards in different parts of the supply chain, first in the production sectors, fishing and aquaculture, and then in processing and distribution. The production background has already been provided in the previous chapter dealing with supply while the functions and activities in the middle of the chain are described in this one. In each sector the factors relevant to changing standards are analysed to build up a full picture of the extent of change and the governance forces at work.

5.2 Defining Quality and Safety in Seafood

Understanding biological processes may be regarded as the first stage in ensuring quality and this was discussed by some interviewees:

‘If you buy certain fish during the spawning period for example, it’s likely to be, typically it’s in a less healthy condition anyway than it would be when it’s not. It’s obviously it’s a weaker animal when it’s carrying the eggs. So there are certain times of the year where you know when it’s the spawning season where you wouldn’t tend to buy certain species.’ ‘If you get highly oily fish, they will have a tendency to spoil faster than non-oily fish.’ Director, large company

‘In the summer months, this is when they [*oysters*] spawn generally and the meat content does decrease.’ ‘Crab as well, the quality decreases and increases throughout the year and it changes through the coast. So the time of highest quality is different in the northeast of England than it is in the south west.’ Trade organisation representative 2

‘Whilst we want to be catching the fish [*tuna*] in the most sustainable methods if you take, and handline and pole and line would be two great examples, if you take a handline fish, I’ve done it myself, it’s a twenty minute struggle with a fish, a 50, 60 kilo fish which you’re catching with something as thick as a washing line. And the lactic acid that builds up in the fish during that catching

process is massive, the cellular structure, it really is a huge build up of lactic acid. So when you catch the fish, that fish, it's worked itself up into a real frenzy, there's a lot of stress and then you then you obviously kill the fish. The trick is you need to bleed it, gut it and ice it as quickly as possible after catching it and that should be within minutes. But even so you may get some browning of the meat caused by the lactic acid around the belly.'

Managing director, medium-large company

This kind of knowledge about fish biology may be assumed to be embedded in the seafood industry but it is unclear how far it has influenced seafood production. The fact that fish have often been sold with roe or milt *in situ* (in other words caught in their reproductive phase) suggests that there is a gap between such knowledge and both fishing and consumption practices which obviously has implications for sustainability as well.

The quality of seafood is a complex amalgam of several factors. Freshness is the top requirement and most fundamental feature but as with other foods includes a range of physical and sensory qualities as well as attributes like sustainability and production conditions (Denton W 2003;Whittle KJ 1997). Changes correspond to objective decline factors caused by microbial, oxidative and enzymic spoilage (Bayliss P 1996). Quality and freshness in fish are concepts not entities and hence capable of construction, that is being defined in ways that involve measurable criteria (Bremner HA 2002).

Quality also has a relative aspect, dependent on particular purposes which are structured socially and economically as well as biologically (Mansfield B 2003). One interviewee explained the difference between whole langoustines obtained by creeling (trapping) and mostly destined for export and the trawled nephrops which may have claw or carapace damage but will produce appropriate quality flesh when marketed as scampi (Industry advisor, trade organisation). For salmon there are some clear differences related to end use:

'Smokers generally like high colour and low fat, for sushi they like high colour but they much prefer fish to be more fatty. Quite a difference.' Managing director, medium-large aquaculture company

For some in the trade, quality was experiential:

[This] 'is a pollock caught with a handline. Proper job. That is absolutely fantastic quality. If you look at the gills, lovely colour, lovely eyes, lovely sheen on the fish. Thickness of the fish as well. Just says it's quality.' Managing director, small company 7

More prosaically, it could be measurable and assessed:

'We assess the material on its quality in term of its appearance, its odours, its taste, we use the Torry scoring system here. We have a minimum standard for our main supplier so we're Torry scoring at 8 and above.'⁹⁷ Technical manager, large company

The Torry ratings and another system, the Quality Index Method (QIM) more commonly used elsewhere in Europe, are based on subjective judgements but made by trained assessors to produce consistency (Martinsdóttir E 2002;Shewan JM et al. 2012). There are also a number of technologies now available for quantifiably objective assessment of fish freshness using chemical, physical (such as measurements of texture and colour) or microbiological approaches (Alasalvar C, Garthwaite T, & Öksüz A 2002;Fraser O & Sumar S 1998;Huss HH 1995;Nesvadba P 2002). Techniques for identifying fish species and increasingly their geographical origins and whether wild or farmed are also available (Mackie IM 1997;Martinsohn JT et al. 2011).

As outlined in chapter 2, the concept of quality in food generally has expanded beyond the sensory attributes to encompass a range of other factors, many connected to the production process. Safety is the pre-eminent of these more intangible requirements for all food but for many the next most important factor in regard to seafood would be the sustainability of the resource. However, it is relatively recently that these factors have come to be so important.

From a safety perspective seafood carries low risk as one interviewee described with graphic detail:

'Myself and my colleague have done the advanced fish quality course. And they make you try fish that's been all the range from day 1 to day 15 and she said it was literally going yellow and green, the smell was overpowering, when

⁹⁷ Torry scoring refers to the quality assessment system produced by the Torry Research Station, Aberdeen (in existence from 1929 to 1990) which sets out for individual species a range of characteristics scored up to 10 (the best).

you can eat it it's like eating cotton wool. Fish is very safe product from that point of view; it will look horrible and you won't want to eat it but it still won't kill you.' Manager, trade organisation 1

Risks are low because most types of seafood do not carry or get infected with food poisoning bacteria and seafood is generally stored at cool temperatures and usually eaten cooked in Britain (Archer M, Edmonds M, & George M 2008). Levels of food-borne illness attributable to seafood are low in the UK (Cato JC 1998). Nevertheless, it does rank as a potentially significant disease-carrying food, firstly because of the potential risk of bacterial disease, particularly the specific hazards associated with the consumption of raw molluscs, and secondly due to toxic syndromes including paralytic and other types of shellfish poisoning and the histamine poisoning which can be associated with scombroids such as mackerel and tuna; in addition allergic reactions affect some people (Huss HH, Reilly A., & Ben Embarek PK 2000;Mavromatis P & Quantick P 2002;Scoging AC 1991). The depuration of molluscs explained in chapter 4 is effective against bacteria but does not deal with all viruses (Committee on the Microbiological Safety of Food 1991). There may be additional risks associated with farmed seafood (Ababouch L 2006). Therefore safety-enhancing practices during processing are important. In addition action is needed to destroy naturally-occurring parasites in fish.⁹⁸ There are also issues over levels of contaminants in certain species but these cannot be affected by handling and processing activities so rather present questions about knowledge and consumer choices which are covered in chapter 6.

Research interviewees could calibrate risks in relation to the types of product they produced. How they were manufactured and whether the end purchaser would be cooking them or not were both relevant:

'There are certain products and certain product formats that will have higher intrinsic risks than others. For example if we're buying cooked products they would tend to carry much higher risks because the risks would be much more associated with the processing conditions in the factory wherever it is in the world.' 'If we buy cooked prawns for example, cooked products carry more

⁹⁸ The parasites will be killed by cooking or for fish to be eaten raw by freezing at a specified temperature and for a specified length of time; see (Seafish 2012a).

risks purely and simply because they're not necessarily cooked again by the consumer.' Director, large company

This section has considered the various dimensions of quality that may be desired and food safety risks to be avoided. The next two look at how quality and safety are or can be obtained first in capture, then in farmed fish.

5.3 Producing Quality and Safety at Sea

Handling at sea of capture fish is certainly recognised as the initial key to ensuring quality as some interviewees specified:

'The biggest determinant of fish quality is the way it's handled when it comes out of the water.' 'When you take fish out of the water, when it literally comes out of that water it's in pretty good condition, it's what you do with it afterwards that determines the quality and that's really about the speed at which it's handled onboard the vessel, the conditions in which it's held, largely to do with icing and refrigeration onboard the vessel and obviously the length of time it then takes to get to the market.' Director, large company

'As long as the boat has looked after it initially and kept it cool then we don't have any problems. All it takes is for the boat to look after it. As soon as it gets warm, no matter what I do afterwards, if the boat hasn't been looking after it initially then there's problems.' Managing director, small company 4

In order to keep an (expired) fish in good condition after it has been caught the most important requirement is to maintain it at a low temperature which should be at minus 1.5° to 0°C. This prevents the development of bacteria which otherwise after a few days would produce considerable contamination. The length of time fish will keep, on ice, varies according to species for example nine to fifteen days for cod and haddock, as little as two to six days for summer herring. Avoidance of rough handling is also important to prevent damage that can allow the growth of bacteria and enzymes. Packing the fish in boxes with ice rather than stacking them on open shelves in the hold has been shown to produce better results. For many whitefish species, optimal quality is obtained by bleeding and gutting as soon as possible after capture. Thus there are a number of established practices conducive to keeping seafood in good condition (Horne J 1971; Huss HH 1995; Huss HH, Ababouch L, & Gram L 2004; Whittle KJ 1997).

Preserving freshness of such a perishable commodity as fish has always been a concern for fishers. Vessels with various arrangements for keeping fish alive in water onboard were in use by some British vessels in the eighteenth century. Ice started to be employed in the mid-nineteenth century and had become general in the trawling fleet by the 1870s. Yet fish was often in too poor a state to be landed and would be thrown overboard. Thus discards have had a long history and certainly did not start with the CFP. Subsequently, with the development of steam trawling much longer trips became possible and the limits of keeping qualities that could be maintained using ice were frequently passed. Hence the poor quality of much that reached ports and the great quantities condemned, in other words discarded on land (Cutting CL 1955).

The keeping problem of fish from distant waters was solved only when the technology of freezing at sea had been mastered and freezer-trawlers introduced from the early 1960s (Waterman JJ 1979). British trawlers now could freeze either fillets or whole fish at sea (Foreman S 1989). By this time just 1% of landings were condemned, a huge reduction from the previous period (Burgess GHO et al. 1965). As well as preventing deterioration before landing, the other quality advantages are that processing takes place on very fresh fish and there may be a reduced occurrence of certain pathogens and other risks (Kose S 2011).

Now much of the supply of whitefish for the British market, caught mainly in Icelandic and Norwegian waters following the changes described in the previous chapter, consists of fillets frozen at sea which are generally agreed to be of high quality. As one interviewee said: 'I know that frozen-at-sea fillets is the finest fish you can buy, without question' (Managing director, large company). A trade body, the Frozen at Sea Fillets Association (FASFA) was established in 2000 to promote the product: it consists of (mainly Nordic) fishing companies and British distributors.⁹⁹

⁹⁹ Information about FASFA is on their website <http://fasfa.co.uk>.

However, freezing at sea can only be done on very large vessels which are equipped as factories so this development has not ended the issue of quality of fish onboard which is still very relevant for the British fleet. In the early part of the period considered in this study there was no attempt to influence the way fish was dealt with onboard, the reported attitude of the White Fish Authority being that quality assurance was a management responsibility in which it should not be involved (Eddie GC 1971).

But in a development of governance functions, the quango Seafish launched its Responsible Fishing Scheme (RFS) in 2006. Motivated by a general awareness of higher market demands, the purpose of the RFS is to establish quality standards for the catching sector and improve the status of its products. The standards are in four categories: care of the catch, vessel standards, crew competence and environmental awareness and they emphasise general handling practice, hygiene and storage methods. There is third party auditing of the scheme. In late 2012 there were 203 British vessels holding current certificates, constituting 2.2% of the under 10 metre and 8.7% of the over 10 metre fleets with larger numbers engaged with the programme.¹⁰⁰ Seafish has also undertaken projects to convince fishermen of the more profitable rewards of better handling (Curtis HC, Alva ML, & Martin AA 2005; Curtis HC & Martin AA 2003; Seafish 2008) and has produced a set of Good Manufacturing Guides for fishermen, more recently replaced by five Good Production Guides.¹⁰¹

¹⁰⁰ General information about the Responsible Fishing Scheme is on <http://rfs.seafish.org/>. Numbers in the text were provided by Jim Hyam, Seafish (personal communication). As well as the boats from the domestic fleet there were over 60 non-British vessels certified in the scheme. However, the 2013 Seafish Corporate Plan includes a review of the scheme with the comment that it 'had lost its way and its purpose was now unclear' so it may not continue in its current form or at all.

¹⁰¹ *The Good Practice Guide to Handling and Storing Live Crustacea, Good Manufacturing Practice: Guidelines for Nephrop Fishermen* (revised as *The Good Practice Guide for Nephrops Fishermen*), *The Good Practice Guide for Demersal Fishermen*, *The Good Practice Guide for Pelagic Fishermen* and *Guidelines for the Landing and Sale of Fishery Products*. The *UK Scallop Industry Good Practice Guide*, a result of collaboration between Seafish, the Shellfish Association of Great Britain and the Scallop Association, is less of a detailed guide and rather a statement of environmental and sustainability principles.

The RFS had been preceded by the Seafood Scotland Vessel Quality and Hygiene Scheme which ran for a few years from 2000.¹⁰² A separate scheme to improve the quality of fish handling on boats, the White Fish Quality Improvement Initiative, has been operated by an independent company, Shetland Seafood Quality Control, for this geographical area.

These efforts to improve quality have been much needed. A study carried out in the mid-1980s based on samples from ports all round Britain showed that while much of the fish was of good quality a significant amount was not, 16% being defined as Torry score 6 or less (Hill RG & Coutts JA 1986) (6 is 'the point just before off flavours and odours are detected' and 'the cut off point for sale').¹⁰³ A decade later, an evaluation of the Seafood Scotland Vessel Quality and Hygiene Scheme found much evidence of poor, as well as good quality fish, being landed, the former attributed to overfilled boxes, insufficient or inadequately trained crew and the length of trips (Nautilus Consultants 2001). Another study stated that supermarket buyers did not find the quality of landings from British boats adequate although it did note that better handling and icing had improved the quality of UK landings (Carleton C et al. 1999). The report of a project covering both Scotland and Eire refers to the 'indifferent quality' (p8) of much of what their fishermen landed with significant levels of avoidable quality loss indicated by a series of Seafish port audits. Its onboard survey found various handling practices conducive to lower quality scores. Positive attitudes of skippers and crews and longer experience on the same boat were associated with better quality. The project concluded that lack of communication and even lack of trust within the supply chain were major factors inhibiting incentives for better quality (Seafish 2004).

The guides to good practice produced by Seafish are not the first by any means. A series of Advisory Notes were published by the Torry Research Station in the 1970s covering such topics as taking care of the catch, what kind of ice to use, cleaning and the relative advantages of different methods of

¹⁰² The Seafood Scotland scheme was not formally wound up but ceased when it had 'served its purpose' and 'really delivered a better quality regime for whitefish' (personal communication, Jeremy Sparks, Seafood Scotland 4 December 2012).

¹⁰³ Quotes taken from Seafish fact sheet *Seafood Freshness Quality*, 2011.

storage (Horne J 1971).¹⁰⁴ The issue has not been about information but about getting practice to accord with such advice. There has been some legislation and much Seafish governance activity with such aims.

Fishing vessels were affected by European food safety regulation from the introduction of the 1991 Directive 91/493/EEC *Laying down the health conditions for the production and the placing on the market of fishery products* followed by Directive 92/48/EEC *Laying down the minimum hygiene rules applicable to fishery products caught on board certain vessels* and subsequently by developments in general food law with the 2004 (EC)No 852/2004 *On the hygiene of foodstuffs* and accompanying (EC)No 853/2004, *Laying down specific hygiene rules for food of animal origin*.¹⁰⁵ The regulatory requirements have been translated by Seafish into vessel hygiene checklists, a general one and a more stringent set of demands for factory vessels that fillet and pack fish onboard. The basic one as well as covering equipment, staff awareness and general hygiene has some specific fish handling specifications including maintenance at the temperature of melting ice (0°C) and speedy gutting which as previously explained are also key quality practices. The more detailed conditions for factory vessels include an additional section on hygiene of the fish preparation area. However, only those classified as factory vessels require regulatory approval, which would be from environmental or port health authorities. These agencies do not seem to have put much inspection effort into the mass of other vessels in relation to which these regulations do not seem to be enforced, particularly as far as handling practices at sea are concerned. A research project has classed the fish-handling and storage areas of a large minority of vessels as 'medium' or 'poor' (Seafish 2004).

¹⁰⁴ The Torry Research Unit publications are considered valuable enough to be kept in the FAO's Corporate Document Repository in www.fao.org. Lists of its Advisory Notes are in (Horne J 1971) but are not dated there or for the most part on the FAO website either. The earliest Torry advice for improving quality through better handling at sea was produced much earlier, in 1929 (Lumley A, Piqué JJ, & Reay GA 1929).

¹⁰⁵ The implementing regulations for 91/493 are *The Food Safety (Fishery Products) Regulations 1992* and *The Food Safety (Fishery Products on Fishing Vessels) Regulations 1992*; for 852/2004 and 853/2004 it is the *Food Hygiene (England) Regulations 2006*.

The regional organisations related to Seafish have also been trying to improve standards:

‘The most important factor in determining the whole quality and shelf life of the fish is how it’s treated in the first hour onboard the boat, when you catch it when it’s live. How quickly you wash it, gut it, wash it and store it in ice, that then sets tone for how long it’s going to last so once we were able to explain that to the fishermen ... and introduce some slush ice to make sure the temperature is controlled much quicker.’ ‘A lot of the fish merchants and fish processors give us good feedback that soft-fleshed fish like hake and megrim, which we catch quite a lot here have improved.’ Manager, trade organisation 1.

Some of this effort is as basic as getting ice used onboard because despite its long history in this country’s fishing it is still not uniform practice:

‘We offered the fishermen ice boxes at a discounted rate. Because ... one of the things we discovered is that they don’t put the fish on ice. So in these small boats people go out 4 o’clock this morning probably and come back whenever. They catch fish and put it on deck; in this heat, the fish deteriorates immediately.’ ‘They’re very insular, they’re very much in their own world. They’re out at sea and that’s it.’ Manager, trade organisation 2

With the under 10 metre vessels fishing on short trips, and often referred to as ‘day boats’, some emphasised the short length of time involved in getting the product through the supply chain as the intrinsic guarantee of freshness and hence high quality without any additional measures being needed:

‘None of the other ports will produce the quality of the fish you get [*here*]. ... our fleet only goes out for eight hours at a time so whatever is caught today is in London tomorrow night, so there’s a very, very quick turnaround.’ Director, medium company 1

‘Scottish boats I think are still out too long to push the quality up. But South West England or French boats they just run them as day boats out and back, out and back, then get a higher quality product with a higher price.’ Trader, medium-large company

However, a problem has persisted. In an assessment produced by the National Federation of Fishermen’s Organisation under the heading ‘Why do we still have a quality problem?’, a number of reasons are given for this historic issue connected with the UK fishing industry. They include the lack of relationship between prices and better quality (indicating ineffective market mechanisms), longer trip lengths, problems in attracting crew and their increased workload and the lack of systems to weigh boxes on landing

(Hopper AG et al. 2003). However, a report a decade later strikes a more positive note in stating that cod from UK vessels is of better quality than imported fish which is certainly a mark of progress (EUMOFA 2013).

There is some activity upstream in certain supply chains to enhance quality and improve sustainability. One project found that a processing company which developed relationships by inviting crews from the boats they used to visit their premises and see the impact of differences in catch quality, experienced consistent improvements as a result (Seafish 2004). There were also some examples in this research. One interviewee (Director, large company) talked about improving langoustine quality through a specific project which that company had initiated. Another processor described especially detailed involvement (connected with foreign sourcing):

‘In that particular operation we employed someone for two years to stand on the line and watch every piece of fish coming off. That was a commitment that we put in. Now we don’t do that in all our supply chains but this is a particularly important one.’ Managing director, medium-large company

And a retailer respondent explained:

‘[We] are working with the fishery to try and improve.’ ‘That’s about truly understanding the fishery so going in at a detailed level of understanding, the number of boats used in that fishery, the type of gear that they’re using and is there anything that we can do specifically to influence by-catch. ... And we have in the past in a number of different fisheries funded resource to go into fisheries and to enable them to gather essential data.’ Category technologist, major retailer

There has been a limited development of provenance schemes which enable the purchaser of fish to identify the boat on which it has been caught. The South West Handline Fishermen’s Association operate s a tagging scheme for sea bass and a similar format is run by south coast fishermen. A major distributor to the foodservice industry has a scheme with selected vessels to allow advance ordering of certain species together with information about the vessel, skipper and fishing conditions but it is a small niche market, as the interviewee commented: ‘It’s for the aficionado chef who really, really wants to get into provenance’ (Group director, large company).

This research did not find a great deal to indicate such direct involvement which would seem to be limited to the activity of a few companies. So unlike the case with some other foods, upstream companies whether processors or retailers usually do not get proactively drawn into the production of quality in capture fish. They more usually have a general impact on production through the standards set or employed for what is purchased, as discussed in a subsequent section. But in a more diffuse way market expectations must affect practices as merchants select better-kept fish:

‘You learn the boats, you learn which boats do a good job, which boats take plenty of ice to sea, which skippers are good skippers. It just becomes experience. We buy off certain few boats.’ Fish merchant, small company

Thus market expectations can incentivize a greater onboard effort to ensure good quality. Other factors conducive to improved quality are modern, better equipped vessels, shorter fishing trips and technological developments especially freezing at sea, though the benefits of the last of these now come to the British market mainly via imports.

To summarise the position on governance for quality regarding seafood caught by British boats, there is food hygiene regulation in place but lax enforcement except for factory vessels and otherwise no specific rules in operation except for the RFS volunteers, these being the only functioning standards, so that for the most part practices are based on the operators’ business decisions. There are limited private governance initiatives by a small number of companies which have worked closely with selected fisheries (of the two examples given above, one refers to domestic production, the other to a developing country) plus the more extensive work by Seafish and its linked organisations. Thus contrasting with the extensive public regulation of the activity of fishing as described in chapter 4, much less state attention has been given to affecting the product of that activity except for the regulatory impact on factory ships. Governance for better quality has been mainly the work of the quango Seafish, which could be considered as acting on behalf of the state and by the associated industry-based groups together with market mechanisms. Change has nevertheless gradually occurred and quality has improved in response to all these influences.

5.4 Producing Quality in Farmed Seafood

From the viewpoint of ensuring quality, aquaculture has the great advantage of facilitating control of all the relevant factors, allowing choices to be made about the grades to produce for particular markets. The nutritional and sensory qualities of the fish produced will depend on numerous decisions including breeding, feed type and feeding regimes, light control and the way various processes are managed (Espe M 2008).

This allows operators downstream in the supply chain to exercise greater influence on the production process than is possible with capture fish as an interviewee indicated:

‘They tend to be sites you can visit, you know what the product’s been consistently fed on but you do have to check that they’re using the right feeds, that the medicines they used are the correct medicines, that you’ve not had them use any substances.’ Director, large company

An example of the development of a premium product for a retailer customer described on a visit to a salmon farming site included the following elements: feed from sustainable sources, with lower levels of contaminants than the industry standard, such as to produce a fish that would consist of a relatively low proportion of fat overall but still provide nutritionally appropriate levels of omega-3 fatty acids (information from the account given by a production manager, large aquaculture company). Apparently exceptional as the informant said, this nevertheless illustrates the scope for upstream partners to extensively influence the production process.

For both salmon and trout the preferred degree of pink colouring of the flesh is a major objective, considered second only to freshness in importance to consumers. This is achieved by manipulating amounts of the carotenoid pigments astaxanthin and canthaxanthin in feeds, something which has to be carefully controlled as levels are regulated by both UK and European legislation (Davies SJ 2008).

Better quality texture and appearance results from reduced stress at slaughter (Robb D 2002). How this was achieved in one location was described as follows:

'We've developed the system so that we chill the fish on the [well] boat. We then have a chilled mechanism, to get the temperatures down very quickly. We have to do that for quality. If the fish is warm it will go into rigor sooner. So the key criterion for us is to have as low stress fish as possible. We measure the stress levels of the fish, we measure the PH of the fish every day. We have a database. We understand when something's right and when something's wrong.' Processing manager, large aquaculture company

Other handling practices at and post-slaughter are also important for quality. Bleeding salmon improves colour and taste by removing iron and avoids oxidation if frozen. As with all seafood chains, chilling and the maintenance of farmed fish at low temperatures by using ice is vital (Willoughby S 1999).

Going beyond the sensory aspects, fish welfare may be considered a direct quality objective as well as an ethical issue. Welfare may be understood in three ways: in terms of biological functioning, by defining a natural life including surroundings and with consideration for affective states which though hard to access in relation to fish are known to include fear and pain (Lund V & Mejdell CM 2006). Various indicators of welfare have been suggested including feed intake, growth, health and minimisation of injuries (Damsgård B 2008). From a more critical perspective, aquaculture inherently involves damaging and stressful procedures including invasive techniques to remove eggs and sperm, handling, artificial lighting and pre-slaughter starvation and may cause a number of fish health problems, although some conditions can be ameliorated (Compassion in World Farming 2009;Stevenson P 2007). There is disagreement among these sources on the importance of density of stocking as an indicator of welfare but agreement about the fundamental significance of water quality.

As fish are known to experience pain this should be minimised pre-slaughter by stunning, preferably using the electricity method as others such as carbon dioxide take too long to produce unconsciousness (Damsgård B 2008;Tinarwo A 2006). However, one source has concluded that much slaughter of farmed

fish is carried out inhumanely, causing considerable stress (Mood A & Brooke P 2012). As already noted, this will produce an inferior end product so welfare and quality objectives overlap.

This is a regulated area as farmed fish and to some extent shellfish are included in legislation dealing with slaughter. The *Welfare of Animals (Slaughter or Killing) Regulations 1995* making it an offence to cause avoidable suffering implemented EU Directive 93/119, *On the protection of animals at the time of slaughter or killing*. This has been superseded by EU Regulation 1099/2009 *On the protection of animals at the time of killing* for which further domestic legislation has been enacted or is expected.¹⁰⁶

There are certain food safety issues associated with aquaculture which may be biological or chemical in origin. Many can be largely avoided by appropriate management through an HACCP approach including precautions in site selection and by control of water and feed quality but these may be more difficult to apply in small-scale operations. Contaminants can be biomagnified in fish feed which may need special treatment. (Cole DW et al. 2009; Joint FAO/NACA/WHO Study Group 1999)

The Scottish salmon industry began to establish standards for the industry early on with the establishment of the certified Tartan Mark and Shetland Seafood Quality Control mark both in place by the mid-1980s (Laird LM 1999). The 1990s saw the production of a series of codes of practice which paid particular attention to environmental issues such as the impact of farming on wildlife and the avoidance of escapes as well as good practice in maintaining the health of the stock (Greenwood M 2003). As noted in chapter 4, these were from 2006 compiled into the comprehensive *Code of Good Practice for*

¹⁰⁶ The 1995 regulations cover Great Britain and were complemented by SR No 558, *The Welfare of Animals (Slaughter or Killing) Regulations (Northern Ireland) 1996*; they were amended for England in 2001, 2003, 2006 and 2007. The updating legislation is SSI 321 *The Welfare of Animals at Time of Killing (Scotland) Regulation 2012*, SR 107 *The Welfare of Animals at the Time of Killing (Northern Ireland) Regulations 2014* and W92 *The Welfare of Animals at the Time of Killing (Wales) Regulations 2014*; similar regulations were passed for England in 2014 but subsequently revoked and presumably are to be replaced.

Scottish Finfish Aquaculture which with regular revisions remains the manual for salmon production and mandatory for members of the trade body, now the Scottish Salmon Producers' Organization. The Code has third party auditing. Although the Tartan Mark scheme ceased in 2008, Scottish salmon has achieved French Label Rouge accreditation and European PGI (Protected Geographical Indication) status. More recently, a high proportion of salmon production has been accredited under the welfare-focused RSPCA Freedom Food scheme. These activities have been part of a successful campaign to position Scottish salmon as a premium product within the wider industry. As explained from the perspective of one of the major producing companies:

'In Scotland, where we suffer is that we can't reach the cost of production in Chile or from Norway. So we need to find another route, a specialisation route, a high profile route, a high top tiering route.' Production manager, large aquaculture company

From 1993 to the early 2000s the Scottish Quality Trout scheme was in operation but subsequently superseded by Quality Trout UK which from 2000 has operated a quality assurance scheme with third party auditing for the main species, rainbow trout. It includes environmental and welfare criteria. The scheme is linked to and benchmarked against the *Code of Good Practice for Scottish Finfish Aquaculture*.¹⁰⁷

In relation to farmed seafood more generally, the process of privately led standard setting has developed in a similar way to the way it has done for agriculture as described in chapter 2 and it is not surprising that one scheme has come from an organisation founded initially to promote agricultural good practice. EUREPGAP launched its aquaculture assurance scheme in 2004 and included a range of environmental and social issues. Now part of GLOBALGAP (GG), the aquaculture standard includes criteria for all aspects of production, fish welfare and environmental management and limits feed sourcing to approved suppliers. The system includes a chain of custody standard and works as usual through third party certification companies. It functions as a business standard, not as an eco-label but also has acquired a consumer-facing aspect which invites purchasers to enter the identifying

¹⁰⁷ Information about the scheme is on www.qualitytrout.co.uk.

number from packaging onto the website to see information about relevant accredited producers.¹⁰⁸ As noted in chapter 2, GLOBALGAP is an alliance of retailers and producers.

Another extensive scheme is the US-based Global Aquaculture Alliance (GAA) which started in 1997 and promotes its Best Aquaculture Practices programme which covers a range of issues including environmental protection, social responsibility, animal welfare and food safety. Its third party certifications are managed by a separate Aquaculture Certification Council.¹⁰⁹ There is wide membership of the GAA covering not only producers, processors and retailers of seafood products but foodservice companies and feed and equipment suppliers. There do not seem to be any certifications of British aquaculture enterprises in either of these schemes which are constituted on a business to business basis but as already noted both salmon and trout farming in the UK have their own industry quality certifications.

None of these aquaculture schemes have achieved the pre-eminent status enjoyed by the MSC for capture fisheries, nor have they appealed directly to consumers. Hence and in response to requests from 'innumerable suppliers and retailers' the WWF, a progenitor of course of the MSC, announced in 2007 its intention to begin a new process of standard-setting for individual farmed species through a set of Aquaculture Dialogues, a process involving a wide range of stakeholders. This was followed by the plan to set up an Aquaculture Stewardship Council (ASC). In contrast to the MSC which began with partnership between an NGO and a multinational food manufacturing company, the ASC has been entirely a civil society affair as a joint venture between WWF and another NGO, the Dutch Sustainable Trade

¹⁰⁸ Documentation connected with the EUREPGAP aquaculture scheme can still be found via the previous website www.eurep.org. Information about the current GLOBALGAP scheme is on www.globalgap.org.

¹⁰⁹ Information about the GAA is on its website, www.gaalliance.org and also see (Lee D & Connelly J 2006).

Initiative, and it is based in the Netherlands.¹¹⁰ The ASC was formally established and the first standards agreed in 2012 and by early 2013 standards for five species had been finalised and the first certifications awarded. Unlike the other two aquaculture schemes it is conceived as a consumer-facing model with its own logo.

During the formative stage of ASC development, GLOBALGAP (GG) has co-operated with WWF to provide support. Specifically, auditors from the GG programme have been trained so as to be able to certify the new ASC standards but these remain distinct from GG standards and products certified simply in the GG scheme will not be able to adopt the ASC label. The ASC took a further collaborative step in 2013 when it signed a three-way Memorandum of Agreement with both GLOBALGAP and the GAA to work together on certain issues, including harmonising feed standards and reducing duplication for producers seeking more than one certification. All three of these bodies include environmental, animal welfare and social criteria in their standards but it seems that GG has a greater emphasis on safety and quality while the ASC's mission is 'to transform aquaculture towards environmental and social sustainability'.¹¹¹ While the ASC was founded by two NGOs, the GAA describes itself on its website as an 'international, non-profit trade association' a description which also fits GLOBALGAP but the co-operation between the three testifies to the blurring of boundaries between civil society and private interests in governance systems. In another overlap the ASC salmon standard has been accepted as a goal by the producer organisation

¹¹⁰ The WWF press release referring to innumerable requests, 'Benchmarking study: certification' is dated 14 December 2007 and the one announcing the founding of the ASC, 'WWF plans next phase for sustainable aquaculture standards' was on 27 January 2009. Despite the involvement of a development NGO, at the time the ASC proposal was announced in 2009, there were protests from developing country organisations which expressed the view that the new body would support types of aquaculture with deleterious environmental and social impacts. See <http://mangroveactionproject.org>.

¹¹¹ The quotation about the ASC's mission is from its brochure leaflet 'Certifying responsible aquaculture' while another version on its website www.asc-aqua.org is 'to transform aquaculture towards environmental sustainability and social responsibility'. The website has information about ASC's relationships with GG and GAA. The species for which ASC standards have been produced (in varying stages from discussion to completion at 2013) are: abalone, cobia, bivalves, freshwater trout, pangasius, salmon, seriola, shrimp (prawns) and tilapia.

Global Salmon Initiative.¹¹² Hence all three may be regarded as examples of private governance although NGO involvement in the ASC does provide an additional legitimising claim of public interest purpose. In all of them private and public interests overlap. There is also co-operation between the ASC and the MSC whereby the latter is sharing its traceability system so that, with a few amendments, certifiers of the Chain of Custody for the latter are accredited to do the same for the former.

Certified organic aquaculture involves a further set of standards (Ötles Y, Ozden O, & Ötles S 2013) which are regulated by UK and European legislation as described in chapter 2. In terms of European regulation, aquaculture was explicitly included for the first time in (EU) No 834/2007 *On organic production and labelling of organic products* and further detailed requirements are set out in (EC) No 710/2009 providing detailed rules on organic aquaculture animal and seaweed production. There are two UK aquaculture certifiers, the Organic Food Federation and the Soil Association. Organic standards are relatively more stringent than those for farming generally along a range of factors including feed restrictions, the use of veterinary medicines and handling procedure.¹¹³ No specific information on the size of the UK market for organically farmed seafood has been found but it would appear to be very small. It includes some organic aquaculture imports, particularly warmwater prawns.

Much less attention has been given to analysing and assessing aquaculture standards schemes compared to the literature on the MSC. However one ranking exercise has been carried out. On ecological impact it put most organic farming standards ahead of the rest, placing both GG and GAA well down the performance list (this assessment took place prior to the existence of

¹¹² See the GSI media release 'Farmed salmon industry puts sustainability before competition to meet record consumer demand', 18 March 2014 on www.globalsalmoninitiative.org which includes the commitment to have all member companies ASC certified by 2020.

¹¹³ The Soil Association operated interim aquaculture standards from 1998 and fully adopted them in 2006 (see its Press Release 16 August 2006 'Soil Association embraces organic aquaculture'). Soil Association and Organic Food Federation aquaculture standards may be found on their respective websites, www.soilassociation.org and www.orgfoodfed.com.

ASC certification) (Volpe JP, Gee J, Beck M, & Ethier V 2011). As the ASC scheme spreads, its performance against both environmental and social sustainability goals compared to GG and GAA which do not involve civil society actors will be a useful test of how much difference the latter can make.

The extent to which the various schemes produce real improvements for the welfare of farmed fish or for the environments of developing countries has been disputed. In particular the way that standards are drawn up and implemented have been seen to reflect the interests and values of richer countries' buyers, not necessarily resulting in the best environmental outcomes (Bain C & Hatanaka M 2010; Belton B, Haque MM, Little DC, & Smith LX 2011; Belton B, Little D, & Grady K 2009). Other limitations are the fact that being based on individual enterprises they do not cover the impact on broader territorial areas and the non-inclusion of distribution and transport impacts in their sustainability criteria (Bush SR, Belton B, Hall D, Vandergeest P, Murray FJ, Ponte S, Oosterveer P, Islam MS, Mol APJ, Hatanaka M, Kruijssen F, Ha TTT, Little DC, & Kusumawati R 2013a). But one positive factor is that the inclusion of developing countries is far less in doubt in relation to eco-labelled aquaculture produce compared to the situation with capture fisheries. For example there are already a fair number of tilapia and pangasius farms in developing countries which have been certified by the ASC so there are at least economic opportunities for the countries of the global South in this scheme even if, as with all such programmes, they may be relatively difficult for small producers to access.

No specific information has been found for the extent of either GLOBALGAP or GAA accredited products sold in the UK. However, as the former organisation's origins lie in the joint effort by major retailers, not least those from the UK, to assure standards of supply it is likely that much of the seafood farmed in developing countries and sold in British supermarkets is GG certified. It may well be joined soon by products bearing the ASC logo.

The EU has a general eco-labelling programme of its own, the Eco-Management and Audit Scheme (EMAS) which the Commission recommended

to the industry in its 2002 aquaculture strategy document. This does not seem to have been taken up, certainly not in Britain, and is not even mentioned in the Commission's 2009 follow-up strategy document which seemed to constitute recognition that it is not going to make any headway. However, renewed effort in this direction has been signalled in the CFP reform Regulation (EU) No 1380/2013 which includes provision for non-binding guidelines on sustainable aquaculture to be produced by the Commission as the basis for strategic plans which member states should produce by the summer of 2014.

There is one element of global governance in relation to aquaculture eco-labelling namely the FAO's *Technical Guidelines on Aquaculture Certification*. Like those for capture fisheries they deal not only with direct impacts but with organisational and procedural measures (FAO 2011d). The production of the guidelines has been fairly recent in relation to the established schemes but the GAA's Best Aquaculture Practices standard is described as adhering to the FAO guidelines and GLOBALGAP states in its aquaculture brochure that in producing the current version 4 of its aquaculture standard the FAO guidelines were used as a reference. The ASC says that the guidelines 'were respected' during the Aquaculture Dialogues, that the organisation contributed to them and also intends to benchmark its programme against them in due course.¹¹⁴ Thus, in the same way as for marine fish eco-labelling, the FAO has exerted influence over these private initiatives despite the lack of formal legislation.

As shown, the issues covered in aquaculture certification schemes generally include environmental and animal welfare criteria along with standards for quality and safety. By contrast the eco-labels for capture fish are focused on sustainability issues so buyer requirements for safety and quality have to be ensured by other means.

The ways food safety and quality are sought in farmed seafood contrast sharply with approaches to improving quality from capture fisheries. The latter

¹¹⁴ Personal communication from Bas Geerts, Standards Director, ASC (June 2013).

is not amenable to direct control and instead there are attempts to influence in favour of better practice. Aquaculture, however, like agriculture, is the subject of more formal and determining arrangements. A number of schemes have been noted in this section, each of which has a set of standards to be followed and third party auditing. They are comparable to those established in other parts of the food system and discussed in chapter 2 but may have been influenced by the existence of the MSC, paying greater attention to sustainability and the environment. State regulation deals with slaughter and organic production but the lead in establishing and monitoring standards has been taken by private interests and civil society without involving government action.

5.5 Context: Seafood Distribution and Processing

Before the governance of safety and quality in the processing and distribution parts of the supply chain are considered, this section first sets the scene by providing historical background to their development. This is complemented by some descriptive information relating to the contemporary situation, using intelligence gained from the database of seafood companies compiled as part of this research (as described in chapter 3).

The distribution and processing of seafood has to a large extent remained separate from other food supply chains though this has become more blurred in certain aspects in recent decades. Not only primary but also secondary processing of seafood is carried out by seafood companies, not by the general food processing industry. Distribution also retains certain particularistic features.

The physical infrastructure that developed with the historic growth of fishing activities continues to be intrinsic to a good part of the seafood industry: the fishing harbours, auction halls and nearby premises housing the activities associated with servicing vessels and dealing with the catch. However, rather than the rail connections to the ports so important in the nineteenth and early

twentieth centuries, transportation is now mainly by road. Much is still landed at those same ports by both British and non-UK vessels but seafood wild and farmed also arrives overland and by air. While modern transportation means that functions can now more easily be geographically dispersed, processing is still particularly concentrated in two areas. Humberside in eastern England developed in the heyday of British trawling but despite losing its distant water fleet following the changes outlined in chapter 4 has succeeded in maintaining its position as the centre of secondary processing; Grampian by contrast has grown more recently to become the second largest processing area, linked to Scotland's position as the most important UK fishing region following the establishment of the new international regime, and containing the dominant port of Peterhead which takes by far the largest landings from UK vessels (Carleton C, Cappell R, Graham I, & Marshall D 1999; Coull J 1999; Symes DG & Haughton GF 1987).

As far as the economic infrastructure is concerned the changes have been greater. While auctions are still important for local landings, much supply has come to be sourced direct by processors and distributors, including by contracts with individual fishing boats and in the form of imports. Formerly, the distribution system was dominated by the port wholesaler/inland wholesaler structure; the former supplied some fryers and retailers direct but a considerable proportion of available fish was transported between them and sold on to fishmongers by the latter group through the inland markets. These inland markets were seen to carry out a useful function, mediating between demand and the non-standardised nature of supply (Taylor RA 1960). By the mid-1980s the role of the inland markets had greatly reduced, with strong competition provided by direct deliveries from ports, inland depots and independent wholesalers; there were only 67 merchants at Billingsgate in 1987 compared to 150 in 1967, 17 in Birmingham down from 28 and 12 in Liverpool reduced from 25 at the earlier date (Rosson P 1975; Symes D 1988b; Symes D & Maddock S 1989). Throughput of seafood at Billingsgate has been analysed for specific periods: it fell sharply between 1950 and the mid-1970s and roughly plateaued out during the 1980s; volumes then fell by 15% between 1991/92 and 2000/01 (Denton JW 1991; Saphir N 2002). The period from the

mid-1980s to mid-1990s saw further substantial change in the sector with noticeable increases in direct sales to supermarkets and caterers (Joseph M & Findlater A 1996). However a decade later it was noted that wholesalers were still important suppliers for foodservice buyers (Ernst & Young 2005). The general trends have continued with particular impact presumed from the decline of independent fishmongers who had previously been the mainstay of the inland markets' customer base. At 2012, the inland wholesale markets continue, albeit with a reduced function, and the premier one at Billingsgate retains its prestige.¹¹⁵ But for the most part, wholesalers and processors supply each other and their supermarket and major foodservice customers through a variety of direct arrangements which may include contracts and have delivery arrangements included.

Auctions have nearly always been the province of market forces albeit with certain allegations in the past of malpractice such as pre-arranged buying rings to reduce competition and discounts to certain buyers; there was also the problem of merchants from subsidiaries of vessel-owning companies bidding for their own company's fish (Taylor RA 1960). However, there has been just one state intervention when a competition authority examined the workings of the Newlyn auction in the late 1980s and found that anti-competitive practices had taken place in the way it was managed (Office of Fair Trading 1988).¹¹⁶

Renewal of infrastructure and physical fabric is one way to improve hygiene and quality as well as to satisfy other objectives such as increasing capacity

¹¹⁵ The number of seafood trading companies at Billingsgate in 2012 was 43 (65 in 1988); at Birmingham 10 (17); at Liverpool 7 (12); at Manchester 5 (16); at Glasgow it was unchanged from 1988 at 18. Information about Billingsgate and Glasgow came from their respective websites, www.cityoflondon.gov.uk/business/wholesale-food-markets/billingsgate and www.citymarketsglasgow.co.uk; numbers for Birmingham, Liverpool and Manchester were provided by the respective markets in response to email enquiries. The number of merchants can only give a rough idea of the size of each market as a smaller total could be achieving the same or a greater level of business but as the researcher did not have access to turnover information it provides an approximation. Billingsgate market continues on the site established in 1982 although successive reports have noted the inadequacy of facilities there in relation to more recent requirements (Denton JW 1991; Myers M et al. 2004; Saphir N 2002).

¹¹⁶ The matter was to be referred to the Monopolies and Mergers Commission but no record has been found of any further action. The company at the centre of the investigation continued to be active in the Newlyn auction.

and this has been facilitated by CFP funding under the successive Financial Instrument for Fisheries Guidance (FIG) and European Fisheries Fund (EFF). A large number of projects have been supported including improved harbour and auction hall facilities and capital investments in many processing companies for new or enlarged buildings and for equipment. A UK summary of the outcomes of the FIG programme records that 154 processing and marketing companies received a total of €16.9m with another €2.8m granted for upgrading harbour and market facilities (the beneficiaries contributing defined shares towards costs). An early review noted that 40% of British seafood companies benefited from the FIG, notably in increasing capacity, and that in the EU generally there would have been very little processing investment without it. The EFF programme for 2007-2013 includes funding for modernising premises and equipment in the processing sector that meets various objectives including improved hygiene, reduction of negative environmental effects and innovative introductions (DEFRA 2010; Nautilus Consultants 2003).

The processing industry consists of two types of activity, primary and secondary processing and companies may specialise in either or carry out both. According to Seafish definitions, primary processing covers cutting, filleting, picking, peeling, shelling, washing, chilling, packing, freezing, heading and gutting of fish and shellfish; secondary processing means brining, smoking, cooking, freezing, canning, boning, breading, battering, vacuum and other controlled packaging or the production of ready-to-eat meals.

The products of secondary processing have changed considerably over recent decades. The traditional focus was on smoked items with cold smoking the predominant method in Britain. For the most part this consisted of kippers and finnan haddocks which made up 90% of smoked production in the mid-1960s; other items including bloaters (ungutted to give a gamey flavour), smoked cod and haddock, smoked cod roe and the hot-smoked buckling (herring) and Arbroath smokies (haddock). In addition to smoking, processing activity has included salt curing (producing pickled herrings) and some canning (of herrings, pilchards and sprats). Up to the 1960s salmon was only a small part

of the smoking industry but the much greater availability produced by farming subsequently has allowed this to greatly increase.¹¹⁷ Hot-smoked mackerel, not even mentioned in a 1965 manual, was becoming established by the mid-1980s (Connell JJ 1987). Since the 1980s, the range of secondary processing has greatly extended with huge numbers of chilled and frozen easy-cook products and ready meals made for both the domestic and foodservice markets. Some of the technologies used such as modified atmosphere packaging require higher levels of capital investment, advantaging larger firms, but smoking and other types of preparation can still be done on a modest scale, so a range of size firms has continued (Young JA 1987).

In an overview of the seafood processing industry over the twentieth century based on the Census of Production it has been argued that fundamental changes took place in the quarter century starting in the late 1940s. Machinery could replace manual processes such as gutting while the Torry smoking kiln substituted technology and predictable results for reliance on personal knowledge. Larger enterprises could benefit from economies of scale and take better advantage of such options and there was a decline of artisanal production although small firms have continued to be an important element of the sector (Reid C & Robinson C 2003). The financial impact of mechanisation costs could be considerable (Flear F 1973) so investment must have been much less of a possibility for smaller companies.

For the more recent period the structure and economic state of the UK seafood processing sector has been charted in periodic surveys carried out by Seafish from 1986 to 2012. Over this period the number of plants where seafood processing is carried out (the surveys counted sites, not companies) has fallen from 988 to 325, a massive reduction of two-thirds in twenty-six years. Employment in terms of full-time-equivalents has also declined sharply from 19,359 to 11,864. Units predominantly dealing with salmon were only counted

¹¹⁷ Cold-smoking means the smoke temperature is up to 30°C while in hot-smoking it is at about 120°C which cooks the fish. Hot-smoked products have been more popular in other parts of Europe than Britain. Prior to smoking, the fish is brined, or in some cases dry-salted, for specific periods of time. A full account of the various methods is in (Burgess GHO, Cutting C, Lovern JA, & Waterman JJ 1965).

from 2004 when there were 76, down to 53 in 2012. Reductions did not necessarily mean that firms went out of business as they could have been rationalising sites or continuing with a different balance of activities that no longer met the survey criteria but it must be assumed that a large part of the fall reflects the cessation of many companies. The period has thus been one of drastic change. The surveys, with their series of snapshots have not analysed the departures but they point to various pressures which are particularly difficult for small enterprises. They have included shortage and uncertainty of supply, increasing costs including for energy and water and for meeting new hygiene and waste disposal requirements, the inability to pass on increased costs because of buyer power and perceived limits to what end customers will pay for seafood compared to other proteins and finally disadvantageous terms of trade in which processors typically receive less credit than they have to grant their customers, causing cash flow problems. In the reports the industry has been consistently characterised as consisting of a small number of large, multi-site companies and a large number of small, single site businesses.¹¹⁸ Most recently as smaller enterprises have disproportionately declined, the difference in numbers between small and large companies has reduced. (Banks R 1988;Brown A 2009;Curtis H & Barr R 2012;Curtis HC 2000;Curtis HC & White R 2005;Garrett A 2011;Joseph M & Findlater A 1996). The twin structure of the processing industry has been modelled and larger companies assessed as more efficient (Harris R & Robinson C 2000) but the Seafish surveys have shown the flexible way companies respond to different customer groups and a study of costs and earnings in the sector found that smaller companies can often achieve better profitability (Curtis HC & Bryson J 2002). In a recent analysis concentrating on cod, a three-way structure of the processor sector is put forward: large processors supplying national retail and foodservice companies often by direct contract, medium size ones sourcing for regional outlets by direct contract and from market purchasing and finally the small firms which rely on auctions and supply local concerns (EUMOFA 2013); this is a better match with the pattern

¹¹⁸ The size criterion was in terms of full-time employees: small 1-25 FTEs; medium: 26-100 FTEs; and large 100+ FTEs.

found by categorising the research seafood companies database than the simple large/small grouping.

Although only mentioned briefly in some of the surveys, an important reason for reductions in the British industry must be the increasing amount of processing carried out in China since the late 1990s. Typically, whitefish captured in northern waters such as the Barents Sea is delivered frozen to China where it is thawed, undergoes processing and is refrozen for export to European markets. Low labour costs constitute the economic rationale for this arrangement but there has also been evidence that the system has been used to launder illegally caught fish into the supply chain, at least prior to the additional control measures brought in by the EU in 2010 (Album G 2010;Clarke S 2009). In that year the second largest source of cod imports into Britain (after Iceland) was China, reflecting this processing trade (Almond S & Thomas B (Eds) 2011).

The database of seafood companies supplements the formal accounts just described with more descriptive material which can illustrate the range of functions performed. The section of the database listing those carrying out distribution and processing activities is discussed here, generally excluding primary producers except in the few cases where the weight of the business seemed to lie at least equally in their extra-production activities.

Starting with companies focused on trading and distribution, there were twenty-three on the database but subsequently four of them ceased when their parent company went into administration in 2010. While serving the British market, eight also traded with other European countries and another four even further afield. Most sold a range of chilled and/or frozen seafood but one with offices in Murmansk and Moscow was a specialist in pelagic species. Niche markets were served by the firm trading in ethically sourced canned tuna and pelagic fish and by the company supplying Chinese caterers. One enterprise described itself as 'a commercial venture driven by community and fishing issues'. In relation to food safety and quality, five referred to auditing of suppliers and another four mentioned HACCP or a formal quality system. Ten

of the companies made statements supporting fishery sustainability but it was not clear how many of them had restrictive sourcing policies and only one mentioned MSC certification. Of course what a company puts on its website does not cover everything it does and there may have been undisclosed policies on some of these issues but the statements, or lack of them, do indicate how they were content to appear to the outside world.

Turning to the larger group, 129 companies were processors of seafood, no distinction being made between primary and secondary practitioners because it did not seem possible to do so accurately on website information alone. In the great range of different activities, certain can be grouped. Some firms carry out primary processing and supply a variety of chilled seafood while others specialise in shellfish. There are smoking specialists, often with a shop, with or without an online service and two canned fish producers. Some companies have diversified and sell non-seafood products, a couple also supply bait, one combines oyster cultivation with a restaurant and shop chain while the most enterprising of all combines smoking fish with cruises and a wedding service. There are companies which are particularly geared to the foodservice trade and this category contains both general services and suppliers to institutional caterers and to the fish and chip trade. Extensive ranges of ready to eat products and seafood-based meals are produced by several companies of different sizes. Finally there are the large companies able to supply the major retailer chains with chilled, frozen and prepared food, including supermarket own-label lines.

Turning to the area of company policies and systems, nineteen of the processors mentioned on their website that they had an HACCP system, twenty-three referred to some sort of quality system and another nine had achieved a Seafish quality award. The number indicating some sort of active sustainability sourcing policy was also twenty-three of which eleven included MSC products. As with the trading and distribution group, website information does not necessarily provide the whole story but it does speak to the image they wish to present. From that point of view there is a minority of companies

aware of sustainability issues but most do not seem to think they are important enough to mention.

Following the sampling procedure described in chapter 3, the research participant companies, that is those which provided a stakeholder interview, are a microcosm of this diversity though as explained in chapter 3 they cannot represent it fully. In terms of the locational structure of the seafood distribution and processing sector they reflect what seems to be the current situation. Eight were situated in fishing ports, though not necessarily in the harbour area; of these six obtained most of their supply from local landings but two which had once done so now sourced elsewhere. One company was based in an inland wholesale market and five were in the Humberside food processing hub of which three functioned also on other sites elsewhere. The remaining ten operated from a range of other locations.

5.6 Securing Food Safety and Quality in Processing and Distribution

In contrast to the position at sea, subsequent processing and distribution have become subject to much more governance geared to ensuring food safety and quality. This contrasts too with the position in the early part of the period being examined when standards could be extremely poor as graphically described in a contemporary account (Taylor RA 1960):

‘Before the sales begin large fish are dragged over the dirty stone floors of the markets where seagulls wander, feet tramp and persons spit; after the sales, boxes piled up with fish have other boxes piled high upon them squashing and bruising the fish beneath; and during the processing, water in the filleting troughs belonging to some merchants is allowed to become so dirty that it can only increase the rate of bacterial growth and spoilage of the fish.’

The same source goes on to describe the returnable wooden boxes in which fish was sent from the ports to wholesalers and customers as ‘a serious reflection on the trade’s attitude towards hygiene’ (p172) as they absorbed fish slime along with melting ice, stood around for days collecting dirt and micro-organisms, were rarely cleaned properly and eventually disintegrated during

transport or upon arrival. And in a report published a quarter-century later about one port, the investigator noticed such practices as holding fish overnight inadequately iced in non-chilled premises, non-iced fish left in the auction-hall awaiting collection and poor standards of hygiene in merchants' premises, stating about the dock area: 'The level of tidiness and cleanliness on an estate where food is being processed is clearly unacceptable' (Tower J 1986) (p31). Another account at this time recorded poor temperature control at all stages of the supply chain from vessel to retailer, resulting in tasteless fish (Mills A 1987).

Further on in the chain, much of the filleting in port premises was carried out under poor conditions of hygiene. Fish smoking processes lacked quality control and a survey of kipper production in one centre found that only a quarter of the output could be classified as of good quality, some being rated as quite inedible (Burgess GHO, Cutting C, Lovern JA, & Waterman JJ 1965). Smoking stale fish was noted in this source as a major cause of poor quality, something echoed in the first interview quotation of this chapter. Poor quality frozen fish was also noted.

The quotes at the beginning of this chapter typify general agreement from the interview research that quality and safety standards have improved markedly from the picture given by these earlier accounts. No study of such improvements has been found and there are only a very small number of brief references in existing work to such change having occurred (Carleton C (Ed) 1997; Coull J 1999) so this documentation marks a significant contribution to knowledge about what has been happening in the seafood supply chain.

In considering what lay behind such changes, it is first necessary to describe the regulatory environment. While it is European legislation with its British versions that has had a big impact on the seafood processing industry there is also a global governance element that should be mentioned. Although not having a direct impact on companies in the UK supply chain, the authoritative technical papers on various aspects of seafood safety and quality produced by the FAO which are cited by agencies and consultants constitute a discourse of

expert knowledge which, as it is suggested here, is bound to have affected policy-making.¹¹⁹ There is also the comprehensive Codex *Code of Practice for Fish and Fishery Products* intended to assist in achieving 'safe and wholesome products that can be sold on national or international markets and meet the requirements of the Codex Standards' (Codex Alimentarius 2009a). Dealing with industry practices from another direction, the United Nations Environment Programme has published a guide for reducing the environmental impact of fish processing (COWI Consulting Engineers and Planners 2000).

More generally the Codex Alimentarius Commission (CAC) has been issuing successive versions of its massively comprehensive *International Code of Practice - General Principles of Food Hygiene* since 1969 (Codex Alimentarius 2009b). HACCP principles have been incorporated since 1993. Member states are asked to refer to the CAC document when drawing up hygiene guidelines in European Directive 93/43/EEC *On the hygiene of foodstuffs* which also includes a requirement for HACCP principles to be followed, surely not coincidental to its adoption by Codex in the same year.

Turning to European legislation, in the 1980s there were various European measures specifically about the seafood sector which focussed not on hygiene but rather on the development of a common market for 'fisheries and aquaculture products' and other Community objectives. Regulation (EEC) No 3796/81 *On the common organization of the market in fishery products* though mainly concerned with price issues specified that standards should be established for seafood products which should only be marketed if in conformance with those standards.¹²⁰ Regulation (EEC) No 4042/89 *On the*

¹¹⁹ See (Cato JC 1998), (Huss HH 1995; Huss HH, Ababouch L, & Gram L 2004) and (Sumner J, Ross T, & Ababouch L 2004); FAO work on seafood quality goes back decades, at least to an FAO Technical Conference on Fish Inspection & Quality Control held in 1969, reported in (Burgess G 1972).

¹²⁰ This Regulation was mainly concerned with the establishment of Producer Organisations and the withdrawal price support scheme; subsequent regulations on these market organisation topics were (EC) No 3759/92 and 104/2000, both entitled *On the common organisation of the markets in fishery and aquaculture products*. Domestic implementation of the standards aspects was by *The Sea Fish Marketing Standards Regulations 1986* subsequently superseded for Scotland by *The Sea Fish (Marketing Standards) (Scotland) Regulations 2004*.

improvement of the conditions under which fishery and aquaculture products are processed and marketed introduced a financial assistance programme for infrastructure improvements. It was followed by the 1991 Directives 91/493/EEC *Laying down the health conditions for the production and the placing on the market of fishery products* (already mentioned in relation to vessels) and 91/492/EEC *Laying down the health conditions for the production and the placing on the market of live bivalve molluscs* (considered in relation to production in the previous chapter, in section 4.4).¹²¹

Again in pursuance of the common market in seafood products, European legislation required labelling as well as traceability of seafood through the chain in (EC) No 2065/2001 *Laying down detailed rules for the application of Council Regulation (EC) No 104/2000 as regards informing consumers about fishery and aquaculture products* which came into force in 2002. The labelling information required for seafood was the commercial designation, production method and catch area.¹²² Although not mentioned within this legislation, states had been asked to improve identification of the origins of traded species in the *FAO Code of Conduct for Responsible Fisheries* so there is also an element of global governance here (Deere C 1999).

Not long afterwards came the general and animal product food hygiene regulations (EC)852/2004 and (EC)853/2004 that were part of the European Community response to the food scares of the previous decade. These have already been noted in relation to vessels but they are implemented more strictly in processing establishments which must be registered. Enforcement is

¹²¹ The implementing legislation was the *Food Safety (Fishery Products) Regulations 1992* and the *Food Safety (Live Bivalve Molluscs and Other Shellfish) Regulations 1992* and subsequently *SI 994, The Food Safety (Fishery Products and Live Shellfish) (Hygiene) Regulations 1998*.

¹²² Labelling of fish was previously included in *The Food Labelling Regulations 1996* but there was no requirement to provide the production method or catch area. An assessment of traceability regulation in the UK concluded that it did 'not result in a very stringent system' (Nguyen QV 2004) (page 21). Subsequently there has been a series of British fish labelling regulations enacting the European requirements starting with *SI 461 The Fish Labelling (England) Regulations 2003*, continuing with *SI No 420 The Fish Labelling (England) Regulations 2010* and most recently the *Fish Labelling Regulations 2013*. Each of these has equivalent measures in the devolved administrations, that is 2003, 2010 and 2013 separate Fish Labelling Regulations for Northern Ireland, Scotland and Wales.

the responsibility of local authority environmental health departments or of port health authorities in their jurisdictions.

Further requirements were added by recent European labelling regulation (EU) No 1169/2011 *On the provision of food information to consumers* coming into force in December 2014. It specifies that previous freezing and also the addition of water, even if less than 5%, must be identified and the term 'formed fish' used when what looks like a whole piece is made up of bits combined by use of other ingredients. The requirement to identify previously frozen fish was also specified in Regulation 1224/2009, *Establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy*.¹²³

Although the focus of the earlier regulations was the common market and more competitive products, not food protection or enhancement for their own sakes, these regulations did specify the improvement of hygiene and quality and make them European objectives for the seafood industry from the early 1990s. A particularly significant requirement for seafood processors in the 1993 Directive 93/43/EEC *On the hygiene of foodstuffs*, reiterated in the 2004 Directive (EC)No 852/2004 with the same title, was implementation of the Hazard Analysis of Critical Control Points (HACCP) system. The implementing UK regulation for the 1993 Directive, *The Food Safety (General Food Hygiene) Regulations 1995*, introduced HACCP principles. Subsequently, following a lethal food scare, the Pennington Report 1997 recommended that HACCP be made compulsory for all food businesses, something that has been only partially implemented but is an approach that has been seen as marking an important move from prescription to self-regulating management (Dillon M & McEachern V 1997;Howard MT 2004).

Seafood companies are also regulated on three other issues with major implications for processors: the disposal of fish and shell waste under the

¹²³ The corresponding UK SI, *The Food Information Regulations 2013*, includes part of the provisions relating to fish, that relating to previously frozen items awaiting further guidance.

Animal By-Products Regulations¹²⁴, packaging (and for larger companies its waste disposal)¹²⁵ and effluent discharge¹²⁶. Merchants and processing companies which import seafood from outside the EU (with the exception of certain European countries including Iceland, Faeroes and Norway which have similar status) must comply with regulations imposing veterinary controls to ensure that incoming products conform to Community food safety requirements.¹²⁷

The European General Food Law of (EC) 178/2002 *Laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety* established the principle of traceability in all food chains for the first time, something which soon became important to the seafood industry. An EU-commissioned project developed the Tracefish electronic system for seafood traceability, based on barcoding principles using the EAN.UCC numbering system general in the food industry.¹²⁸

¹²⁴ Introduced as Regulation (EC) No 1774/2002 of 3 October 2002 *Laying down health rules concerning animal by-products not intended for human consumption* and subsequently superseded by Regulation (EC) No 1069/2009 of 21 October 2009 *Laying down health rules as regards animal by-products and derived products not intended for human consumption*. There are enacting regulations for Scotland 2003, England 2005 and Wales 2003 & 2006.

¹²⁵ The *Packaging (Essential Requirements) Regulations* 1998, replaced by those of 2003 lay down heavy metal limits. Companies over a threshold turnover have recycling responsibilities under the *Producer Responsibility Obligations (Packaging Waste) Regulations* 2007 and 2012 amending regulations. Both sets of regulations enact 1994 and 2004 EU Directives on packaging and packaging waste.

¹²⁶ The Urban Waste Water Treatment Directive, 91/271/EEC (*Concerning urban waste-water treatment*) was significant for seafood processors because of the need to pay for treatment and better disposal than the previous pattern of effluent from coastal plants (the majority) being discharged untreated into the sea and because of the quantities produced by them as heavy water users. The enacting regulations are the *Urban Waste Water Treatment Regulations* for England & Wales and for Scotland 1994 and for Northern Ireland 1995 and their various 2003 amendment regulations.

¹²⁷ These are the separate *The Products of Animal Origin (Third Country Imports) Regulations* for England 2006 and for each of Northern Ireland, Scotland and Wales 2007 plus their various amending regulations corresponding to Directives 90/675/EEC and 97/29/EC dealing with veterinary checks on products entering from third countries.

¹²⁸ The Tracefish system is now owned by British-based private company, Anglo-Dutch Technology Ltd (see www.tracefish.co.uk). No information has been found on the extent to which it is used in the UK seafood industry.

Traceability is also required under the European arrangement for protected names. In 2009 there were three and by 2013 nine UK seafood products which had achieved either Protected Designation of Origin (PDO) or Protected Geographical Indication (PGI) (none coming into the Traditional Speciality Guaranteed category). They are the Arbroath Smokie (PGI), Cornish Sardines (PGI), Fal Oysters (PDO), Isle of Man Queenies (PDO), Lough Neagh Eels (PGI), Scottish farmed salmon (PGI), Scottish wild salmon (PGI), Traditional Grimsby Smoked Fish (PGI) and Whitstable Oysters (PGI). Though several of these are specialist products serving niche markets and in some cases mainly exports, the farmed salmon classification covers the considerable total output of both conventional and organic production which relevant to the domestic food chain.¹²⁹

That meeting the standards of the two 1991 European Directives would require considerable upgrading of facilities was recognised in an impact study based on the legislation when it was still in draft. The capital cost for the UK was estimated at £170 million (Myers MA & Wilson P 1990). It would be logical to think that the financial assistance programme in Regulation EEC/4042/89 mentioned above would have been accessed in support of improvements but it appears that no such plan was formulated.¹³⁰ However, as explained in section 5.5 above, CFP funding mechanisms have been used for such purposes over the years in relation to a large number of individual projects.

Equally important, the requirements of the 1991 Directives imposing a previously unknown level of regulation required a shift in attitudes and culture. A few years after their introduction, a study of four small/medium fish processing companies in Scotland using participant observation found that many employees were unconvinced about the necessity for such standards and needed constant surveillance to ensure that the rules were observed (Haugh H 2000).

¹²⁹Information about protected names is on the Defra website at www.defra.gov.uk/food-farm/food/protected-names/uk-registered-names.

¹³⁰ Enquiries to Defra and the Marine Management Organisation elicited the replies that no planning document in response to EEC 4042/89 was known.

Prior to the legislative developments outlined in the previous paragraphs, there was already in existence a body of British regulation relating to food hygiene and labelling, as noted in chapter 2. The *Food Hygiene (Market Stalls and Delivery Vehicles) Regulations 1966*, the *Food Hygiene (General) Regulations 1970*, *The Food Act 1984* and the *Food Labelling Regulations 1984* were understood as applying to the seafood industry and their requirements assessed and promoted by Seafish, the first on this list being very relevant because in the mid-1980s nearly a quarter of fresh fish sales were from market stalls or mobile shops. However, the legislation was considered imprecise and because of dependence on local authorities variably enforced and considered to have little impact on quality (Seafish 1987). The *Food Safety Act 1990* caused prescriptive guidance to be delivered to food businesses in general (Howard MT 2004) but what impact this had on the seafood industry is not clear. The 1991 European directives specifically dealing with seafood products came out shortly afterwards, followed by the further legislation already outlined and the impacts are bound to have been intertwined.

In relation to the timing of this research with the interviews taking place in 2009 and the first part of 2010, the earliest of the European food hygiene regulations had been in place for nearly twenty years, the European labelling and traceability requirements for a shorter period but long enough to be established as routine practice. With this in mind, the reactions of the interviewees to the legislation that affected them can be considered.

Most comments were approving of the rationale for food hygiene regulations in the seafood industry. Some attributed improvements directly to the legislation:

‘The fish industry for many years was light years behind the meat industry, the dairy industry in terms of our controls because we knew we had a safe product. Why did somebody want to spend a fortune on doing up his factory when it didn’t actually improve the product? But the regulations have now improved the hygiene side. We now have a good product but also produced in much, much better surroundings than we had in the past. That’s certainly been a dramatic improvement.’ Trade organisation representative 1

There were some critical comments on the lines that ‘It’s a bit over the top, bit of overkill’ (Director, medium company 2) and about the financial aspect: ‘It’s a

lot of money on your working costs' (Managing director, small company 5).

But generally companies of all sizes saw food safety regulation as beneficial:

'There is a reason for legal requirements and we're quite clear that we have to comply to that. Food safety laws, hygiene laws are there for definite reasons, to protect the consumer, the end consumer and I don't think it's a hindrance by any means. Of course, there are certain things that you wish it wasn't there but there is a reason for everything. The legality is there for reasons of protecting the final consumer. It's not only a commercial reality it's about protecting the final consumer, the final me and you.' Head of operations, large company

'They're perfectly reasonable in what they ask, and what they'll ..., they'll do spot checks without telling you they're coming, in which they are perfectly correct, they keep you on your toes. As far as health and hygiene on the products that we produce, I haven't got any problems with that whatsoever.' Director, medium company 1

Respondents described various ways in which they acted to ensure that food hygiene standards were met. Examples were using the HACCP approach, maintaining temperature controls and microbiological testing:

'Here is a hazard analysis: hazard risk, temperature, monitoring, what is the standard, what are you looking for, who's responsible, action if it's not right. Right through filleting, salting, washing, smoking, trimming, slicing, packing.' Managing director, small company 5

'We are monitoring temperatures etc all the time. If something goes out of spec we have got procedures in place to alter the environment or make a decision on the product.' Director, medium-large company

'The majority of chip shops now check. If it's frozen at sea they check the temperature of the lorry. If it's fresh, again check the temperatures and also ... check a sample. If you have a good relationship with your supplier that issue should never come and any health issue really should only be if you're not following procedures.' Director, trade organisation

'We will also include in that programme things like routine, regular testing for wild capture it's residues, wild capture products, to look at things like the impact of any pollution, contaminants, heavy metals, all this sort of stuff and some species more prone to retaining those than others, things like tunas and swordfish, these sort of things will tend to be quite prone to taking heavy metals.' Director, large company

'We send samples for analysis every week as well. This is one which just came back. These are what they're checking, E coli, staph aureus. Every week. Once a month we do a slightly different check, salmonella, listeria. That's what is required.' Director, medium company 2

Food safety is the objective where the enforcement of regulation is strongest and where companies have relationships with local environmental health

departments (or in some cases, depending on location, with port health authorities). Although various weaknesses in local food control systems have been identified (Spears K 2000) a general study of food safety regulation found that environmental health officers (EHOs) were particularly valued by small and medium size companies as sources of information and advice (Hutter BM 2011). The present research did not produce a straightforward picture on this point.¹³¹ A trade organisation respondent mentioned valuable assistance given to fish and chip shops and an interviewee in a medium company based in the Humberside hub referred approvingly to the food specialist EHOs in the local department. However, two respondents from small companies in other parts of the country mentioned somewhat fraught relations with their environmental health personnel:

‘The environmental health officers, we’ve had three. One, he didn’t know whether he was coming or going. The other one was pedantic to the point of being almost insane, in fact he did have a nervous breakdown, and he’s now in charge of a mortuary or something, he was a nightmare. And this chap who’s very reasonable, you can talk to him and explain.’ Managing director, small company 5

‘They’ll come in, what’s this, what’s this there?’ ‘You’re full of experience and training, they come and tell you what to do, you know what I mean. But they don’t know what to do.’ Managing director, small company 3

Turning to another legal requirement, that of traceability, the respondents were clear about how this was satisfied although as already mentioned it had come into force just a few years before the interviews took place. Interviewees generally stated that traceability was in place in relation to the seafood they sourced. Typically they said that origins could be identified ‘back to the boat’ for capture fish:

‘We can trace it back to the boat and the day it’s caught. On our packs for example, we have, it’s a serial number, every pack of fish that goes out, so we can trace it back to which boat we got it from, what day it was landed, so complete traceability.’ Director, medium company 1

¹³¹ The Hutter 2011 finding is certainly more reliable as it was based on a postal survey in which there were over 200 respondents as well as on interviews.

'We can trace every item of shellfish back to the bed it was harvested from, we can trace every tuna loin back through the factories in Sri Lanka and the Maldives back to the boat from which it was fished.' 'Mussels and you can go all the way back, temperature of the vehicles and things like that. It's complete traceability.' Group director, large company

Traceability for farmed seafood could be even more detailed:

'Theoretically in most you can trace back an individual fish to the egg and you can almost map its life history. For example if we want, on a famed salmon we can go back and say when it's been inoculated, when it was in its original smolt format, where the eggs were from and trace the whole genetic history.' Director, large company

There were some exceptions, shellfish produced in Britain being one:

'A lot of the producers are very small and if they do supply a bigger market they tend to come together, put the product into one place and then that gets shipped out.' Trade organisation representative 2

The batching issue is actually a wider one which is about the limits to complete traceability of wild fish and a reason for traceability being implemented later for fish than in other food sectors (Larsen E 2003). There are amalgamations at various levels: the output of different trawls on any boat and catches from different vessels combined by merchants, auction houses and beyond.

'You won't know what's in that box, what came from each particular vessel once you've amalgamated it. It's almost ludicrous. This is why DEFRA, even they are not keen to enforce traceability to the n^{th} degree because it's not practical at all.' Partner, medium company

'Traceability is a big issue with raw materials coming out of China.' 'The primary processor might buy one to one and a half kilos fish from ten different boats for example which will then be consolidated into different containers and sent to China. The minute that that fish becomes consolidated from different vessels, how do you carry on, set about and identifying through the process? By the time you have processed all those, you've lost that traceability back to an individual boat. What you might have is traceability back to five or six boats.' Commercial manager, medium-large company

The rules relating to batching have in fact been very imprecise but most recently have been defined in 2009 such that what is caught by a single vessel or even what is caught by several ships operating in the same geographical area is considered as a lot; this marks acceptance of the scale at which

batching occurs and hence the limitations of traceability.¹³²

The respondents could also refer to the internal systems they had in place to maintain traceability and satisfy their own customers:

‘It comes over in the cold store, we take a note of the herring on the pallet, it goes down as a batch number for incoming herring and as we draw that we give each pallet an individual batch number and then that’s transferred, some people require it on their labels, other people don’t.’ Director, medium company 2

‘As it arrives in our factory, we then trace it as we use it into the meals. We can trace it back when was it used, which day it was used, which line it was used on.’ Head of operations, large company

‘We do an exercise every six months, take a couple of products on a particular day and say let’s trace it back and see where it’s all gone and make sure we can recall it if necessary.’ Site manager, medium-large company

The purpose of the traceability requirement when introduced in the 2002 European Food Law was in connection with food safety problems, giving a means to assess them accurately and enable targeted withdrawals. Having a recall system and being able to trace problems was certainly one reason mentioned by interviewees:

‘Yes, we have product recalls probably a couple of times a year. It’s normally to do with mussels.’ ‘Where we have had to recall we have been able to do it within a 2-3 hour period. We had a major recall of mussels last year, as did the retailers, when some frozen mussels entered the marketplace. We had everything back. We’ve got 14,000 customers. Every one of them who took

¹³² It had been assumed that Directive 89/396EEC, *On indications or marks identifying the lot to which a foodstuff belongs*, applies here but this is very broadly written and gives no rule that could be applied to the fish amalgamation issues raised by some respondents (Van NQ 2004). The 1991 Directives on marketing fishery products and live molluscs define a 'batch' as 'the quantity of fishery products obtained under practically identical circumstances'. But in relation to labelling the regulation refers to issues arising from a 'batch' (here undefined) offered for sale containing more than one species or a single species derived from different sources, to ensure that a full description is provided, which is clearly a different usage and moreover in the document says nothing about batches in relation to traceability. In the *Food (Lot Marking) Regulations 1996* 'lot' is defined as 'a batch of sales units of food produced, manufactured or packaged under similar conditions', which gives considerable scope for interpretation. Most recently the lot is defined in Regulation 1224/2009 *Establishing a Community control system for ensuring compliance with the rules of the common fisheries policy*, as 'a quantity of fisheries and aquaculture products of a given species of the same presentation and coming from the same relevant geographical area and the same fishing vessel, or group of fishing vessels, or the same aquaculture production unit'.

from those batches of mussels, we had contacted, isolated the mussels in their premises and over the next few days, collected them. It is a major operation but it is essential and you need to be able to do it.' Group director, large company

'If they [*retailers*] have an issue on a pack in store they will ring us up if they're not happy with the quality or picked something up that they don't like, we need to go back in minutes not hours and days. Say, right we've done the traceability, it actually came from, the boat it came off, x, y and z.' Managing director, medium-large company

But there are other reasons which companies gave for maintaining traceability systems and indeed this process has many functions. With the greater complexity of food production and supply chains, traceability is needed to manage them and fulfils various purposes (Coff C, Korthals M, & Barling D 2008;Morrison C 2003). Traceability counters information asymmetry in the supply chain though there are different views on whether this extends to consumers (Hobbs JE 2004;Hobbs JE, Bailey, Dickinson, & Haghiri 2005;Houghton JR, Rose G, Frewer LJ, Van Kleef E, Chryssochoidis G, Kehagis O, Korzen-Bohr S, Lassen J, Pfenning U, & Strada A 2008). Traceability is needed generally to handle food risks and is intrinsic to quality assurance systems (Leat P, Marr P, & Ritchie C 1998). As a management tool it has been argued that traceability can provide various benefits for seafood and other food chains and can be central to operating the supply chain for quality by generating trust (Árnason SV 2007;Frederiksen M 2002;Frederiksen M & Gram L 2004;Mai N et al. 2010;Viaene J & Verbeke W 1998).

The functions mentioned by the research participants were relatively restricted in comparison. For some companies a key objective of traceability was to ensure they sourced, or to demonstrate that they provided, legally caught or in some cases sustainably certified, fish:

'That is what they are calling traceability. That is what they are satisfied with, having the knowledge that we have to prove to certain of our customers like multinationals, like certain of our wholesalers, that have to prove that we are still holding sufficient quota for the fish.' Partner, medium company

'We went through a phase of challenging the amount of beam trawling that they were using in the flat fish arena. And we had a number of listed boats that we knew had beam trawling gear on their boats. And we knew a list of fishermen who didn't have beam trawl and we would often use traceability to go back to

boats, fishing vessel name or registration code to verify the origin from the right vessel to make sure they were using the right fishing gear.’ Category technologist, major retailer

Traceability is required to authenticate seafood labelling and various physical and chemical methods have been developed to deal with the need to identify species, production method and geographical origin (Moretti VM et al. 2003). Furthermore the credibility of eco-certification schemes depends on the ability to trace a product back to the specific source (Accenture Development Partners 2009); as an interviewee mentioned: ‘one MSC-certified sells to another, you have that chain of custody, you have that traceability so that’s where I suppose the MSC label is a good scheme’ (Commercial manager, medium-large company). The fish tagging schemes mentioned in section 5.3 are using traceability to signify authenticity.

Traceability is also an aspect of the enforcement system for preventing illegal fishing:

‘In 2006 I believe it came in, there was a new piece of UK legislation, regulation, called the Registration of Buyers and Sellers. Since that introduction to the various sectors of the industry has ruled out illegal landings, termed black fish that element of traceability in the supply chain for all UK fish.’ Industry advisor, trade organisation [*in fact dates to 2005*]

As indicated in chapter 4 this was indeed significant legislation for enforcing fisheries management rules. But the overall limitations of the system were described by another respondent:

‘Under the European regulations, there is a traceability requirement under I think it’s regulation number 178/2002, you have to be able to trace one up and one down which sounds brilliant but unfortunately the food chain is a lot longer than one up and one down. Somebody receiving a fish product in the UK, it may have gone through half a dozen hands before it got to us so the traceability can be lost further down the chain which is what happening with the IUU fish where it was almost impossible to trace it because it was losing its identity in somewhere like Spain.’ Trade organisation representative 1

For the survey respondents, the rationale mentioned most often for maintaining traceability is to conform with buyer requirements. It has been argued that British retailers prioritised traceability requirements as part of their reaction to the 1990 *Food Safety Act*, which would be considerably earlier than the EU legislation of 2002, perhaps this contributing to the extent to which it became

embedded in part of the industry (Hobbs JE, Fearne, & Spriggs 2002). In any case buyer requirements overlap with the other reasons because purchasers are looking for safeguards against illegal or unsafe seafood:

‘Everyone has to have traceability now. Without traceability you can’t, certainly be involved in the UK retail business without traceability.’ Managing director, large company

[*Named major retailer*] ‘have to be absolutely scrupulous on the traceability of the product because if it was discovered that they got a product that’s come from an unsustainable source or perhaps the ethics surrounding people catching the product or rearing the product, they would have serious repercussions on that.’ Trade organisation representative 1

And from another referring to wholesale customers:

‘The major ones who are going into retail would probably do an annual audit and check our traceability.’ Site manager, medium-large company

There were also answers from companies dealing directly with retailers which indicated a more direct exercise of governance functions in their traceability requirements:

‘And it is because of our shall we say our major customer [*a supermarket chain*] that we developed the traceability just over a year ago where we can now trace back all batches of fish, all batches of cod and haddock that is at the moment, back to the catch area, the catch period, the trawler which goes into the port of first landing.’ Technical manager, medium company

‘Traceability is paramount for us because we work with [*named major retailer*]. They will expect us to have full traceability backwards and forwards for all our processes.’ Head of operations, large company

But this needs to be contrasted with other customers who were uninterested in traceability. Chef awareness was reported as ‘very low’ by one (Group director, large company), of fish fryer customers ‘nobody’s ever asked’ said another (Managing director, small company 3) and generally in relation to foodservice it was ‘not on traceability no, price is more the thing’ (Manager, trade organisation 1), while from someone whose main sales were to fishmongers ‘if they want it it’s there but most of them don’t give a damn’ (Fish merchant, small company).

For many companies legal requirements for food safety and traceability were only part of their aims and the standards to which they worked. Instead, quality was the top objective. In order to achieve it they first aimed to exercise control over the raw materials they bought. Much of this was about relationships with suppliers:

‘The quality is not really, why is it not an issue? Because we work with suppliers we’ve known for a number of years or we work with new suppliers who we’ve inspected their facilities, we agree a specification with them.’ ‘We audit our suppliers four times a year, whether that be European suppliers or Asian suppliers.’ Commercial manager, medium-large company

‘The business has been built on building, identifying first of all the right kind of suppliers that can give us not only the volume that we need at the price we need but also excellence in quality.’ ‘We also have a raw materials technical team which focus very heavily on the product we are buying. So we have a lot of supply based auditing that goes on. ‘We get very involved with fishing fleets, helping them to improve quality through better handling methods. And also it’s about having a very, very tight specification.’ Managing director, medium-large company

‘We also have quality systems and auditing that goes back into, down our supply chain. So we will work with our suppliers, we visit them, they operate to quality standards, we educate them.’ ‘We sort of, almost train if you like our supplier’s technical people into what we expect, what our standards are.’ Director, large company

These three quotes are from larger companies with fairly sophisticated arrangements. Here firms were implementing their own systems of governance in relation to their suppliers. None referred to the Seafish Responsible Fishing Scheme or the other formal systems for improving quality on board mentioned in section 5.3 but they may not have been sourcing from the UK.

Small companies did not refer to audit systems as such but were just the same making clear what kind of quality they expected and working with suppliers on a long-term basis:

‘We have the choice of which boats to purchase off, depending on what orders we’ve got and what the quality requirements are.’ Managing director, small company 4

‘The suppliers that have come from historical usage and reputation, reputation means a lot.’ Depot manager, small company

‘Yes the quality, they know what we need. If I don’t get the quality, it just goes straight back. That’s the way it works.’ Managing director, small company 3

Secondary processors might refer to their own internal quality systems (but it must be noted that most comments on quality were about the raw material):

‘We have a significant system of quality management actually in our factories.’
‘Every intake, we would take of fish, whether it be fresh or frozen form or prawn, some sort of testing things like intrinsic quality, everything gets tasted, there’s a sample taken from every batch that we take in is tasted so that an organoleptic assessment goes on everything that we do.’ Director, large company

‘I’m an independent checker of all the lines. I go to every line, as often as I can. Make sure that - today they’re on chunky, cod. So first thing I do is go to the raw material, make sure it is chunky cod. Look at the quality, visually, that’s all you can do. Does it look OK. Colour OK? I need to check that all correct batter, crumbs, in place. We have to do checks on fish content all the time. Really important on frying line, that right amount of batter and crumb is on the product. Make sure it’s all looking fine.’ ‘I do taste panels every day, whatever is produced.’ Quality assurance assistant, medium company

The companies of course responded to the quality requirements of their customers. These differed between sectors (supermarkets, fishmongers, foodservice) as well as between individual purchasers and were related to price. The differences illustrate the relativity of the idea of quality:

‘It’s like any type of manufacturing business, when you talk about the middle of the supply chain, the processing of seafood, customer specifications dictate not only quality but price. Not all fish quality is the same, not all shellfish quality is the same but the price isn’t the same either.’ Industry advisor, trade organisation

‘There are customers of ours at the lower end of the market, so they’re wanting a cheap, a volume and low price, rather than a smaller volume and a high quality.’ Trader, medium-large company

‘There are choices. There will be people who are totally focussed on the cheapest cost of production of an animal and people who care about how it actually eats and getting to those two different places is completely different.’ Production manager, large aquaculture company

‘Our customers are all pretty good, fishmongers. Not like dealing with the supermarkets, the quality is secondary, it’s price-driven. These guys we deal with don’t mind paying for the fish. They understand better fish costs more on the market.’ Fish merchant, small company

‘The restaurants we supply are the top, top restaurants, mostly Michelin star restaurants, we supply. Obviously the head chefs are very demanding on the quality that they get.’ Director, small company

Quality as the primary criterion for sourcing, followed by price, was a consistent finding in the series of Seafish processor surveys. But as noted in one of them it could be interpreted as processors seeking the level of quality relevant to their own business and customer base (Brown A 2009).

Different definitions of quality could be relevant within the major supermarkets that each have a range of own-brands from the economising to the premium, but also between different chains targeting different points in the market. One interviewee whose company manufactured for a retailer at the higher end reflected certain expectations in the statement that the latter goes for quality 'so we ensure the material going into the meals is the best' (Technical manager, large company). However, another one whose company manufactured for a discount chain but said his opinions were based on what people who supplied other retailers told him, was of the view that:

'...there isn't a huge amount of difference in quality, the quality required of all the major supermarkets, even down to [*named discount chains*] who people see as being cheaper so they expect to be low quality. In actual fact, often the opposite applies; you're getting a cheaper product at a quality that is sometimes much better than shall we say the standard supermarket product'
Technical manager, medium company.

There are ways of bringing down price by lowering quality which clearly are acceptable to some customers as described by some of the interviewees. Fillets of whitefish for breading may have been frozen in a block rather than the better result obtained by freezing them individually. Prawns sell more cheaply if glazed with water. Pangasius is soaked in varying concentrations of phosphates which add weight meaning that 'It's selling you water really' (Managing director, large company). The recent EU Regulation 1169/2011 mentioned above which requires identification of water additions to fish may cause change in some of these practices.

Some companies were in a position to set their own quality standards even if they were suppliers to the major retailers as was the case with both of the following:

'We only make one type of kipper. We pride ourselves it's the best quality. It's not the cheapest. There's a lot cheaper ones going around.' 'So the quality aspect is, we maintain the quality, it's purely we drive our customers, we're not customer driven in that respect.' Director, medium company 2

'Clearly if we're doing our own brand ..., we would set our own quality level.'
Director, large company

The second of these quotes makes the distinction between manufacturing supermarket own-label products and their own. But for some firms the former was definitely dominant; in the words of one respondent 'We mainly live and breathe the brands of our customers' (Managing director, medium-large company). Major retailer customers set standards for their suppliers. Even the kipper producer just quoted had to make changes to conform: 'Then he came back up with a food hygienist who said we need to do this and need to do that', an example being the replacement of traditional wooden tenter sticks used to hang up the herring in the smoking kiln with ones made of stainless steel. Another referred more generally to the standards expected: 'Their demands in terms of the quality of the finished product are based on the fact that customers perceive they are buying the best products in the market' (Technical manager, large company).

In line with the picture in some of the literature outlined in chapter 2 describing the way food producers can be controlled by the standards set by major buyers, this applied to some of the research participant companies, the demand being for accreditation in the British Retail Consortium (BRC) scheme. This was noted as having requirements markedly more stringent than legally needed. The expectation of standards so far beyond legal requirements has been explained as being due to uncertainty as to how the 'due diligence' required in the 1990 *Food Safety Act* would be interpreted by the courts (Caswell JA & Henson SJ 1998).

'A lot of companies that we would want to deal with, before you can deal with them, what is your BRC. Traditionally it was BRC standard, a few years down the line it was the EFSIS standard because EFSIS was the first company to start auditing against this standard. It's now, in its latest, in the past 12 months or so it has changed its name to the Global Food Standard. It is a world-wide food standard. So anywhere in the world, if we want to produce for a supermarket chain in the United States, they would say to us what

accreditation have you got, we've got grade A Global Food Standard, and they would know straightaway what standard your factory is.' 'The majority of our customers now, in retail unless you've got BRC accreditation preferably at grade A or grade B is acceptable, you're not going to manufacture in this day and age for a major supermarket or to some degree the major players in the foodservice, particularly the pub groups.' 'You can't get even the grade B accreditation without having a much higher standard than the law actually requires.' Technical manager, medium company

'The BRC which is their [*supermarkets*] own system, they made it that much harder last year for people to get a grade A.' 'Generally what the biggest supermarkets want us to work to, is far higher, far exceeds anything the FSA or any other government agency for that matter, wants us to work to. In that respect you could say we're lucky, they have raised our game and the supply basis game.' Commercial manager, medium-large company

Other interview responses mentioned accreditations either in the BRC system or other certifications without linking them to specific customer demand:

'All our depots have BRC A grade higher accreditation which gives peace of mind to our customers and ourselves, so that we can sleep at night.' Group director, large company

'The company is accredited to a thing called Label Rouge which is in France, which is the highest thing you can get there. We're accredited to ISO 14001. We're accredited to PGI which is a geographical index. We're also accredited to SSPO [*Scottish Salmon Producers' Organization*] which is the industry code of practice.' 'We then have various individual accreditations to certain companies.' Managing director, medium-large aquaculture company

The BRC Global Standard for Food Safety, introduced in 1998 as a British initiative and now used globally was in its fifth 2008 edition at the time of the interviews and subsequently the sixth issue has been produced; covering quality management as well as food safety management it requires HACCP on Codex Alimentarius principles and sets standards for buildings, product control, process control and personnel. Third party auditing is intrinsic to the scheme (British Retail Consortium 2008; British Retail Consortium 2011). In the meantime EFSIS (the European Food Standards Inspections Service), mentioned in one of the above quotes, has been absorbed by an international third party certification company, its functions largely superseded in Britain.¹³³

Seafish has also taken a governance role by using certification to improve quality in the processing and wholesale sectors in addition to the Responsible

¹³³ EFSIS is owned by Sai Global.

Fishing Scheme discussed in section 5.3.¹³⁴ In 2002 it launched the Seafish Quality Processor Award with three year spending of nearly a quarter of a million pounds allocated to establish the scheme and assist applicant companies. The press release announcing the award included a supportive statement by a major processing company saying it would be encouraging its own suppliers to participate. With independent auditing, the scheme covered premises, equipment, hygiene standards and management controls. It continued for eight years until withdrawn in September 2008. Subsequently the similar Seafish Quality Wholesaler Award covering distributors and wholesalers was established in 2005 covering the same areas as the processor one and similarly with an entry and a higher level and with third party auditing; it too has now ended.¹³⁵ As re-assessments under the various schemes showed improvements in standards they can be seen as having achieved their purpose (Oehlenschläger J & Harrison D 2003). Seafish now supports a generic award for small producers, the Safe and Local Supplier Approval (SALSA) scheme.

While the customised awards have ended Seafish is promoting quality in other ways, by publication of guidance and particularly through the Seafood Training Academy, a partnership together with another trade body and four training organisations.¹³⁶ Programmes include food safety, bivalve handling and

¹³⁴ An earlier quality mark scheme for seafood processors and distributors is reported to have been funded in the mid-1980s (Goulding I 1985) but no further information about this has been found.

¹³⁵ Information about the processor scheme at its launch is in www.fishupdate.com, under heading 'Major new quality award launched for processors', 4 September 2002 and in an item headed 'UK: new award marks quality seafood production' dated 5 September 2002 reproduced in the www.just-food.com website, both accessed 3 December 2012. The wholesaler award is described in www.worldfishing.net on 25 January 2005 under heading 'New award marks quality seafood production'. There is no longer any information about the schemes on the Seafish website.

¹³⁶ See Seafish publications: *An Introduction to HACCP in the Seafood Industry* and *Good Manufacturing Practice Guidance: Shellfish Cooking* and guidance sheets on hygiene and contaminants. The Seafood Training Academy seems to have been formed in 2007 (that is the earliest mention of it in *The Sea Fish Industry Annual Report and Accounts 2007/08*) and the teaching partners are: Billingsgate Seafood Training School, London; Grimsby Institute of Further and Higher Education; North West Seafood Training Centre, Blackpool; Workington and the Seafood Training Centre North East, Amble; and for specific courses the National Federation of Fish Friers. Of these organisations, some are part of the further and higher education system, others industry based, with diverse funding arrangements.

depuration, and fish quality assessment and can lead to nationally recognised vocational qualifications.

The Seafish processor 2008 survey, the closest in time to the research interviews, found that nearly half the sample companies were accredited, either to the BRC standard or to the Seafish Quality Processor award. The large firms, with a single exception, were BRC certified and so were many of the medium-size concerns while small companies were less likely to be accredited and if they were, it was to the Seafish scheme (Brown A 2009). Seafish had previously estimated that 60% of British seafood processors, based on trade volumes, were accredited to the BRC, EFSIS or both which may be considered compatible with the survey findings when taking into account the size of the large companies (Archer M & Denton JW 2002).

None of the interviewees mentioned the Seafish processor award (which by the time of the research was no longer in existence) but there was a wistful reference to the wholesaler one from someone who went on to describe efforts to prevent the scheme from ending, even by making financial contributions, but in vain:

‘One of the best things that Seafish did was introduce the wholesalers’ quality awards scheme which we got. You’re audited and temperatures, all the controls, everything else in place, traceability la-di-da-di-da, everything is audited and we got it and we put it on all our wagons and we were dead chuffed because this lifted us out from the people, some of the people who we compete against.’ Chairman, medium wholesaler

Sustainability was not mentioned explicitly as an aspect of quality by the respondents but one firm was a member of the Organic Food Federation and five of the interviewees mentioned selling MSC certified products or being accredited to its chain of custody. One indeed said his company was the world’s leader in terms of MSC foodservice products. A check of certified suppliers on the MSC’s website in 2012, that is about three years after the interviews, found that nine of the interview participant companies had a valid chain of custody certificate, four of those involved at the earlier time and five which seemed to have joined subsequently. This would appear to illustrate the

growing commercial importance of MSC certification, with most of the larger companies but none of the small ones drawn into the scheme by the later date.

Demand for other forms of accreditation could extend to companies' own suppliers and further through the whole supply chain as simply: 'All our suppliers must have BRC, must be BRC approved' (Commercial manager, medium-large company). Others explained further:

'So if a company has got BRC accreditation one knows that that company has got all the things like pest control and quality control in place.' 'Because we're doing raw materials for further manufacture, those companies insist on a supply chain that includes BRC accreditation all the way through.' Site manager, medium-large company

'We are increasingly asking our suppliers to also get accreditation against the Global Food Standard and that is right through to packaging, even distribution. There's a Global Food Standard for distribution of frozen foods. So we can use hauliers, which we know the hauliers then would all use clean wagons, they would have temperature control on the vehicles, they would have a policy if a lorry broke down of uplifting the frozen product without losing it and it would certainly satisfy us and give us some guarantees that the companies we were using are operating to a standard in their industry which is equivalent to our standard in our industry.' 'Increasingly the production factories we use in China are also getting the Global Food Standard accreditation.' Technical manager, medium company

As has been seen, companies which supplied the major retailers had more conditions to satisfy, particularly the requirement for accreditation, and they were aware that their traceability arrangements had to work perfectly. But the interviewees did not give the impression that these conditions were experienced as onerous and a burden, simply that they represented the way companies like theirs had to function under modern circumstances. Of course conclusions cannot necessarily be read from silence as the research participants could not be expected to reveal commercial confidences. However, the impression received was that standards, however measured, were not experienced as a problematic issue.

This section has covered a number of themes relating to food safety and quality in the processing and distribution of seafood. First, it showed that standards at the start of the period being considered were poor and that through the 1980s and even up to the 1990s continued to be much less than

ideal. Second, it outlined extensive legislation which affected seafood processing, with clear objectives for better levels of food safety and for traceability. Third, it looked at how the seafood companies represented in the interviews thought about and aimed to achieve these required standards and noted much agreement about general improvements in the seafood industry. Fourth, it examined ideas about quality, their own in regard to sourcing and those of customers. Finally it considered formal methods used for achieving quality or for being rated as achieving certain standards through various accreditation systems, the BRC scheme being the most important.

In considering influences on the companies' approaches to food safety, traceability and quality both state regulation and private governance have been reviewed. For the first two of these goals which are the subject of legislation, the regulatory factor seemed to predominate. Even for a big company supplying a major retailer the legal structures might seem pre-eminent: 'Our whole quality and processing framework is built round complying with the law and the various regulations that come with it' (Technical manager, large company). Quality, however, not specified legislatively, is rather governed by a range of informal and formal private governance arrangements. Some depended on long-term relationships and reputation. Companies with major retailer and other large customers were more likely to use a formal system and particularly BRC accreditation. However, the BRC standard itself has a focus on food safety; in practice quality is intertwined with food safety and requires traceability. It is not separate on a day-to-day basis as experienced by practitioners but these distinctions are useful analytically and show how different strategies may be used by different companies.

While all the companies felt the impact of legal requirements, for some the dominant factor was buyer expectations, whether from the supermarkets directly or via other companies who supplied them. Buyer demand for traceability and for specific accreditations were accepted. However, it was not these requirements but pressure on prices exerted with the force of their buying power that meant that some but by no means a majority of the

companies in the research experienced supermarkets' ability to exert force over their suppliers.

5.7 Supply Chain Relationships

Turning therefore to general supply chain relationships, it is in relation to prices that tensions with retailer customers are most likely to lie. The frankest comments came from two respondents who were not speaking as supermarket suppliers. One had, however, been in this position many years previously and had some unpleasant memories:

'We'd sit in their waiting room for an hour, too busy, can't see you; you get in there, all they want to do is squeeze price, all they wanted to do and it was just whether we could just somehow get away with what we could manage and still keep the huge volumes that we wanted to supply them.' 'They came back, said they felt they'd been uncompetitive in the market, therefore they were what's the word, retrospectively, modifying their purchase price to the Christmas price. And that's what they're paying us and because they had paid us for some, could we sent them a cheque for £80,000.' Trade organisation representative 3

The other gave these reasons for choosing not to be a supermarket supplier:

'I personally wouldn't touch them with a bargepole because we are too small to stand up to their corporate buying power and too small to make the investments that they need to see on site. We put our business in a position where we supply the suppliers to supermarkets.' 'We don't have the economic power, the bargaining power, the negotiating power to deal with the supermarkets direct. Not on any scale. I don't want to either. ... If you don't watch it with supermarkets, they can make so many demands of you and your premises and your business criteria, they're telling you how much money you're going to make.' Managing director, small company 1

The relative power positions of the major retailers in comparison with their suppliers was described by one observer:

'I think that anybody who deals with supermarkets, it's an uneven playing field, which the supermarkets ultimately determine. Obviously a company as big as [*named processing company*], they would take advice from them. But ultimately the supermarkets do the determination of what they want on the counter, a lot of that is based on the bottom line profit. They're not interested in fish as an item, they're interested in fish as a profit.' 'They [*supermarkets*] do tend to call the tune with all their suppliers.' Trade organisation representative 1

Three of the other interviewees conveyed something of their current experiences of dealing with supermarkets:

‘It’s a challenging environment, it’s definitely a challenging thing dealing with the supermarkets. Because they’re trying to get the best possible quality with all the integrity with all the great credentials. But they’re in an extremely competitive environment where every customer is high value to them and wanting to get the best possible deal so therefore the whole package of that pressure comes together.’ ‘To manage those relationships you need good people ... You need good people around you who can articulate their argument, people that are prepared to stand their ground.’ Managing director, medium-large company

‘Our biggest customer at the moment will challenge us all the time. It almost becomes laughable, are you sure that’s your best price, we want you to review this price, review that cost, look at this, look at that..’ Commercial manager, medium-large company

‘It is a straightforward economic power issue. They’re very, very difficult.’ ‘I often say that when account managers have come out after a bit of a battering from one of the retailers, ... they may have the majority of the deck of cards but they don’t have all of the cards actually. It’s not an equal relationship, there’s no doubt about that but there are things that we can do. And they’re very, very tough. They’re extremely tough and pretty sophisticated in the way they have developed it over the years.’ Director, large company

In the view of the respondent who had avoided direct supply relations with retailers there was a saving grace in that the seafood industry was not entirely dependent on them:

‘Fortunately in this country and in Europe you have independent fish markets, which are like fish exchanges. Boats catch the fish, they tend to put it into a port and it tends to be free competition that applies to the buying of it. Where supermarkets get reviled is where they get a iron grip on supply and they can never quite get that iron grip on the fishing industry. They don’t get the opportunity to really go overboard to the point of destroying their suppliers. I don’t want to quote actually what I know about how they work. Suffice to say that the free market of auctions is a shield against the worst excesses that big buying groups could put on the industry if they were given a free run to do it. They could do.’ ‘If the supermarkets don’t play ball with the price they don’t get much fish. So they have to. So there’s a nice balance at the moment.’ Managing director, small company 1

This balance of forces and the particular position of some companies could allow them to take a relatively independent stance in their dealings with supermarkets, positions that resulted from the choices made by such senior managers who might assess the value of business offered against other considerations:

‘Because we’re a privately owned company and we’re debt free, we’re in a very lucky position that we can say no; lots of other people can’t. And we’re small enough to be able to restructure if we lost a chunk of business.’ Commercial manager, medium-large company

‘We’re trading now with [*named supermarket*]. I’ve built that business with [*them*] in the last five or six months. We’ve been talking to them for two years so we didn’t just jump into bed with them. It’s been a long steady dialogue. And we’ve stuck to our principles and really they’ve come to us now because they recognise that.’ Managing director, medium-large company

‘You give them an equally hard time themselves. ... We’ve actually told in the past [*named retailer*] to bugger off, and they came back a few years later. Because at the end of the day if you’re selling a quality product with all of the provenance that we can give it, then if they want to try and strangulate the business, the best thing to do is to tell them to bugger off. Because as the industry gets smaller they need us probably more than we need them now.’ ‘[*Supermarkets are*] a big part of our business, they are. But would we ever let them control us, no we wouldn’t. There are other companies out there that have no choice, they have built businesses to serve multinationals.’ Partner, medium company

These various interview excerpts confirm that supermarket power is an important factor in the seafood supply chain, as in the food system generally. But they also indicate that industry conditions as well as the situation of specific firms and the reactions of those running them can place limits on that power. Here the model of four types of relationship put forward by Cox and his collaborators and discussed in chapter 2 is very relevant. In relationships between supermarkets and suppliers the situation may usually be that of the dominant buyer but it may sometimes be one of at least a measure of interdependence, as with a couple of the interview companies which felt that they were the ones giving greater priority to certain standards above price, or because of supplier size as with the large brand processor. The latter in turn may be the dominant supplier for example in relation to small retailers who only stock frozen seafood or when provisioning the foodservice market. Elsewhere in the supply chain, many relationships can probably be characterised as of either independence or interdependence between smaller processing companies and smaller retail and catering industry concerns.

A key criterion of supply chain relationships is relative levels of profit, highlighted in the Cox and collaborators’ studies. It would not have been possible to include an analysis of relative margins of the companies

interviewed for this study because of both access and technical limitations but there were a few comments in the interviews related to profitability. One person who had referred to the financial pressures exerted by the supermarkets said that business with them was still relatively profitable compared to supplying the catering sector because 'We would tend to compete against lots more small companies in the foodservice area whereas in retail it tends to be three or four big companies on the majority of items' (Director, large company). This indicates a certain balance of forces between the multiples and their main suppliers. On the other hand, echoing findings in the Seafish processor surveys reviewed in section 5.5, two interviewees talked about low margins:

'If you look at our accounts you will see that we're making a profit of just 1%, and that's in a good year, and that's before tax, 1%.' Chairman, medium wholesaler

'So it's not a high margin industry. As a business we've made 2% operating margin for the last three years. We had aspirations to be making 5 but even at 5 if you compare that with big branded manufacturers who own their own relationship with their customer, with their own customer which is the consumer. We don't have that luxury.' 'I think commercially, the margins, the difference between making money and losing money in the industry are so fine, the margins are so fine. Really the successful food companies in the UK are the people who manage to control every element of their business in the right way and the sum of all those small parts equals the profit.' Managing director, medium-large company

However, the second of these two respondents also explained that fresh fish wholesaling, by contrast, could be profitable if carried out by small firms with very low overheads:

'It's a lower margin business, you're selling in bulk.' 'So some people might be happy to shift that fish on 5% if they've got an operating cost of 2%, they've got 3% profit margin. So £5 millions worth of fish a year they quite happy with that that, a hundred and fifty grand, administration cost and they've made themselves a hundred grand. There are plenty of people happy to trade on that level.' Managing director, medium-large company

In another view, processors were still at an advantage compared to those doing the fishing:

'If you are a processor, ... you may decrease your margins to accommodate some of those costs by reducing the price you pay for raw material and when you start doing that, that's when your fleet starts to have problems. Because

they cannot pass on their increased diesel fuel costs, capital costs on to anyone. They are dependent on what market price they can get.' Industry advisor, trade organisation

These impressions can be compared with the British value chain analysis of three species outlined in chapter 2 which found that processors often took a low proportion of the added value of their input but that they did make a higher percentage on some items like fish fingers and frozen coated scampi (Sandberg MG, Gjermundsen A, Hempel E, Olafsen T, Curtis HC, & Martin A 2004). It appeared from this account that except for the two specified products, processors were often at a disadvantage to both the retail and foodservice poles of the supply chain.

The previous section described supply chain relationships from the viewpoint of securing safety, traceability and quality and showed the impact of requirements from large customers, particularly the major retailers. This one has focused on other aspects of relationships between the companies interviewed and the much larger and economically more powerful supermarkets. The power imbalance could make dealings difficult for the supplying companies but some nevertheless had the resources to maintain a level of independence and insist on certain conditions of their own.

5.8 Governance and Seafood Safety and Quality

This chapter like the previous one has been an account of extensive change in the seafood industry. Here the topic has been the development of greatly improved standards of hygiene, food safety and quality of the product. The governance mechanisms in play are listed in Table 5.1, mainly legislation (summarised on the basis of key topics) and standards schemes and indicating the governance source of each entry and its purpose for each of the two production sectors, fishing and farming, and then for processing and distribution. It lists all the schemes mentioned in this chapter including ones that have ended.

Table 5.1 Governance Relevant to the Safety and Quality of UK Seafood

Vessels

Governance Type	Detail	Governance Source	Purpose
Legislation	EU directives on hygiene rules and marketing seafood & UK fishery food safety regulations	EU & UK	Common market & food safety
Legislation	EU regulation on food safety and UK food hygiene regulations	EU & UK	Food safety
Standards scheme	Seafood Scotland Vessel Quality and Hygiene Scheme	Seafood Scotland	Improving quality
Standards scheme	Responsible Fishing Scheme	Seafish	Improving quality
Standards scheme	White Fish Quality Improvement Initiative	Shetland Seafood Quality Control	Improving quality

Aquaculture

Governance Type	Detail	Governance Source	Purpose
Legislation	EU directives & UK regulations on feed and animal slaughter	EU & UK	Animal welfare
Legislation	EU Regulations on organic aquaculture	EU	Organic standards
Guidance	FAO guidelines on aquaculture eco-labelling	FAO	Eco-labelling standards
Standards scheme	Tartan Mark	Scottish Salmon Growers Association	Premium positioning/ marketing & environmental protection
Standards scheme	Code of Good Practice for Scottish Finfish Aquaculture	Scottish Salmon Producers' Organization	Premium positioning/ marketing & environmental protection
Standards scheme	Salmon Quality Assessment	Shetland Seafood Quality Control	Premium positioning/ marketing & environmental protection
Standards scheme	Freedom Food	RSPCA	Premium positioning/ marketing & animal welfare
Standards scheme	Label Rouge	National Commission for Labels and Certification (France)	Premium positioning/ marketing

Standards scheme	Scottish Quality Trout	Scottish Quality Trout	Premium positioning/ marketing & environmental protection
Standards scheme	Quality Trout UK	Quality Trout UK	Premium positioning/ marketing & environmental protection
Standards scheme	The Aquaculture Standard	GLOBALGAP	Quality, sustainability, safety, traceability, buyer requirements
Standards scheme	Best Aquaculture Practices, multi-species standards	Global Aquaculture Alliance/ Aquaculture Certification Council	Quality, sustainability, safety, traceability, buyer requirements
Standards scheme	ASC species specific standards	Aquaculture Stewardship Council	Quality, sustainability, safety, traceability, buyer requirements
Standards scheme	Salmonids/Gadoids/Bivalve Molluscs Standards	Organic Food Federation	Organic standards
Standards scheme	Soil Association Organic Standards Aquaculture	Soil Association	Organic standards

Processing/Distribution

<i>Governance Type</i>	<i>Detail</i>	<i>Governance Source</i>	<i>Purpose</i>
Legislation	EU directives on hygiene rules and marketing seafood & UK fishery food safety regulations	EU & UK	Common market & food safety
Legislation	EU regulation on food safety and UK food safety/hygiene legislation & regulations	EU & UK	Food safety & traceability
Legislation	EU regulations on seafood labelling & UK fish labelling regulations	EU & UK	Common market & consumer information
Legislation	EU & UK regulations on disposal of animal by-products, EU directives & UK regulations on packaging and EU directive and UK regulations on waste water treatment	EU & UK	Environmental protection
Legislation	EU directives & UK regulations on imports from third countries	EU & UK	Food safety and animal health
Legislation	Regulation on registering fish buyers & sellers	UK	Fisheries management
Guidance	Codes of practice - hygiene generally & fish	Codex Alimentarius	Food safety & trading standards
Training	Training/qualifications for food processors	Seafood Training Academy	Quality & food safety, individual development

Standards scheme	Global Standard for Food Safety	British Retail Consortium	Food safety, quality & satisfying due diligence for buyers
Audit	Company specific systems	Seafood Companies	Quality of raw materials
Standards scheme	Quality Processor Award	Seafish	Quality & food safety
Standards scheme	Quality Wholesaler Award	Seafish	Quality & food safety
Standards scheme	Safe and Local Supplier Approval	SALSA	Food safety
Standards scheme	European Food Standards Inspections Service	EFSIS	Food safety & quality

General

Governance Type	Detail	Governance Source	Purpose
Legislation	EU Protected Food Name legislation	EU	Food authenticity and marketing

Source: Author

It is clear that there is a considerable amount of legislation at work particularly affecting the processing sector. This regulation has been concerned with a range of public objectives including facilitating the common market, food safety, animal welfare and environmental protection. Facilitating the common market is an objective that also benefits many private interests, though perhaps disadvantaging others less well able to compete.

While the activities of the two primary production sectors are highly regulated in many respects as shown in the previous chapter, this applies much less to what they do in relation to food safety and quality with two exceptions: bivalves must either be cultivated in sufficiently clean waters or subsequently purified while for the fishing side there is specific hygiene legislation relating to vessels.

In practice the bivalve rules are closely followed but the boat hygiene specifications do not seem to be monitored for much of the UK fleet. Quality onboard has been pursued through voluntary schemes, the most important being the Responsible Fishing Scheme, organised by the quango Seafish in its publicly mandated role of supporting the industry, the other two managed by an industry body (Seafood Scotland) and an independent company (Shetland Seafood Quality Control) respectively.

Turning to aquaculture, the standards schemes fall into three groups. For the highly organised salmon farming industry, producers have through their trade organisations determined their own quality standards by self-producing codes of practice and for a period while the Tartan Mark was in operation even their own certification scheme. Trout farmers have followed suit with their own programme. The salmon farming industry has also chosen two other forms of certification, Freedom Food and Label Rouge. All these activities, though including provisions for some public interest and ethical aims such as environmental protection and animal welfare, are essentially marketing-driven and connected with the orientation of the Scottish industry, as noted earlier, to self-positioning as the provider of a premium product. A second group consists of general aquaculture schemes (in some cases containing species-specific standards) produced by bodies which are constituted as alliances of wider groups of stakeholders, involving not just primary producers but other seafood companies, retailers, food service and in the case of the ASC (Aquaculture Stewardship Council) also NGOs. Their schemes have a number of objectives covering quality, safety, sustainability and traceability but a fundamental purpose is to produce products that will suit the requirements of buyers, whether in retail or foodservice. A connected aim is to deflect criticism about environmental impacts. This second group has impacted on the UK seafood supply chain only via imports and to an unknown extent as there is no documentation but with the ASC's development and its consumer-oriented logo this may increase in the future and become more publicly transparent. Finally in the third group, organic standards bodies form another category, promoting and safeguarding this market sector within the relevant legislation. The FAO guidelines have certainly affected the second group and possibly the others as well.

In the processing sector the private schemes stand on an extensive regulatory underpinning which at some level has taken into account the international Codex Alimentarius guidelines. In addition, there is wide use of and indeed requirement for BRC certification as several interviewees remarked. Of the other general schemes noted, SALSA is geared to smaller companies that

either do not wish to undertake BRC accreditation or do not consider that it would be commercially justifiable to do so and EFSIS which seems to have been largely superseded by the BRC system could fulfil a similar role. These were for defined periods supplemented by the two Seafish schemes aiming to improve quality and safety in the service provided by processors and wholesalers respectively. Seafish is also a partner in the Seafood Training Academy together with four training and education organisations. In addition to specific schemes, many interviewees referred to a range of formal and informal auditing arrangements which they or their companies applied to ensure the quality of raw materials they wanted from their suppliers.

A final governance institution is the protected names scheme of the EU which includes both primary produce and processed foods. Legislatively established and administered through national and EU systems, its objectives are largely about marketing and supporting small producers while any award made will be the outcome of private industry promotional activity so this institution could also be regarded as a mixed public-private governance arrangement. For consumers they also safeguard food authenticity but this does not seem to have been a material factor in the British supply chain in relation to the seafood items recognised in the system.

What this analysis shows is firstly the importance of state-led governance in the overall system; legislation for seafood safety, traceability and labelling has impacted greatly on processing and distribution. Secondly, it indicates that contrary to the trend of discussion in much of the literature on standards in food chains, they do not all have a simple function. In part there is indeed conformity with the buyer-driven model in the increasing demand for BRC certification, the BRC clearly representing the interests of retail buyers. Also in line with a common pattern, this is becoming more compulsory than voluntary for certain parts of the market, judging by some of the interview comments. The other two general schemes have a similar purpose and SALSA as a joint venture of the National Farmers' Union, the Food and Drink Federation, the British Hospitality Association and the British Retail Association represents buyer as well as (agricultural) producer interests. But the seafood-specific

standards are industry driven, directly producer led in the case of the salmon and trout farming, otherwise by the quango Seafish (representing industry and a public interest) or by industry groups for the two dealing with Scottish vessels. They are about improving market position by meeting general demand for higher standards of quality and food safety rather than those of specific buyers and have not been created to satisfy specific purchaser requirements.

The research has also illustrated the differential impacts of public and private governance on different types of processing and distribution company. For smaller ones legislation is the dominating factor along with market expectations but for bigger enterprises directly serving large downstream concerns it is the private schemes that dominate. This is similar to findings elsewhere. Processing and distribution companies of all sizes must depend on the regulatory framework to ensure that general facilities such as auction halls and markets, although generally privately run, maintain food safety standards whether they use them routinely or only occasionally.

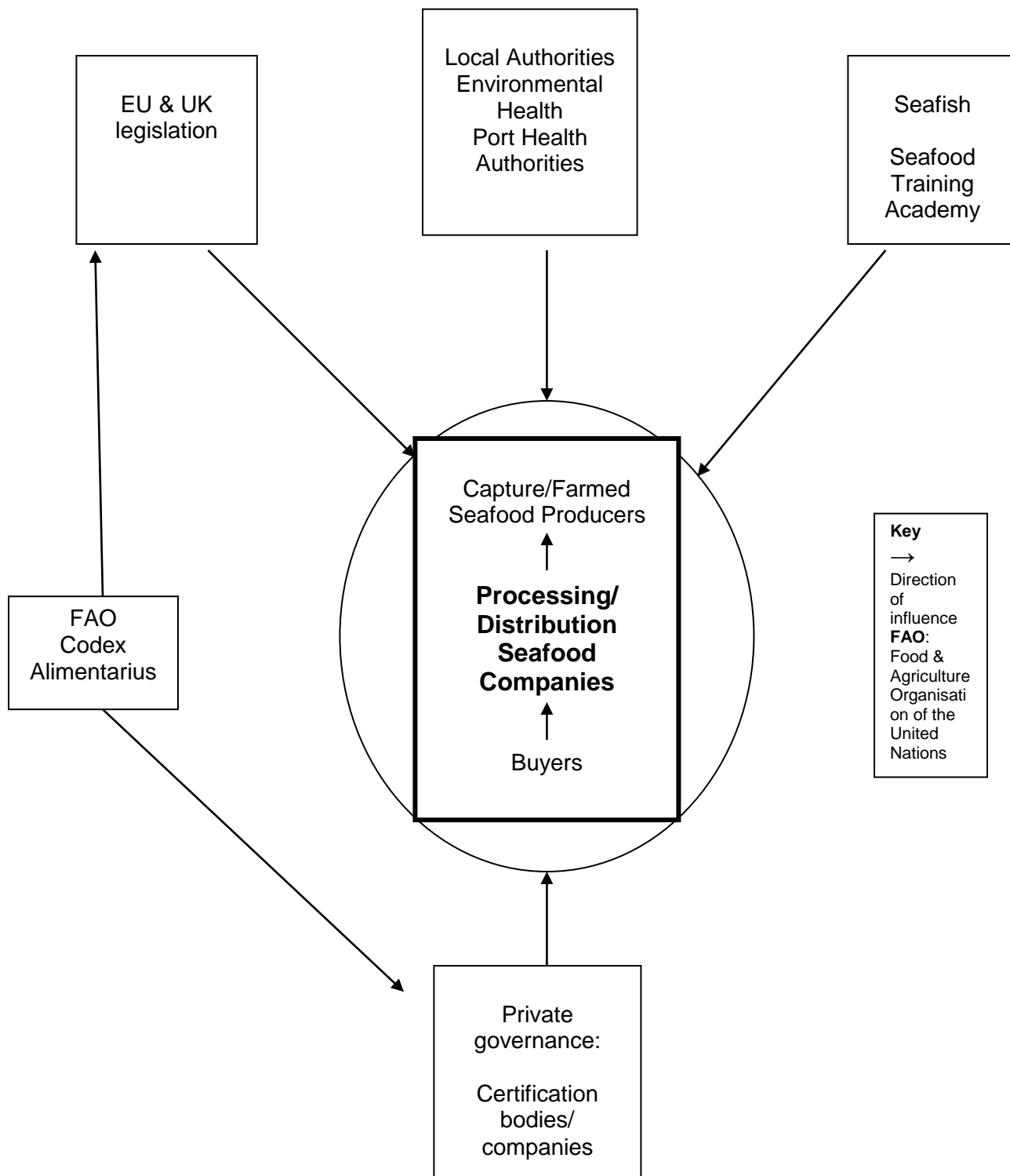
What has changed most is the net increase of formal governance mechanisms overall. At the beginning of the period reviewed there was no regulation for food safety and quality in the primary production side (with the minor exception of bivalve molluscs), which at the time consisted only of capture fishing, and the hygiene rules then in operation were apparently making limited impact on processing and distribution practices. Now there is some private and public regulation affecting production and a great deal that has changed the way processing and distribution companies carry out their activities. There has been an increase in and important impact of private governance but it has not replaced public rules. Rather, the latter deepened first and private schemes then built on and in various ways went beyond legislative requirements. The process has been one of change over time such as the increasing requirement for BRC accreditation and the implementation, then cessation, of the Seafish schemes for wholesalers and for processors.

However, all this public and private governance is part of what in the scheme set out in chapter 2 was categorised as external governance and there is a need also to consider governance within supply chain relationships as illustrated in figure 5.1. The overlap between internal and external is the private governance exerted by buyers when they require particular accreditations. But what the interviews also showed was that other factors determine what occurs inside the central box which are best understood in terms of the Cox power model with its four possible structures: dominant buyer, dominant supplier, independence and interdependence.

One feature of internal supply chain governance is the kind of long-term collaborative relationship posited by some of the other literature reviewed in chapter 2 as was illustrated by several interviewee comments referring to such relations with suppliers; that could mean that they themselves were dominant buyers if large, but in other cases were more likely to be those of interdependence. It also includes other relationships in which the interview companies were on the receiving end of dominant buyers, notably supermarkets, which wielded power not so much by their demands for certification which have increasingly become a performance norm but by the conditions, usually about pricing, that they set for business to be done. Even so, as one respondent commented, the buyers do not hold all the cards and certain companies were able to assert some level of independence by refusing certain terms even in relation to retailers hugely bigger than themselves.

But the account this far has not exhausted the governance factors in play. Supermarkets are themselves subject to some of these and the governance issues widen further when consumers are considered. These questions are picked up in the next chapter which moves on to the end points of the supply chain, that is retail, foodservice and consumption.

Figure 5.1 Governance Affecting Seafood Processing and Distribution Companies



Source: Author

CHAPTER 6: GOVERNANCE OF SEAFOOD CONSUMPTION, RETAIL AND FOODSERVICE

6.1 Introduction

In this chapter the analysis moves to the end section of the supply chain, looking at governance in relation to retail and foodservice delivery on one hand and on the choices and decisions about seafood made by consumers on the other. A major new influencing factor from the middle of the period under review was the development of nutritional knowledge about the benefits of fish-eating and the public health advice generated as a result. Consumers with their pre-existing socially and culturally formed attitudes to seafood were variably affected by the new message but it was a boon to the industry with scope for new governance action. At the same time the impact of general retailing change on the food system resulted in a range of new options for consumers which has co-existed with continuity of a key foodservice element in the form of the fish and chip shop. In both retail and catering sectors the industry and consumers alike were faced by the supply and sustainability dilemmas which were described in chapter 4 and reacted to them in various ways.

The research participants had varying perspectives on consumers, those with retail operations and the supermarkets from direct knowledge, others second-hand from their own customers or through a general understanding of what was happening in the industry. The result was a disparate series of observations. There were certainly some upbeat comments about seafood being seen as a healthy food and about consumer interest in provenance:

‘People are generally buying more fish, it’s more popular than it was because of the health aspect, because people are made aware of the health aspects of eating fish.’ Director, medium company 1

‘I don’t say that the majority of people but there is a much larger group now, a growing group of people who actually care about where their food comes from. We see this now, there’s a lot of pubs and restaurants actually showing the origin of their meat and we see it with fish as well.’ Manager, trade organisation 2

But negative perceptions were also reflected such as that ‘...there’s an awful lot of people eating no fish’ (Trade organisation representative 3) or that according to a survey of their customers many ‘were concerned about how to cook it and they didn’t want to touch it an awful lot’ (Category technologist, major retailer). Other views expressed about consumers included their desire for convenience, the impact of the recession and both conservatism and adventurousness in seafood choices. These themes are picked up in the section on consumer attitudes.

But first the scene is set by a largely statistical outline of consumption patterns. The chapter then shows how the public health message about seafood was developed before exploring the complexity of consumer thoughts on this subject and the many approaches used by those aiming to affect them, that is to exercise a governance influence. The final sections examine changes in seafood retailing and in foodservice and how governance is exercised both by these sectors on consumption and upon them particularly in relation to the challenge of sustainable sourcing.

6.2 Seafood Consumption Trends

Consumption of seafood in Britain has certainly changed over the years and this section describes what has been occurring and some of the social factors at work. For the overall picture Table 6.1 presents consumption at five-year intervals from 1945.¹³⁷

In the immediate post-war period there was high consumption, equivalent to an annual average of 13.5 kg per person but in the 1950s it started to fall. The decline continued in the following decades to reach a very low point in the mid-

¹³⁷ The term consumption is used conventionally as in the statistical series from which data has been taken which record purchasing; actual consumption would need to take into account factors such as cooking practices and wastage.

Table 6.1 Seafood Consumption 1945-2010 (Grams per person per week)

<i>Year</i>	<i>Fresh white fish</i>	<i>Fresh fat fish</i>	<i>Shellfish</i>	<i>Total fish and fish products</i>
1945	NA	NA	NA	261
1950	89	16	3	188
1955	90	11	3	169
1960	67	9	3	166
1965	64	7	2	164
1970	50	6	1	152
1975	37	5	2	127
1980	32	7	3	136
1985	29	7	4	139
1990	24	8	5	144
1995	20	10	6	144
2000	15	14	7	143
2005	19	7	5	167
2010	15	5	7	151

Sources: Author based on National Food Survey for 1945-2000 and Living Costs and Food Survey for 2001-2010, available at www.defra.gov.uk/statistics/foodfarm/food/familyfood.

The total column exceeds the total of fresh white fish, fresh fat fish and shellfish because it also includes tinned, frozen and cooked fish and other fish products such as fish fingers and prepared meals.

1970s when it was at an annual average of 6.6 kg. Thereafter consumption of seafood rose again to reach a relatively high point in the mid-2000s when it was up to 8.7kg but recently has fallen back again and at 2012 was at 7.5 kg per person. Within the national picture there are regional differences in consumption levels. This is the basic trend and an analysis using an index incorporating a price element has shown that to some extent it reflects replacement of greater quantities of the cheapest types of seafood, herrings and low quality white fish, by smaller quantities of higher value items (Reid C 2003).

More detailed information about seafood categories is available for the period from 1975 onwards and is illustrated in Figure 6.1 (page 291). With this detail

a more dramatic picture of change in household consumption over the last thirty-five years can be seen. The greatest growth has been in the category 'ready meals and other fish products', particularly from around 2000. The purchase of white fish, including both fresh and frozen, has plummeted and fish takeaways have tended to fall while tinned fish has risen through much of the period but reduced recently. Positive development has been seen in the steady growth of salmon (fresh and frozen) and shellfish. Other oily ('blue' in the statistical terminology) fish showed a more modest increase from the late 1990s to the mid-2000s but has gone down slightly since then. The 'ready meals' development of seafood is similar to the general trend for convenience seen across the food system and associated with broad social changes, particularly the participation of all adults in the labour market (Fofana A 2001).

One element in purchasing pattern shifts is response to price movements. Some of the research interviews reflected this awareness:

'With the economy the way it is people will not go and spend money on bass fillets and turbot fillets, expensive things but they will buy a fish pie that has got loads of fish in it but not expensive fish.' Director, medium company 1

Demand for fresh fish is relatively sensitive to price changes and income (Department for Environment 2001;Fofana A 2001). The early 1990s recession reduced the market for fish generally and has been specifically documented for salmon and trout (Seafish 1999;Shaw SA & Egan DN 1996). Analysis of the impact of price rises between 2007 and 2012 shows that fish was one of the foods bought less and also traded down (cheaper products purchased within a food group) (Department for Environment 2013). At the same time expenditure on fish as a proportion of spending on food gradually increased over the decade 2001 to 2011 from 4.3% to 5.2% suggesting that cost has been a reason for the slight reduction in consumption seen since 2006 (Elliott M, Hargreaves J, & Pilgrim S (Eds) 2012) though the above argument about trading up in quality may also be relevant. A full historic analysis of the impact of price changes on seafood purchasing would be a major undertaking beyond the capacity of this project but it should be borne in mind that this is one of the factors at work as fish is always in competition with other sources of protein.

Thus the perception reflected in some interview comments that sales of fish were increasing needs to be contextualised. It could be a reflection of particular market segments that certain companies serve or the result of general population increase even if per capita consumption is not rising. In addition the interviews took place at a particular point in the economic cycle when the downturn had begun but had not yet entered the recessionary phase which might be about to have greater impact on food purchasing decisions.

Furthermore, consumption averages gloss many social differences. To illustrate this, three variables have been selected using the more detailed breakdown of seafood types available since the 2001 change from the National Food Survey to the Household Expenditure and Food Survey, subsequently replaced by the Living Costs and Food Survey and shown on Figures 6.2 to 6.7b grouped at the end of the section (pages 292-301). The (website) published data restricts the ability to produce long time series because of various definitional changes.

In what follows, it must be remembered that the categorisation hides as well as reveals what type of seafood was being consumed. The 'white fish' group refers to what has been bought fresh, frozen, smoked, dried or salted but in addition it is likely that most takeaway fish and much in the 'ready meal and other fish products' group (abbreviated to 'ready meals') also consists of white fish species. Fresh and frozen salmon have been given a separate category, 'blue fish' covering other oily fish but also smoked salmon. 'Tinned and bottled fish' consists of a range of species with different nutritional qualities (generally abbreviated to 'tinned fish' on the charts). A separate issue relevant to reading the information is that year to year differences to some degree may be sampling effects.

The first factor examined is age as shown in Figures 6.2, 6.3a and 6.3b (pages 292-294). Looking at total consumption by age group from 1979 to 2000, three distinct bands appear, the lowest levels corresponding to the youngest age groups and conversely older groups having consumed the most with a middle-

aged group in the middle. The other two graphs give profiles of the different types of seafood consumed by each age group in 2001/02 and then in 2010. The point to emphasise is how different the patterns are for each age group in each of the years and also between the two years; for example the white fish category was a much higher proportion of the consumption of older groups in 2001/02 while for young ones it was tinned fish and ready meals whilst in the later years ready meals had become the largest item for all groups but the two older groups, while still favouring white fish, were also taking more salmon.

The second factor is income, shown on Figures 6.4, 6.5a, 6.5b and 6.5c (pages 295-298), Quintile 5 being the highest income and Quintile 1 the lowest in each graph. There are similarities between the overall picture shown in Figure 6.4 for each of the years 2001/02, 2005/06 and 2010 but certainly not a simple income gradient; the two lowest together with the highest income groups having larger consumption than the two middle groups. The seafood type breakdowns show that the highest income group consistently took more salmon, other oily fish and shellfish but people in the lower income category consumed more fish ready meals, while tinned fish was eaten by all groups. White fish had dropped in the later years compared to 2001/02 but as noted, might well have been eaten in the form of ready meals.

The third social variable analysed is the difference made by whether the household includes one or more children. Figure 6.6 (page 299) demonstrates that children in the household were associated with much less seafood eating than in adult-only households. Within seafood spending, households with children consumed a higher proportion in the form of ready meals and tinned fish while those without took more in forms which would need cooking from scratch as Figures 6.7a and 6.7b (pages 300-301) show.

These social factors have been echoed in specific research on consumer characteristics. A survey carried out in the early 1990s found that purchasing was strongest in the older age groups with younger ones more likely to go for tinned or frozen options than for fresh fish; the socio-economic breakdown

showed all groups buying fish with the AB group getting relatively more canned and frozen fish (LeGrand L 1992).

To summarise what can be learned from these analyses, it is that social factors affect seafood consumption in complex ways. They suggest that for many people, the quantity and type of seafood eaten will alter over the life course in accordance with changes in age, income and whether children are living in the household. Further, seafood is a category that covers a great range of species and many types of preparation which elicit different consumption reactions.

Seafood eaten outside the home also needs to be taken into account. Information is only available for a recent period but is shown for 2001/02 to 2011 in Figure 6.8 (page 302). Fish in sandwiches has been the main form most of the time, followed by fried white fish; this is in addition to the takeaways shown on the household graphs which must also consist mainly of fried white fish. To put it in context, however, seafood eaten out has been between just 8% and 5% each year of the total seafood consumption per person, similar to the proportion purchased as takeaways. Or to put it in context another way, the quantity of seafood eaten out in each of these years has been roughly similar to pizzas but half that of burgers.

Apart from picking out salmon and the broad distinction between white, other oily fish and shellfish, the national statistics do not tell us about species. They do not indicate which of them are in the tinned fish, takeaways and ready meals categories. The question of species is important both from the supply and sustainability perspectives and for the public health implications of consumption.

Most of the fish eaten in Britain has for a long time consisted of a narrow range of species. But specifics have changed over time and also have a regional dimension. In the mid-1980s the top three species sold in all the major inland wholesale markets in England were cod, plaice and haddock in that order but in Glasgow it was whiting, haddock and lemon sole (Symes D 1988a). Research carried out in north east England in a similar time-frame confirmed

that half of the consumption of the households involved consisted of cod, haddock and plaice (Gofton L & Marshall D 1991). An examination of species used in catering in the mid-1990s determined that fish and chip establishments mainly sold cod and haddock, hotels salmon, trout, herring and mackerel while restaurants were big on sole, prawns and trout (Maddock S & Young JA 1995). Half of retail sales of fresh fish around this time were accounted for by cod, haddock and salmon (Carleton C, Cappell R, Graham I, & Marshall D 1999). By 2012, however, the most popular fish retailed was tuna, followed by salmon, cod, haddock, pollack, warmwater prawns, mackerel and then coldwater prawns; or from the perspective of one supermarket the 'big five' species had become tuna, cod, salmon, haddock and prawns (Future Foundation 2012;Seafish 2012b). The whole period thus shows significant changes and an extension in the range.

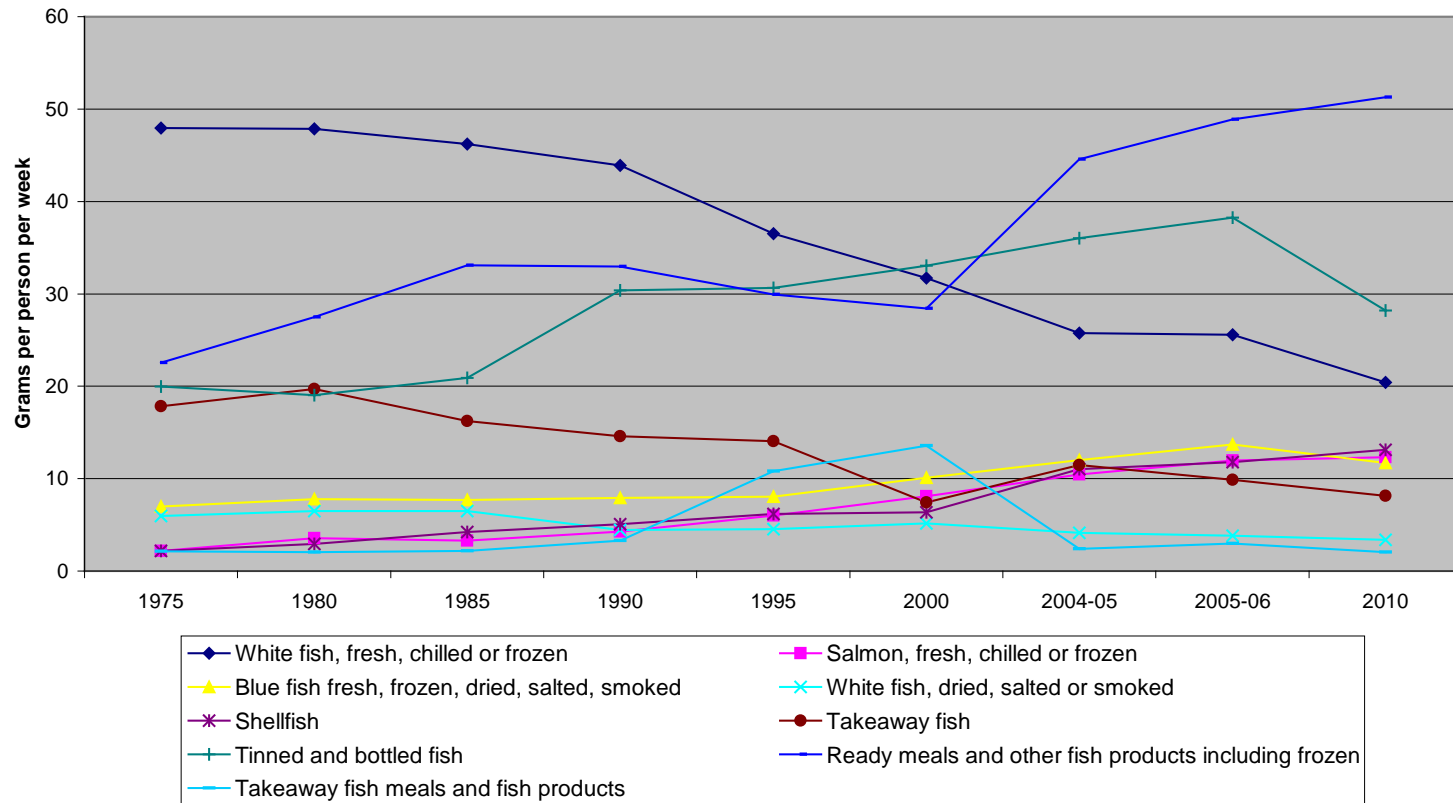
There are some additional features of consumption which are not reflected in statistical sources. There was a long-established pattern of fish purchasing taking place mainly on Tuesdays and Fridays (Taylor RA 1960); more recently there has been a return to fish for Friday dinners (Future Foundation 2012). Overlaying such patterns is the response to seasons and weather, familiar to some of the research participants in the impact on demand:

'The market demand is asymmetric. You've got a big demand for certain products, salmon, getting towards Christmas, pick-up towards Easter, if it's sunny in the summer you've got barbecues to deal with.' Production manager, large aquaculture company

'... the sun is out for the first time, it's a Friday coming up to half term or something, and suddenly half the UK population decides to go down to the pub for the evening, sit down have a sarsaparilla and suddenly say, bugger it, let's not go back and cook, why don't we get some fish & chips here.' Group director, large company

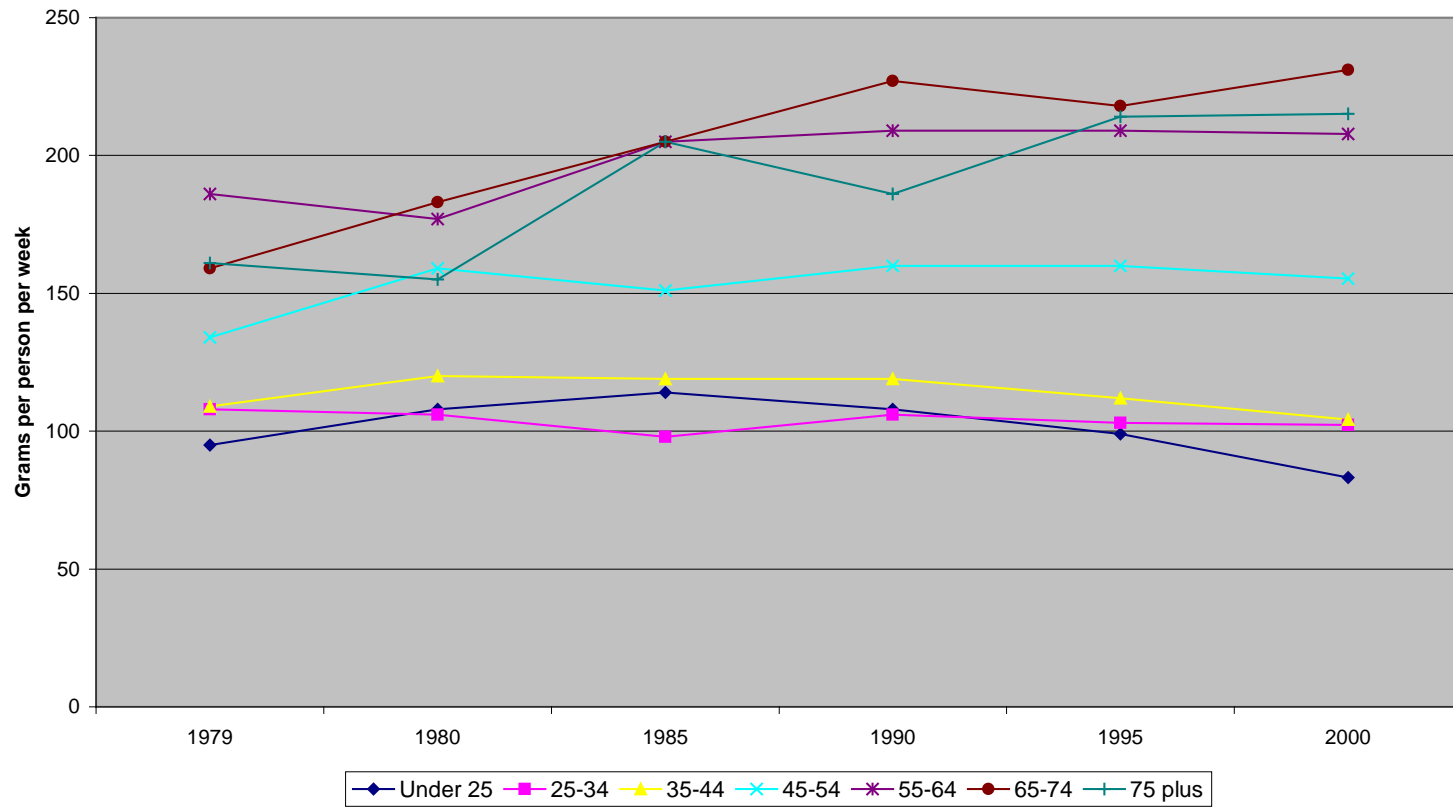
'It's the weather, it's all to do with the weather, to do with rain. If it could rain at tea time, they won't go to the chip shop.' Managing director, small company 3

Figure 6.1: Seafood Consumption 1975-2010



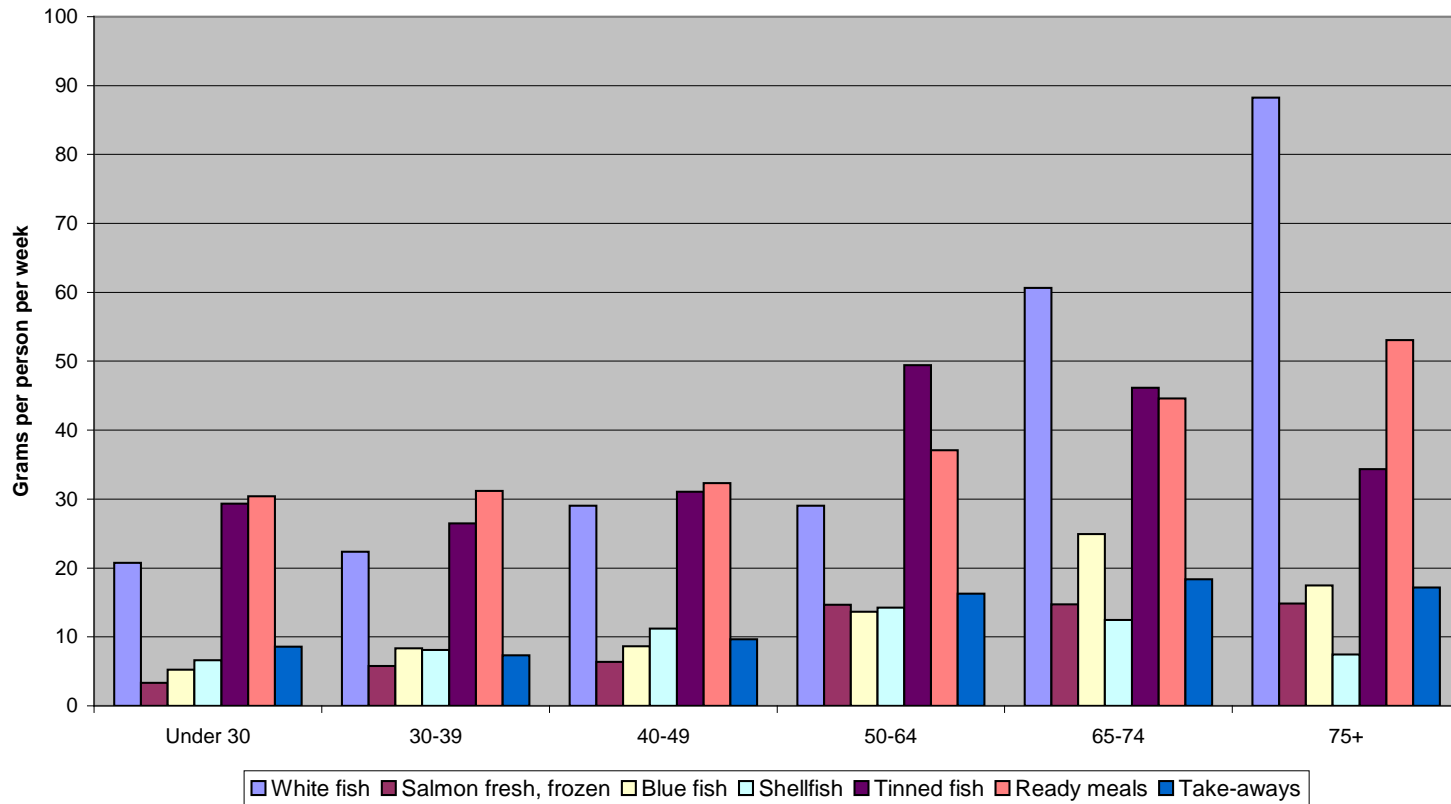
Source: Author based on National Food Survey and Living Costs and Food Survey

Figure 6.2 Seafood Consumption by Age 1979-2000



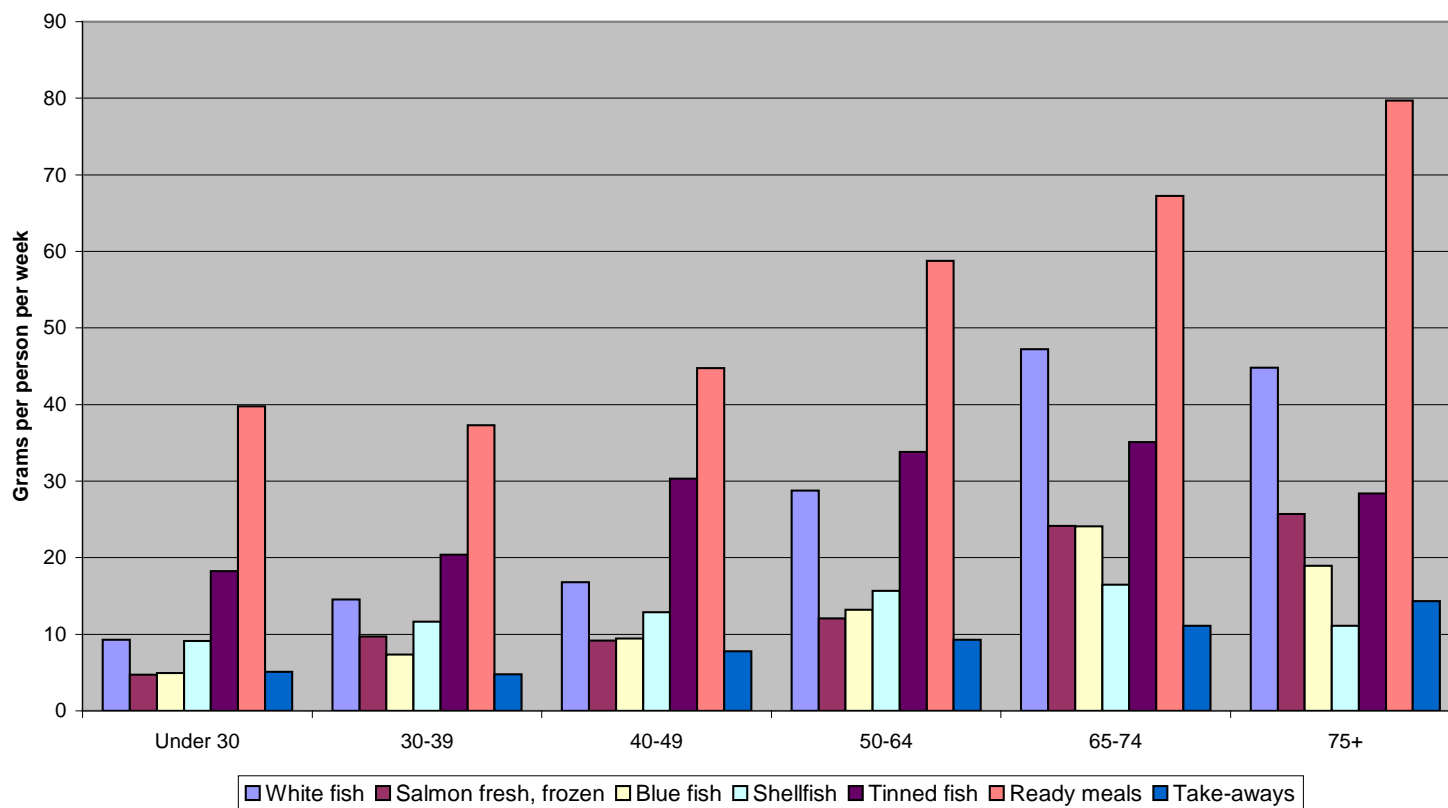
Source: Author based on National Food Survey and Living Costs and Food Survey

Figure 6.3a Seafood Type Consumed by Age of Household Reference Person 2001/02



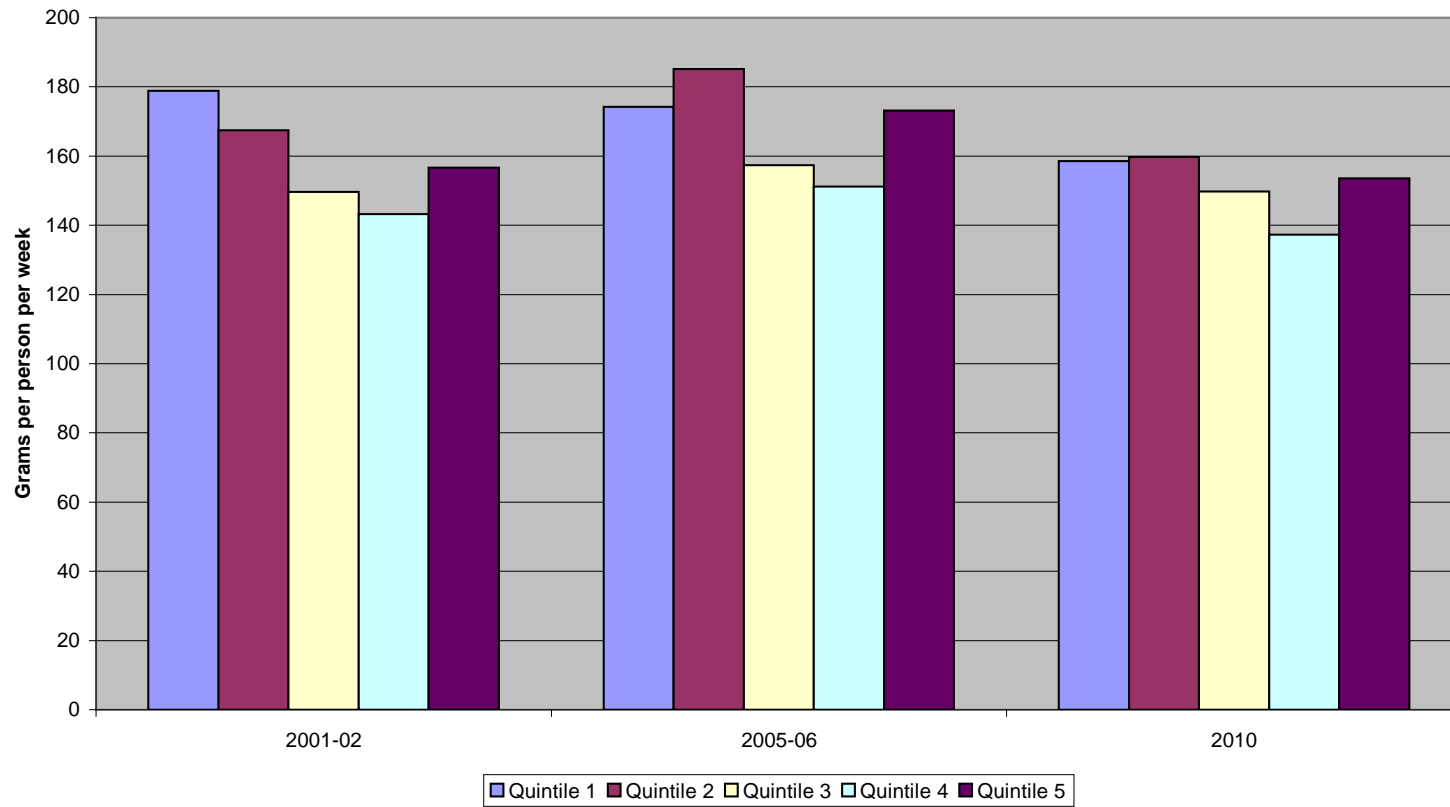
Source: Author based on Living Costs and Food Survey

Figure 6.3b Seafood Type Consumed by Age of Household Reference Person in 2010



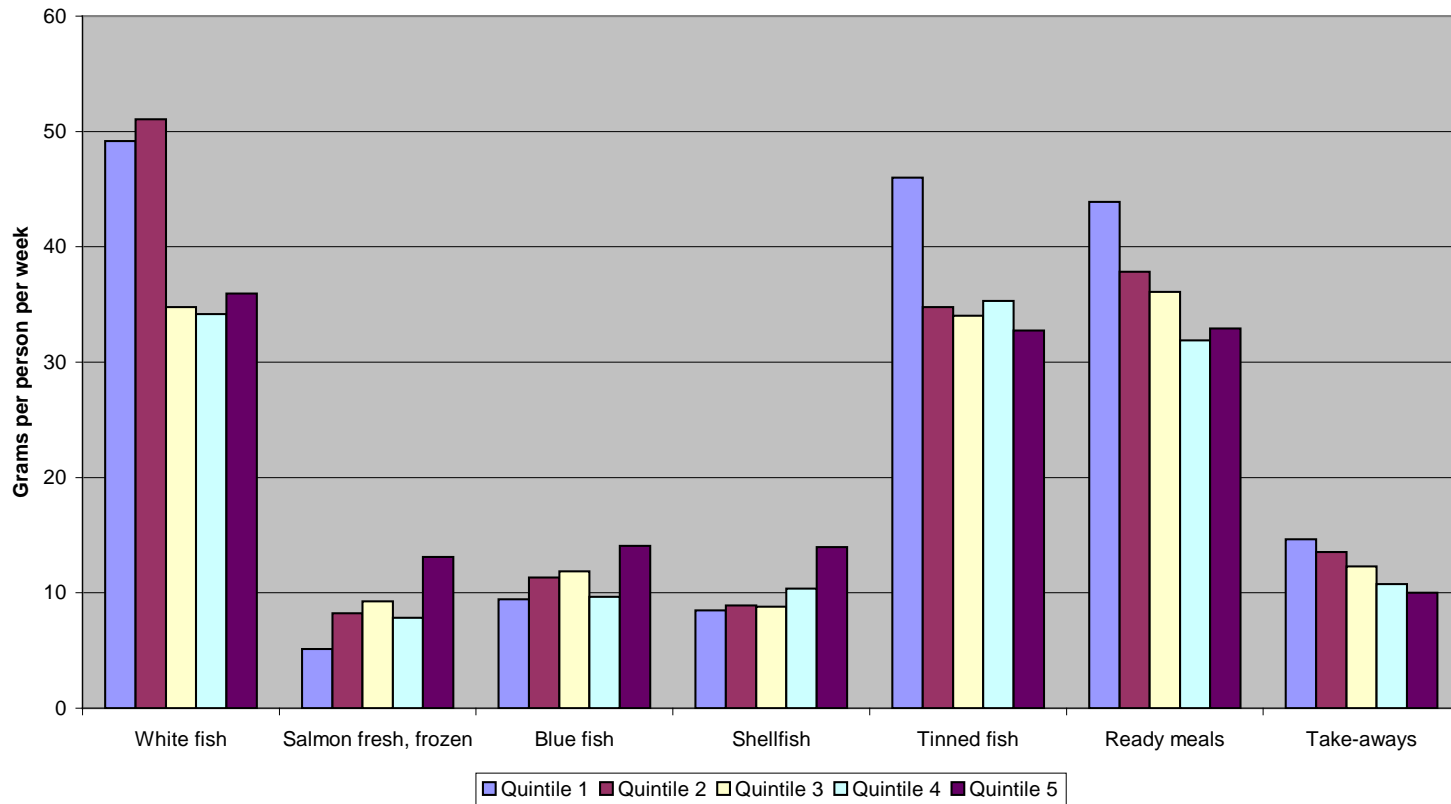
Source: Author based on Living Costs and Food Survey

Figure 6.4 Seafood Consumption by Income Quintile 2001/02, 2005/06 and 2010



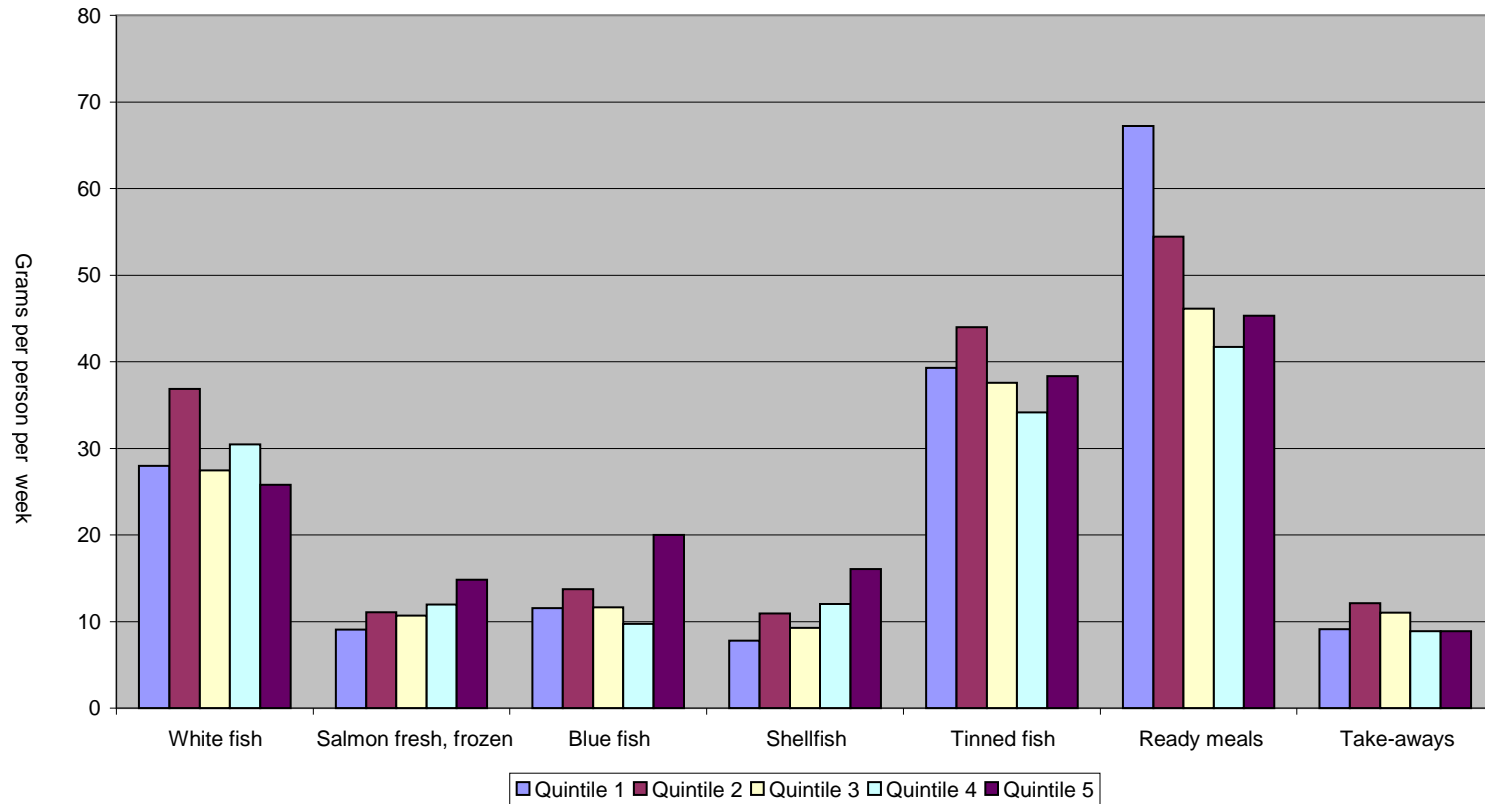
Source: Author based on Living Costs and Food Survey

Figure 6.5a Seafood Type and Income Quintile 2001/02



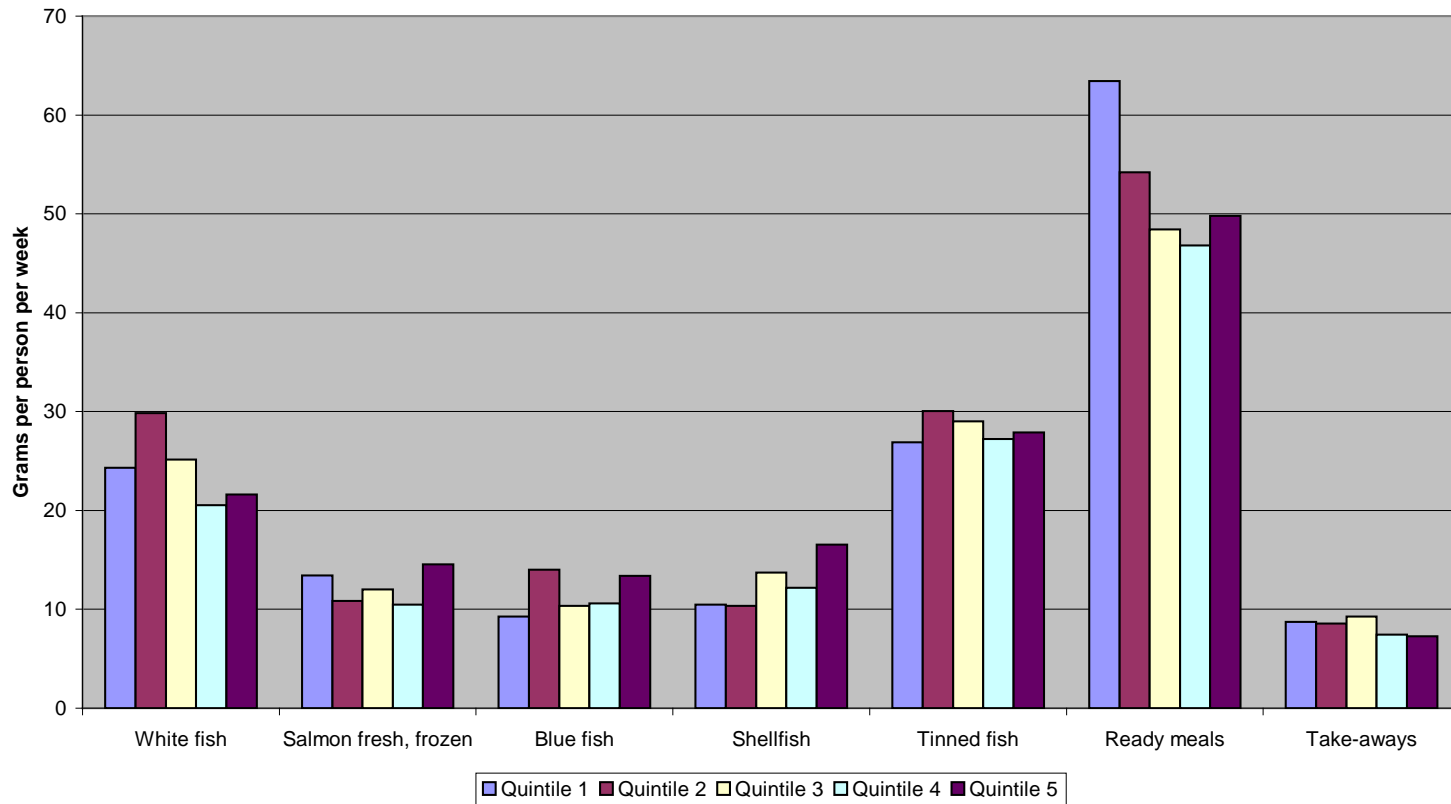
Source: Author based on Living Costs and Food Survey

Figure 6.5b Seafood Type and Income Quintile 2005/06



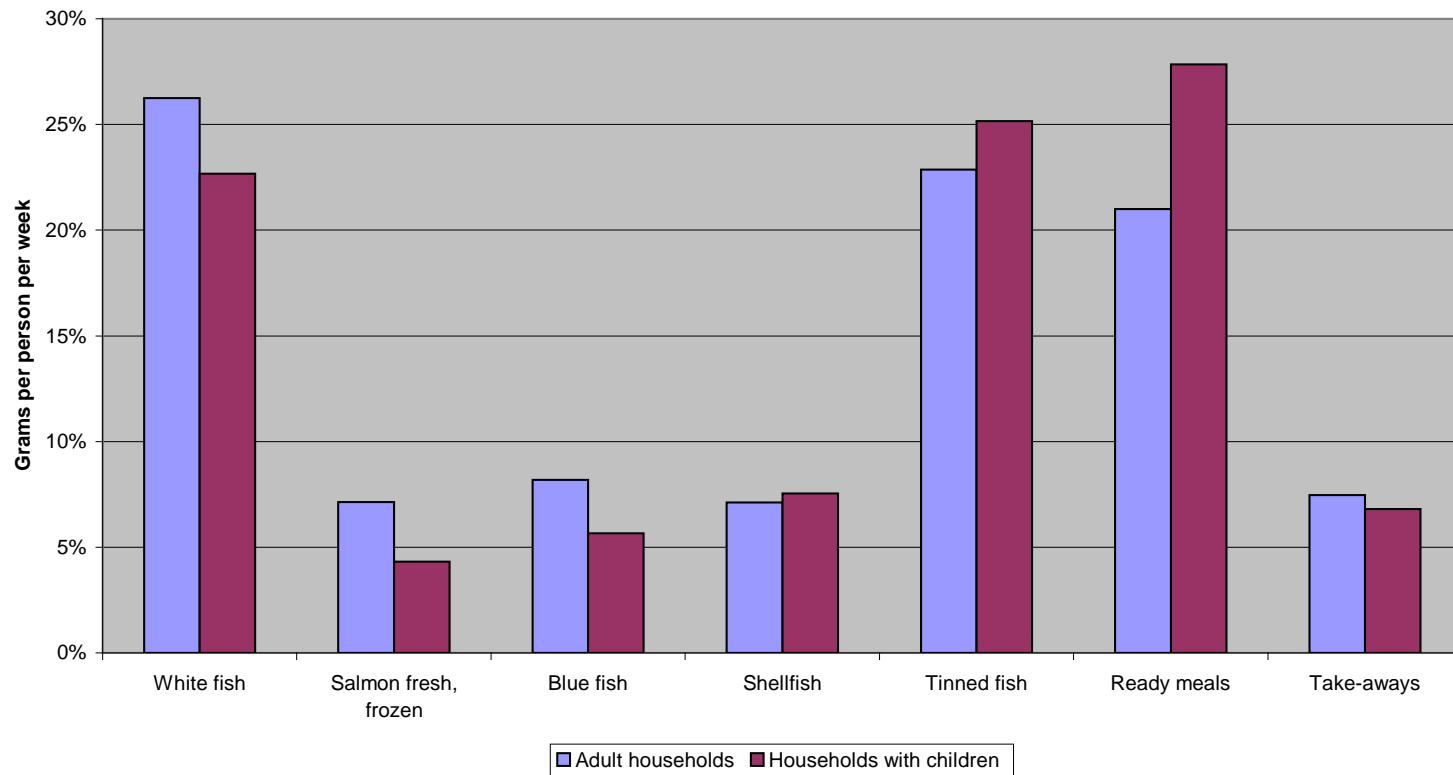
Source: Author based on Living Costs and Food Survey

Figure 6.5c Seafood Type and Income Quintile 2010



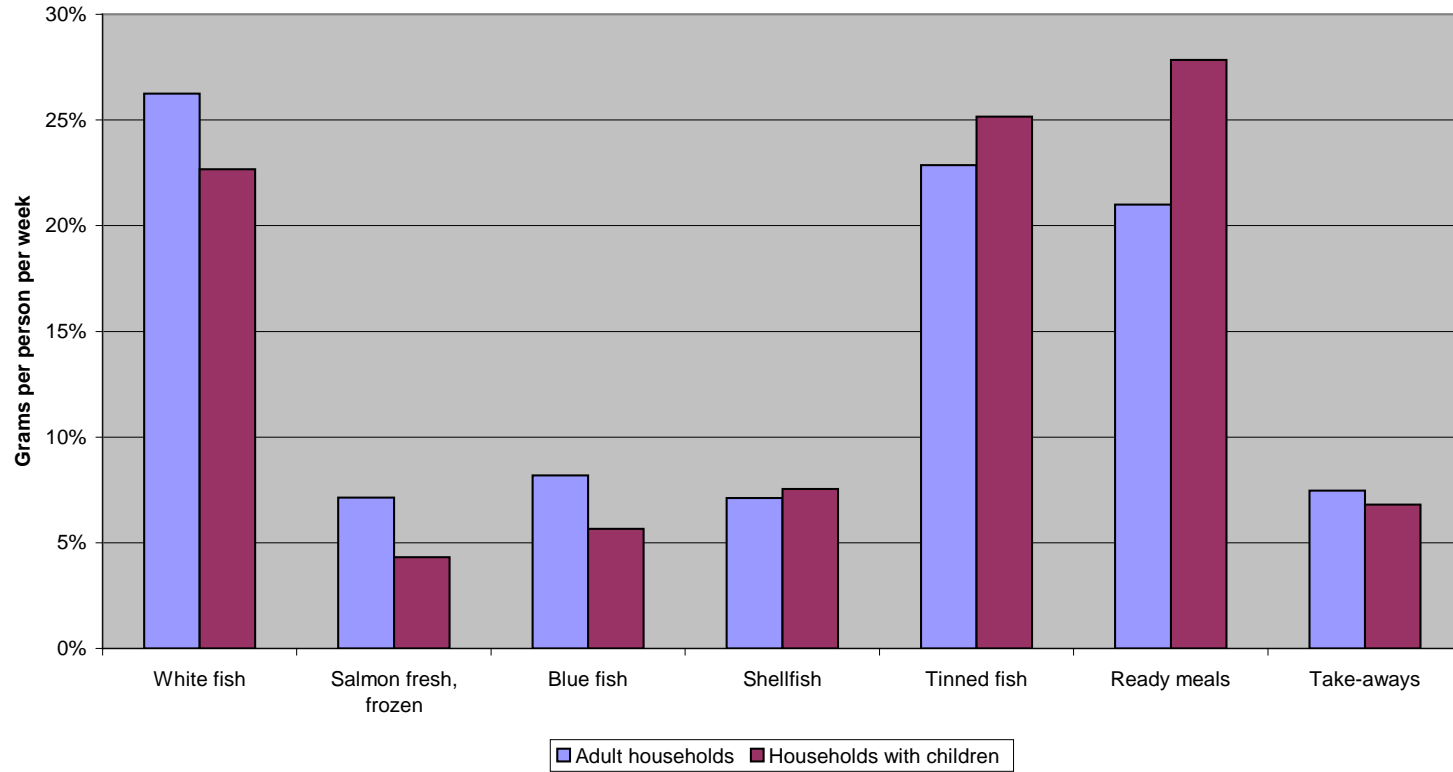
Source: Author based on Living Costs and Food Survey

Figure 6.7a Percentages of Seafood Type Consumed by Households Without and With Children in 2001/02



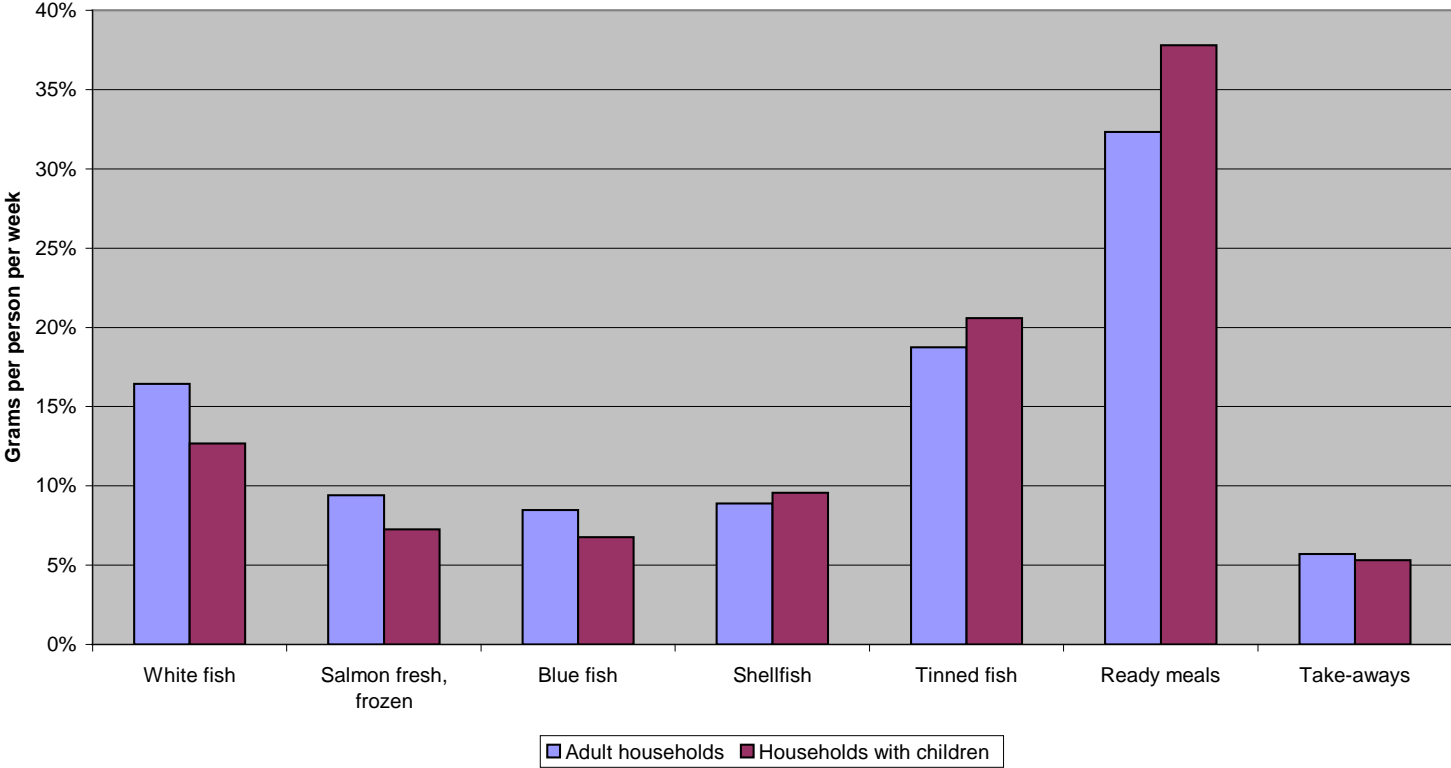
Source: Author based on Living Costs and Food Survey

Figure 6.7a Percentages of Seafood Type Consumed by Households Without and With Children in 2001/02



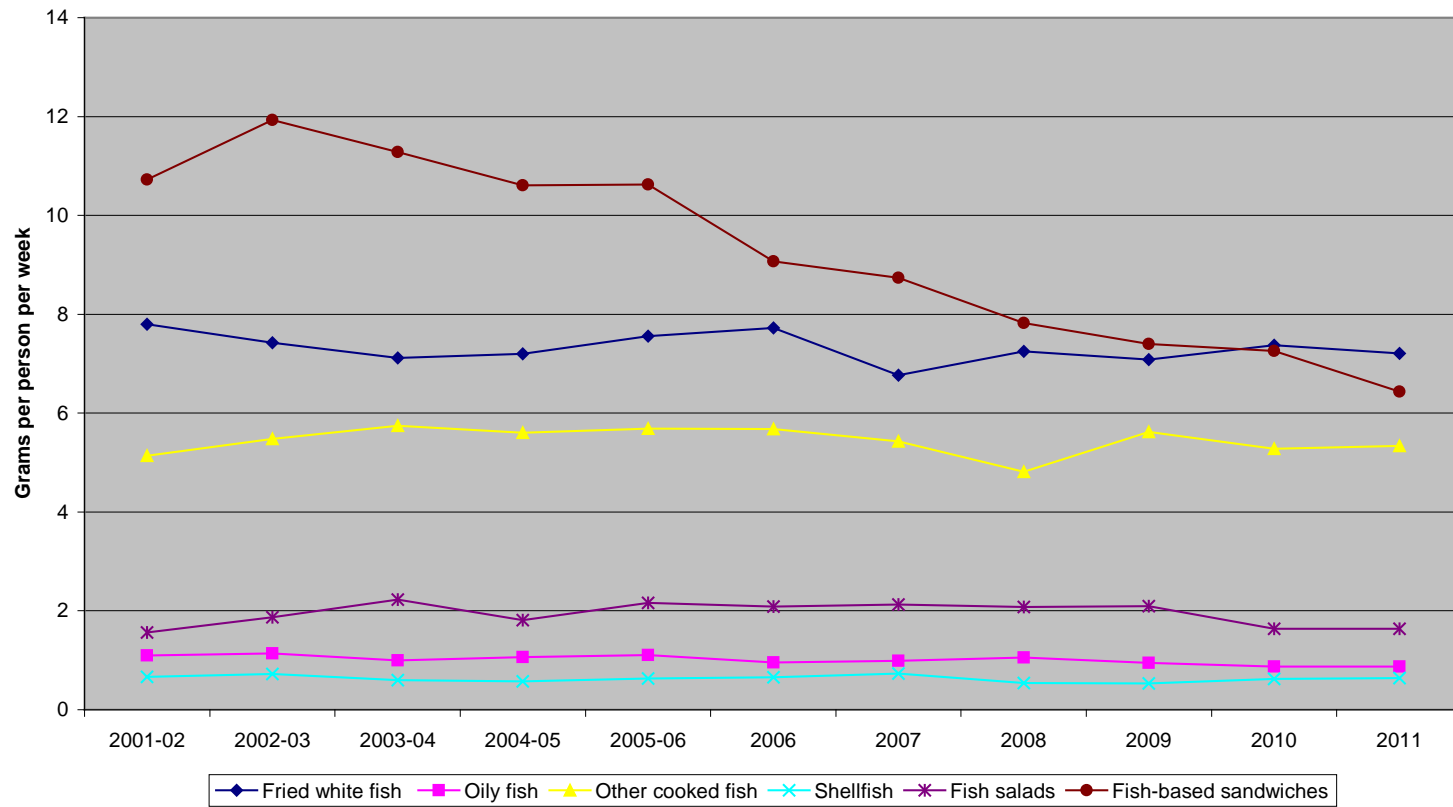
Source: Author based on Living Costs and Food Survey

Figure 6.7b Percentages Of Seafood Type Consumed by Households Without and With Children in 2010



Source: Author based on Living Costs and Food Survey

Figure 6.8 Seafood Eaten Out 2001/02 to 2011



Source: Author based on Living Costs and Food Survey
 Seafood that is part of Chinese, Indian or Thai food is not included in this graph.

Having established the picture of the seafood being eaten, the rest of this chapter turns to possible influencing factors. There are clearly many economic, social and cultural dimensions in play in relation to consumption so while attempting to assess the impact of governance factors on the consumption of seafood it has to be acknowledged that they can only partially explain such a complex phenomenon.

6.3 The Discourse of Seafood and Health

The main governance intervention to impact on seafood consumption has been the development of a public health message about its benefits. This section traces the basis for the public advice on the nutritional benefits provided by seafood, recounts which agencies were involved in promulgating it and shows how the initiative has been allowed to pass to the seafood industry. It also deals with other issues that bear on the benefits and risks of seafood consumption.

The first interview quotation of this chapter states a commonplace of the seafood industry about the healthiness of fish. But the characterisation of fish as a positively healthy food and the promulgation of this view in official discourse is quite recent, particularly so in the case of shellfish.

In the early period of the development of nutritional science fish was seen mainly as a source of protein. To an advocate¹³⁸ it was 'first class protein', the special merits of which were:

'its unequalled value for invalids, due to its digestibility; its value for sedentary workers, who need to nourish their nervous systems without providing too much muscular energy; and its value as a change, and as an easily digested high-grade supplement to an ordinary diet.' (Graham M 1943), (page 23)

In the early 1960s the dietary value of fish was considered to be for protein, for calcium especially if the bones of tinned varieties were eaten, and in 'fat'

¹³⁸ M Graham was subsequently Director of Fisheries Research for England and Wales, 1945-1958

(previous term for what is now described as 'oily') fish, for vitamins A and D (Pyke M 1961). Similarly a promotional publication of the period stated the nutritional qualities of fish to be the provision of protein and various trace elements while fish liver oils contributed vitamins A and D (White Fish Authority 1959). Nearly two decades later, nutritional information about fish was much the same, protein, trace elements and certain vitamins (Yudkin J 1977). It should be noted that none of these sources mentioned shellfish. Thus while considered a valuable food, fish was seen as nutritionally comparable with other sources of protein with which it was in competition.

But starting in the mid-1980s a transformation in thinking about the nutritional value of seafood came about when research started showing that fish consumption lowered heart disease risks (Burr ML et al. 1989;Kromhout D, Bosschieter E B, & Coulander C de L 1985). Further investigation elucidating the operative factor to be omega-3 polyunsaturated fatty acids (PUFAs), strengthened the case for the benefits of fish eating in relation to coronary disease and began to show possible positive relationships with a wide range of other conditions including mental ill-health and inflammatory disease as well as for infant development; however fish oil supplements showed much less clear benefits (Hu FB et al. 2002;Kris-Etherton PM, Harris WS, & Appel LJ 2002;Marckmann P & Grønbæk 1999;Ruxton CHS et al. 2007).¹³⁹ Nevertheless, a minority of studies have found no benefit from fish eating in relation to cardiovascular disease (Ascherio A et al. 1995;Morris MC et al. 1995). More recently attention has focused on omega-6 to omega-3 ratios and the argument that they are far too high in western diets, suggesting that omega-3 intakes should be increased (Mukhopadhyay R 2012;Simopoulos AP 2008). Some evidence for the protective effect of fish in relation to certain types of cancer has also been found (Welch AA et al. 2002). In addition fish is an important source of a range of micro-nutrients, trace elements and vitamins, varying with each species (Simopoulos AP 1997). Although contaminants in both wild and farmed fish pose some risks, they have been assessed as less

¹³⁹ The omega-3 fatty acids important in human physiology are alpha-linolenic, obtainable from plant sources, and the two found in marine animals, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).

than the benefits of fish-eating (FAO & WHO 2011; Mozaffarian D & Rimm EB 2006; Santerre CR 2010); this has been qualified in an analysis concluding that the risks from species with high levels of methylmercury should be avoided in favour of others, especially those with high PUFA levels (Stern AH 2007). While some are unconvinced (Hooper L et al. 2006; Jenkins DJA et al. 2009) the majority view is that fish eating (but not necessarily taking fish oil supplements) is beneficial to human health (De Roos B, Sneddon A, & Macdonald H 2012; Sanders T 2012). Fish, now elevated (in some of its forms) to a superfood (Pratt S & Matthews K 2004) had begun its exceptional career as a health food.

Reflecting the new research at an early stage a Seafish document of the late-1980s in addition to statements about low fat protein and the range of other nutrients highlighted the statement 'The regular consumption of fish can reduce the chances of heart disease' (Seafish 1987), para 3.7. However, this information was not yet in the general public arena.

The Committee on Medical Aspects of Food Policy (COMA) had produced reports in 1974 on coronary heart disease and in 1984 on cardiovascular disease in which fish was not mentioned. The first official advice about fish eating came in the third COMA report on dealing with this disease area (Committee on Medical Aspects of Food Policy 1994) and it reflected then recent research. It advised an increase in the population average consumption of long chain n-3 PUFA from about 0.1g/day to about 0.2g/day (1.5g/week) and translated this into clear nutritional advice: 'We recommend that people eat at least two portions of fish, of which one should be oily fish, weekly' (para S.3.7.3). But as one element in what was a very technical report it received no special publicity and was not conveyed to consumers at the time.

This changed as the Food Standards Agency established in 2000, a few years after the publication of the 1994 COMA report, developed its nutritional role. Its website publicised the COMA recommendation, advising consumers to eat two portions of fish a week, one of them oily. This enabled Seafish and seafood companies to cite government advice to eat fish regularly whereas

previously the COMA report existed as advice to the government rather than to the public.

A separate strand of official consideration regarding health aspects of fish consumption had meanwhile developed which concerned potential risks from contaminants. This was first examined by the then Ministry of Agriculture, Fisheries and Food and the results published in a Food Surveillance Information Sheet in 1998; reassuringly, it stated that dietary intake of the elements examined were within safety limits and posed no risk to those eating even large amounts of seafood.¹⁴⁰

The FSA took up the issue and following research on imported seafood which found relatively high levels of mercury in certain species, issued interim advice to restrict marlin, shark and swordfish consumption in 2002. Next, after a risk assessment by the Committee on Toxicity (COT), came revised precautionary advice in 2003 for pregnant and breast-feeding women and those intending to conceive to limit tuna consumption; they and also children were still recommended to avoid the previously established mercury-risk species.¹⁴¹ A full risk/benefit review was then requested and jointly carried out by COT and the Scientific Advisory Committee on Nutrition (SACN) which had replaced COMA. The judgement was that the advantages of fish eating outweighed the risks but that care should be taken by certain identified population groups (Scientific Advisory Committee on Nutrition and Committee on Toxicity 2004).

Consequently in June 2004 the FSA issued a revised version of its advice, now combining the positive health and negative risk avoidance messages. This was a complicated script which said that pregnant and breast-feeding women plus girls and women of child-bearing age should eat one to two portions of oily fish weekly but that other women plus men in general could eat as many as four. Further, all children plus pregnant women were advised not to eat the

¹⁴⁰ See MAFF Food Surveillance Information Sheet 151, *Concentration of Metals and Other Elements in Marine Fish and Shellfish*, 1998. It states that risks are within safe limits 'where defined', without clarifying where such limits have not been defined.

¹⁴¹ See FSA Food Survey Information Sheet 40, *Mercury in Imported Fish and Shellfish, UK Farmed Fish and their Products*, 2003.

higher risk three species at all; in addition, pregnant women only were told to limit tinned tuna consumption to four cans per weeks. This new complexity did not change the usual form in which fish consumption advice was generally promulgated being in the simplified 'two portions of fish a week, one of which should be oily' version.¹⁴²

The FSA has referred to some informal contact with DEFRA about the implications of the consumption advice for fish stock sustainability saying the latter had provided reassurances.¹⁴³ Subsequently the Agency adopted a general policy of taking sustainability issues into account which was likely to mean further attention being given to the seafood supply issue. In the meantime concerns about the nutritional advice in relation to sustainability problems began to be expressed from other directions. A notable input was the report on the relationship between fisheries and the marine environment which estimated that 33 million more portions of oily fish would be needed each week to increase consumption levels to the recommended amount for British adults, hugely increasing pressure on stocks (Royal Commission on Environmental Pollution 2004). Concern about additional pressures on fishery resources, especially given its importance as a food source in poorer countries, surfaced along with doubts about the feasibility of increasing supply sustainably to fill the gap between current fish-eating and the levels that would match the advice (Brunner EJ et al. 2009; Foster C 2005; House of Commons Environment 2009; Jenkins DJA, Sievenpiper JL, Pauly D, Sumaila UR, Kendall CWC, & Mowat FM 2009).

In response, the FSA undertook a public consultation in 2009 in which the health benefits of eating fish were reiterated but views were invited on how this could be combined with sustainability considerations (Food Standards Agency 2009). As a result, the last version of the Agency's fish consumption advice

¹⁴² The account of the development of FSA fish consumption advice is based on the report of an FSA workshop hosted by the Royal Society on 30 September 2005 as *Case Study: Advice on Fish Consumption - Benefits and Risks*, available on <http://royalsociety.org> plus contemporary information previously downloaded from the FSA website which is no longer available.

¹⁴³ See the report mentioned in footnote 142.

was issued later that year; two portions a week, one oily, was still the recommendation (with the same safety provisos) but for the first time shellfish were included. There had been industry lobbying for the inclusion of shellfish and Seafish organised a review which compiled information about the omega-3 content of shellfish species¹⁴⁴. The advice was amplified by statements asking consumers to use sustainability criteria in their choices, including certification, and to eat a wider range of species but it did not address the general issue of the potential difficulties of assuring supply should the twice-a-week advice be universally adopted.

Previously, fish consumption had featured very little in any government nutritional advice. Seafood was not mentioned in the 1978 general recommendations. The first public health strategy, *Health of the Nation*, was published in 1992; its dietary focus was on reducing saturated fat consumption. A task force set up to progress the dietary targets in this strategy did mention fish as one of the generic foods along with fruit, vegetables and cereals for which a publicly funded promotional effort should be made but nothing seems to have come of this recommendation, at least in relation to fish (Nutrition Task Force 1994). A few years later a new public health strategy, *Saving Lives: Our Healthier Nation*, included diet among the changes recommended for reducing the risk of developing coronary heart disease or stroke, calling for 'increased consumption of such foods as fruit, vegetables, and oily fish' without any elaboration as to quantities (Department of Health 1999), (para 6.12). The next public health White Paper in 2004, *Choosing Health* referred to a healthy diet in various places but did not include a prescription for it and did not make any recommendations about fish. The subsequent action plan for food and health did not include fish-eating in its objectives (Department of Health 2005a). A new government led to a new policy and *Healthy Lives, Healthy People: Our Strategy for Public Health in England*; this is specific about the five-a-day fruit and vegetable advice but contains no mention of fish (Department of Health 2010). In Britain, governments generally have not been

¹⁴⁴ Reference to the review and a graph combining the omega-3 content of major shellfish and fish species are in the 28 July 2009 letter sent by Seafish to the FSA in response to the consultation and signed by Peter Wilson.

enthusiastic about telling people what to eat and particularly about what not to eat. In the case of seafood, as with fruit and vegetables, there is at least the advantage of the line being 'eat more' rather than the 'eat less' messages which come into conflict equally with specific food industry interests and the preferences of individuals (Nestle M 2003). However, even an 'eat more' message is an implied 'eat less of something else' so not necessarily embraced full-heartedly. Thus it is specifically the FSA with its arm's length relationship to government and not the Department of Health (DH) that was responsible for promulgating the public health message to England and Wales that fish is a healthy food .

The Scotland situation was different because following the outcome of a special enquiry (the James Report), a nutritional plan, *Eating for Health: A Diet Action Plan for Scotland* (known as the Scottish Diet Action Plan) was produced and this does have a seafood consumption target namely that oily fish should double to an average of 88g weekly while whitefish consumption should continue at the same level. The report also contains a number of statements about the need to increase fish consumption along with fruit, vegetables and cereals so giving it full prominence as part of a healthy diet. (Scottish Office 1993;Scottish Office 1996). The next public health strategy for Scotland reaffirmed those same targets (Scottish Office 1999). Northern Ireland too had a food and nutrition strategy and this included the two a week, one oily fish target (Food and Nutrition Strategy Group 1996). The difference between the approach or at least emphasis in the official documents produced for England and Wales compared to those for Scotland and Northern Ireland illustrates the fact of political or value choices intertwining with nutrition science.

The 2010 change of government resulted in the public health responsibilities of the FSA in England and Wales being removed and returned to the DH. The food information on the DH website (as at 2012) has been greatly reduced compared to the previous FSA coverage and does not include specific material about seafood. The Eatwell plate (formerly within the FSA website) is indeed promoted there and the protein section does include the advice to eat at least

two portions of fish a week one being oily fish but there is only a small amount of additional information. Fuller information and advice is now provided on the NHS Choices website and this has all the details about levels of omega-3 fatty acids in different species of fish and shellfish and specific guidance for pregnant women and other population groups formerly found under the FSA aegis; it also contains a small section about sustainability issues. Nutrition responsibilities, have remained with the FSA for Scotland and Northern Ireland; in the latter case nutritional information nevertheless does not reside with the Northern Ireland FSA but has been placed on the province's general government website, NI Direct. Only for Scotland can nutritional advice, including about seafood, be found on a food website (FSA Scotland). While the core content is recognizably the same, the wording, level of detail and layout are different on each of these sites. To summarise the situation, all the information previously provided from a single point, the Food Standards Agency, is still available but in a complicated way from diverse sources.¹⁴⁵

Another aspect of public health policy since 2010 has been to develop partnerships with the private sector under the Public Health Responsibility Deal (PHRD). Two large seafood companies were included in this arrangement as at January 2013. However, the policies which they have produced, as listed on the DH website, do not relate to fish eating. One company has pledged to avoid using artificial trans-fats, the other one to four separate policies to do with improving the health of its own staff including on smoking and healthy eating. On their own websites each of these companies has a health section which includes reference to the two-a-week advice. Thus they are promoting the public health message on a private basis (which obviously dovetails with their commercial interests) while their contribution as seafood companies is

¹⁴⁵ The Department of Health public health webpage is www.dh.gov.uk/health/category/policy-areas/public-health, the Eatwell plate can be found on www.food.gov.uk is on and the NHS Choices information about seafood is at www.nhs.uk/livewell/goodfood/pages/fish-shellfish.aspx. The Northern Ireland fish and shellfish advice is on www.nidirect.gov.uk/index/information-and-services/health-and-well-being/eat-well/healthy-diet/nutrition-essentials/fish-and-shellfish.htm. The Scotland information is on www.eatwellscotland.org/healthydiet/nutritionessentials/fishandshellfish/index.html.

underplayed in the Responsibility Deal.¹⁴⁶ In any case doubts about the effectiveness of the PHRD have been expressed both in a House of Lords report and in academic analysis (House of Lords Science and Technology Select Committee 2011; Panjwani C & Caraher M 2013).

When the FSA still had a public health role it was in a position to be the authoritative source of nutritional advice to consumers. A general assessment of the FSA during that time found that was effectively consumer-focused and had invested in consumer education initiatives (Brooker S & Taylor A 2009) while from a business perspective the organisation was seen as providing expert advice on nutrition (Connect Research 2010). Since the reduction in the FSA's responsibilities the situation is more open to different interpretations being employed. SACN continues to function, providing guidance for government agencies, but it does not have a public face. Thus the mechanism for dealing with new information and giving consumers up-to-date health advice regarding seafood is unclear.

Seafish as the industry promoter holds up the banner for 'one of the healthiest things you can put on your plate' mentioning on its eat-two-a-week page not just the well-known heart disease prevention and the range of nutrients but every area on which there has been some positive finding in the medical science literature, even if not yet well-established, including for skin health, inflammatory bowel disease and depression. Most recently it has jumped on the vitamin D bandwagon as this has become a more publicly recognised health issue and fish is indeed a source of this nutrient.¹⁴⁷ Seafish has funded and publishes on its website reports commissioned by the trade association the Shellfish Association of Great Britain about the nutritional benefits of shellfish, a formal one supplied with five pages of references and a less formal one more geared to lay members of the public and including traffic light ratings

¹⁴⁶ The companies concerned are Coldwater Seafoods and Young's Seafood.

¹⁴⁷ The general Seafish information was taken from www.seafish.org/eating-seafood/health/eat-2-portions-of-seafood-a-week on 1 January 2013. A Seafish media statement 'Brits urged to eat more fish to boost vitamin D levels over winter' was issued on 30 December 2013.

for nine species (Woolmer A 2010a;Woolmer A 2010b).¹⁴⁸ Thus the benefits of fish-eating have changed from being the subject of a public health message to becoming a marketing tool.

Since the status of seafood as inherently healthy began to be established there have been only a small number of issues where this position was questioned. One has been the cholesterol content of prawns which had routinely led dieticians to advise restricted consumption. However, recent research has shown that intake of the dietary cholesterol in cold-water prawns did not lead to elevated levels of cholesterol in the participants (Isherwood C et al. 2010).

Another issue is whether there is a difference in nutritional benefit from farmed compared to wild fish. It has been posited that not only farmed fish but other animals reared in intensive systems provide a lower proportion of polyunsaturated fatty acids than wild equivalents (Denton M & Lacey R 1991). One factor is the deliberate substitution of vegetable oil for fish oil in feed which has been notable in relation to salmon rearing in order to reduce reliance on wild fish and improve sustainability but this has been specifically eschewed by the Scottish farming industry as a quality issue.¹⁴⁹ Some subsequent research has indeed found relatively lower omega-3 levels in the species examined (Fuentes A et al. 2010;George R & Bhopal R 1995;Karapanagiotidis IT et al. 2006); other work, however, has indicated that farmed fish can provide as much or even more of the beneficial fatty acids (Cahu C, Salen P, & De Lorgeril M 2004;Cole DW, Cole R, Gaydos SJ, Gray J, Hyland G, Jacques ML, Powell-Dunford N, Sawjney C, & Au WW 2009;Jensen IJ et al. 2012). Another aspect is that farmed salmon has been found to have considerably lower levels of vitamin D than the wild form in one study (Lu Z et al. 2007). However, the debate about the comparative nutritional value of wild and farmed fish does not seem to have reached public consciousness in Britain.

¹⁴⁸ The formal report by A Woolmer with its references is written in an academic style but no record of such a publication in a peer-reviewed journal has been found. The reports are also available on the SAGB website www.shellfish.org.uk.

¹⁴⁹ Interview comments by production manager, large aquaculture company and managing director, medium-large aquaculture company.

A recent development relating to farmed fish which again does not seem to have had public recognition is the 2013 EU derogation from animal feed rules which now allows protein derived from pigs and poultry to be used, as noted in chapter 4. The FSA advice to ministers provided in advance of the negotiations leading to this change was that the UK should not support it on the grounds that a more precautionary approach was advisable and because of majority opposition to it from consumers canvassed in a specially commissioned study; it was also noted that the change could create difficulties for non-meat eating or pork-avoiding fish eaters. From the material considered by the FSA it appears that there was a difference of view between producer interests that favoured the relaxation (one reason being greater sustainability if substituted for wild fish in feed) and consumer interests that opposed it. The UK government abstained when the issue was considered by the relevant EU committee but the change was approved by a qualified majority vote and has come into effect.¹⁵⁰ The extent to which fish fed with pig or poultry meal will enter the UK food chain remains to be seen.

The issue of contaminants in farmed fish has not been given much public attention in Britain either and there does not seem to be general awareness that it has been shown to have higher levels of various toxins than wild seafood as academic work on mercury levels in fish and on dioxins and related contaminants in farmed fish has found (Cole DW, Cole R, Gaydos SJ, Gray J,

¹⁵⁰ The Agency's Director of Food Safety had in fact recommended support for the ban relaxation (Gleadle A, 'Proposal to relax certain provisions of the current feed ban', report to FSA Board meeting, 7 September 2011) but this was not agreed. Both the report and the formal letter of advice sent by the Chair Jeff Rooker to DEFRA Minister Jim Paice on 15 September 2011 are available on the FSA website along with an expression of support for the change from the Deputy Chief Veterinary Officer and arguments against it from the Chief Medical Officer and the Which Chief Policy Advisor. When the issue was considered by the EU's Standing Committee on the Food Chain and Animal Health the UK abstained, making a short statement, but the proposal was approved by a qualified majority vote (see the Summary Report of the 18 July 2012 meeting, available on <http://ec.europa.eu>). DEFRA's reasons for abstaining are set out more fully in an Explanatory Memorandum provided to the House of Commons European Scrutiny Committee for its 17 July 2012 meeting, the record of which is available from www.publications.parliament.uk; it shows that the FSA's arguments were accepted but that the decision was taken to abstain rather than to oppose the proposal because of the UK's generally deregulatory stance.

Hyland G, Jacques ML, Powell-Dunford N, Sawjney C, & Au WW 2009; Jacobs M, Ferrario J, & Byrne C 2002; Jacobs MN, Covaci A, & Schepens P 2002; Knowles TG, Farrington D, & Kestin SC 2003). Another issue is about pesticide contamination in farmed fish (Little DC, Milwain GR, & Price C 2008b). There has been official reassurance as the European Food Safety Authority's Panel on Contaminants in the Food Chain, responding to a specific request by the European Parliament, has issued an assessment which looked a range of finfish farmed in the EU and concluded that as far as the consumer was concerned there is no safety difference to be taken into account between farmed and wild-caught fish (Little DC, Milwain GR, & Price C 2008a). However another view is that public trust would be more readily achieved by clarity to consumers about the uncertainties involved in making such judgements (Luoma SN & Löfstedt RE 2007).

There has been one notable case which did impinge on public consciousness, namely the publication of research funded by the American Pew Trust which stated that there were significantly higher levels of organochlorine contaminants, dioxins and PCBs, in farmed compared to wild salmon and that the problem was greater in European-reared fish, including from Scotland, than the products of either North or South America, so much so that it would be advisable not to eat it more often than once every two months (Hites RA et al. 2004). Furthermore the article was not simply put out in a scientific journal but rather the findings were deliberately publicised in an effective campaign that hit the headlines on both sides of the Atlantic. In response, the FSA stated on its website that the levels of contaminants shown in the study were within existing safety recommendations and that the benefits of eating salmon would outweigh the risks.¹⁵¹ EFSA subsequently judged the difference between wild

¹⁵¹ The study was criticised for using lower threshold US Environment Protection Agency criteria, in contradiction to the commonly accepted standards of US Food and Drugs Administration as well as of the EU and the World Health Organisation. The greater level of contaminants found in European farmed salmon has been acknowledged due to the wild fish used in their feed coming from more polluted seas but it has been judged not to be at an unacceptable level; it has been calculated that a hundred times more lives may be potentially saved by eating omega-3 rich fish than would be lost by the extra cancer risk (Tuomisto J & Frøyland L 2008). The SACN and COT were already deliberating their advice to the FSA when the Hites et al article appeared, advice which eventuated in the 2004 version of the FSA recommendations.

and farmed salmon insufficient to make a difference to human health (Luoma SN & Löfstedt RE 2007).

Whatever the negative effect on sales, as with most food scares, it was a temporary phenomenon. However, the impact was such that several years later two of the research interviewees still felt very strongly about the piece:

‘Three years ago a ridiculous trust in America called the Pew Foundation came out with something totally, absolutely outrageous and decimated our industry for about six months.’ Managing director, medium-large aquaculture company

‘Were the contaminants real, it would be a different case. But they weren’t real, the whole thing was a pure fabrication. And it was about propaganda to attack an industry. The dishonesty of them.’ Trader, medium-large company¹⁵²

In fact the Hites et al study was not the first time that the issue of contaminants in farmed salmon had been raised in Britain and questions asked about the advice to consume it. A BBC 2 documentary in January 2001 *Warnings from the Wild: the Price of Salmon* reported on some earlier research on the subject, indicating higher levels of contamination in farmed than wild salmon, associated with their feed. However, this programme did not seem to make a particular public impact and no reports of any consequences have been found.¹⁵³

The brief 2004 salmon crisis having passed, seafood was restored to its image of health and safety. This does not seem to have been dented by an incident

¹⁵² Some reporting indicated that supermarket sales of salmon held well in the immediate aftermath of the study’s publication (see Lawrence F, ‘Salmon warning fails to deter shoppers’, *The Guardian*, 13 January 2004 and Lyst C, ‘Salmon sales defy health warnings’, *The Scotsman*, 13 January 2004) but the quoted interviewees spoke about a big reduction in demand for six and one month respectively; they were in completely different businesses and might well have had different experiences or they may have had different memory recall. The information sheet published by Seafish in March 2004, *Seafood in Retail: Snapshot* showed a drop in purchase of fresh salmon in the month after the Hites et al article was published but a speedy recovery almost immediately. Speculatively, it may be the reassurance provided by the FSA that limited anti-salmon reaction by consumers.

¹⁵³ An article describing the programme under the heading ‘Farmed salmon “contaminated”’, 3 January 2001, is on the BBC news website, <http://news.bbc.co.uk>.

in which salmon was tainted by diesel and a wide recall actioned by the FSA in 2008.¹⁵⁴

As focus group members were reported to have said in research carried out in 2012, 'you never hear bad things about it' meaning that unlike some other foods fish had not attracted health warnings nor was it associated by participants with food scares. At the same time these contributors knew about omega-3 benefits and the two-a-week and oily fish recommendations.¹⁵⁵ Thus not only has the salmon contamination scare apparently been well forgotten, the various reservations in the FSA's advice, the limitations placed on consumption by certain vulnerable groups, seemed to have left no residue of doubt about the healthiness of fish.

However, the overall impact of the 'eat fish' health message on the British public is difficult to gauge due to a lack of research. Work carried out in 2001 gives an interesting perspective on consumer views about seafood and health at a time when the advice was relatively new. Those interviewed thought seafood to be a healthy choice compared to other proteins particularly because of its wild and natural associations. They linked health and food safety and many rated shellfish as unsafe because of food poisoning risks. They knew about and often mentioned omega-3 benefits but equally (rather in contradiction) low fat qualities of seafood and they rated whitefish as the healthiest as well as safest option (Gross T 2001b). This suggests that the significance of the relationship between omega-3 fatty acids and oily fish had not yet been absorbed and that respondents were reflecting an earlier period of nutritional guidance when the emphasis was on reducing fat intakes. No other study of consumer views during the 2000s in the UK has been found but the likelihood of mixed understandings about the seafood message is

¹⁵⁴ See Topping A, 'Supermarkets recall salmon over contamination, 16 February 2008, *Guardian* and Gammell C, Borland S and Cramb A, 'Salmon products tainted by diesel recalled', 26 February 2008, *Daily Telegraph*. Illustrating the complexity of supply chains, salmon from one farm was implicated in 50 products sold by 10 retail chains.

¹⁵⁵ This research was reported in the presentation by Maureen Reynier, 'Understanding the seafood consumer' given at the Seafish Conference on Seafood and the Consumer held on 9 October 2012 in Birmingham.

illustrated in a study carried out in Belgium in the early 2000s which found less than a third of those surveyed aware of the connection between omega-3 fatty acids and fish while a higher proportion thought wrongly that it is a source of dietary fibre, correct knowledge rising with higher levels of education; those surveyed had more extensive views about contaminants than about nutrients in fish (Verbeke W et al. 2005). Recent research in Britain found that only 27% understood the two-a-week seafood message (compared to 77% for the five-a-day fruit and vegetables advice) with women and older people more aware than men and the young; however, nearly everyone knew that omega-3 fatty acids were beneficial and 61% identified them with oily fish (Future Foundation 2012). This indicates both a diffusion of the idea of health connected with seafood and the fact that what has been absorbed is not exactly in the official form and probably arises from various sources.

Knowledge about omega-3 benefits without taking in the general seafood nutritional advice suggests that rather than being motivated by dietary recommendations relating to fish, people are responding to advertising about specific substances in the process that has been described as nutritionism, as discussed in chapter 2; this in turn is linked to the supplements industry which markets various omega-3 products. A number of health claims related to omega-3 fatty acids have been made, some but not all of which have been upheld (EFSA 2011).

The consumer views noted above expressing concerns about shellfish are not unfounded; there are risks from both cyanobacterial and marine toxins for which monitoring systems are in place (Davidson K & Bresnan E 2009). However, its food safety has rarely surfaced as a public issue. There was an exception when a 'sewage infested oysters' headline was generated after a Michelin-starred restaurant was found to have been the site of one of the largest norovirus outbreaks ever recorded, affecting over 500 people and associated with contaminated shellfish (Health Protection Agency 2009). Two years later an FSA-commissioned study reported on the finding of norovirus in three-quarters of British-produced oysters but the agency did not issue new advice for consumers who were simply expected to be aware of the risks in

eating raw shellfish. Neither of these reports seems to have caused any particular anxiety for the public at large most of whom do not of course habitually eat oysters or visit any of the country's top restaurants.¹⁵⁶

The FSA role was pivotal in establishing the healthiness of fish-eating in the public mind because it stood as an objective source. But no active diffusion of the 'eat fish' health message was carried out by the FSA; for example it did not undertake an advertising campaign on this issue as it did in relation to salt reduction and its website, though designed at that time to be accessible to the public, may be presumed to have been used by only a minority of the population. Health and nutritional professionals may well have given the advice to their patients and clients but this does not reach a mass audience. Rather, the seafood industry has been able to refer to the advice as coming from an authoritative body, the FSA, and absorb it into its promotional activity. Advice on marketing seafood proffered nearly three decades ago, 'Nutrition is an aspect of quality that can distinguish a product from its competitors' (Nettleton JA 1985) (p173) has been fully taken up by Seafish and the seafood industry. Over a couple of decades this has resulted in wide consumer recognition.

The only British state exercise in promoting fish consumption has come from the Scottish government which launched a campaign in 2009 and in the following year allocated £300,000 'to increase awareness of the health benefits of eating seafood and highlight the conservation credentials of Scotland's fishing fleet', the money allocated to the Seafood Scotland, the industry-based sister organisation to Seafish, to be spent not only on promoting consumption but to developing market opportunities; thus the objective would seem to have been supporting producers at least as much as improving consumer health.¹⁵⁷

¹⁵⁶ For a news item on the restaurant incidents see Wallop H, 'Fat Duck: sewage-infested oysters to blame for illness says official report', *Daily Telegraph*, 10 September 2009. For a summary of the norovirus survey see Ghosh P, 'Winter vomiting virus: British oysters contain bug', BBC News, 29 November 2011. The full report *Investigation into the Prevalence, Distribution and Levels of Norovirus Titre in Oyster Harvesting Areas in the UK* is on the FSA website.

¹⁵⁷ See the news releases on www.scotland.co.uk, 'Eat more fish, Scots urged' of 15 May 2009 and 'Eat more fish campaign' dated 28 April 2010.

This section has shown how the developing views of nutritionists and scientists, then policy makers and the seafood industry have created the widely accepted discourse of fish as a healthy food. Has this affected consumption? Some of the research interviewees thought so:

‘The amount of fish has increased dramatically as people begin to realise the benefits of omega-3.’ Managing director, medium-large aquaculture company

‘Fish, seafood generally, up to the recession has enjoyed tremendous growth, as a protein source within the UK, fresh natural fish has enjoyed stronger growth than any other type of protein ... [*because*] it ticks all the boxes of a healthy eating mindset.’ Industry advisor, trade organisation

As noted in chapter 2, there is some evidence that knowledge about healthy food recommendations positively influences consumption and that campaigns have altered certain dietary behaviours (Wakefield M, Loken B, & Hornik RC 2010;Wardle J, Parmenter K, & Waller J 2013) although no testing in relation to the ‘eat fish’ advice seems to have been done. Actual consumption is then affected by a range of social circumstances as shown by the differences demonstrated in section 6.2 of this chapter and research in other European countries (Trondsen T et al. 2003;Verbeke W & Vackier I 2005). The British population certainly has not adopted the two a week prescription en masse and results of the first three years of the National Diet and Nutrition Survey confirmed consumption to be well below this level (Bates B et al. 2012). In a ten year review of the Scottish Diet Action Plan it was observed that consumption of oily fish had not increased despite the target to double it (failure was noted for most of the other dietary targets as well) (Lang T, Dowler E, & Hunter DJ 2006). A recent survey of children found that only 16-18% (depending on the age group) ate fish twice a week and similar proportions never ate it at all though over half of all in the eleven and over age groups knew about the fish eating advice (British Nutrition Foundation 2013).

But if there were to be an effect it would be expected to develop gradually. The fish eating advice was formalised in the mid-1990s and its dissemination has been gradual as it has not been the subject of a mass campaign. The National Food and Living Costs and Food Surveys show that average annual

seafood consumption in each of the 1990s years ranged from 141 to 149 grams per person each week except for one exceptional year, 1995 when it was 158. Between 2001/02 and 2009 the range was 170 with a peak from 2005/06 to 2007 but after the turn of the decade it has reduced and in 2011 was back to the 1990s level. It therefore would be plausible to conclude that the message did have some effect and thus a governance outcome. It may, however, have been short-term, dependent on reinforcement which has been lacking since the FSA role ceased or overlaid by cost considerations in the economic downturn. In any case there are many other influences on seafood choices and non-choices than health advice and to these the next section turns.

6.4 Influencing Consumer Attitudes to Seafood

Aside from the prescriptive nature of government agency advisories, an alternative discourse aims to understand patterns of eating and non-eating of seafood by consumers in their own terms. In part an academic literature aiming to provide an analysis of attitudes and behaviour within the social sciences disciplines, there is also an agenda of producing information that will be useful for marketing purposes. Indeed, a variety of different approaches have been used in attempts to exercise governance upon consumption which are also examined in this section. Various comments made in the interviews reflect views about consumer preferences.

One longstanding facet of the encounter with consumer views is recognition of a strand of strongly negative feeling about eating and/or cooking fish. Some of the research interviewees, as already indicated at the beginning of this chapter, mentioned such antipathies:

‘... a lot of young people don’t eat fish or are even prepared to try it.’
Commercial manager, medium-large company

‘We’re more comfortable going into a hotel restaurant, having somebody else cook it, not with taking it home and cooking it ourselves.’ Trade organisation representative 1

A more recent factor about consumer wishes which some interviewees thought important was a need for fish to fit into demands for greater convenience:

'Then there's also the line that if it's not cooked, if it's not ready to eat, "I don't fancy that". That's basically how I feel the market is going.' Managing Director, small company 2

There is indeed a body of research that confirms both of these perceptions. In part, it reflected and attempted to explain the long period of decline and low consumption of seafood in the 1970s and 1980s.

A study carried out in the late-1980s in north east England found that bones and 'offensive smell' were off-putting to many, that fish was thought to be troublesome to cook and the food most often rated as 'least enjoyed eating'. Equally important was showing how fish fitted into ideas about meal construction, as it was often considered to be less substantial or less suitable for main meals compared to meat while tinned fish was thought appropriate for sandwiches and light meals. Convenience was found to be particularly important to the younger food decision-makers who liked frozen products. Fish was already thought of as a healthy food (this was a decade before 'eat seafood' advice began to be promulgated) but that did not over-ride its lesser role and status in the food system. (Gofton L & Marshall D 1991; Marshall D 1988; Marshall D 1993). Other studies carried out in a similar time frame concentrated on pelagic fish. One found a general negative attitude to these oily fish, another that herring was less liked than haddock because of its bones and cooking smell though found palatable either cooked or smoked, while very little mackerel was eaten at all (Baird PB, Bennett R, & Hamilton M 1988; Marshall DW & Currall J 1992). The interplay between positive and negative ideas about fish and the differential uses of fresh, frozen and canned types were echoed in research about a decade later (Leek S, Maddock S, & Foxall G 2000). Alternatively, the decline in fish-eating was attributed in a commercial analysis to the shift towards convenience foods, something that was relatively slow to develop with seafood (Intel 2004a). It seems to have remained the case that there are polarised tastes in relation to fish, reflected by a more recent market research categorisation into three types of

consumers: fish rejecters 20%; fish tolerators 70% and fish lovers only 10% (Porritt J & Goodman J 2005).

One negative factor not mentioned in these studies but which can be added on the basis of evidence from the previous chapter is the impact of poor quality. Applying as it did to fresh, to smoked and to frozen fish, this must have resulted in many indifferent if not worse fish-eating experiences and equally must have contributed to the lack of enthusiasm among many consumers. It may also be associated with the smells that some people disliked which are not experienced with really fresh fish. This is an aspect that has not hitherto been taken into account in the attitude literature, namely that consumer dislikes have been the result of encounters with poor quality seafood, directly or by reputation.

Thus lack of enthusiasm for fish has been identified and noted as a barrier to consumption which may be of concern for either commercial or public health reasons. Facing these attitudes, attempts to woo consumers into eating more seafood have taken various forms. Advertising was noted in the early 1990s as playing a small part, with a low overall ratio of advertising spend to sales but one which was greater than for the other fresh items (meat, fruit and vegetables) and with most of it promoting frozen products (LeGrand L 1992).

Regardless of formal advertising, the use of media in relation to food generally has become significant (Rousseau S 2012). Celebrity chefs were credited by a couple of the research interviewees with a positive impact on consumption:

‘I think these TV chefs and BBC chefs have helped to some extent. I think that people are more aware of what to do with things, how to get the best of certain types of fish, how to put certain fish together to come out with a nice combination of things.’ Director, medium company 1

‘... there’s a definite Rick Stein effect. There a celebrity chef effect of. For instance if he spends ten minutes talking about Cornish sardines, the next day the fish shop down the road here, the fish man right up to the retailer would all say the next day, there are people definitely looking to try that fish, because they saw it on telly, they’ll say, well I’ll give that a go.’ Manager, trade organisation

The credibility of Rick Stein was endorsed by restaurant customers according to recent research which also quotes a fishmonger saying 'Delia [Smith] only had to mention monkfish and the very next day everyone was asking for some' and from a fishing agent: 'There was a massive upsurge in demand for dab as a result of Fish Fight and Jamie Oliver' (Fishing for the Markets 2011; Revill Nation Ltd 2011) while this same programme resulted in a sustained increase in demand for various minority species according to one major retailer (Sainsbury's 2013).¹⁵⁸ Celebrity chefs have had a growing influence, some linked to branded restaurants and other commercial products. Their television cooking programmes, while primarily used as entertainment, may also have an impact on broadening tastes and skills for at least a section of viewers (Caraher M, Lang T, & Dixon P 2000; Henderson JC 2011; Randall S 1999; Rowe M, Prestage M, & Cook E 1999; Wood RC 2000). Market research has credited TV chef programmes as the biggest single influence on cooking fish (mother was well down the list, below experiences abroad and cookbooks) (Future Foundation 2012). The credibility of some chef personalities was expressed in the phrase 'Jamie says' (with reference to celebrity chef Jamie Oliver) attributed to focus group participants in recent research findings about attitudes to seafood meaning that he was a trusted source of information, unlike the case with commercial interests or what participants might consider sensationalising media reports.¹⁵⁹ However, the influence of TV is increasingly being shared with or may even come to be superseded by YouTube food channels, some involving the same big-name chefs, according to one account.¹⁶⁰

A linked area is that of cookery book publication, again a source of both education and entertainment. An exercise was undertaken in January 2013 to provide a snapshot estimate of the fish cooking books available on Amazon. It revealed as many as fifty-five; an equivalent search for meat cookery books

¹⁵⁸ The Channel 4 series *Hugh's Fish Fight* which ran in January 2011 was fronted by celebrity chef Hugh Fearnley-Whittingstall and in tandem ran a series of demonstrations by Jamie Oliver of recipes using less well-known species under the heading of *The Big Fish Fight*.

¹⁵⁹ Maureen Reynier, *op cit*.

¹⁶⁰ Lucy McDonald, 'Are YouTube food channels killing TV chefs?', *The Independent*, 21 March 2013.

yielded the much lower number of forty-two¹⁶¹. Many of the books were by celebrity chefs, some linked to television programmes. Examining the dates of publication (occasionally re-publication) of the fish books there was a contrast between the years before 2006 when one or two, occasionally three such books were produced and the following period which saw three, four, six or seven of them in each of the years. While it is to be expected that there are more books of recent date available at any one time, it is suggested that there may be a relationship with the fish and health message being promulgated from the early 2000s; a gap between the message and the consumer unease about cooking fish noted earlier became seen as a market opportunity which many are seeking to fill with helpful productions. At any rate the large number of seafood cookery books indicates a perceived high level of demand.

Beyond books, the provision of seafood recipes is a common aspect of promotion and several of the processors in the seafood company database included a selection on their websites. Putting out recipes as a promotional tool is not new; the erstwhile Herring Industry Board produced a book of them (Graham M 1943). It is a sound approach because lack of recipe knowledge was identified as a barrier to fish consumption by a third of those questioned in one piece of research (Future Foundation 2012).

Recipe display is one of the routes used by Seafish for promoting seafood consumption. As already noted, strong use is made of the health message; in the organisation's words: 'We deliver a year-round campaign about the health benefits of seafood to consumers, designed to support the UK government's advice to consume two portions of seafood a week, one of which should be oily

¹⁶¹ The trawl consisted of the first five pages of two Amazon searches using keywords 'fish cooking' and 'meat cooking' respectively; it is not exhaustive but serves to illustrate the cookery book situation. Kindle-only books were excluded. A small number of the books were out of print and offered second hand. The meat group books included six about smoking or charcuterie which might be considered rather technical and for which there were no fish equivalents; in addition many of the meat books had a special slant for example offal, sausages, game, rare breeds, while nearly all the fish books were general, suggesting that the two groups of books served somewhat different purposes.

fish.¹⁶² For business it provides syndicated market research. It organised an annual Seafood Week (in the final year Seafood Fortnight) from 2001 to 2008, working with supermarket and foodservice partners for special promotions and using celebrity chefs to gain publicity.¹⁶³ The tagline used by Seafish on its website is 'The authority on seafood'; in communications to industry the organisation often uses the phrase 'for a sustainable & profitable future'. The main version is more geared to consumers and the public.

From 2011 Seafish has run the initiative 'Fish is the Dish' with its own website featuring recipes, competitions and photographed resident mums to answer seafood-related questions. The site provides direct links to selected seafood suppliers. The project makes full use of social media in its mission to break down barriers of perceived difficulty and to showcase ways of cooking fish that will fit into busy lives. The project has generated its own booklet consisting entirely of fish recipes produced by participant bloggers and has arranged special events headed by celebrity chefs.¹⁶⁴

Certain promotional activities have been directed at children. Seafish has produced advice for those intending to address children, recommending a focus on primary school age (Seafish 2003a). Recently the organisation has developed seafood education programmes for schools, working with various partners. It is not alone in doing so: the MSC had a three year Fish and Kids programme, part-funded by DEFRA, involving educational material and the serving of certified seafood in school meals.¹⁶⁵

¹⁶² On the <http://www.seafish.org/processors/seafood-promotion-/promotional-materials> page of the Seafish website (accessed 20 January 2013).

¹⁶³ See the anonymous note in the online *Nutrition and Food Science*, 2005, 35, 1 (no page number provided).

¹⁶⁴ The website is at www.fishisthedish.co.uk/. The recipe booklet is *Fish is the Dish by Seafish*.

¹⁶⁵ Seafish reports on its main website www.seafish.org that it is working with the National Schools Partnership to develop pilot materials for schools and with the Billingsgate Seafood Training School on its schools outreach programme. The story 'Lincolnshire launchpad for seafood project, 22 April 2013' reports on the former, noting the involvement of Young's and other industry partners, and the item 'UK children are stinting on seafood', 6 June 2013 describes Seafish collaboration with the British Nutrition Foundation in its Healthy Eating Week work with schools, both on www.fishnewseu.com. Information about the Fish and Kids programme is on the MSC website, www.msc.org.

In the past, publicly funded promotion efforts have been much more extensive, encompassing new product development and market research. The White Fish Authority (WFA) worked with processing companies and commissioned market research on a number of fronts, the motivation being to increase domestic consumption of the products of the fishing industry. Blue whiting fish fingers, canned products, frozen and composite fillets were variously trialled by housewives, fish fryers, hospitals and schools (David Elliott and Associates 1976;David Elliott and Associates 1979;White Fish Authority 1978c;White Fish Authority 1980;White T 1977). New shellfish products were developed (Urch M 1976;White Fish Authority 1977a) and extensive market research and promotional effort into mackerel use commissioned (David Elliott and Associates 1977;White Fish Authority 1978a;White Fish Authority 1978b). Two other projects were the development of dishes suitable for cook-freezing and the production of fish recipes for schools (English HR 1978;White Fish Authority 1974). As the dates and much of the authorship indicate, this form of intervention was carried out by the WFA and it ceased under its successor quango, Seafish which has had a greater focus on marketing and promotion. The Torry Research Station had been an occasional collaborator with WFA projects but also carried out its own development work on new products using pelagic fish (Marshall DW, Boyd NJ, & Gofton LR 1992;Mills A & Teepsoo H 1992). All this is the kind of industrial activity no longer thought appropriate for state or publicly funded action and which has for some time been left to market agents. There does not seem to have been much impact on consumption. Although apparently well-received in the research, nothing further seems to have come of the blue whiting trials, the shellfish developments were less successful and 'deboned retextured mackerel' has unsurprisingly not re-surfaced. However, there was one successful area because hot-smoked mackerel and pâté based upon it, the subject of one promotional effort, have certainly found a place in British fish eating.

More recent public encouragement has not been entirely lacking because Seafish organised a competition in 1999 to support the development of new products by fish processing companies specifically for mid-price restaurants.

Twenty-five companies entered and at the time of the evaluation the placing of some new products with minor (but not major) caterers as well as with retailers had resulted (Fossey E 2000). This exercise seems to have been a one-off which was not repeated. However, a successful regional effort by South East Seafood (the South East Food Group Partnership) involved the development of a mackerel-based fishcake for schools, satisfying guidelines about oily fish on school menus and making use of the product of local fishing.¹⁶⁶

The EU's protected name system is another kind of public promotional effort which spotlights food authenticity and as detailed in chapter 5 there were nine UK seafood products accredited in this scheme at 2013. However, there is no evidence to suggest that they have been used in domestic advertising or promotions or that the accolade has made any difference to the consumption of these particular seafoods by British consumers. Hence the assumption is that these designations in relation to what is produced in the UK are primarily marketing tools used for exports. Conversely, no evidence has been seen of any protected name seafood products from other European countries being marketed as such in this country, indicating that there is generally low recognition of the system by UK consumers.

Regardless of particular efforts or promotions, consumer taste has diversified as seen in section 6.2 of this chapter. Consumers' more recent willingness to eat a greater range of seafood was remarked upon in some of the interviews:

'People starting to travel trying more, what were perceived to be more exotic fish and people going on holiday and eating fresh tuna or mahi-mahi or swordfish so capitalised on that trend.' 'It's obvious that trends in consumption have altered massively as people have been less able to get less cod and haddock locally, price of white fish as well as done that. People have been more open to trying, to new species. Farmed fish, farmed salmon has exploded in that time.' Managing director, medium-large company

'We've seen perhaps in the UK, I wouldn't say a huge diversification but a notable diversification in consumer taste.' Industry Advisor, trade organisation

¹⁶⁶ The fishcake manufacture involves two local firms, a seafood processor and food manufacturer and is reported in Britton S, 25 February 2008, 'Omega-3 fishcakes offer schools a healthy option' on www.foodmanufacture.co.uk.

But price was felt to be a constraining factor and consumers unwilling to go beyond certain thresholds in what they paid for fish:

‘Fish has become more expensive. As an island nation, fish was always cheap. It isn’t that cheap any more. Some of the better cuts of fish will cost as much as the better cuts of beef. In this country we don’t really seem to be prepared to pay as much for fish as we are for beef.’ Commercial Manager, medium-large company

‘When it comes down to it, consumers aren’t, there’s a few purists that possibly are, but they want quality but don’t want the price, they want quality but buy on price.’ Managing Director, large company

An important question about consumer choice is the extent to which there is awareness of sustainability issues and whether this affects purchasing decisions. Some of the research interviewees thought it did:

‘All of our customers ask because you get a lot of customers, their own customers coming in saying, I thought that wasn’t sustainable, thought that was endangered.’ Depot Manager, small company

‘The general public in the restaurants are very much into the whole provenance, and want to know where comes from, that it’s sustainably caught.’ Manager, trade organisation 1

This is an area where the civil society expression of environmental NGOs is trying to influence individual choices and thereby have an impact on conservation, part of a general ethical consumption movement (Harrison R 2005). WWF has been instrumental in developing the MSC and ASC eco-labelling schemes, as described in chapters 4 and 5, which enable consumers to show preferences for more sustainably produced seafood and has argued that ‘consumers also have the power to effect change’ ‘by making informed decisions about the fish we choose’ (Gubbay S & Searle A 2001) (p5). The Good Fish Guide is produced by and website Fishonline operated by the Marine Conservation Society (MCS) as tools for consumers to make an informed choice with the sustainability of each species given a traffic light rating; wallet cards and a mobile app are available for easy reference when making a purchase or foodservice choice. Greenpeace also has consumption advice on its website. These are all attempts to actively engage individuals in

having a democratic influence on seafood sourcing or put another way to exercise governance upon it (Oosterveer P & Spaargaren G 2011).¹⁶⁷

The NGOs were credited with effectiveness in achieving this in one interview:

‘Raising awareness by NGOs etc in the public domain raises in turn consumer awareness, making consumers more aware and switched on to these issues.’
Industry Advisor, trade organisation

However, this potential effectiveness, particularly of the MCS listings, has not been unchallenged. When the organisation removed mackerel from its ‘fish to eat’ list early in 2013 because of the ongoing dispute described in chapter 4, there were objections from politicians; subsequent discussions resulted in some mackerel caught by UK vessels being restored to a more positive recommendation a few months later, the international dispute remaining unresolved. Later in 2013 Seafish issued a media release contesting the MCS’s continued placement of North Sea cod on its ‘fish to avoid’ list, thus at the same time both recognising the potential impact of the rating and aiming to displace it.¹⁶⁸

Further, while Seafish provides a lot of sustainable sourcing information on its main website, this is not the case on its promotional offshoot Fish is the Dish, geared to consumers as described above. Here there has either been no mention (as accessed early in 2013) or extremely limited reference (accessed

¹⁶⁷ The MCS advice is on www.fishonline.org; the first edition of its *Good Fish Guide* was published in 2002; the Pocket Good Fish Guide and fishonline website began in 2004. Greenpeace consumption advice is on www.greenpeace.org.uk/oceans/what-we-are-doing/sustainable-seafood/sustainable-seafood-frequently-asked-questions.

¹⁶⁸ Political reaction to the MCS mackerel decision was reported in ‘Politicians condemn mackerel move’, 23 January 2013 on www.fishnewseu.com. The partial reversal was announced in the MCS press release of 16 May 2013, ‘Political stand-off reflected in fresh sustainability ratings for the nation’s favourite fish: only mackerel caught by the best method is given revised “fish to eat” rating by the Marine Conservation Society’ and according to a Seafish release of the same date, ‘Seafish comment: mackerel back on the Fish to Eat list’ came after ‘the MCS has consulted extensively with UK industry’; the fish thus reinstated was only from the South West handline fishery but other UK (and EU and Norwegian) caught mackerel had progressed to the ‘eat with caution’ category. The cod statement in ‘Seafish advises consumers to continue buying cod with a clear conscience’, 14 November 2013 on www.seafish.org is what raised the ire of George Monbiot as discussed in chapter 4.

early in 2014) to sustainability issues and the site neither endorses any certification scheme nor refers to the MCS classification.¹⁶⁹

Both MCS and Greenpeace have produced supermarket sustainable sourcing league tables; the next section gives more details but here it is relevant to suggest that at least in part the ratings may have an impact because the multiples believe that they could influence purchasing behaviour though this may be less a matter of choosing a source of sustainable fish than of choosing a supermarket with a better image.

In comparison with these NGO efforts little has been done by public authorities to promote sustainable choices by consumers. However, the DEFRA-commissioned Fishing for Markets projects mentioned in chapter 4 was geared to increasing the consumption of less familiar species in order to reduce discards and the Department also funded work by Cefas to identify which underutilised species could be safely promoted without the risk of too much fishing pressure (Catchpole T 2011). The European Commission has set up the 'Inseparable Eat, Buy and Sell Sustainable Fish' website to promote sustainable seafood consumption.¹⁷⁰

However, what results from these campaigning efforts on behalf of sustainability in relation to consumers is unclear. One study of intentions did indicate that consumers would respond positively to certified seafood products (Jaffry S et al. 2004). However, Seafish-sponsored research found the sustainability of seafood to be a peripheral issue to the majority of purchasers, one which had little impact on their decisions (Seafish 2005a). A Waitrose-commissioned survey in 2009 concluded that there was 'widespread ignorance of the issues around sustainable fishing' with 78% of those questioned making

¹⁶⁹ In 2014 the site included a page entitled 'Sustainability and labels' which said that Fish is the Dish does not endorse any labels but that eating a variety of seafood and choosing what is in season is recommended. There is also specific reassurance given on the sustainability of haddock (because MSC certified, despite no general endorsement or other mention of this certification) and of cod (on the basis that 95% comes from well-managed fisheries).

¹⁷⁰ The Inseparable website is at <http://ec.europa.eu/fisheries/inseparable/en/eat>.

no effort to purchase sustainable seafood.¹⁷¹ In a more telling test, when Unilever in pursuance of its sustainability goals substituted the then recently MSC-certified hoki for cod, partly as fish fingers, sales fell and the innovation was eventually discontinued (Porritt J & Goodman J 2005).

Recent UK research found familiarity with the MSC logo to be relatively low (30%) but when asked to choose between special offer cod and more expensive but eco-labelled hake, about half did choose the latter (Potts T, Brennan R, Pita C, & Lowrie G 2011). In MSC-sponsored research in six countries, including Britain, its label recognition averaged at 23%.¹⁷² When asked about purchasing certified fish in research focusing on sustainability objectives, only the most committed were interested and this was assessed as 'a niche aspiration' contrasting with other aims more readily adopted like minimising waste (Owen L, Seaman H, & Prince S 2007). In another piece of research which looked at various criteria of sustainable and healthy food, 'sustainably sourced fish' was rated as an important issue by 70% of respondents but only 38% said they actively sought MSC items (Department for Environment 2011). As noted in chapter 2, survey responses are not necessarily an accurate guide to what people will actually purchase. However, it has been argued that there was a longer term impact from the film about the need for marine conservation *The End of the Line* which was released in mid-2009 because research showed an interest in seafood sustainability being retained after a year (Channel 4 Britdoc Foundation 2011). Another positive indication is evidence that a premium attaches to whitefish described as more environmentally favourable 'line-caught' or carrying an MSC label in British supermarkets (Sogn-Grundvåg G, Larsen TA, & Young JA 2013). So is the survey finding that the proportion who felt they could make a positive difference to sustainable fishing through their purchasing decisions more than doubled between 2009 and 2013 although when shopping for fresh fish,

¹⁷¹ Information about the YouGov survey sponsored by Waitrose is in the 2 June 2009 press release 'Waitrose calls for a sea change on the issue of sustainable fishing as new research reveals: 72% are unaware that some fish are as close to extinction as the white rhino' on www.waitrose.presscentre.com.

¹⁷² The research carried out by AMR Marketing Research is reported on the MSC website www.msc.org, dated 4 October 2010.

respondents gave less priority to future availability than to nutritional factors (Arnold H & Pickard T 2013). Given this range of variable evidence the conclusion seems to be that some consumers are motivated to make more sustainable choices, particularly when eco-labelled seafood is offered, but that they are a minority.

Some scepticism about the extent of consumer interest in sustainability was expressed by an interviewee:

'I think there is a growing consumer pull [*on sustainability*]. I think the part which is disappointing is that I don't believe that consumers are actually prepared to pay more for it. I think that everyone talks, people talk about what they will do but when it comes to actually translating that into action, I don't believe there is compelling evidence. ... Every piece of sustainable fish because of the extra steps you're asking everyone to take to ensure it is sustainable, builds costs in.' Managing director, medium-large company

And the lack of recognition found in the surveys was echoed by a retailer respondent:

'The MSC logo which is used on packs, we had to take it off the packs because the customers weren't associating anything with it ... don't actually know what it means.' Buyer, major retailer

Nevertheless a commercial view has been that even if consumers do not show much interest it would be better to take a proactive stance for the future (Mintel 2004a). Product image could be seen to be harmed if seen as connected with environmental problems (in relation to farmed fish) (Shaw SA & Egan DN 1996). As one of the research interviewees put it:

'The phrase that I think I've heard and I think sums up where I'd be is "People want better value for their values". ... 'If you move away from the sustainability agenda you do so at your peril. And I think the more mature businesses, in whatever sector they are, all see that. It may not be the highest profile topic amongst consumers or amongst customers, retailers or distributors or whoever you deal with, but it's still there and I think that the market will be very unforgiving if business actually moves away from the sustainability agenda completely and I think that's the same in fish.' Director, large company

There is also some agreement that consumers expect brands and supermarkets to be responsible for sustainable or at least responsible sourcing (Arnold H & Pickard T 2013;Mintel 2010;Washington S & Ababouch L 2011). In British research asking about responsibility for ensuring sustainable

fisheries, 55% said it was the supermarkets (the identical proportion said fishermen while the government got the biggest vote of 63%) (Sainsbury's 2013). The emphasis on retailers seems to be particularly high in the UK (possibly shared with other European markets) as a global survey asking a similar question found only 16% pointing to seafood retailers (Washington S & Ababouch L 2011). Supermarkets can enable more sustainable decisions through 'choice editing' of what is available to buy (Jones P, Hillier D, & Comfort D 2011; Owen L, Seaman H, & Prince S 2007) and there is considerable, but not majority, public support for more of this to be done on ethical grounds (there is much less backing if health is the motive), this being a general view as seafood was not specified in the relevant question (Arnold H & Pickard T 2013).

A senior manager of one of the major retailers has been reported as saying that sustainability issues are 'too complex' for consumers to understand and should be sorted out for them by business.¹⁷³ Those commenting in the research concurred:

'They have so many other things to worry about and they just assume [*named supermarket*] is doing the right thing. And I think they assume every retailer is doing the right thing and they wouldn't be stocking anything if was unsustainable or would kill you or whatever.' Buyer, major retailer

'The first thing to say would be to say from a sustainability point of view the customer trusted [*named supermarket*] implicitly and they just felt that sustainability ... is a given. They expected it from us and they trusted us to deliver sustainability.' Category Technologist, major retailer

'When you really look in depth at the surveys, what they're really saying is: we know there's an issue out there with seafood sustainability, we don't really understand it, it's very, very complex, we get all these confusing messages, actually we just want it dealt with. Now we want it dealt with either by you Mr Supermarket or you Mr Brand-owner.' Director, large company

In addition to a focus on sustainability, NGO publicity and media coverage have been seen to give the seafood industry a poor public image and raised particular anxieties about cod overfishing. Seafish included enhancing the industry's reputation in its 2012 high level objectives because it considers

¹⁷³ The head of sustainability and ethical sourcing was quoted with this view in Smith L, 'Fisheries sustainability "too complex" for consumers says Waitrose', 16 October 2012, www.fish2fork.com.

public perceptions are of 'severe shortages of fish' and 'extreme environmental impacts'.¹⁷⁴ Similar ideas were expressed by some interviewees:

'There are certain misconceptions because obviously everybody reads about the shortage of cod and how levels are near collapse. But this is a North Sea problem, not a Cornish problem. So we have to try and educate the customers as best we can through the retailers that we haven't got a cod problem down here. Not everyone's convinced by that and a lot of people that are told there's no problem with Cornish cod will not buy it because of the general feeling about it.' Director, medium company 1

'I think also we have to work on the consumer perception that this is an industry in crisis, and it's not. There are elements that are continuing to struggle. But there's still is a reputational challenge to be got over with consumers around the world.' Director, large company

Actually research is limited and patchy on what consumers in Britain think about seafood and how, if at all, they make sense of contrasting messages about fish as a source of health and about fisheries in crisis. As noted in the previous section, people recognise fish as healthy food but may not necessarily have accurate knowledge about exactly what makes it so. A Seafish commissioned survey at the beginning of the 2000s in preparation for the seafood labelling regulations showed those involved to have a negative image of farmed fish (Gross T 2001a). Another found poor perceptions of frozen compared to fresh fish but that many people with this view nevertheless bought frozen regularly (Nevin C 2003). In the mid-2000s a study of English consumers focused on attitudes to previously-frozen and thawed fish which were negative (fillets labelled as thawed got lower ratings compared with the identical product assessed without such information); it also noted both the generally positive feelings about healthy seafood and reasons for non-consumption which were topped by cost and dislike of bones (Altintzoglou T et al. 2012).¹⁷⁵ These various snapshots are isolated pieces of information, each collected for a different purpose, mainly commercial in nature.

¹⁷⁴ These phrases were used in a presentation by Jon Harman, 'Seafood and the consumer: fish is food' given at the Seafish Conference on Seafood and the Consumer held on 9 October 2012 in Birmingham.

¹⁷⁵ The Altintzoglou et al 2012 study was carried out by the Norwegian research institute Nofima so is assumed to have been commissioned in connection with Norwegian exports of whitefish to the British market and (EU) No 1169/2011 which when it comes into force will require information about previous freezing to be divulged.

A further specific question is about consumer attitudes to organically farmed fish. EU-funded research in five countries, including Britain, found much scepticism because those questioned tended to think that 'organic' referred to a natural situation and therefore wild fish (Aarset B et al. 2004). This equation is known from other research (Mansfield B 2004b). One interviewee had a similar view, describing frustration at the realisation in contact with the Soil Association that his idea for organic fish and chips using certified potatoes and batter ingredients and sustainably caught fish would not be accepted:

'Why can't we call it organic? It's the last [*natural*] food in the world. We can't call it organic because we can't certify its food chain.' Chairman, medium wholesaler

Since the time of the consumer research (Aarset et al 2004), the situation has changed in that organic aquaculture has European-wide standards as explained in Chapter 5. It is likely that production in Europe has increased and it may be that more people eating organically farmed fish understand how it has been produced.¹⁷⁶ A later Norwegian experimental study showed willingness to pay a premium for organic and Freedom Food salmon but only if the pigmentation was similar to that of conventional salmon which was not the case for the organically-produced samples, paler because of feed restrictions (Olesen I et al. 2010) but no recent information has been found about consumer attitudes over organic seafood in Britain.

The question of trust came up in the Altintzoglou et al article because consumers in the study were aware that some fish bought as fresh had been previously frozen and defrosted but without this being stated. A survey carried out for the FSA showed consumers to be aware of a number of misdescription issues, fish along with meat and dairy products being considered the most risky both in relation to causing illness and to cheating (COI Communications & Define Solutions 2003).

¹⁷⁶ The feed manufacturer BioMar says on its website in relation to its feed for organic production 'demand for organic fish is taking off across the European continent'; this is undated but from references to various items of regulation must be no earlier than 2010; it was accessed in March 2013.

A specific test of trust relating to seafood was the revelation that as a report headline put it: 'Customers are not getting what they pay for as DNA testing reveals that shops sell millions of wrongly-identified fish products' . The investigation jointly commissioned from Bangor University by the Sunday Times and Greenpeace had in fact found a relatively modest 6% of samples with wrongly declared fish such as pangasius in a pollack product and Pacific cod declared as Atlantic cod, the implicated samples having been obtained from six, including the four leading, major retailers. It may not be a coincidence that a month before this investigation a survey carried out by the Food Safety Authority of Ireland (FSAI) found a considerable minority of fish products to be mislabelled.¹⁷⁷ This was not the first time analysis had shown such deceptions. An FSA investigation found that up to 15% of salmon and 10% of sea bass and sea bream labelled as wild were actually the product of farming (FSA 2007).¹⁷⁸ An Irish study had found as many as 39% of samples wrongly labelled (Miller DD & Mariani S 2010) and other such frauds have been documented further afield (Jacquet JL & Pauly D 2008). Nevertheless, the extent of mislabelling in Britain seems relatively low. One study found that less than 1.5% of fish fingers tested were other than the species claimed (Huxley-Jones E et al. 2012). Two-country research which demonstrated 7% mislabelled products in the UK (similar to the Bangor University results) found a much higher rate of falsification in the samples from Ireland, 28%; intriguingly while the Irish ones were cheaper whitefish labelled as cod, the British ones included several in which Atlantic cod was presented as the cheaper and more sustainable Pacific cod, which it was suggested, related to greater environmental awareness in this country or alternatively a possible disguise for illegal fishing (Miller D, Jessel A, & Mariani S 2012). DNA testing has also been carried out to validate MSC certification, finding very low mislabelling rates of less than 1%; almost three in ten of the samples in one exercise had

¹⁷⁷ The Sunday Times report was published on 24 April 2011 by Leake J and Dowling K as 'Fishy labels: what's really in that pack of haddock?' The FSAI survey is reported in '19 pc of fish mislabelled: survey', 31 March 2011 in the Fish Information & Services website, <http://fis.com>

¹⁷⁸ The FSA report also covers a separate investigation in fifteen local authorities on compliance with the fish labelling regulations and found that 29% of samples examined did not supply all or some of the information required.

been obtained in the UK, 28% in another (Marine Stewardship Council 2012; Marine Stewardship Council 2013a).

It is instructive to compare the impact of the Bangor research which was published in a national newspaper against the 2013 furore over 'beef' products found to contain horse and pig meat (the first revelations of the latter also having been produced by the FSAI). Unlike the 'horsemeat scandal', the fish issue was successfully entitled a labelling failure; it seems not to have been widely reported nor to have aroused public emotion. By contrast, the attempt to regard the meat products findings as purely a labelling issue did not seem to convince the public and the substitutions were widely discussed as a betrayal of trust, causing some major players to make significant changes in their supply chains. Thus general confidence in fish as a food apparently is not affected by such incidents and fish seems to be altogether a less sensitive area than meat.

This section has looked at research on consumer attitudes to fish and at various attempts to affect seafood consumption, whether to increase it or to shape it in the cause of sustainability, in either case engaging with complex social and cultural attitudes. What happens when the seafood health discourse based on science and commercial interests interrelates with the complexity of socially and culturally influenced food choices? Much of the answer lies in the delivery to consumers through both retail and foodservice channels, considered in the next two sections.

6.5 Retail and the Governance of Consumer Supply

Purchase and consumption of seafood are mediated in different ways by the retail and food service systems. How these arrangements have changed over the last half century has some specific features while also being related to the supply chain changes that took place in relation to all fresh foods and have been subject to certain governance influences as well as having governance impacts on consumers.

At the end of the 1950s there were about 15,000 fishmongers and 17,000 fish and chip shops in the UK with some overlap between them (White Fish Authority 1959). That piece of information encapsulates a very particular aspect of seafood consumption, the extent to which it has consisted of fish cooked outside the home and purchased in takeaway form. Fish selling was not infrequently combined with either poultry or with other foods but was sufficiently distinctive to be described as deploying craft skills and to be considered by those involved as 'a career with a thrill in it' (National Federation of Fishmongers 1955). Although most fishmongers are assumed to have been single shopkeepers, many high streets featured one of the MacFisheries chain of shops of which there were 420 by 1956, part of a vertically integrated company which included fishing trawlers and a wholesale fish business (Chaloner WH 1971).

Seafood has been the last category of fresh foods to be absorbed by the supermarkets. Initial attempts in the 1960s were unsuccessful because factors like short shelf life could not be overcome at that stage but efforts restarted in some larger stores in the late 1970s with the innovation of modified atmosphere packaging (MAP) (Goulding I 1985). The change from use of a wholesale market to a supermarket's own distribution system that this entailed was described by one of the research interviewees:

'Historically, [*named supermarket*] used to get a lot of supply from Billingsgate to supply all their London stores. But then they decided they want to go to central distribution, and again that was all about cost saving. But of course, one of the problems with fish if you want to keep it really well you need to keep it on ice, one of the problems with ice is that ice melts. Difficult to put on a lorry taking cheese and god knows what else to the store, ice melting all over the floor. So [*they*] made a decision, and that's been followed by quite a few of the other supermarkets now, they will move away from the old traditional way of distributing fish and they would now distribute it with a thing called MAP packaging, modified atmosphere packaging. When they decided, [*they were*] the first people to do it and when they went across to MAP packaging of course we didn't have the facility to do it at Billingsgate so they took the order away.' [*After the interviewee wrote a critical piece about this for a trade paper the retailer complained.*] 'What they were unhappy about was that I was letting the cat out of the bag, that their supposed fresh fish was no longer fresh fish, it was actually MAP packaged fish.' Trade organisation representative 1.

The development of frozen fish had also extended the retail options for fish which could now be stocked by general grocery stores (Chaloner WH 1971). Meanwhile MacFisheries developed into a general supermarket chain during the 1960s and 1970s but failed to compete successfully and after it was sold off at the end of the latter decade its remaining wet fish shops were all closed.¹⁷⁹

Fishmongers had sharply reduced to 4,800 by 1971 (Rosson P 1975). Nevertheless, 1991 market analysis indicated that fishmongers still sold 42% of fresh fish and the supermarkets only 28%; (the 27% listed as 'other' is assumed to have been sold through mobile vans and by stalls); however, the supermarkets dealt with most tinned and frozen fish (LeGrand L 1992). By 1995 supermarket fresh fish sales were up to 61% (Murray AD & Fofana A 2002). At 2005 there were just under 1,300 fishmongery outlets all told, including mobile fish vans and market stalls, with 85% of chilled and frozen seafood being sold by supermarkets (James E (Ed) 2006; Seafish 2005b).

The problem of achieving quality and the correct handling of fish have been issues at the retail end just as has been tracked in all the preceding stages of the supply chain. A mid-1960s account said that many fish shops were dirty, unhygienic and in disrepair, categorising the fish sold in them as ranging from good to poor in quality (Burgess GHO, Cutting C, Lovern JA, & Waterman JJ 1965). Two Seafish surveys in 1983 which involved analysis of hundreds of samples found low standards of freshness with a fifth falling below acceptability levels. Although too few in number for statistical significance, the best results were achieved by mobile traders, attributed to faster turnover from their active sales techniques. On the negative side particular concerns were noted about the low scores for MAP pre-packed fish sold by supermarkets despite sell-by dates being observed. The ratings for cleanliness and general

¹⁷⁹ Information about MacFisheries is on www.macfisheries.co.uk/, accessed on 11 October 2012.

appearance were in reverse to the quality of products with supermarkets scoring highly and mobile sellers poorly (Myers M 1983).¹⁸⁰

Seafish again functioning in its role of quality promoter, subsequently issued guidelines for retailers emphasising the need for better temperature control and proper use of ice; the document linked decline of fish eating in the previous quarter-century to the poor quality of so much sold, the only source that has been found to make this connection (Seafish 1987). In addition it appears that Seafish developed a specific code of practice for producing and handling MAP fish as this is mentioned in the 1983 report.

Standards had evidently improved greatly by the time of the Seafish-commissioned research in the mid-2000s because consumers questioned thought that independent fishmongers provided better quality than the supermarkets. Consumers gave a higher valuation to good hygiene than fishmongers appeared to do and also rated choice and the expertise and advice of personnel in these outlets (Seafish 2005b). It seems from this work that there might be a long-term place for independents to continue in tandem with supermarket supply, fishmongers competing on quality, stalls and vans on price. Some shops also supplied restaurants in addition to selling directly to the public.

Seafish has been involved in one specific quality activity geared to retail which was the development together with the Billingsgate Seafood Training School of a fishmongery course which is now offered by all the four teaching institutions that make up the Seafood Training Academy. The course is used by independent fishmongers and by at least one supermarket chain to train fresh fish counter staff.¹⁸¹

The 1980s survey mentioned above provides evidence that the retailer chains have not always provided a high quality of seafood. However, since that time

¹⁸⁰ The terminology used in this report is 'controlled atmosphere packaging' (CAP) rather than MAP.

¹⁸¹ Information about training provided to a named major retailer was given during a visit to Billingsgate on 10 November 2009.

their standards have risen in general. As described in chapter 4 in relation to seafood processors who deal with supermarkets there are systems in place to ensure that those standards are met. Some of the interviewees thought that supermarkets deserved credit for improving quality:

‘In this day and age, the way that the retail markets have driven the supply chain down that continuous improvement route has meant that quality management controls generally, food safety and traceability standards have increased tremendously because of the demands that the retailers have put on in terms of factory standards and going for things like BRC accreditation which is pretty much the norm for anyone who wants to supply the retail market and big wholesalers as well.’ Industry Advisor, trade organisation

‘What the retailers are doing is raising the bar all the time, fighting the consumers’ cause because again they don’t want to be on Channel 4 *Despatches* next week. It’s the power of, power of the consumer, power of the press. The supermarkets’ own label being as popular as it is, and supermarkets putting their name to it, they don’t want to make anyone ill, they want to make a good product. So all the time raising the bar with suppliers in terms of standards that we must adhere to.’ Commercial manager, medium-large company

But others disagreed:

‘Some are purely interested in quality. Others are much more interested in lots and lots of paperwork. Retail is much more interested in paperwork, and price, than anything else.’ Site manager, medium-large company

‘It’s like when you go to the supermarkets, I’ve seen what the fish is like. It’s all off, you see it, it’s all off and it’s not right, they sell that ‘cos it’s the right temperature but it’s all rubbish what you see on the supermarkets, it’s just all rubbish. It’s not fresh. They put it in the packages but it’s not fresh. It lies in own juices there, not good for it.’ Managing Director, small company 3

The view that supermarket quality is not necessarily high was supported by a recent piece of investigative journalism in which Torry ratings were applied to samples of cod, plaice and salmon purchased from the largest four supermarkets. The majority were found to be just at or below the level considered acceptable for consumption but comparator samples from a single fishmonger had noticeably higher scores.¹⁸²

¹⁸² See Prince R, ‘How your supermarket “fresh” fish can be THREE [*upper case in the original*] weeks old: seafood bought from the big four was only two days away from rotting’, 17 November 2013, *Daily Mail*. This was a very small survey of twelve samples from supermarket and three from a fishmonger and the results can only be considered as indicative.

The quotation above referring to the Channel 4 investigative programme *Despatches* illustrates reputational threats for supermarkets, with resulting pressures to prioritise food safety. The quoted interviewee and a retailer respondent made these concerns explicit:

‘In food as you know there’s been more and more scares. So again, us and the supermarkets are trying to foresee some of these, what are the issues of the future, what can we do to put things in place to deal with those. At the end of the day it’s making our food safer,’ Commercial manager, medium-large company

‘And it’s more the case that if there is some kind of scare in the industry, we want to make sure whatever it is, we are absolutely 100% whiter than white.’ Buyer, major retailer

Hence there is a drive for supermarket suppliers to have BRC food safety accreditation as described in chapter 5. The multiples need to respond to any safety issue and an example is the FSA investigation of mercury in imported fish and shellfish. Its report, mentioned above, appends statements from four of the major retailers, all emphasising that their suppliers routinely monitor mercury levels.¹⁸³

The multiples’ drive for quality generally has been attributed to consumer demand (Marsden TK, Lee R, Flynn AC, & Thankappan S 2010). However, one of the interviewees took a different view:

‘In terms of quality supply the retailers, depending on who they are, different aspirations, all say we want higher quality, our customers demand the highest possible quality and we want to be the highest possible quality. In actual fact they don’t really care. They do set certain parameters which the supplier is obliged to meet and they are quite stringent and quite strict. Albeit they don’t really care because profit and market share control what they do and if they find they are losing either of those ... they will modify their purchasing strategies accordingly and they will cut corners for the commercial results they are seeking to achieve. But of course they will always say we want highest quality because that’s what our customers say they need. Their customers haven’t got a clue what they’re buying. It’s a total con.’ Trade representative
3

Apart from safety and quality, the role of supermarkets has been significant in enlarging the range of seafood products available to consumers but no

¹⁸³ The statements were from Asda, Morrisons, Sainsbury’s and Waitrose, reproduced in FSA Food Survey Information Sheet 40, *Mercury in Imported Fish and Shellfish, UK Farmed Fish and their Products*, 2003.

information source has been found to track this. The readiness of some consumers to eat a wider range of seafood was noted in the previous section; hypothetically, there must have been a series of symbiotic moves in which retailers with their suppliers have trialled new options and consumers have, at least some of the time, responded favourably. Fresh/chilled salmon, fresh tuna and warmwater prawns, now top sellers, have only become generally available in recent decades. The supply factors discussed in chapter 4 have been responsible for such availability but the supermarkets' distribution systems have made mass market purchasing possible. In addition, a great number of seafood prepared meals and other types of ready to eat dishes in both chilled and frozen form have been made available by the multiples.

Retailer information is one route to influencing choices and specific promotions can be effective; one supermarket has initiated Switch the Fish events in which it gives away fish from certain less often eaten species; sales of these varieties increased in subsequent months (Future Foundation 2012). Another has explained the greater ease of promotions with farmed fish which can be better planned in advance (Tesco 1999). Demonstrating the impact of marketing, another retailer was credited by a processor in the research with changing the fortunes of one species; previously a 1990 report on the once huge Cornish pilchard fishery noted it had reduced to less than 600 tonnes a year for human consumption, much of it exported, and rehearsed twelve constraints which would make development of the market difficult (Eurographic Ltd 1990) but a few years later when re-branded as 'Cornish sardines' fish sales took off:

'[named supermarket] have done all the scientific research, good enough for me. Since they done that, the Cornish sardine fishery is quite big. ... We sell 100 kilo a day whereas we couldn't sell 100 kilo a year previously.' Managing director, small company 7.¹⁸⁴

¹⁸⁴ The story of the change from pilchards to Cornish sardines is told in Stummer R, 'Who are you calling pilchard? It's "Cornish sardine" to you', *The Independent*, 17 August 2003 and in a report on the BBC Inside Out South West programme 'Pilchards' on 30 January 2006. In these accounts credit for the transformation is attributed differently, to a local processor; regardless of the exact circumstances which have not been fully established it is certainly interesting that the quoted individual gave all the credit to the named supermarket. The transformation of the Cornish sardine has subsequently been sealed by the fishery and product achieving MSC certification and PGI designation respectively.

The success of three new species which have joined the top whitefish species as the nation's favourites bears further reflection. Considering the work of Gofton and Marshall discussed earlier about the place of fish in meal construction and the importance of the notion of substantialness, it is surely not by chance that it is the pink or red salmon, tuna and prawns that have been found appropriate by British consumers for incorporation into meals as a main protein and meat substitute. The prestige value of fresh salmon, a luxury item before farming brought availability and price within everyday reach, and the familiarity with canned salmon and tuna must also have played a part. Thus changes in consumption have resulted from the conjunction of supply and distribution factors with the social and cultural ideas of consumers.

In addition convenience of presentation has been a factor in extending the attractiveness of these options. As one of the respondents said:

'Fish was in the old days presented with lots of bones; the majority of fish is now presented either skinless and boneless or certainly boneless. It is also presented in a form that people of a culinary bent can still cook it so it's more convenient now than it ever was and I think that's why it's increased.'
Managing director, medium-large aquaculture company

This was in keeping with a 1999 statement by one of the leading supermarkets about convenience. It reported rapid growth in sales of packaged fish, particularly of prepared cuts where bones and skin have been removed (Tesco 1999). Another retailer noted increasing preference among its customers for convenience products like coated and smoked fish, overtaking sales of the raw form (Asda 1999).

The way the retailers both test the willingness of their consumers to buy different things and meet their desire for convenience was described by a retailer interviewee:

'There's a big increase in trout and again that's coming from younger customers because we're adding value to things like trout in a way that young customers aren't scared of, adding butters and showing them how to de-bone the trout and things like that.' Category technologist, major retailer

A general driver in the food market has been a constant emphasis on new products and innovation. Very different from the public sector efforts at

product development outlined in the previous section, an account of the procedure followed was given by one of the research participants, describing a process of interchange between the seafood processor and a major retailer customer:

'We have people dedicated to new product development all the time. Whether they come up with new sauces or new impact formats.' 'With [*named supermarket*] for example we will send down maybe twenty or thirty new products for them to look at. And they will come back and say they would like to progress on two or three. And we go through a proper review with them of what it will be, what it will look like, what the selling price will be. And you go through all that and then they will say yeah we'll try that or don't like that.'

Director, medium-large company

Differences of view about the drivers of innovation in the current food system were outlined in chapter 2. What is the driving force for innovation in the UK seafood category would certainly be a question worth pursuing but all that can be done here is to outline the context. At present there are two leading seafood brands, Young's and Birds Eye, competing mainly on frozen lines with the varying chilled and frozen own-label products of the leading supermarket chains. These add up to a number of product types, each of which would need to be separately analysed in order to assess primacy and market success. A study based on scanner data in two areas of Britain found that the best known brands, Bird's Eye and Youngs, did obtain a premium price over own-label products but that other national marks sold at a relative discount, suggesting that national seafood brands retain significance (Roheim C, Gardiner L, & Asche F 2007). This then needs to be compared with the results of processes such as described in the quotation about new product development just given about how an own brand manufacturer undertakes research and development in conjunction with the retailer.

One issue that does seem to motivate all the major retailers to some degree is sustainable sourcing, thanks in great part to effective NGO campaigning. Greenpeace launched its operation in 2005 with a report critically reviewing the sourcing policies of the top nine seafood retailers (Greenpeace 2005). Its 2006 stunt to put pressure on one supermarket chain made a deep impression including the fact that it did result in a sourcing change as reflected in one (albeit critical) interview comment:

‘Greenpeace sitting on roof of Asda’s building, that’s unacceptable behaviour as well. Yes it gets the headlines, gets Asda to say it will stop buying North Sea cod. It’s like plastic bag issue in supermarkets, it’s over-simplified by the media. So that’s all people can take in.’ Commercial manager, medium-large company¹⁸⁵

Just one year later, the NGO was able to report considerable change: all the retailers had produced sustainable procurement policies and progress being made towards removing unsustainably fished species from their shelves (Greenpeace 2006).

The league tables rating the multiples on sustainable sourcing which Greenpeace included in its two reports have proved to be an effective tool of governance. It has been picked up by MCS which has begun to produce such rankings on a survey basis biennially.¹⁸⁶ The quango National Consumer Council and successor body Consumer Focus also produced retailer rankings on ‘sustainable fish’ as part of a general assessments of performance on environmental criteria in three reports (Allder J & Yates L 2009;Dibb S 2006;Yates L 2007). Farmed fish welfare is a factor in the Compassion in World Farming (CIWF) periodic Most Compassionate Supermarket assessments.¹⁸⁷ All the ratings recognise the long-term efforts that some of supermarkets have made and may motivate others to do more, thus exercising a governance impact upon them. At the same time they actually assist retailers who are competing on quality because it gives their claims validation from publicly trusted sources.

Both supermarkets represented in the interviews referred to the MCS ranking (but neither to the CIWF one). One of them mentioned the need to take note of where it stood in the MCS ranking, illustrating the importance attached to this assessment and hence acknowledging its governance impact:

¹⁸⁵ Confirmation of the Asda decision about North Sea cod can be found in news item ‘Fishermen’s leader hits at cod policy as ASDA moves species off shelves’, www.fishupdate.com, 29 March 2006.

¹⁸⁶ The MCS Supermarket Seafood Surveys 2006, 2011 and 2013 can be accessed on their website, www.mcsuk.org.

¹⁸⁷ For the CIWF supermarket ratings which were produced for 2003/04, 2005/06 and 2010 see (Pickett H 2006;Pickett H & Burgess K 2003) and ‘Farm animals are winners in UK supermarket awards’, 27 July 2010 on their website www.ciwf.org.

‘The MCS do a league chart, the ranking thing, now that will go to press. We came out quite well in it, we were quite pleased with it. Things like that will happen, something that goes to the press ... and we want to make sure we’re fine for anything like that. We need to be doing the work behind the scenes so if anything does come up then we know we’re fine with everything.’ Buyer, major retailer

However, other retailers when they have a choice are resisting the governance implicit in such NGO rankings. For the MCS 2013 survey, the same number of supermarkets declined to take part in the survey as completed the questionnaire, including two of the big four. Predictably the chains that have performed worst in the past have been least likely to co-operate in the exercise, indicating limitations to an NGO’s ability to affect them.

Greenpeace started a new campaign in 2008 focusing on tuna (Greenpeace 2008). It had already noted a problem in the retailers’ sustainable sourcing policies applying to own-label ranges only and not to branded lines such as canned fish (Greenpeace 2006). Public awareness over tuna (and other seafood sustainability issues) was raised by the film *The End of the Line* which its producers used as a tool in extensive lobbying activity (Channel 4 Britdoc Foundation 2011). In a 2011 follow-up report Greenpeace recorded that three of the multiples sourced all their own brand tuna from pole-and-line operations (Greenpeace 2011). In that year the campaign was supported by the inclusion of tuna issues in the Channel 4 programme *Hugh’s Fish Fight*. The 2012 report, *Changing Tuna: How the Global Tuna Industry is in Transition to Sustainable Supply*, reported not only that the remaining major UK retailers had committed to switching to pole-and-line tuna by specific dates but further that the companies producing the two main brands sold in Britain (Princes and John West) had also committed to this change (Greenpeace 2012). This has been a striking achievement and Greenpeace, the Fish Fight campaign and *The End of the Line* film may all share some credit for a successful exercise in governance with a massive impact on improving sustainable sourcing by

British retailers.¹⁸⁸

Another example of campaigning to influence supermarket purchasing practice concerns farmed prawns. The 2013 edition of *Hugh's Fish Fight*, again on Channel 4, included an item on unsustainably produced feed which reportedly resulted in 40,000 tweets being sent to retailers about prawn production. A few months later, seven of them undertook through the BRC to deal with the issue.¹⁸⁹

The MCS's traffic light sustainability classification which has already been noted as making a direct appeal to consumers, has a bigger impact through affecting retailer sourcing especially as sale of items classified as 'fish to avoid' (category 5 in one version) has been a key factor in lowering position in both Greenpeace and MCS rankings:

'So really it's about working with the best, avoiding the worst and that is primarily we would say avoid anything on our banned list and avoid any that are on the MCS fish to avoid list.' Category technologist, major retailer

'There's all the sustainability matrix that we go through with the supplier before we even agree to list anything.' 'So for example on a fresh fish line the first thing to decide would be what grade MCS says, Marine Conservation Society. So anything grade 5 we do not stock.' Buyer, major retailer

The argument has been made in relation to a similar fish list in another country that even if the lists of what are recommended to eat or shun have little direct

¹⁸⁸ The three at 2011 were Marks & Spencer, Sainsbury's and Waitrose. The commitments reported in 2012 were Tesco (aim 2012), Morrisons (aim 2013) and Asda (aim 2014); Mitsubishi, owners of the Princes brand has made the commitment for 2014 and Thai Union, owner of John West, for 2016. Princes agreed to remove claims from its cans that it used fish caught sustainably after it was featured critically in a *Hugh's Fish Fight* programme and Greenpeace referred the company to the Office of Fair Trading: see Hickman M, 'Fresh triumph for ethical tuna fishing campaign', 12 April 2011, *The Independent* which pays tribute to 'one of the most successful campaigns in years'. However, it subsequently appeared that some of these commitments might not be kept and the Greenpeace 2014 ratings includes criticisms as well as plaudits: see Densham A, 'From win to bin: our 2014 tuna league table', 28 February 2014 on www.greenpeace.org.uk.

¹⁸⁹ The tweet campaign and retailer response are reported in Ford R, 'Farmed prawns cleanup underway as supermarkets tackle Fish Fight concerns', 8 July 2013, in *The Grocer*, (www.thegrocer.co.uk). The item explained that the BRC had set up an internal Fishmeal Working Group which intended to embark on wider discussion via the International Sustainability Unit, an organisation under the patronage of the Prince of Wales.

effect, the publication is an important communicative and trust-building instrument which aids sustainability (De Vos BI & Bush S 2011). The examples here of close interaction between the MCS and the two retailers represented in the research in relation to the advice lists bears out this reflection.

The MSC certification scheme is also central to supermarket seafood sourcing. In fact the multiples have been described as dominating discussions in the formative stage of the programme with an 'overwhelming desire for this sort of labelling' (MacMullen P 1998) (p36) and similarly were amongst those who urged WWF to set up what became the ASC as noted in the preceding chapter. Both of the retailer interviewees referred to their confidence in the MSC:

'We do believe firmly in the MSC and that centres around the original formation of the MSC, being a multi-stakeholder group and there was plenty of opportunity for everyone to almost feed into the development of those standards. We do think it's a fair standard and we don't currently see any other standard that would be deemed as an equivalent.' Category technologist, major retailer

'The MSC, their accreditation system that we consider to be the gold standard of sustainability.' Buyer, major retailer

They also mentioned a range of approaches taken as part of their sustainable sourcing policies:

'And then we look at catch method, there are certain catch methods that we exclude, beam trawling, cyanide, that kind of thing. So some catch methods we'll exclude straightaway.' Buyer, major retailer

'From a responsibility point of view we are looking to increase the amount of lesser known species that we sell.' 'We are also looking to increase in the amount of aquaculture that we take from but on that front we do need to be careful from a feed point of view, on the feed that is used for aquaculture, making sure that there is ... sustainability concerned with feed.' 'Sustainability was always part of our decision-making process, we have had a sustainable fisheries policy for over a decade so we were taking it seriously quite a while ago.' Category technologist, major retailer

Another variant is the published scheme of a British supermarket which has its own traffic light rating developed through interchange with environmentalists as well as with the seafood industry. MSC certified seafood is preferred but if that

is not available the ratings are applied (Washington S & Ababouch L 2011) (p44).

Such attention to environmental criteria has not always been evident and one interviewee had a disillusioned story to tell about the clash between sustainability and price for one supermarket chain which changed from pole-and-line caught to cheaper purse-seine capture tuna in the mid-1980s. (However, in a more recent period this same retailer has changed back to the more sustainable option.) So there was a critical perspective on the supermarkets' sustainability efforts on the part of some of the (non-retailer) research participants:

'Certainly the buyers don't want to be seen to be sourcing fish that isn't squeaky clean. Because it's a PR disaster waiting to happen. You have got that, because the movement has gathered real momentum. They wouldn't want to be the one to be seen to step out of line, the PR effect would be quite damaging.' Managing director, medium-large company

'With the credit crunch 18 months ago, at the beginning of that, the retailers, sustainability went out of the window and economics became the prime mover. All of the retailers moved from cod to haddock and that was not a sustainability issue, that was purely and simply an economic issue. And now that the price of haddock has gone up they're all back to cod.' Site manager, medium-large company

With the varying motives involved, an overall judgement was perhaps best delivered by this mixed interview reflection:

'The UK retailers ... are very, very interested in sustainability but in all honesty some of that is about their own general environmental credentials as opposed to passionate commitment to the sustainability of fisheries per se. And it does vary. The UK retailer I've found is amongst the most committed around the world. The UK has led the sort of pole side of sustainability from the marketplace more than anywhere else.' Director, large company

While not only pressure on retailers for sustainable sourcing but also advice on what to source has clearly come from NGOs, there is also an important contribution from Seafish. The organisation has since 2007 produced species-based 'responsible sourcing guides' and also general introductions to the subject, addressed to seafood buyers. The first specific guides were for cod, haddock and coldwater prawns and at 2013 there were thirty-four guides for individual capture species and four dealing with farmed seafood. Each

presents what the industry regards as a balanced view of sustainability issues including information on the biology of each animal, the state of specific stocks, conservation measures in place and seasonal patterns; an added advantage is that the guides are kept updated. No reference to the use of these sourcing guides was made in the two retailer interviews or has been found in relation to retailers in general but it would be unlikely if they were not consulted by many of those with seafood purchasing responsibilities (and this would be equally relevant in the foodservice sector). Recently an interactive guide to certification schemes has been added to the Seafish website with the facility to filter types of issue under the headings environment, social welfare, animal welfare and food safety and it can also distinguish between business-to-business and consumer-facing programmes.

In 2011 a new initiative, the Sustainable Seafood Coalition, formed with the ambitious overall goal that all seafood sold in Britain should be from sustainable sources. Instigated by the NGO ClientEarth but with membership consisting of seafood companies and major retailers with some food service involvement, trade bodies and the addition of campaigning Hugh's Fish Fight, the organisation represents the entire supply chain downstream of (but not including) primary producers. The mechanism for promoting sustainability is intended to be voluntary codes of conduct, planned so far to be on responsible sourcing, on diversifying the market with a wider range of species and on accurate labelling particularly in relation to environmental claims. The organisation also has a lobbying role in relation to UK and EU policies. A consultation draft of the labelling code (intended to apply to menus and website information as well as to retail packaging) was issued in 2013; it includes definitions of 'sustainability' and 'responsibility' which, when the document is finalised and put into practice, should ensure better consistency about such claims in the future.¹⁹⁰

¹⁹⁰ Information about the organisation is on <http://sustainableseafoodcoalition.org>. The starting point for the initiative was an investigation into claims of 'sustainable' or 'responsible' sourcing on seafood products which assessed a number to be misleading or unverifiable (ClientEarth 2011).

Some of the multiples have already worked for many years on sustainable sourcing while others appear to have been motivated more recently by Greenpeace. Either way, retailers have complex rationales for such policies. As with Unilever when it jointly set up the MSC, they have a sensible self-interest in working to ensure future supplies of fish. Promoting less-well known species to reduce discards of those same fish and relieve cod is also a mechanism for selling more seafood and getting ahead of competitors in what is offered to shoppers. The supermarkets are in part responding to the environmental NGOs and a concern about green issues among a section of consumers and in part working on their image and standing as socially responsible organisations, important in maintaining the trust of customers.

However powerful the retailers are, it should not be forgotten that like all food businesses they are subject to public regulation, also applying to fishmongers and other retailers of seafood. In addition to the *Food Safety Act 1990* with its due diligence principle, food retailers are subject to the European General Food Law Regulation (EC) No 178/2002 and related legislation with the same requirements relating to registration, food hygiene and traceability as other operators. The *Food Labelling Regulations 1996* and related obligations are also significant for retailers. As with other food businesses, larger companies are expected to self-regulate and local monitoring and enforcement concentrates on smaller concerns (Hutter BM 2011). However, prosecutions against the major retailers brought by local authorities demonstrate that supermarkets continue to be subject to active public regulation which remains a necessary backstop to private and self-governance.¹⁹¹ Small and medium-size businesses (SMEs) are particularly reliant on EHOs for information and

¹⁹¹ See the following stories relating to out-of-date food on sale, selected to provide examples relating to the top four supermarkets at 2012: 'Asda fined for out-of-date food' (in South Wales), 23 May 2007, BBC News, and 'Asda fined £36,000 for selling out-of-date food' (in Staffordshire), 30 September 2008, www.birminghammail.co.uk; 'Store fined over out-of-date food' (Morrisons, in Eccles), 15 February 2007, www.manchestereveningnews.co.uk and 'Halifax supermarket fined over 17-days out-of-date food for sale' (Morrisons), 27 July 2007, www.halifaxcourier.co.uk; 'Sainsbury's branches fined over out-of-date food' (in London), 10 January 2008, www.thisislocallondon.co.uk and 'Sainsbury's fined for selling out of date food' (in West Sussex), 14 May 2009, www.wscountytimes.co.uk; 'Tesco fined over out-of-date food' (in South Wales), 23 January 2008, BBC News, and 'Tesco fined for sale of out-of-date goods' (in Bracknell), 14 May 2011, www.thegrocer.co.uk.

advice in relation to food safety legislation and indeed been described as driven to compliance by these enforcement agents (Fairman R & Yapp C 2004); (the study dealt with retailers, takeaway shops and caterers).

In contrast to the multiples, this retail section finally turns to examples of short chains which connect consumers directly with producers in the provision of seafood. A number of firms in the project database of companies, more than a tenth of the total, had a retail shop and/or a mail order service to the public. Some of these concerns had their own fishing boats, one was a shellfish farmer, others primarily carried out primary processing and distribution while yet others produced smoked fish. Finally a new initiative which started in 2013 links member-consumers to local fishermen; the former pay for a share of the catch in advance and receive a weekly box of seafood from the latter.¹⁹²

This section has provided an account of changing patterns of seafood retailing which, as in the rest of the food system, has eventuated in supermarket domination. The multiples have been key players in both the improvement of quality and the increase in range of seafood sold, whether of diversified species or in terms of various convenience formats. In this way they have changed seafood consumption; from a health point of view increasing seafood purchasing by making it easier and more convenient has been valuable but the type of seafood sold has not necessarily been the oily fish most beneficial except for the (coincidental) major increase in salmon availability.

As with all food operators, supermarkets are publicly regulated but as the most downstream party in the supply chain, not privately governed. However, they have been the object of environmentalist campaigning which has been successful in producing change in a short period of time. As a result, seafood sustainability has been increasingly incorporated into retailers' business objectives. This then changes consumption through choice editing. Such commitments may be expected to intensify pressure on the rest of the supply

¹⁹² The scheme called Catchbox is reported under the heading 'What's the catch?', 15 March 2013 on www.fishnewseu.com, has a website www.catchbox.coop and serves Brighton, Chichester and Worthing. It is modelled on Community Supported Fisheries projects in the US.

chain which is likely to manifest in increased demand for certifications for both capture and farmed seafood.

6.6 Foodservice and the Governance of Consumer Supply

There is agreement that consumption outside the home is relatively more important for seafood than the other forms of protein but it is not easy to establish the proportions that apply. A source from the mid-1980s reported that the domestic and catering markets were the same size (Goulding I 1985) and one from the mid-1990s had a similar assessment (Backman P 1996). Market research from the early 2000s stated that of all forms of protein, seafood was the most likely to be eaten outside of home (Seafish 2003b). These three indications do not match the consumption statistics from food surveys discussed in section 6.2 in which only 5%-8% of seafood consumption was outside the home, or if takeaways are included 11%-14%, in the years 2001/02 to 2011. These inconsistencies are no doubt due to different definitions of both the seafood base (the assessments of larger proportions outside the home are probably based just on fresh and frozen fish) and of what counts as eating out; fish and chips seem to occupy a special space between home and outside eating. But regardless of the exact figures it still seems to be case that a relatively high proportion of fish and shellfish is eaten outside the home and this accords with evidence discussed in section 6.3 about unease over cooking fish felt by many consumers.

While seafood may be offered in all forms of foodservice it is unusual in having certain more specialised delivery channels although the boundaries are never sharp. The most dominant has been 'fish and chips' as a distinct type of food with what is to some extent a separate supply chain. There are also a small number of specialist seafood restaurants. An analysis of the top five seafood species consumed outside the home in 1999 showed that 30% was delivered via fish and chip shops, another 30% by the cost sector (including staff canteens, the NHS and schools) while the remainder came in restaurants, pubs and other eating places (Seafish 1999).

A sub-set of the seafood companies database compiled for this research consists of fifteen foodservice related businesses. Six supply the fish and chip trade, four are chains of fish and chip shops and five are chains of (mainly) fish restaurants. Two of the interviewed processing companies turned out to have a fish and chip customer base wholly in one case and as one major strand (in a sub-company) in the other. These firms partly delineate the separate delivery and consumption system for seafood.

Fish and chips developed in the late nineteenth and early twentieth centuries along with the new mass availability of trawler-produced whitefish and became a long term feature of the working-class urban diet (Walton JK 1992). It has continued to be popular and in the mid-2000s fish and chip shops were still the most patronised of all eating-out options, accounting for a third of seafood dispensed in the profit (non-institutional) foodservice sector (followed by restaurants with a quarter and then pubs and hotels) (Mintel 2004b; Seafish 2003b).

Distinct elements of supply, distribution and delivery to the consumer make up what can be considered as a fish and chip supply chain. Most of the fish, primarily cod and haddock, is supplied to the shops in frozen form, whether as frozen-at-sea fillets or fish that is just headed and gutted at sea before being frozen and shipped to China where it is defrosted, processed further and refrozen. Although a minority of fryers do use fresh fish, frozen is the norm. From the early development of the trade, frying fish came from Icelandic and Faroese waters and with the major addition of the Barents Sea as a source this is still the case to a considerable extent but now the fishing takes place from non-British boats, for reasons explained in chapter 4. A standardised product is delivered to a set of trade sizes and the whole system shows considerable industrialisation of the wild fish base.¹⁹³

¹⁹³ There are a set of accepted sizes for cod and haddock fillets in the trade: 3 to 5, 5 to 8, 8 to 16, 16 to 32 and 32 plus and these are in ounces, a testimony to the long-lived British market. More recently, 'tight grades' have been produced by some companies: 4 to 6, 6 to 8, 8 to 10, 10 to 12. In addition, the specification can be skin on or skinless, pin bone in or boneless.

The second element of the system consists of specialist wholesalers which provide a one-stop service. In addition to fish they can supply not just the frying medium and batter mix but drinks, a range of other fast food items which are increasingly offered by fish and chip shops (such as sausages, pies, burgers, pizza), cleaning materials, packaging and even catering equipment. There are a few seafood processing companies which focus on selling fish to fryers and they may prepare it to order but the wholesalers supply fish only in frozen form and do not carry out any form of processing.

Fish and chip shops provide the third component of the structure. In the mid-1980s there were about 10,000 of them (Marketpower 1984), by the second half of the 1990s the number had gone down to between 8,630 and 8,750 (Backman P 1996; Seafish 1999). According to mid-2000s market research there were 4,600 such establishments (Mintel 2004b) but in 2013 their trade organisation estimated the number to be 10,500.¹⁹⁴ Many sell other types of fast food as well so there may be a definitional issue as well as optimism in this much higher figure. However, there is no doubt that the great majority are single owner operations and of the chains that have formed most have only a few branches, the exception being Harry Ramsden's with twenty-four restaurants nationally in early 2013 (a chain which has had a series of different corporate owners). This allows for great diversity in the sector as one interviewee explained:

'The one thing they all have in common is they sell fish and chips. But after that point, that's it, there's nothing else they have in common. Different ranges, different fats, different batters, different fish, different potatoes, different ways of doing things, different temperatures, different people serve, different packaging.' Director, trade organisation

Accompanying these differences and the small scale of the businesses is considerable quality differentiation. Whether they source their fish on quality varies and was judged differently by different companies. One specialist supplier in the research felt that only 18%-20% put quality above price. But

¹⁹⁴ The number comes from the website of the trade body, the National Federation of Fish Friers, www.federationoffishfriers.co.uk.

another was able to say that 90% bought on quality while a fish wholesaler thought:

‘Without exception they tend to buy the top end of quality and the best quality fish produced is frozen-at-sea fillets.’ Managing Director, large company

However, there seemed to be a belief in the industry that consumers do not favour frozen fish and so this is not made clear to them:

‘If you went to a fish and chip shop and say where do you get your fish, they will all say fresh, always, without exception. They’re all frozen but they will never admit it.’ Managing Director, large company

There have long been quality issues connected with fish and chip shops and they were the subject of specific legislation in the early part of the twentieth century. There was controversy about the quality of ingredients and issues over standardisation of portion size and price (Harvey M, McMeekin A, & Warde A 2004).

On the quality of what is currently delivered by fish and chip outfits the judgment made by two of the interviewees was harsh:

‘In my experience there would be maybe 25% of fish and chip shops make a genuine effort to produce a decent quality product..’ Managing Director, large wholesaler

‘I put that now at and I still say we’ve got more than our fair share, between 35 and 40%, or even slightly over 40% of our customer base who really are good for the trade. Turn that round of course, the majority of the people in the trade don’t deserve to be in it.’ Chairman, medium wholesaler

A more optimistic view held that things were improving:

‘If you went back ten years you would definitely be looking at less than 10%, quite definitely. I would think now you have got to be nudging up towards 50%, I would say it’s higher than that, that are at an acceptable standard or above.’ Director, trade organisation

The incentive to improve may be lessened by the fact that fish and chip businesses appear to be very profitable already, according to some of the interviewees, and the figures mentioned in the following quote contrast markedly with the very low margins mentioned by seafood companies as presented in the previous chapter, in section 5.7:

'You should, a good chip shop, the very best, on the top of the game should be getting slightly above 60% gross profit. A poor one, that would be one that would buy-in either part-fried or frozen chips, probably even buying the fish in either IQF [*Individually Quick Frozen*] or even worse probably pre-battered or pre-breaded, you'd be looking down at the 50 mark.' 'I would say that an average of 55 ... would certainly be achievable.' Director, trade organisation

'If you want to get rich buy a fish shop, if you don't mind unsocial hours and smelling like a piece of fish.' Managing Director, large company (which supplies fish and chip shops)

Nevertheless, the situation was seen as improving and two types of action by external agencies were seen as relevant. The input of environmental health services in raising standards was highlighted in one comment which refers to an increase in regulation compared to the past:

'If you go back twenty years, there was either no training at all and the EHOs were more like black cats, the place had to have rats running through it for the EHO to come in. Whereas now there is an inspection maximum eighteen months, and in most cases it's once a year. ... Where ourselves, Seafish and most of the EHOs now, it's not a case of going in and condemning right left and centre, it's more a case of working at it.' Director, trade organisation

A snapshot view of the standard of food hygiene in the fish and chip establishments of one city has been provided by an exercise carried out by Norwich City's Environmental Health Department. Of the thirty-eight businesses, twenty-eight (74%) were rated as good or very good, three newly registered shops were in need of urgent improvement and another three also needed to improve.¹⁹⁵

The other approach is a series of incentives. Seafish ran the Fish and Chip Quality Award up to 2010 and it is now managed by the trade body the National Federation of Fish Friers (NFFF). Seafish has run its award scheme since 1988 and it currently includes several categories including Takeaway Fish and Chip Shop of the Year, Young Fish Frier of the Year and the Good Catch Award for responsible sourcing. Various private companies with an interest in supplying fish and chip shops sponsor these awards. Seafish and

¹⁹⁵ Information taken from www.norwich.gov.uk, undated but accessed on 19 February 2013.

the NFFF jointly run training courses and a Fish Frying Certificate is awarded.

These activities were seen as raising standards:

‘Seafish’s competition for the Fish Frier of the Year which is great because that has driven standards in all these shops. Some of the shops that I could take you to, they are state of the art, they are absolutely wonderful places.’
Chairman, medium wholesaler

One aspect of the competitions is the inclusion of sustainability criteria. One of the interviewees took a cynical view of what this meant:

‘They had to build in sustainability, food safety and all these other things to win the prize. Whether they believe it or not I don’t know but they do preach it.’
Managing director, large company

The difficulties preventing small businesses in the ‘casual eating’ sector from actively sourcing sustainably have been recognised (Sharpe R 2010). The interviewees connected with the fish and chip trade agreed that the greater part of it was neither interested in nor knowledgeable about sustainability or traceability with a few exceptions:

‘I think in general they see it as, “if you catch it, we’re going to sell it”. So therefore if it’s there, why go on to us about sustainability.’ Director, trade organisation

‘We’ve got posters proclaiming that ocean-wild fish is from sustainable resources. We’ve got some very far-thinking customers and they’ve got in their shops brochures telling the story of where the fish comes from, even to the names of the vessels.’ Chairman, medium wholesaler

The wholesalers supplying frozen fish relied on the Icelandic reputation for successful fisheries management when asked about sustainability on the basis that: ‘The Icelanders have a very strong sustainability because if they don’t, they don’t have an economy’ (Managing Director, large wholesaler).

Fish and chips, once constituting the only fast food available, now has considerable competition. One fish supplier interviewed thought young people ‘don’t want fish and chips, they want kebabs, they want a pizza’ (Managing director, small company 3). Sales of fish and chips seem to have reduced in the late 1990s, a situation investigated in Seafish research which found that while fryers thought this was due to the price being too high because the cost

of fish had risen, consumers were more concerned about health issues (Seafish 2000).

Subsequently, Seafish organised trials to measure fat levels in fish and chip portions and these produced a figure lower than the proportion for a burger or doner kebab, using standard nutritional tables (Watson R 2006). This piece of information continues to be used on the Seafish website.¹⁹⁶ Having recognised that some consumers do not think that fish and chips are a healthy food, the emphasis is on showing that its fat content compares well with other fast food options. In this particular mini-discourse there is no mention of the omega-6 to omega-3 ratio which is a feature of the 'eat healthy fish' message elsewhere on the Seafish website; consuming fish fried in omega-6 rich vegetable oils would not appear likely to improve the ratio while an animal-derived frying medium would increase saturated fat content. By contrast, the American Heart Association Nutrition Committee specifically counsels the avoidance of commercially prepared fried fish (and other convenience fish dishes) on the grounds that it is low in omega-3 and high in trans-fats (Kris-Etherton PM, Harris WS, & Appel LJ 2002). A more recent study has found an increased risk of heart failure connected with a higher intake of fried fish while greater consumption of baked or grilled fish was associated with reduced incidence (Belin RJ et al. 2011). There does not seem to be an objective source of consumer advice about the nutritional impact of fish and chips. More realistically, the general view of fish and chip operators as found by one piece of research was that fish and chips are not a healthy choice but eaten as a treat; as one quoted owner said: 'You're not going to go into a fish and chip shop if you want to eat healthily. Everything's cooked in fat.' (Connect Research 2010) (p12).

¹⁹⁶ The trials produced the figure of 9.8g/100g for a large piece of cod in batter and 9.0g/100g for chips so the Seafish website (page www.seafish.org/foodservice/the-national-fish=chip=awards/did-you-know) refers to 9.4g/100g, the average of the two items, which glosses the fact that most people will eat both fish and chips and get a double dose. The NFFF website states that the average fat content of a portion of fish, chips and peas contains only 7.3% fat but the origin of this figure is not stated.

There is also limited evidence about actual fat content in the fish and chip produced by shops which is likely to vary due to the heterogeneity of the sector including the choice of different frying media and the extent of their re-use. Some local authority environmental health departments have undertaken sample surveys and found high levels of saturated fat and in some cases of trans-fats (and often also of salt) (Antrim Borough Council 2009).¹⁹⁷ A sample survey of takeaway outlets in an east London borough with particular emphasis on use by children found high levels of overall and saturated fat as well as the presence of trans-fats in both the fish and the chip portions tested (Lloyd S, Caraher M, & Madelin T 2010). High levels of salt have also been found in fish and chips though lower than for Chinese takeaways or pizza (Jaworowska A et al. 2012). Some councils have had projects to help their fish and chip shops produce healthier versions of their products. The FSA ran a campaign in 2009 and 2010 addressed to fish and chip outlets with a particular focus on reducing chip oil absorption.¹⁹⁸

Thus while the vast majority of fish and chip shops as small businesses are operating predominantly in a market environment, they experience certain governance influences to varying degrees. As well as food hygiene regulations monitored by environmental health officers, there have been some efforts by local government and the national FSA to improve the healthiness of the products while Seafish and the dedicated trade body use incentives to improve quality generally and to urge sustainable sourcing.

¹⁹⁷In addition to the Antrim Borough Council report as cited see a joint study by six South West London councils reported under the heading 'Health promotion in fish and chip shops' on www.kingston.gov.uk/information/news_and_events/news/news_archive.htm?id+80352 accessed 10 February 2013.

¹⁹⁸ Examples are the Antrim BC Healthier Takeaways Project (see Antrim Borough Council (*op cit*), the LB Wandsworth frying courses reported in Kasprzak E, 'Oil and obesity: frying lessons for fast food workers', 5 May 2012, on the BBC News website and Wigan Council's Healthy Business Awards, reported under 'Frying tonight?' on www.wigan.gov.uk, accessed 10 February 2013. The FSA advice was produced as 'Tips on chips: Help businesses serve healthier food' and found to be helpful in the evaluation of pilot usage (Connect Research 2010). The Healthier Catering Commitment award scheme involving 18 London Boroughs is targeted particularly at fast food outlets, information available on www.cieh.org.

The wider foodservice arena of course includes a very great number of other small-scale restaurants, pubs and hotels. The main governance in place is public regulation and the European General Food Law and various UK enacting regulations apply as in other food businesses. A recent development by the FSA has created a Food Hygiene Rating Scheme which now covers most local authority areas in England, Northern Ireland and Wales with a similar Food Hygiene Information Scheme in Scotland. The assessments are based on the inspections carried out by local authorities. A database covering all establishments where food is eaten outside the home (restaurants, cafés, takeaways, hotels, hospitals, schools and care homes, of course including fish and chip establishments) plus food shops including supermarkets gives access to the rating for each enterprise on a scale of 0 (urgent improvement necessary) to 5 (very good). This has the potential to be a powerful governance tool if knowledge and use of the system does spread among the public, with public regulation as a basis for consumers to exercise governance by choosing establishments with better safety standards.¹⁹⁹ A precursor 'scores on the doors' scheme in one English city found it to be an effective method of improving compliance with food safety rules once comparative information was published on its website, attributed to competitive reactions by operators rather than to pressure from the public (Stanton J, Burton Y, & Gooding C 2008).

Apart from statutory regulation, much foodservice is governed purely by market forces. Businesses are likely to vary their approaches to quality and sustainability according to the market segment in which they compete:

'The genuine chefs as opposed to the cooks are very keen to have and always have been, keen to have top quality and would inspect and have always checked, that one is not quite as fresh as that one, I'll have that one. ... The chap who is working for a fast food outlet, he wants a bag of prawns, ready made, as long as the sell by date is on the packet.' Managing Director, small company 5

However, those that are part of chains, pub groups and institutional catering organisations are increasingly acting in a similar way to and experiencing

¹⁹⁹ Information about the Food Hygiene Rating Scheme is on the FSA website, www.food.gov.uk.

similar pressures as the major retailers such as on quality (Taylor S 2000).

This was familiar to some of the research interviewees:

‘Increasingly the foodservice sector is looking for the same levels of traceability and quality assurance as the retail trade has had.’ Managing Director, large company

‘Bear in mind that a lot of the foodservice companies also have big businesses with people like local authorities, health, education, health authorities etc. It’s an important business, and it’s a relatively stable business in recession. So there’s an agenda from them as well about the ethical nature of their purchasing. And that includes the sustainability of seafood. So that they’re getting that sort of pressure. It’s come later in the foodservice area than it has in the retail area I think that’s fair but I certainly see that as being very important.’ Director, large company

‘The major wholesalers and those supplying restaurants and pubs are very interested in quality, I think that’s their prime concern. Quality is often their major concern. In my opinion they are the most quality conscious sector.’ Site manager, medium-large company

Correct labelling and authenticity of seafood are issues for foodservice as for retail. The investigation described in section 6.4 in which many samples proved to contain a species that differed from the label description also extended to foodservice. A general seafood restaurant and a fish and chip branch were included in the study and in each case a supposed cod dish turned out to be haddock. In a survey of fish in catering establishments co-ordinated by the FSA in 2008 and carried out in fifty-two local authorities, 10% of the fish was wrongly described, most often haddock being substituted for the more expensive cod and a high proportion of the ‘misdescriptions’ were from fish and chip shops (FSA 2008).

A recent governance initiative called fish2fork has been established to promote sustainable seafood sourcing by restaurants. It rates each on a ten point scale based on a self-completed questionnaire or, if the establishment declines, on its own website information. Members of the public are invited to contribute reviews. In early 2013 the fish2fork website had ratings for 579 restaurants in Britain, each chain branch being counted separately. Just under half had a high rating between three and four-and-a-half ‘blue fish’ meaning their sourcing was assessed as in the range from very good to excellent, 16% just passed with from a half to two-and-a-half ‘blue fish’ while a substantial

minority of 38% were rated with between one to five 'red fish' signifying various degrees of non-sustainability. It is not clear how frequently ratings are reviewed but an article on the website in November 2011 highlighted changes since the launching of the system in 2009. It noted that as many as 45% of the restaurants had improved their rating though another 20% had slipped down to a worse position. This would appear to show that at a still early stage the rating system is working as a motivator for improved sustainability albeit imperfectly. To what extent restaurant goers visit the website to check out ratings is unknown as is whether the sustainability assessments they read have affected choices of where to eat. The project provides information for well-motivated consumers but its more important impact is to incentivize the restaurants directly so that, as with the supermarkets, users are increasingly offered only the relatively more sustainable options. In the same vein, chefs supportive of fish2fork have expressed a desire for seafood suppliers to be rated on sustainability to make environmentally positive decision-making easier.²⁰⁰

McDonalds is not one of the restaurant chains included in the fish2fork compendium but it has made an important commitment to sustainable fish sourcing. Its UK website states that all the fish used by the company is MSC certified. Another large foodservice chain, Pret a Manger lists its sustainable fish sourcing policies as pole-and-line-caught skipjack tuna, wild crayfish and Freedom Food accredited farmed salmon.²⁰¹ Two major contract catering companies, the Compass Group and Sodexo, have each stopped using species on the MCS 'fish to avoid' list and more positively serve MSC certified

²⁰⁰ Information is on the website www.fish2fork.com and the article analysing changes is Smith L, 'Huge leap towards sustainable seafood revealed by restaurant survey', 27 November 2011. The chefs' views on seafood suppliers and sustainability is in Smith L, 'Restaurants call for seafood suppliers to be rated on standards', 14 March 2012, again on the website. The founder of fish2fork is the environmental issues journalist and author of *The End of the Line* Charles Clover. A British initiative, the website has extended internationally and in early 2013 had portals for five other countries.

²⁰¹ Pret launched a sandwich made with MSC certified salmon in November 2007 and in March 2008 the MSC produced 'MSC chain of custody case study: Pret a Manger' which quoted Pret's Technical Manager. While the sandwich launch news is still on the MSC website at 2013, the chain of custody sheet is not and the sandwich itself seems no longer to be available in Pret establishments.

seafood. In the same way as for the supermarkets, sustainable sourcing contributes to the construction of image and reputation for all these companies.

Ethical sourcing of seafood has also been pursued through the broader initiative of Sustainable Fish City, a project instigated by the NGO Sustain, which signed up both public and private organisations initially as part of the 2012 London Olympics legacy commitment and has continued to campaign, including tracking the extent to which each London Borough has progressed in using certified fish (Compton R 2013;Sustain 2012).²⁰²

Sustainability in public procurement has been generally progressed by the inclusion of fish in the 2011 establishment of Government Buying Standards for food and catering services. These specify that fish must be sustainably sourced and in addition served on the basis of the twice a week, one oily, nutritional guidelines and they apply not only to government departments but to their executive agencies including the military and the prison service.²⁰³ The University Caterers Organisation has agreed a fast track system with the MSC for members to obtain chain of custody certification, opening the way for higher levels of sustainable sourcing.²⁰⁴

Apart from the sustainability issue, the most coverage in this foodservice section has been given to fish and chip shops because there is little specific information available relating to governance of seafood in other catering establishments. All of them, however, have to operate within the same food hygiene and traceability regulations as other food businesses. Fish and chips establishments are considered by Seafish as part of the seafood industry and hence have had governance action in the form of quality awards as well as promotional support. The result of this public and private governance effort

²⁰² Information about the Sustainable Fish City campaign is on www.sustainweb.org/sustainablefishcity.

²⁰³ The standards were publicised in a Defra press release of 16 June 2011, 'Let them eat hake, government takes lead in buying sustainable fish' and have been fleshed out in (Public Health England 2014) which includes various examples of public catering using only 'sustainable fish' or more reliably 'certified sustainable fish' and/or serving oily fish regularly.

²⁰⁴ See 'UK universities' new fast-track to MSC certified fish on their menus', 23 June 2013 on the MSC website.

seems to have been an improvement in the quality and safety of fish and chips over recent years but standards remain variable.

In relation to sustainability, it is harder for campaigners to get to grips with the dispersed foodservice sector compared to concentrated retailing and there has not been the same kind of civil society intervention as has fallen on the supermarkets but a different form of persuasion has started with fish2fork. Separately from this, some of the largest foodservice companies and chains have shown in their sourcing policies that they are aware of seafood sustainability issues and no doubt of potential enhancement to reputation by adopting sustainable sourcing principles. Recent developments towards sustainability criteria in public procurement both raise the standards required and match the moves that may have already been taken by the concerns that undertake a high proportion of catering in public sector establishments.

6.7 Conclusions about Governance of Seafood Consumption, Retailing and Foodservice

This chapter has examined the complex and often interconnected governance influences relating to consumers and the retail and foodservice sectors that provision them. These are listed in Table 6.2 together with the main purpose served in each case. The governance relationships are drawn in figure 6.9.

Starting with the retail and food service sectors the double box on the diagram indicates that most of the sources of governance for both sectors are identical even though the actual forms may differ in some details. (But relationships with consumers are not the same as denoted by a separate double arrow.) Certainly they share with each other and the rest of the food chain the need to conform with the EU and UK food safety regulatory regime. In addition, the retail sector is particularly affected by the seafood labelling legislation. They share too the local state monitoring of legislation by local authorities and though it is meant to be in light touch mode in relation to large businesses, prosecutions of the major supermarkets for selling out-of-date items illustrate

the active exercise of governance in support of food safety rules while some of the special projects undertaken with fish and chip establishments show a more proactive stance with a public health purpose. The FSA provides advice and information for both sectors and may impact on them by recalls such as the 2008 salmon incident mentioned previously. The FSA's Food Hygiene Rating Scheme covers both sectors in the same system. All of these are exercises of state governance.

Authenticity which is also covered by food hygiene regulation is another FSA responsibility and the agency has carried out one investigation on fish labelling but other projects which have brought to light false or fraudulent naming have been instigated by academic units or even by newspapers. In other words it is meant to be an area of state governance, hence a task for the FSA, but this body has not given it much priority with only the one known exercise so other parts of society have partially filled the gap with their own interventions.

Seafish in its role of supporting the seafood industry has undertaken limited activity in relation to seafood retailing in its work on fishmongers but has had more continuous input to the fish and chip sector, establishing the quality scheme subsequently taken over by the trade body NFFF and continuing to support an annual award competition. Functioning in both these sectors may be improved by what is offered in the Seafish-sponsored Seafood Training Academy which itself contains both public and private organisations. Thus all these activities can be considered examples of mixed public-private governance.

Finally there has been governance activity from civil society actors affecting both sectors; the major supermarkets have been the object of much campaigning which has been described in this chapter and shown to have had a considerable impact on their sourcing policies while restaurants have been targeted by the fish2fork initiative. While some of this activity has consisted of campaigning in which certain NGOs have pronounced judgement upon or even taken action against retailers from the outside, there has also been much of

Table 6.2 Governance Relevant to Seafood Consumption, Retailing & Foodservice in Britain

Consumers

Governance Type	Detail	Governance Source	Purpose
Nutritional advice	2 x week, 1 oily; exceptions: vulnerable groups, certain species	FSA → Dept Health	Public health
Nutritional advice	2 x week, 1 oily	Seafish, seafood company websites	Promoting seafood consumption
Nutritional advice re fish & chips	Fish & chips does not have particularly high fat levels	Seafish	Promoting seafood consumption
Nutritional advice	Omega-3/fish oil health claims	Supplements companies	Promoting supplements
Protected names legislation	9 seafoods designated	EU	Food authenticity & marketing
Cooking information	TV programmes, celebrity chefs, cookery books, food blogs	Media, chef activity, publishing, individuals	Communication, information, entertainment
Cooking information	Fish is the Dish website, recipes	Seafish, seafood company websites	Promoting seafood consumption
Nutritional advice and cooking for children	Seafood school programmes	Seafish, Seafood Scotland, MSC	Promoting (certified) seafood to children
Seafood availability	Choice of seafood sold (affected by supply issues)	Retail including supermarkets, foodservice	Commercial
Public new product development	Various projects	WFA, Seafish, SE Seafood	Promoting less used species
Underutilised species promotion	Fishing for Markets programme, promotions	DEFRA, supermarkets	Sustainable consumption, commercial
Commercial new product development	Continuous developments	Processors, supermarkets, foodservice	Commercial
Promotions, advertising	Supermarket promotions, Seafood Week	Supermarkets, Seafish	Promoting seafood consumption
Sustainability advice	Eco-labels, advice lists, Inseparable website	MCS (Fishonline), MSC, EU	Sustainable consumption
Sustainable seafood availability	Availability of sustainable products	Retail including supermarkets, foodservice	Commercial, more sustainable consumption

Retailing

Governance Type	Detail	Governance Source	Purpose
Legislation	EU regulation on food safety and UK food safety/hygiene legislation & regulations	EU & UK	Food safety & traceability
Legislation	EU regulations on seafood labelling & UK fish labelling regulations	EU & UK	Common market & consumer information
Regulation	EHO monitoring	Local authorities	Food safety
Testing	DNA & other tests of authenticity	Individual Projects/ Academic institutions	Checking authenticity
Training (skills and food safety)	Training/qualifications for retailers/fishmongers	Seafood Training Academy	Quality & food safety, individual development
Campaigning	Reports, supermarket rating tables, direct action	NGOs (Greenpeace, MCS, CIWF)	Sustainable sourcing & animal welfare
Campaigning	Mass tweets	Fish Fight	Sustainable sourcing
Collaborative persuasion	Sustainable sourcing guides	Seafish	Sustainable sourcing
Collaborative persuasion	Advice lists especially fish to avoid	MCS	Sustainable sourcing
Collaborative persuasion	Eco-labelled seafood availability	MSC, ASC et al	Sustainable sourcing
Collaborative persuasion	Sustainable Seafood Coalition	ClientEarth	Sustainable sourcing

Foodservice

Governance Type	Detail	Governance Source	Purpose
Legislation	EU regulation on food safety and UK food safety/hygiene legislation & regulations	EU & UK	Food safety & traceability
Regulation	EHO monitoring	Local authorities	Food safety
Regulation + consumer choice	Food Hygiene Rating Scheme/Food Hygiene Information Scheme	FSA/FSA Scotland	Food safety
Testing	DNA & other tests of authenticity	Individual Projects/ Academic institutions	Checking authenticity
Advice	Campaigns to decrease fat & salt content in fish & chips	FSA & certain local authorities	Public health
Standards scheme	Fish and Chip Quality Award	Seafish → NFFF	Quality & food safety

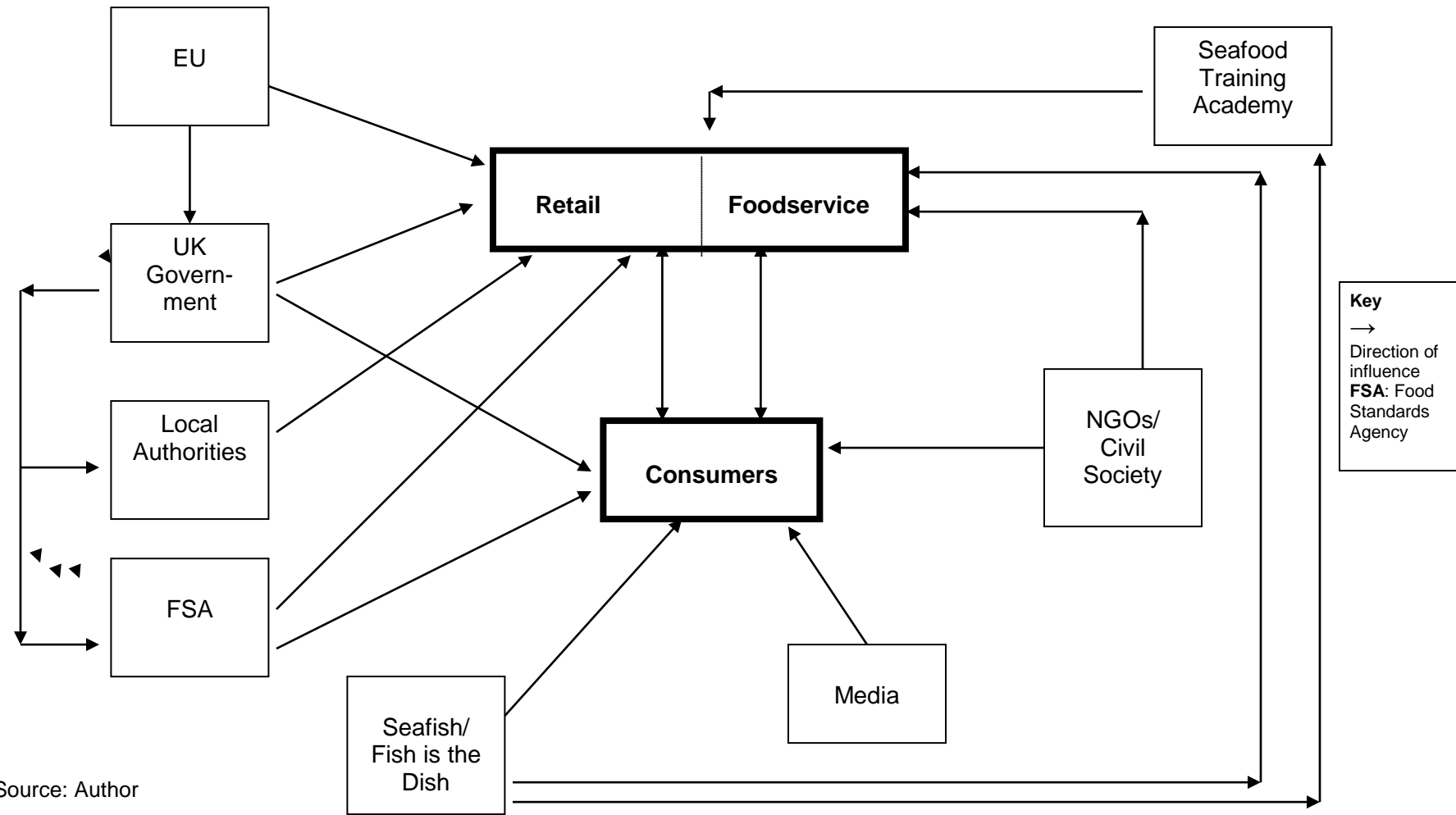
Award scheme	National Fish & Chips Awards	Seafish	Quality & food safety, responsible sourcing
Training (food safety)	Training/qualifications for foodservice	Seafood Training Academy	Food safety
Training (fish & chips)	Fish Frying Certificate	NFFF/Seafood Training Academy	Quality & food safety, individual development
Campaigning	Restaurant sustainability ratings website	fish2fork	Sustainable sourcing
Public procurement	Government Buying standards	UK government	Sustainable sourcing & public health
Collaborative persuasion	Sustainable Fish City	Sustain	Sustainable sourcing
Collaborative persuasion	Sustainable sourcing guides	Seafish	Sustainable sourcing
Collaborative persuasion	Sustainable Seafood Coalition (limited foodservice involvement)	ClientEarth	Sustainable sourcing

Source: Author

what has been termed here ‘collaborative persuasion’, working jointly with them for a shared objective, namely sustainability.

Considering all this governance activity chronologically, the regulatory basis started in the early 1990s with both UK and EU legislation which was strengthened in the early 2000s, always involving local authority implementation through environmental health departments. The Seafish annual fish and chip competition started in the late 1980s but training for retail personnel seems to have begun only in the mid-2000s. The NGO activity also got going from the early 2000s, starting with the first MCS guide in 2002. The FSA has of course only been operating since 2000. Thus governance activity impacting on the retail and foodservice sectors in relation to seafood has intensified since the turn of the twenty-first century. As for the purposes of these items of governance activity, while food safety, traceability and accurate information for consumers has been the object of regulation, food safety along with quality has also been progressed by a mixture of private and public action,

Figure 6.9 Governance Affecting and Affected by Consumers, Retail and Foodservice



Source: Author

through training delivered by both public and private agencies led by Seafish and for the fish and chip sector through award schemes in which Seafish and the trade organisation NFFF collaborate. The broader aim behind these activities is economic success which has required modernisation to meet higher socially-generated safety and quality expectations. Sustainability has been pursued through government procurement standards, but only since 2011, and by localised initiatives including Sustainable Fish City, and otherwise through the 'collaborative persuasion' of civil society working with willing retail and foodservice businesses (sometimes previously resistant ones which had experienced the impact of critical campaigning). Finally the exercises aiming to decrease fat and salt levels in fish and chips provide a rare example of public health action aiming not to change individual behaviour but to change the products and choices available in a preferred direction.

In relation to seafood consumers the types of governance in operation are similar to those outlined in the literature about consumption in general in chapter 2. There, consideration started with food availability and advertising, moved on to the provision of public nutritional guidelines, looked at how these and nutritional science are used by the food industry and then went on to the questions of ethical food choices and to consumer perceptions of risks over food.

In relation to seafood, availability has been affected by the supply issues discussed in chapter 4 and by changes in retailing and foodservice outlined in this one. They have shown that while the particular liking of British consumers for whitefish has not changed, availability has considerably expanded the range of species routinely eaten and types of preparation. This has been aided on the one hand by new product developments and promotional efforts from retailing and the seafood industry but also by various media outputs whether oriented to the provision of information or to entertainment.

Turning to governance by public nutritional guidelines, in the case of seafood it was slow to start. When the findings of research about the benefits of eating

particularly oily fish became accepted by nutritional scientists and included in the 1994 COMA Report, along with many other 'eat less' recommendations, there was no effort to share this particular point with the public at large. Even in subsequent public health strategies produced by the Department of Health fish was mentioned briefly or not at all. It was only in the short period of a decade when the Food Standards Agency was responsible for nutrition so that there was a consumer-facing public agency giving up-front advice on food and health that the advice to eat two portions of fish a week acquired an official public dimension. Even then there was no public health campaign in favour of eating fish. Since the reversion of nutrition responsibilities to the Department of Health, the fish-eating advice formulated by the FSA has been transferred to the websites of various government departments and agencies and as a result the content is likely to reach fewer people, leaving a gap instead of an obvious place to go for complete and up-to-date recommendations.

Thus although the message is still formally promulgated in the official discourse, dissemination has been left to private interests. As described in section 6.3, this process started early on as Seafish was passing on the good news from research about fish and heart disease some time before it was officially accepted via the COMA report. Seafish, quite appropriately given its remit, as well as individual companies now use all promotional and advertising possibilities to spread the fish and health connection. It is particularly striking that Seafish has been developing programmes for schools, sometimes with commercial partners. Further, Seafish in describing itself as 'the authority on seafood' has self-positioned as the trustworthy presenter of information to the public. However, nutritional advice is largely provided with the primary objective of promoting seafood consumption and hence the seafood industry, rather than for a public health purpose.

In many ways it may not matter that fish eating is promoted by those with most to gain economically if the end result is still beneficial. This could be regarded as the case for seafood to quite a considerable extent but such an approach has its limits. The FSA advice in its final form was fairly complicated with special provisions for different demographic groups and in relation to certain

fish species considered to pose some health risks. These nuances tend to be underplayed if not forgotten in commercial messages. The health benefits are obtained particularly from oily fish and certain shellfish species but this aspect is underemphasised in promotions as that could be to the detriment of other types of seafood. Finally, the form in which fish is probably eaten the most, whitefish fried in oil or fat, is the least likely to deliver health gains but this fact is not presented to the public. A further point is the transmogrification of the dietary advice to promote not fish-eating but omega-3 supplements (by certain commercial interests but not by Seafish) these providing comparatively little benefit.

Retail and foodservice establishments in their governance by availability do not provide any preference to health aspects. They do not particularly promote oily fish or refrain from extensive provision of coated (battered or crumbed) fish options in the case of supermarkets or fried fish in many foodservice outlets. They cannot indeed be expected to go against the preferences of their customers which these stocking choices reflect. Thus there is a dissonance between governance with a public health objective and governance whether by availability or by health messages where the objective is really sales and commercial success.

The FSA advice in its last form contained a reference to sustainability which consumers were asked to consider in their choices but most health oriented fish eating advice does not mention this issue or does so only to give brief reassurances such as have been seen on the Fish is the Dish website. In fact, contrasting with the plethora of messages promoting fish eating for nutritional benefit, there are many fewer to urge ethical seafood choices. The MCS advice list and the fish2fork restaurant rating site are available for dedicated people to use but require effort while MSC labels have only minority recognition, even if rising, and there is even less public knowledge about aquaculture certifications. It is too soon to know whether the EU's sustainable fish website will receive much usage by British consumers. Generalised anxieties resulting from pessimistic media reports such as about cod stock problems may affect purchasing as reflected in some interview comments, but

again only for a minority. Thus governing ethical seafood consumption is more a matter of business sourcing policies than of individual buying decisions. Here, however, many retail and increasingly foodservice providers exercise positive choice governance by making what is available to consumers more sustainably sourced.

The final major food consumption issue discussed in chapter 2 was that of risk and reactions to its perception. This chapter has shown that risk issues do not seem to be salient in the same way when it comes to seafood. Although there are microbiological hazards (and have been actual food poisoning outbreaks) as well as issues about contaminants, particularly in relation to farmed fish, they have not given rise to public disquiet or except for some avoidance of shellfish, correctly seen as the most risky, impacted consumption choices. Similarly, authenticity issues have not caused the same public concerns as in relation to meat despite the mislabelling investigations that have been reported. These attitudes could change as a result of the recent decision to allow the incorporation of pig and poultry meal into fish feed should a problem arise and the public in consequence become aware of such cross-species practices. However, for the present no specific governance approaches related to dealing with risk comparable with the various quality assurance schemes for meat seem to be necessary.

A last consumption governance question is about the reverse side of whether consumers exercise this influence on their retail and foodservice providers. As noted previously, the major retailers are mindful of the views of their customers and sensitive to issues which bear on their general standing. This has probably made them more responsive to NGO campaigning and persuasion than they would otherwise have been. Consumers acting as part of civil society in the tweets campaign that has led to reconsideration of prawn feed was a more unusual expression but the more likely one is the withdrawal or granting of regular custom which is affected by reputation as well as the offer, impacts being seen in the shifting relative positioning of the big four UK supermarkets. But this applies much less to foodservice where so much custom is either sporadic or, as in various branches of public sector catering,

has no choice. Nevertheless, large chains are in a more comparable position to supermarkets in seeking a long-term customer preference and hence needing to pay attention to reputation and how it can be affected by sourcing which may be why Pret a Manger and McDonalds publicise their seafood (among other) sourcing policies. In general consumers are most influential when harnessed by civil society actors.

In this chapter the complementary stories of the public health effort to get more fish consumed in order to improve general health and of the commercial imperative to sell more fish have been traced. The organs of the state marshalled and publicised scientifically valid information to improve the health of the population but the upshot seems to be that the state gave an imprimatur to certain constructions about food and health for private industry to use in its own interests.

CHAPTER 7: CONCLUSIONS - GOVERNANCE, CHANGE AND THEORY

This final chapter reviews the findings of the study in relation to the research questions and considers the implications both for agri-food and governance theory and for specific policy issues. After reflecting on the research process finally it suggests further avenues for research which flow from this piece of work.

7.1 Findings in Relation to the Research Questions

The **first research question** asked how the seafood supply chain for British consumption has changed over the period 1950 to the present. The changes as described in detail in chapters 4, 5 and 6, have been shown to be very extensive. Economic forces and technological developments produced the initial impetus behind them.

Starting with supply, the period began with the situation that had existed in the pre-war period when the main supply of fresh fish was the catch produced by a large British fishing fleet. It consisted of whitefish, predominantly cod and haddock, from one sector of the fleet and herrings from another; these were supplemented by small quantities of other species of fish and shellfish from the near waters plus imported tinned fish. The first set of major changes altered not the dominant type of supply which continued to be whitefish, but its source, no longer from the domestic fleet but largely imported. Later, there were direct restrictions on what could be fished as sustainability became a concern in the face of declining fisheries resulting from the impact of ever-greater technological sophistication. The second major production change was the development of domestic aquaculture which from the late 1980s made available growing volumes of salmon and later a range of farmed shellfish. Supply was also increased and varied by greater and more diversified imports of both wild and farmed seafood, assisted by technological advances in freezing and refrigeration and in air transport.

The poles of the distribution system at the beginning of the period, auctions in the main fishing ports and inland wholesale markets, still existed at the end but functioning at a greatly reduced level, much replaced by direct funnelling of supply to large processing companies and to major retailers and hence shorter chains. But the extent of processing increased with more primary processing for sale to end consumers and to the catering industry and a huge increase in convenience prepared foods and ready meals, in line with developments in the food system generally.

Change was tracked in relation to the hygiene and quality of seafood made available for the British table, the product of handling at sea and in the distribution and processing sectors. Standards were shown to be very low at the beginning of the period but had improved markedly in more recent years though the upgrading of practices at sea by British fishers has tended to lag behind other sections of the supply chain. There was wide agreement that there had been extensive improvements throughout the industry.

The retail and food service industries were the final location of change described. The supermarket revolution eventually added seafood to its other categories of fresh produce, changing the previous retailing arrangements as in the rest of the food system though some specialist fish retailers have continued to function. The supermarkets have increased the range of species sold and introduced various convenience lines, as in the rest of the food system. In contrast, the major foodservice format for seafood, the fish and chip shop has survived, albeit somewhat altered, throughout the period.

The **second research question** asked how public and private forms of governance, separately or jointly, have affected supply, processing and consumption in the seafood supply chain and how they have driven change over the period.

Before considering the changes that may have been instigated by governance measures, those that have taken place independently of such impetus should be noted. There have been significant technological innovations impacting on

the production, processing and distribution of seafood by enhancing fishing capability, domesticating various species for farming, enabling high quality preservation through refrigeration and freezing and facilitating trade and distribution through transport developments. Seafood has also shared in the other general changes in the food provisioning system including the impact of the supermarkets, the diversification of products and the growth of convenience. However, certain seafood developments while resulting from economic and technical processes had repercussions which were met by governance action, resulting in supply chain modifications. Table 7.1 lists significant changes which are related to governance inputs, relevant to both the second and third research questions.

Table 7.1 Major Changes in British Seafood Chain Related to Governance Mechanisms

Change	Governance Factor	Governance Source
Post-war development of fishing industry	State financial incentives	UK government
End of British distant water fleet/ Supply substitutions	UNCLOS & 200 mile EEZs	United Nations
Recognition of declining stocks & implementation of policies for sustainable fishing	CFP fisheries management: quotas & other restrictions; enforcement. Vessel decommissioning.	EU & UK government
Quotas becoming a rights-based system	Fixed quota allocations, quota trading & leasing	UK government
Policies to reduce/avoid discards	Catch quota schemes/trials CFP policy change	UK government: MMO & devolved UK administrations EU
Market incentive for sustainable fisheries management	Standards scheme (eco-labelling)	MSC
Development of domestic aquaculture (finfish & shellfish)	Planning & environmental controls	EU and UK government/ Devolved administrations/ Local authorities/ Crown Estate
Waters classification & purification requirements (shellfish)	Legislation	EU & UK government
Market incentives for sustainable and quality aquaculture production/ Self-management of standards (domestic)	Standards schemes	Tartan Mark, Shetland Seafood Quality Control, Code of Good Practice for Finfish, Label Rouge, Freedom Food, GLOBALGAP, ASC

Improved quality & safety onboard	Responsible Fishing Scheme & other standards schemes for fishing	Seafish, Seafood Scotland & Shetland Seafood Quality Control
Higher food safety standards onboard & on land	Legislation	EU & UK government
Labelling & traceability requirements	Legislation	EU & UK government
Improved distribution & processing facilities	Funding	EU & UK government
Higher standards of safety & quality in processing	Standards schemes	BRC, SALSA, EFSIS, Seafish Quality Processor/Wholesaler Awards
Higher standards of safety in retail & foodservice	Food Hygiene Rating Scheme/ Food Hygiene Information Scheme	FSA, FSA Scotland
Sustainable sourcing by retail & foodservice (choice editing for consumers)	NGO campaigns, league tables, supermarket/ foodservice ratings, advice lists	Greenpeace, MCS, fish2fork, Sustainable Fish City
Better quality fish & chips	Standards & award schemes	Seafish, NFFF
Seafood recommended for health	Nutritional guidelines	COMA, FSA, Department of Health
Greater range & convenience of seafood options	Availability in retail & foodservice	Supermarkets, restaurants
Seafood promotion	Fish is the Dish website, programmes, books, retail promotions	Seafish, media, supermarkets
Sustainability-oriented choices by consumers	Eco-labelling, advice list/website, supermarket ratings	MSC, MCS, fish2fork

Source: Author

Changes in the British fishing industry demonstrate the interchange between governance actions and economic and technical progression. Post-Second World War government action put in place incentives and assistance to modernise vessels and increase production, adding to what must have been existing economic trends as the economy was rebuilt. Investment in technology and enhancement of capacity, concurrently also taking place among other fishing nations, continued the pre-war trend of overfishing to a point where counter-action could no longer be avoided. Hence, mainly through the CFP, public governance of fisheries was set in train with controls and enforcement measures that have been periodically strengthened. From the

supply aspect, management for stock replenishment restricts fishing and therefore quantities obtained from those sources though of course it takes place in areas where overfishing has already limited catches or will do so soon. Prior to this getting underway, world political change led to the UN convention which legalised EEZ declarations resulting in a decisive change for UK fishing which was severely restricted in the distant waters now recognised as belonging to other countries. The result was change in sourcing supply for consumption which both incentivized and was facilitated by growth in seafood trade.

Quite differently to what took place over fishing, aquaculture in Britain developed without state input except for some supportive (including academic) research. Governance has not been a factor in creating this production innovation but has consisted of various mechanisms, public and private, to ameliorate its impacts, the former by planning controls and environmental legislation, the latter through various standards schemes. Public governance here functioned mainly to deal with the clash of different interests that farming provoked rather than as a driver of change. Private governance, however, was an agent of change in the form of raising standards.

Moving on to processing and distribution, public and private governance have both effected material change. Market forces expressed in the retail revolution and developments in convenience food have considerably increased and varied the amount of processing carried out while supermarket requirements have realigned much of the distribution system. Standards have been improved by both public and private governance activity.

A strong framework of public regulation affecting processing and distribution has come into place from the 1990s. Preceding chapters have indicated the key items of legislation applying both generally to food and specifically to seafood. There are four ways in which they can have an impact on businesses and hence produce change. First, there is the legal situation itself which means that requirements are publicised through various channels of communication (including trade associations and the Seafish website), that

compliance is monitored by local (or port health) authorities and that if necessary, there is enforcement through the courts. Second, the legal requirements become part of customer specifications. Third, legislation is the bedrock of any private assurance schemes which are in place, though typically, the latter will make greater demands. The fourth possible route may be specific initiatives to assist and incentivize compliance.

As has been noted, monitoring and enforcement of the legal requirements relating to food safety on fishing boats is lax except for factory ships. However, expectations of customers will still have risen and over time is assumed to have had an impact on practice. The third and fourth approaches have been undertaken by Seafish with its Responsible Fishing Scheme (RFS), which accredits the achievement of certain standards and by the provision of information and support by this organisation directly and by the connected regional organisations. The RFS also includes a sustainability element.

On land, however, where regular environmental health inspections are experienced, the direct state regulation impact is stronger. The expectations of customers are also felt more directly by processing and distribution companies than by fishermen as reflected in the universal expectation heard in the interviews that traceability is in place. The third path, private assurance, is a further major factor, with high expectations that larger and even medium-size companies will have BRC accreditation, especially taking into account the fact, as one interviewee explained, that its standards have become more demanding over time so that participating companies have to change and improve accordingly. The Seafish schemes for processors and wholesalers though short-lived were another means of encouraging the raising of standards as are the courses now provided by the private-public partnership constituting the Seafood Training Academy.

Public and private governance have each been effective and also mutually reinforcing in producing change in the sector. UK and EU state regulation was the prime mover, not least by the former requiring food chain companies, including retailers, to take responsibility for achieving safety and therefore to

bear the associated costs but also by establishing a primary framework of standards, by maintaining a localised service to support and if necessary enforce their implementation and in addition by providing grants through the CFP for the many capital improvements needed for the achievement of higher standards in seafood processing and distribution. Seafish, inherently acting as a mixed public-private source of governance, has played an important role in raising standards.

Modes of governance applying to consumers are more complex and varied than those relevant to other parts of the seafood chain and they have to be geared entirely to persuasion with no compulsory element. There were quantitative shifts over the period reducing up to the mid-1970s, rising subsequently and more recently falling somewhat. Certain negative attitudes and cultural preferences plus the easier availability of other proteins seem to have been the reason for the drop and a variety of factors including greater prosperity probably contributed to the subsequent increase. The biggest ostensible influence on behaviour has been the health message, whether given in the form of official nutritional guidelines as the 'twice a week, once oily' advice, in promotions from Seafish and the seafood industry or through general media contributions. It was suggested in chapter 6 that this has probably increased consumption although there is a dearth of evidence to substantiate definite conclusions. The sustainability discourse has probably affected choices within seafood options to some extent but the direct effect on individual purchasing is likely to have been marginal compared to the sourcing decisions made by retailers and large foodservice companies. Availability may well be the most significant governance factor motivating consumption, together with price and convenience. as offered by supermarkets and also by fish and chip shops.

Summarising governance impacts on changes in the seafood supply chain, state regulation has had a major impact on the sourcing of wild seafood but not on the levels of farmed product marketed. Both public and private governance have changed processing and distribution. Changes in the supply chain itself have then impacted on consumption along with many specific seafood-oriented

messages. Consumers have not been primary drivers of change but the choices they have made in response to various sources of influence must have had some impact on which innovations in the supply chain have continued.

The **third research question** asked about the specific governance mechanisms used to pursue sustainability, safety and quality in the seafood chain and the extent of their success.

Fisheries management has been the main tool for pursuing sustainability of wild stocks and fisheries management is inherently a state or supra-state (intergovernmental) responsibility as only these bodies have the legitimacy to make and enforce rules about what had previously been a commons resource. This is particularly clear within the territorial waters that each state has declared since UNCLOS but it is also the case that the regional organisations with responsibilities for stocks in the high seas outside EEZs are based on nation state membership. The global governance represented by UNCLOS has been an important part of the structure available for conservation management notwithstanding the fact that this aspect has been neglected by many countries.

Active management for protection of the marine environment only started in the 1980s when escalating over-exploitation of stocks due to greatly enhanced fishing technologies began to rouse real concerns and by this time Britain was part of the European enterprise and therefore bound by the CFP. As explained in chapter 4, the CFP did not at the outset prioritise sustainability for the Community's fisheries in its objectives but with each successive review this has become more important and in the 2013 reform has become the central goal. Further, although the CFP has been justifiably criticised in the past for many failures when judged against sustainability criteria, recent evidence as reviewed earlier is that it has achieved real improvements for many of the stocks relevant to British fishing and British consumption (albeit much less so for those in other seas). Both rule-making, especially in the form of quota systems, and enforcement have been relevant.

While the product of state processes, the CFP has had increasing possibilities for other stakeholders to participate in its formulation and workings. Governments have usually acted in the interests of their own fishing industries and doubtless both domestic and Brussels lobbying have been involved. Fishing interests are well represented in the (Regional) Advisory Councils which have operated since the mid-2000s. Implementation of the CFP in Britain has closely involved the fishing industry through the delegation of much quota management to POs and through the incentive of partial privatisation of quota and more deeply because effective fisheries management can only occur if fishers co-operate. It is a classic case where a specific interest has to be included by the state for practical reasons. Recent developments in the Scottish fishing industry have shown the benefits achieved by the active involvement of fishermen who have participated in conservation initiatives and more generally certain improvements since the 2002 CFP reforms suggest that effective management is more likely to be achieved with stakeholder involvement.

The development of eco-labelling, the MSC being the most significant scheme, has added a private governance tool to the pursuit of sustainability. Fishery certification is dependent on state management being in place as explained in chapter 4 so it primarily adds an incentive for compliance, something that is valuable because of the need for industry co-operation to make management work. However, whether or not MSC certification has improved the sustainability of its fisheries is a strongly contested issue.

Civil society actors have contributed to raising sustainability consciousness in various ways. They appear to have been much more active in the most recent round of CFP reforms than in previous ones, possibly because for the first time the European Parliament has been part of the decision-making process in addition to the Commission and member state governments, offering more scope for efforts to influence outcomes. Such campaigning may well have had an impact on the greater commitment of the 2013 reformed CFP to the goal of sustainability and especially on the decision to end most discards within a defined timetable. On a more ongoing basis, certain environmental NGOs

have also been participating in the Advisory Councils and again exerting some influence.

Environmental NGOs have opened up public perceptions to the issue of fishery conservation and whether by the oppositionist tactics employed by Greenpeace and Fish Fight or through the collaborative persuasion used by WWF and MCS, have incentivized some major retailers and large foodservice companies to adopt sustainable sourcing policies though others were already active in this direction as shown by their early support for eco-labelling. The impact has sometimes gone further up the supply chain, influencing fishing interests to enter the certification process and the effect of retail and foodservice company requirements has been documented in previous chapters in relation to how tuna is caught and prawns fed. While in part this plays to the interests of retailers and other companies who compete on quality and image, it seems that real change has been produced by these organisations in the approach to sourcing. How far this in turn produces ecological change in the seas is again down to the effectiveness of state fishery management and enforcement but it may be more likely that there is an impact on farming practices. Although ostensibly the campaigns of NGOs and the introduction of consumer-facing eco-labels have been about addressing the public, asking for change to be made through individual purchasing decisions, the governance impact has been mainly in persuading commercial buyers whether in retail or foodservice to change their approach to sourcing. Nevertheless, the development of consumer awareness does provide an important incentive for them to do so.

The mode of fisheries governance during the period under review has described a curve. At the beginning it was entirely the province of private relationships making up supply chains; in the pre-war period this had on occasion led to controls being imposed in response to certain market conditions but for the main part fishing was unrestrained. The CFP then introduced an era of state-determined management based on quotas and vessel decommissioning although via the state-constituted POs and subsequently the partial privatisation of quota there was in Britain a private

aspect to the arrangements. More recently there has been a gradual shift in which on the one hand the public system has become more open to both private and civil society influences (through the Advisory Councils and the European Parliament) and on the other, while it continues to be the main structure, it has been supplemented by the privately-run standards of certification bodies. The current situation is a more mixed system of governance which has probably increased effectiveness, particularly by gaining more support for fisheries management from the industry in which the economic incentives from semi-privatisation doubtless played a part.

Governance for sustainability has more varied forms in relation to seafood farming which takes place in the near waters and for some processes on land and so could never be as uncontrolled as fishing on the open seas had been. Particularly in relation to salmon aquaculture there is public regulation to moderate its environmental impacts and mediate conflict with wild salmon interests, as much economic as ecological. Planning controls apply with some specific features such as the idiosyncratic Crown Estate regime which substituted for local authority regulation in relation to salmon farming for many years and the Several and Regulation Orders applied to shellfish and there is defined animal disease and feed legislation. However, compared to capture fishing privately-led governance is much more significant and again in relation to salmon production, with some initial public encouragement, has included self-regulation systems of synchronised farming for better disease control.

The broader sustainability issue that has evoked most criticism of aquaculture, the use of wild fish for feed is being tackled by the industry itself developing and using compounds that minimise the use of fishmeal and fish oil, substituting plant-based protein and recycling fish waste resulting from mainstream processing. As well as meeting the industry's own needs for sustainable raw materials, this may reflect a response to criticisms by environmentalists, who would thus have exercised a certain governance influence over business decision-making.

Domestic finfish farming saw the early development of industry-led assurance schemes for salmon and trout which combine objectives relating to sustainability of production with those intended to yield a high quality product. There is a similar combination of sustainability and quality aims in the other aquaculture certification schemes that have developed and which are relevant to imports for the UK market. Downstream supply chain interests have been material to the establishment of schemes such as GLOBALGAP for aquaculture and the ASC, which is comparable to what happened in relation to the MSC. These are all systems of private governance, developed without any state involvement to meet market requirements but which reflect civil society environmental input to varying extents. Thus in relation to the sustainability of domestic aquaculture there has been no state involvement and progress has been market led with some environmentalist influence.

Turning to food safety, it has been massively improved in the seafood industry and as already stated, the groundwork was laid by public regulation and then built upon by private assurance systems. With the private schemes, whether the RFS and other Seafish initiatives or the generic BRC and SALSA programmes, the objective is not simply safety but higher quality which is not legislated beyond the basic requirement of the 1990 *Food Safety Act*. This is where private governance goes beyond legal requirements and hence has been material in raising overall quality and not just safety standards.

Retailing and foodservice are subject to the same state food hygiene regulations as the rest of the food system with monitoring and enforcement concentrated on smaller businesses. Large ones like the supermarket chains have been largely self-regulatory and generally achieve high standards, although as noted in chapter 6 there have been lapses and they still need to be overseen by public authorities. Little has been found specifically about fishmonger safety and quality but indications of improvements suggest the regulatory system has had an impact. The one area where standards schemes have been implemented for safety and quality in the foodservice sector has been in relation to fish and chip shops which have their own private quality schemes run by Seafish and the sector's trade association and

evidence was put forward from the interviews about the higher standards they had fostered.

Modes of governance for achieving safety and quality differ on sea and on land. For vessels there is some public regulation but little enforcement except over the largest vessels and the more important mechanisms have been market incentives and the Seafish scheme. In relation to processors and distributors on land there is a strong regulatory regime both in terms of legislation and implementation and in addition a major impact from private standards schemes, particularly the BRC programme. Not only do private schemes rest on a foundation of public regulation, there were interview indications that environmental health monitoring may be reduced for businesses with BRC certification and therefore assumed to have achieved certain standards so there is an interrelationship between two modes.

Summarising the findings relevant to the third research question, the mechanisms involved in governance for sustainability, safety and quality have been complex and inter-related. For sustainability and food safety, state and supra-state regulation (with some global governance input) has provided the basic governance structures, supplemented to varying degrees by a number of private systems. For achieving quality criteria which are inherently more relativistic and targeted to particular markets, private systems are the key. Thus in the seafood chain, state-led governance is most important upstream, still quite important mid-stream but less so downstream although still present. Another way of thinking about this contrast is that more of the costs of maintaining food hygiene are internalised at least by the larger seafood companies while the public purse bears the expenses of fisheries management and of supporting food safety standards in small food businesses. But even when businesses experience the demands of customers to conform to their requirements and for certification to schemes such as the MSC and BRC more powerfully and immediately than their legal obligations, public regulation underlies the private systems while for smaller businesses at all points in the supply chain public regulation is generally the operative governance factor. As for effectiveness, although the ability of governments to reverse the decline of

fishery stocks was very much in doubt in the years following the inception of the CFP, reforms have changed the situation and significant if partial improvements have been registered in the recent period which may reasonably be expected to continue with implementation of the 2014 changes. In relation to food hygiene, the establishment of the FSA did restore public trust in the food system and legislation has played a significant part in much-needed food safety improvements. However, private governance has been the motive force for more general enhancement of quality.

7.2 The Seafood Supply Chain and Agri-Food and Governance Theory

Given the evidence reviewed in the previous section, the operation of governance in the seafood supply chain can be further interrogated in relation to the existing literature on food chains and on the role of the state. First, the internal governance of the supply chain and particularly the role of the major retailers is considered. Then its external governance is examined as exerted by the state and supra-state, including bodies to which certain functions are delegated by it (some having mixed public and private characteristics) and by civil society organisations. The former relates to agri-food theory, the latter to both agri-food and general governance theory.

Agri-food analysis has highlighted the role of powerful supermarket chains and as in the rest of the food system, they have remoulded much of the structure of distribution for seafood and have affected the content of production through their own brands. They are in a dominating position in relation to their suppliers through the sheer size of their purchasing capacity and the fact that food businesses of any size have to come to terms with their gatekeeping control of access to a considerable part of the market. Much of the recent food chain literature describes how their clout is exercised through standards systems. This was discussed in chapter 2 (section 2.4) which lists a number of contributions that refer to ostensibly voluntary private standards being imposed, to standards driving the global food system and to 'governing by

standards'. The standard and audit demands are seen as not only a mechanism for achieving certain results but an expression of retailer power. However, this does not seem to describe the dynamics of the seafood chain in the UK.

From the interview responses analysed in chapter 5, the conclusion was that retailer power over suppliers is wielded through economic strength, not through any standards system. Supermarkets and some large foodservice companies do indeed require conformity to assurance standards, particularly the BRC award, but these do not seem to be a point of contention and the companies that supply them may well be requiring their own suppliers to conform in a similar way. Again, supermarkets and large foodservice businesses may also specify how their suppliers source raw materials to fit their sustainability policies, for example favouring MSC-certified options, but neither was this raised as a problem by the seafood companies in the research. The retailers may well have had a role in the raising of standards of seafood products and by preferring eco-labelled products have pushed certain producers into certification and even strongly influenced parts of the chain but this is not the same as saying that the supply chain as a whole is buyer-driven through the requirement for certain standards, as posited by some theoretical approaches.

In addition, the study has shown limits to the multiples' sway over the seafood provisioning system. As one interviewee commented, supermarkets are not able to monopolise the entire supply chain. Although much reduced compared to the historic situation, a fair proportion of first sale seafood in Britain still goes through the auction system so the retailers do not control market prices and cannot force them down in the way they have been known to do in relation to some other foods. Not only does a non-supermarket retail sector continue, which is also the case for other fresh foods, but the relatively large size of the foodservice market for seafood compared to the retail one is suggested as a key factor in limiting supermarket control. In addition there is a manufacturer brand presence which acts as a counterweight, especially for frozen items. Thus, although the major retailers are a powerful factor, there is no single

focus of power in this particular chain but diverse sources which are manifest in different supply relationships.

Capture fish is inherently less amenable to manipulation in terms of availability and characteristics than agricultural output so while considerable standardisation of products has nevertheless occurred, the retailers cannot aim to control what is available, although they can do so much more in relation to farmed seafood. Further, as well as ensuring the safety and traceability of supplies, as with all food, they need to satisfy themselves that capture fish has been caught legally and if they have sustainable sourcing policies that products conform to them. These factors together with the diversity and complexity of sourcing that is required militate against detailed retailer control. Instead, the stores need to have considerable reliance on the knowledge and capabilities of their seafood industry suppliers. As some of the work outlined in chapter 2 suggests, this is the sort of situation in which supermarkets need a partnership, albeit not one of equals. A combination of such factors, together with individual choices as exemplified by a small number of the research interviewees, has allowed some companies, as these respondents stated, to see themselves as standing up to the supermarkets and sometimes refusing business with them on terms they disliked.

Thus governance within supply chains has a contingent aspect rather than being entirely predictable as a simple function of supermarket dominance something that does not seem to be considered in the agri-food literature. This is why the Cox power model has been employed in chapter 5. It provides scope for different relationships within supply chains based on what parties need from and are able to offer each other, grouped into the four possible types. Buyer dominance, not only by the major retailers but also in relation to large foodservice companies may indeed be the position experienced by some seafood processing and distribution companies. However, there is also scope for certain levels of interdependence due to the various complexities attached to sourcing seafood which have been mentioned. If a given company has a range of customers, it may have more than one type of relationship with various of them and could in some of them even be in a dominant position

itself. Smaller companies as previously suggested may in any event be more likely to have relationships of independence or interdependence with small or medium enterprise buyers. However, even within this framework choices are not simply a reflection of structural relationships but are made as a result of assessments by individuals as was evident in the case of some of the research interviewees.

Given the variability found even among the small number of interviewed companies that had dealings with supermarkets, the idea of generalising to the concept of a buyer-driven chain or other single characterisation is quite inappropriate. In any case, only a minority of companies serve the major retailers directly or even indirectly through supplying those that do so. The use of the 'buyer-driven' concept in the literature has generally been to characterise export chains, typically from poorer producer countries to richer purchasing destinations as set out in the discussion of global commodity/value chains in section 2.3.3. In these cases the impact of standards is probably different to the situation within a country such as Britain. The standards required from British suppliers are easier for them to accept as they have a starting point in domestic legislation and are determined within a common culture whereas when forced on developing country producers they may be more likely to be experienced as an external imposition, possibly at odds with local practices and understandings. In addition, much of the imports of seafood into the UK are from other rich countries which have comparable domestic standards and whose producers may be in a favourable bargaining position.

The judgement that the UK seafood chain should not be described as buyer-driven leads to a further question about this term and what conditions generally would satisfy such a description. It is practically tautologous to say that major customers for any product will dominate their own suppliers from whom they can expect that their specific requirements will be met. On the other hand, foods will generally have a diversity of markets, except perhaps for some very specialised items produced for export, so cannot be wholly controlled by any one of them. If buyer-driven means that a high proportion of output is destined

for a single channel, it might be expected that the deciding percentage level or at least a range would be specified, something that does not appear to have been done in the literature. It also leaves no room for the fact that for export into European countries the main requirements which producers have to satisfy are set by a governmental body, the EU, which gatekeeps access on behalf of buyers as well as consumers. The thesis therefore questions the usefulness of the buyer-driven concept to categorise an entire food supply chain.

Another aspect of the issue concerns standards schemes which in the dominant paradigm have usually been seen exclusively as a means of imposing buyer control as set out in chapter 2 (section 2.2.3). By contrast this study has shown in relation to domestic aquaculture that assurance schemes were established by producers not in response to buyer demands but in order to enhance their market position and overcome environmentally-driven criticisms and that external schemes such as Label Rouge and Freedom Food were adopted for similar reasons. From a different direction, the various Seafish schemes to incentivize quality improvements have mobilised interests within specific parts of the industry to raise standards, assessed as generally necessary for the success of those sectors and again not in response to specific buyers. In these examples the tool of standards and audits can be seen to serve self-management although in other contexts they may be used as a means of exerting control by others in the supply chain. Some of the UK meat assurance schemes mentioned in chapter 2 have had similar self-management motivations. This type of function has begun to be recognised but needs to be fully incorporated into theories about supply chain governance; while in some circumstances indicating external influences, in others standards may serve purposes of self-governance and control and indeed avoidance of external influence.

Rather than a single epithet either applying or not applying, it would be more useful to think of a continuum of buyer influence over food chains from dominant to weak and consider what sort of conditions are connected to relative positions in different chains. In such a continuum, the UK seafood

supply chain as a whole may be placed in the middle as there are indeed strong buyer influences but only applying to a part. Sub-chains within may have a different characterisation. Imported tropical farmed seafood might in principle be expected to conform to the buyer-driven paradigm and this may apply for example to warmwater prawns coming into the UK, given at least partial buyer influence found in two of the studies mentioned in chapter 2, but in relation to other species such as pangasius and tilapia British buyers take much smaller quantities so probably have much less influence on the supply chain though buyers elsewhere may be more significant. Similarly British pelagic fishing serves export markets to a much greater degree than the domestic one so again UK buyers may not be very influential. Indeed the effect of competition between buyers may be generally relevant but does not seem to have been treated in the literature. On the other hand in the large frozen whitefish trade for fish and chips, the main buyers, here wholesalers who supply the shops, specify the sizes of imported fillets they want in ounces and recently some have introduced new and more precise dimensions so here it may be buyer-driven by distributors. In contrast, the domestic salmon farming industry has been largely self-managed and producer-led. This diversity is comparable to the overall impression gained from the review of seafood studies included in chapter 2.

Thus in relation to the internal governance of supply chains the thesis has shown the utility of combining a commodity systems framework with the power paradigm and demonstrated the need for a more complex characterisation of supply chains than presented by the buyer/producer-driven dichotomy, proposing a continuum approach instead.

Turning to the sources of external governance on the chain as a whole, the most important is clearly the state. A major difference of this analysis compared to most previous work is that it has aimed to cover both public regulation and private governance on an equal basis and to examine their inter-relationships. Consequently, it has specified the key items of European and UK legislation of relevance to the seafood supply chain. Although the result is necessarily selective, it still amounts to a very large number of entries

(listed for convenience in Appendix 2) which in itself speaks for the significance of the public function. The chronology of governance developments by the state compared to those initiated by the private sector is also relevant to understanding relative influences. In relation to food safety, public action has generally led and private governance followed but then may have developed further in various directions. Eco-certification requires state-led fisheries management to be in place. There has also been a distinct input from global governance institutions, particularly over fisheries management but also in relation to food safety. Thus the research has illustrated how the regulatory state indicated in chapter 2 has functioned in relation to one important food chain.

The overall coverage here redresses the balance which has often been missing in other studies and demonstrates the importance of public regulation. Typically work dealing with supply chain governance will state that governmental regulation is important or even that it is the bedrock of food governance but then use the main part of the account to discuss the private arrangements in place so that the overall impression given is that these are the most important ones to consider. This typifies some of the work set out in section 2.4 which concentrate on private and civil society managed standards. Legal developments have received relatively little attention with the exception of the 2002 European General Food Law, the importance of which has been recognised and of the 1990 *Food Safety Act* but which has sometimes been characterised as deregulatory, an interpretation contested in chapter 2.

The dominant narrative has too easily seen the development of private standards and audit systems through a neo-liberal prism, in keeping with the rhetoric of reducing the role of states. An alternative view is that as supply chains for food have increased in complexity and geographical reach, they have needed much more governance in total. In addition, through concurrent globalisation processes, they have become more visible and open to scrutiny by wider groups of potential stakeholders while at the same time more bodies from civil society have pushed claims to be included as such stakeholders in terms of a public interest, also raising more issues for attention. The needed

increase in governance has taken both public (regulation) and private forms, sometimes with civil society input. Private governance has been at its strongest in relation to supply chains that reach into poorer states with weaker governments where it can be as much an expression of neo-colonial economic relations as of corporate power. Despite a recently dominant anti-regulation philosophy (or rhetoric) in favour of neo-liberal markets, to some extent linked academically to the public choice theory summarised in chapter 2, governance institutions are necessary to supply chain functioning. Private innovations have indeed often filled the gap when additional controls seem needed, whether because states adopt a policy position that this is a preferable solution or because they do not have the capacity to impose public regulation or for both reasons. That is not the same, however, as states contracting as these are new or extended fields of action.

In richer countries with stronger states public governance often steps in where market forces and private mechanisms are proving to be inadequate, as occurred in Britain and the EU in relation to food safety following the food scandals of the late 1980s and 1990s and in relation to fisheries when evidence mounted of alarming stock depletions. Historically, food regulation has always followed demonstrations of market failures rather than pre-empting them, as experienced in relation to nineteenth century types of adulteration in Britain so this is not a new way for the state to operate. This is a different view from that taken by proponents of the 'hollowed-out' state who argue that a previous era of command-and-control has been replaced by more decentralised systems. In reality the history of food safety regulation in Britain generally and as applying to seafood in particular shows that it has often been lax in the past but has become more tightly controlled in recent decades in reaction to food crises.

Some more recent agri-food contributions do recognise effective domestic state or global governance as preferable to reliance on private standards as indicated in chapter 2. And with regard to developing countries, while a seafood study reviewed in that theoretical chapter gave an example of a state (Kenya) that had difficulties in enforcing its own conservation legislation,

another one noted in relation to aquaculture eco-labelling (chapter 4) that some countries of the global South now have greater ability to regulate production, arguing that their role should not be sidelined. The greater role of the state under authoritarian or corporatist rule as in China and Russia also needs to be accommodated in agri-food theory. It is likely that the governance role of the state in developing countries will become more visible and mixed public and private arrangements more widespread in the future and that some agri-food theory will need to be reconsidered accordingly .

Returning to the UK scenario, seafood production has certain particularistic features which have produced differences in governance compared to that for other foods. Not only is wild fish the last mainstream food to be hunted, now in circumstances of radically declining reserves, the growth of aquaculture, so different from the very gradual development of agriculture over centuries if not millennia, has thrown up many environmental issues as well as competition for resources over a short space of time. These factors have led to greater and more restrictive types of continuing state regulation of seafood primary production than has been the case for land farming. By contrast, in relation to food hygiene, while there has been specific regulation pertaining to seafood, it is certainly not greater than the attention given to meat. The balance of public and private regulation for safety is likely to be similar for seafood as for meat and poultry although public regulation of primary production is much greater in the case of seafood. Thus despite the special characteristics associated with seafood, the conclusions drawn here about the importance of examining the balance of public regulation and private governance are relevant to the analysis of other food chains.

However, the mechanisms of state involvement in relation to seafood do have some specific features as well as sharing others with the food system as a whole. As a significant body of theory outlined in chapter 2 (section 2.2) agrees, the 'regulatory state' continues to perform vital functions but has developed different methods of operation and branched into different kinds of agencies. In part this meets the need for more efficiency to deal with and facilitate ever-greater economic and social complexity but it is also important to

remember its potential function of providing some balance to what would otherwise just be the outcome of the interaction of ever more powerful market forces. The governance theory literature has focused on demonstrating the contours of change and on understanding processes. However, here it is held that in examining the workings of the state and its delegated agencies it is essential to analyse how public and private interests are served in each case.

In this thesis three such delegated agencies or quangos relevant to seafood have strongly featured and can be discussed in relation to the wider phenomenon of agencification. The Marine Management Organisation and Seafish are each classified as a 'non-departmental public body', the difference being that the MMO is an 'executive' one, Seafish not. The FSA, however, is a 'non-ministerial government department'. All three were established by legislation and are run by boards whose members and chairs are ministerial appointments. Seafish is the oldest dating back to 1981, the FSA started in 2000 and the MMO only in 2010. In relation to fishery matters the MMO as previously indicated acts as an implementer and enforcer of legislation for England, handling matters like vessel licensing and quota management although in relation to wider marine conservation it is responsible for more potentially controversial issues; the governmental role of implementing legislation is underlined by the fact that the same functions are part of the devolved administrations in Northern Ireland, Scotland and Wales and not the responsibility of delegated agencies. The other two organisations appear to have functioned at least in part with a greater level of independence and are compared further below. Only the FSA has open board meetings which the public may attend but the other two organisations do publish their board meeting minutes on their respective websites which can be taken as their recognition of a public obligation.

The key contrast between the FSA and Seafish is that the former was originally formed to promote public health and consumer interests, the latter to promote private ones, those of the seafood industry, although also having regard to consumers. The FSA had its remit formally reduced by a new government in 2010, losing nutritional responsibilities, and subsequently has defined its

function more narrowly as concerned with food safety and food hygiene, of course still showing the centrality of public interests in its role. Prior to this change the Agency had challenged the food industry in various ways such as its salt reduction programme and championing of traffic light nutritional labelling as well as by insisting on a number of product recalls and, although it can only be speculation, it is presumed that (some) food industry interests were influential in leading to the loss of responsibilities that ensued in 2010. But even before this change and under a previous government there had been a criticism that the FSA was going beyond its remit in championing rather than merely protecting consumers (as noted previously in relation to the review relating to improved regulation resulting from the Hampton Report). The Agency's continuing but perhaps muted influence was demonstrated when its recommendation that the EU proposal for pig and poultry material to be allowed in fish feed should be opposed was taken on board by the UK government, at least to the extent that it abstained when the issue was voted in the relevant committee; however, for ideological reasons, that is a stance of general support for deregulation, it did not go so far as to vote against.

Seafish by contrast survived the Cleasby review as well as the legal challenge and has continued with a remit established back in 1981. Although as a quango it is a public body, it has been described in this analysis as an organisation of mixed private-public governance, furthering the state's interests in the continuing success of what is still evidently considered to be an important industry. In a broad sense this is of course in the public interest (as indeed is the success of British industry generally) but it is nevertheless relevant to consider the balance of public and private interests served. Seafish has promoted sustainability and undertaken various initiatives to improve the quality of seafood such as its various award schemes which are of public benefit but the motivation has always been primarily to promote the prosperity of the industry. Likewise, the organisation does address consumers, particularly through the Fish is the Dish website and its associated activities but the fundamental purpose here is to promote seafood purchasing rather than public health or sustainable consumption. Arguments in the Monbiot criticism of Seafish discussed in chapter 4 may well be disputed, but it did highlight the

valid question of why there is a publicly constituted body with finance-raising powers to support this particular industry (as with agriculture, noted in chapter 4), carrying out functions normally performed through trade associations which do indeed exist within the seafood world. The role of Seafish can also be contrasted to that of the MMO; the latter implements regulation while Seafish carries out additional promotional activity which is valued by the industry but not legislatively required.

The agencies which are part of the state can further be compared to another major constituent of the mixed public-private governance system for seafood, the fishery POs (Producer Organisations). Established initially to maintain prices, an obvious private interest, and long tasked with the governmental function of quota allocation to their members in Britain, they have recently been required to take a more significant role in meeting the overall objectives of the re-reformed CFP. While quota allocation is a delegated function, the increase in responsibilities for fulfilling CFP objectives does not mean any reduction in what either the Commission or constituent countries are expected to do so it is not replacing state work but enrolling the POs more closely into public regulatory aims.

Thus the governance activities of the state are used with varying purposes and can shift as those in control and their political objectives alter, an important aspect that has been given inadequate attention in food system studies but which resonates with writings about the contingency of power considered in chapter 2 (section 2.1). The comparison between Seafish and the FSA seems to indicate that the existence of state support for fishing and the seafood industry has remained fairly constant for a long time (especially bearing in mind that Seafish succeeded other organisations with similar functions) and that it is becoming entrenched in relation to public safeguarding of food safety. The consistent fact of support does not mean that its objectives are unchanged, however: while the previous White Fish Authority was geared to expanding production, in a different era Seafish promotes sustainable fishing. By comparison, consumer and public health does not have consistent support in the same way. When the FSA's nutrition remit was removed in 2010 it was not

a question of the state divesting itself of responsibilities; having been devolved to a government agency they were re-centralised at least for England and Wales but it appears that a new government saw the relative interests of consumers as against producers in a different way from that of the government that had originally established the Agency. Nutritional advice is still publicly provided but now in a lower-key form totally outweighed by commercial promotional activities, so that the promulgation of the twice a week message has been left, intentionally or otherwise, to Seafish and the seafood industry with uneven results as discussed in chapter 6. Despite its public health significance, a reluctance to fully take on what people eat as an active area of influence for government has been displayed.

The bodies just reviewed and other parts of the state machinery are not all moving in the same direction. Seafish represents the long-standing state support at a distance for primary production which predates what is generally considered as the phase of regulatory state development. The MMO most clearly conforms to the model drawn in the political science literature of state functions being hived off into semi-independent agencies in the recent period, especially as it was a gradual process which started with the earlier separation of the Marine Fisheries Agency as an executive agency within the department of state. The fishery POs, in Britain discharging a public role in quota allocation, are newly charged with responsibilities for the fulfilment of CFP goals and so have just been brought more closely into the European state orbit. Reverse delegation has partially taken place with the FSA (nutrition) and completely in the case of Marine Scotland which as explained in chapter 4 was brought back into the Scottish Government, its predecessor body having previously operated on a delegated basis. Indeed the very fact that the state operates in different ways in the four UK administrations over such policy areas as fisheries management and advice to the public on nutrition illustrates the lack of a single pathway, whether because of size, political choices or for other reasons. Thus the picture of state restructuring is altogether more complex than the impression often given in agri-food and political science studies dealing with changes in the nature of state rule of a one-way delegatory route even if the latter is correctly seen as the dominant trend.

This study has provided examples of different specific interests promoted by the state in relation to fisheries. Certain private producers benefit from the much more generous allocation of fishing quota to the more industrialised compared to the smaller scale segments of the British fishing fleet. Further advantage has been bestowed on the same sector by the semi-privatisation of quota allocations through transferability. Alternatively, an example of the state acting to moderate conflict between interests is the change to the Crown Estate's control over the granting of shellfish orders in which the state's own drive to maximise revenue was balanced against the potential interests of producers. But the serving of broader public interests has also been illustrated when government action has been responsible for tightening food safety rules and for implementing fishing quotas for conservation purposes. In more complex ways much European legislation focused on conditions for the common and single market has supported both private and public interests. What is important is not so much how the state and its variously delegated agencies are structured and their inter-relationships but to what ends their power and influence are targeted. This vital aspect has had insufficient attention in the political science literature.

While the importance of the state has often been underplayed in agri-food studies, that of NGOs and private governance institutions has sometimes been exaggerated. For example the MSC has been described as 'a supranational, state-like NGO' in one source while another has termed private governance regimes 'a range of quasi- or even pseudo-states' and while these may be intended as metaphors they distract attention from real state action (or inaction).²⁰⁵ The discussion about the MSC in chapter 4 has demonstrated a more modest role, one which is ancillary, however usefully, to state-based fishery management and enforcement. Like other certification schemes, the MSC operates in the private sphere but it derives legitimacy from its independence from specific economic interests and from a level of accountability and transparency provided by the participation of a range of

²⁰⁵ The first quotation is from (Constance D & Bonanno A 2000) (p133), the second from (Busch L 2011) (p51).

stakeholders. Private governance in Britain in general has been shown in this thesis to act in concert with and sometimes as an adjunct to state regulation and this includes cases where civil society organisations are involved. The second quote of this paragraph may have been intended to describe the situation in food chains where producers are in poor countries with less effective state regulation but as already noted this is becoming less of a factor and private governance will in future increasingly need to operate together with such states rather than independently.

What does remain in the British situation is that private governance plays a very important role in food chains, particularly in relation to safety and quality, a role which should be seen in context, as part of a mixed system in which public and private approaches generally collaborate but where there is sometimes disagreement and even conflict which is resolved in different ways at different times depending on economic forces and the political balance of power, as seen in the various examples reviewed in the thesis. This study has shown that there is not a simple trend in the balance of public and private regulation; rather, decisions about action or inaction are made in response to issues thrown up by the way supply chains are functioning (sometimes malfunctioning), taking into account public reactions and the interests favoured by those holding political power.

Certain NGOs have been shown to exercise governance sway in the seafood supply chain, particularly in making sustainability a more vital issue for some retailers and foodservice companies than would otherwise have been the case, these then pushing requirements upstream. But the limits to this influence are illustrated by the large proportion of major retailers which declined to take part in the most recent MCS survey as reported in chapter 6. The supermarkets that have co-operated with the MCS and which enthusiastically support the MSC scheme are those for whom such moves fit perfectly with their quality-oriented marketing strategies. This is not to deny sincerity about sustainability as a motive for some or all of them which in certain cases has pre-dated environmental NGO intervention but it shows civil society action as most successful when it dovetails with economic interests.

NGOs aim to affect states or corporations or increasingly both; they often succeed, particularly with the latter, thus exercising some governance impact, but they cannot autonomously produce change in either the economic or political system and should not be regarded as governance actors on a par with the state and private economic forces, contrary to the impression given in some governance studies. Their role can be important in promoting public interests in the issues they pursue but should be seen as contributory to a mixed system. NGOs vary greatly in their philosophies and priorities as well as in the policies they pursue and in particular on how far they collaborate with those whose actions they seek to alter and therefore the interests they promote. In addition there are issues about accountability; while some NGOs have a large number of supporters, typically these are not involved in policy-making and may well not have any democratic input into how organisations are run. While the fishing interests recorded in chapter 4 who questioned motivations behind funding for environmentalists clearly have their own drum to beat, they may nevertheless be raising valid questions about the objectives of such organisations; the extent to which they represent a general public interest as opposed to more specific aims which may be less generally accepted cannot be taken for granted. The greater the influence that environmentalist NGOs exercise, the more obvious the need for better accountability arrangements. Thus a more nuanced view of the NGO interventions than is found in much of the coverage in the literature on food governance is needed.

The concept of a mixed system has been preferred to the use of the term 'hybrid', quite often employed in the literature. Mixtures are fluid and changeable whereas hybrids have more fixed identities. In discussing mixed systems or bodies with mixed functions, this thesis has aimed to establish the particular balance and interests served in each case. Most importantly, the hybridity notion can throw a veil over which organisations and agencies are responsible for actions or failures, contributing to an accountability deficit, whereas here the aim has been to clarify actors and their interests.

This links to the point that a more accurate account of the balance of public and private governance in food chains is vital not only for better understanding but in relation to policy. Only states, individually or jointly, have the legitimacy and powers to limit or shape the forces of local and global economies and their strongest actors, major including transnational corporations. Only state leadership will be able to ensure that the challenge of food security and the need to move to sustainable forms of food production, including seafood, are tackled in the face of severe tests such as world population growth and climate change. Areas for future policy discussed in the next section all require state action, whether in a co-ordinating role or more directly.

If the starting point is that food governance is made up of a complex and unaccountable collection of private and 'hybrid' institutions, the impression given by some analysts, it is difficult to see a basis for campaigning to make changes except in relation to individual organisations or companies at the margins - indeed if that was the real situation it would be hard to see how policy reforms could come about. However, the analysis here has shown that this is not the case. Those wishing to affect food policy need to start with a clear appreciation of the role of the state, actual and potential, and the way its decisions are made through its various structures and delegated bodies and how these are affected by various interests, not least economic, as an essential step in creating conduits to campaigning for preferred policy choices.

7.3 Reflections on Policy Issues

The most important policy issues that been raised in this study are future security of supply, authority over standards and control of the nutrition message.

Long term seafood supply is threatened by the fact that so much of the seafood eaten in Britain is imported which, limitations of fishing access having been established, is the converse of both overfishing and the governance action which has subsequently sought to control it. Growing prosperity in many

parts of the world means that total demand for seafood is rising faster than the rate at which production can increase and in the future the UK may be less well placed to compete for this resource. A further aspect of the problem is the disparity between sustainable supply and the quantity that would be needed were the nutritional 'twice a week' advice to be adopted by a large proportion of the population (though this is not at all likely given present trends). In such a context it is important that the fisheries for which the British fleet has access should be managed sustainably so as to maximise long-term output and that the UK's input to CFP policy should focus on ensuring that this objective can be met. Secondly, sustainable supply would be enhanced by a larger quota share for the inshore under-10 fleet. Finally, there is potential for the development of aquaculture, particularly in England. A DEFRA-commissioned report published in 2009 did review the future supply situation, as reported in chapter 4, but it does not appear that there has been any resulting action. Future seafood supply ought to be dealt with in a framework of general government policy for food security, something which is also lacking at present.

A linked issue to the question of food security is the inadequacy of official statistics for clarifying what seafood is available for consumption. Those showing production figures whether from fisheries or farms are more oriented to economic interests than to what is available for domestic use, something which is very complicated not only because of the extent of both exports and imports but also the fact that some exports may be re-imported and some imports subsequently exported. The Living Costs and Food Survey and its predecessor do indeed itemise seafood that is consumed (or at least purchased) but cannot show overall availability. A food security policy would need accurate data about exactly what is obtainable in the country and appropriate information systems are required.

As in the food system generally, companies in the seafood supply chain use various third party audited assurance schemes which with one exception are entirely privately governed, in a small number of cases with NGO input. The exception is the position in relation to organic standards, relevant to some aquaculture production. Organic standards started and continued for decades

in the form of private systems. A public role in relation to organic standards began only in 1991 with the first European regulation of this production system, motivated by the usual dominating principle in the Community, that of ensuring a level playing field for competition in the single market. For other certification schemes which, like organics, are marketed directly to consumers, it is suggested that they should be brought within a public regulatory framework. As far as seafood in Britain is concerned, this would be relevant in relation to MSC and ASC eco-labelling but not necessarily to business-to-business schemes like BRC and GLOBALGAP. There is no particular debate at present on whether these schemes should be regulated but such a demand may arise in the future. The MSC is unusual among certification schemes in having opportunities for outside stakeholders to comment and put forward objections built into the assessment process and its internal governance structure includes a Stakeholder Council in which both commercial and public interest representatives participate; nevertheless it still falls far short of democratic control. The question is whether something as important as eco-labelling should be left solely to privately run concerns without full transparency and democratic accountability and it is likely that in time a framework of public regulation will be seen as desirable.

The final forward policy issue highlighted is about dietary advice on eating seafood. As traced in chapter 6, the FSA when it was responsible for nutritional matters provided authoritative guidance and was trusted by the public. Crucially, the advice took account of the different needs of specific population groups and was updated when new information was obtained; in its last formulation by the Agency it also mentioned the need for sustainable choices. Since nutrition was removed from the FSA's remit except in Scotland the advice has to be sought from different sources which are much less likely to be accessed by the public for this purpose. New information will still be reviewed by the expert advisory body SACN which in the recently reorganised structure reports to Public Health England, an executive agency of the Department of Health, but neither can be described as a consumer-facing entities, communicating directly with the public in the way the FSA with its former remit succeeded in doing. In the meantime there is a *carte blanche* for

those selling and promoting seafood to convey the message about seafood and health in the most expansive way possible and to use it for advertising purposes. As discussed in chapter 6, the general promotion of seafood consumption is not without benefits but lacks the necessary detail of adequate nutritional guidance. Thus objective and accessible public health communication about seafood continues to be needed. Returning the full nutritional mandate to the FSA has already been advocated by public bodies on other grounds (in reviewing the events of the horsemeat scandal) and this is to be wholeheartedly recommended. At the same time there is a need for understanding to be developed about how British consumers understand the messages about seafood in the diet and about sustainability issues they are receiving and what impact they have on what is actually eaten. Relevant research has been very limited and generally undertaken with a relatively limiting marketing motive and this is a gap which should be rectified.

7.4 Reflections on the Research Process

The research was initiated following the completion of a master's degree in food policy which had included a dissertation on the development of finfish aquaculture in Britain and it began with assumptions based on that experience, particularly a grounding in the agri-food literature as it had developed up to that point, at the turn of the twenty-first century. The first major decision, moving on from the dissertation concentration on a section of primary production, was to study the whole of the supply chain for seafood. This resulted in an orientation in the literature search mainly to material within the discipline of economics and the area of management studies in addition to the specific agri-food field and resulted in an understanding of the linked development of theory and of major changes in the organisation of the food system in the last quarter of the twentieth century which is reflected in sections of chapter 2. During this stage the second key decision was to focus on particular desiderata relevant to food in supply chains, that is food safety, quality and traceability which motivated a further literature search, again often produced from backgrounds in economics and management. In parallel, readings relevant to the seafood industry were

pursued and as knowledge about it developed the issue of sustainability was added to the other three criteria. From some of the more recent agri-food theory, particularly under the headings of global commodity chain and global value chain, these highly indebted to concepts from earlier economics analysis, the concept of governance emerged as the motivator to much taking place in supply chains and the third crucial decision was to make this the key thread, linking it with the previous decision so that the issue became the relationships between governance arrangements and the achievement of the selected desiderata. The emphasis on governance from certain strands of the literature was reinforced by emerging findings from the interviews which indicated a number of governance influences. The decision to focus on governance meant a new consideration of relevant literature and it was only at that stage that it expanded to the discipline of political science and the topics of the role of the state and public regulation. In addition writings from economics and sociological and psychological perspectives were used to extend the concept of governance to the topic of consumption. As this took place in tandem with the fieldwork stage when time was mainly spent in undertaking and processing the interviews, this stage of the literature search was more limited than the original exercise. Finally in the intellectual journey, the consideration of regulation led to a further body of work focusing on this area especially in the discipline of law but as this was at a late stage of the process, the coverage here was more limited still. Thus the literature search has been somewhat uneven. One other point relevant to mention in this regard is that language limitations restricted reflection on the three notable French strands of analysis applied to food systems to what was available in English which may have unduly limited appreciation of their potential contribution to the research.

Over the period covered in this account there were of course continuing developments and publications which have progressed consideration of governance issues in agri-food studies, not least because of concurrent supply chain developments such the further growth of ethical labelling programmes and certification schemes more generally. More recently there has been some limited movement towards greater consideration of the role of the state and public regulation. Increasing work on these issues has also been a feature in

other fields and as an example of growing interest the highly pertinent journal *Regulation & Governance* only started in 2007. Synthesising the insights from the various literatures into agri-food studies is an ongoing endeavour to which this thesis aims to contribute. Thus what has been experienced is not only a personal intellectual journey but one which others in the field of food policy are also making although by varying routes and with varying aims.

From a retrospective stance, the basis on which agri-food work on standards and governance was reviewed would have been improved by closer attention to the local and historical factors applicable to specific studies. Much of the relevant literature has focused on global supply chains with a tendency to gloss over local differences and to concentrate on private governance mechanisms and this was too easily accepted at times of reading. Yet there are important differences between Europe and the US and the Antipodean countries and also between Britain and other European countries in the way both state regulation and private governance have developed. More attention to the contexts of different studies reviewed in the literature search could have assisted the theoretical analysis, particularly over the relationship between public and private forms of governance.

When the decision was taken to focus on governance and the three sources which impact supply chains (that is state/supra-state regulation, private governance and civil society) it was assumed that these would between them explain how supply chains are controlled and therefore how levels of sustainability, safety and quality were determined. This was an assumption based on the accounts given in many agri-food studies which have emphasised the role of governance mechanisms and particularly of standards schemes. Certain interview comments which did not fit this expectation were left to one side in the initial writing-up stage until the realisation dawned that they were interesting and important precisely because they did not correspond to the paradigm. They did not indeed bear specifically on sustainability, safety or quality but they did clarify other aspects of control operating in the seafood chain. This resulted in a renewed emphasis on the power studies of Cox and his collaborators and a partial rethink of the analysis in chapter 5.

Turning to the specific field of research, the seafood industry world was foreign to the researcher who had no personal experience of it prior to the study and no knowledge other than about aquaculture which had been acquired purely on a desk basis. Hence, as described in chapter 3, the discovery process of compiling information about seafood companies and undertaking visits to factories and farms, along with the major exercise of face-to-face interviews was vital in developing a base level of understanding and familiarity, indeed to some extent immersion in the seafood world, necessary for the undertaking. (Reflections on the two new forms of data produced in this research, the seafood companies database and the stakeholder interviews, are set out in the methodology chapter.)

A considerable part of the thesis has been based on secondary sources. Using such information was important for the historical aspects of the enterprise covering a period of two generations, a timescale unusual in agri-food studies. Secondary sources also provided considerable material about the supply and consumption sections of the supply chain. In addition, a focus on regulation must mean the incorporation of relevant legislation. Conversely, it was the existence of such information that made it possible to concentrate on obtaining original data in the form of interviews about the middle of the chain and to nevertheless provide an account of developments in the whole of it. The range and of secondary sources available and their coverage proved very adequate to this objective and this strategy is considered to have been successful. The challenge has been to combine the new data gathered in the research with existing material in such a way as to both provide a balanced account and to relate this to the theoretical issues taken from the various bodies of literature which had been consulted.

7.5 Indications for Further Research and Contribution

There are four governance factors important to the seafood chain which have been encountered at certain points in the study which were not covered in

detail and which merit further investigation. The first is about the role of science. The input of both government department and university-based marine science to the seafood industry in Britain has been noted and scientists have direct input to fisheries management decisions through supra-state bodies like ICES and the FAO. The question would be to assess the value of the contribution made by the state through these activities to the seafood industry. Further, academic contributions may enter the public area with possible governance effects as with the Hites et al (2004) salmon study reviewed earlier so the way scientific contributions are commissioned, funded and used merits research. The second area concerns NGOs which campaign on issues related to seafood; some organisations have featured strongly in this study but there are several others interested in this area and their increasing collective influence will raise more questions about their legitimacy and accountability, suggesting a need for research into their interests, funding and activities. From publicly available information it is evident that there has been some interchange of personnel between industry bodies and NGOs and between the MSC and academia which may be relevant to consider. The third and most closed area is that of fishery and aquaculture certifiers; they play an increasing governance role but little seems to be known about how they function and it would be particularly relevant in connection with UK supply to know more about the operation of the corporation noted in chapter 4 as having certified most British fisheries. Finally, the inadequacy of research about UK consumers and seafood has been noted particularly in relation to nutritional advice. A full understanding of British consumer views and knowledge is needed to inform nutritional education.

The conclusions reached in this chapter further suggest potential pathways for further research in relation to the role of the supermarkets and the question of how supply chains are controlled and to the relative roles of state, private and civil society governance. While the relatively lesser impact of private systems as a governance tool by powerful retailers found here compared to the impression given in much of the literature may be related to specific characteristics of seafood, the analysis has suggested that deriving criteria for constructing continua of buyer influence would enable not only better

understanding but a basis for more structured comparisons and for tracking changes over time. More attention should also be given to sub-chains, comparing those for domestic markets and for export. The analysis of power relationships has also shown the need to analyse not just standards regimes but how rich country buyers negotiate and impose prices for food products. But with greater global competition for limited seafood products expected in the future, the balance of advantage could change and the research then needed might be about buyer contestation and the conditions related to different outcomes.

For the reasons discussed in the previous section, more attention is needed in the approaches to food systems to state-led regulation and enforcement and its inter-relationship with other forms of governance, rather than simply taking it as an unexamined given. The balance of public and private governance is not in a simple or predictable relationship and needs to be examined for different food chains in the light of economic and technological developments as well as in reactions to scares and problems. The various meat chains would be the most obvious areas where such an approach is likely to be fruitful and food authenticity has recently come to the fore as an area where the balance may need to change. In analysis of all forms of governance of food it is particularly important that the interests served should be assessed.

This thesis has thrown light on sixty years of change in the seafood supply chain in Britain and analysed the forces involved over an unusually long period compared to most agri-food studies. Despite the unevenness of available material going back into the past compared with that on more recent developments, both documentary and from the new interview information, the study has succeeded in tracing key changes in the supply chain over the last sixty years.

In terms of the theoretical indications for the research set out in the methodology chapter, the thesis had led not to new theory generation but to contributions regarding both agri-food and governance theory. A great part of the analysis has had a factual positivist and objectivist basis, being founded on

various sources of information, including statistical, about both the seafood supply chain and consumption which have been accepted as reflections of reality. However, the interviews have added interpretivist and constructionist elements which have not only given a broader understanding of the complex ways those in the industry think about such issues as fisheries management and food hygiene governance but have modified the analysis of how supply chains function by showing how some individuals do not simply act in a way that reflects structures and power relativities but make decisions based not only on hard economic calculations but on personal views about sustainability and fairness of returns.

The research has detailed the role of the processing and distribution section of the chain, under-researched in most agri-food and supply chain studies, using new material created by interviews. The concept of governance has been fruitfully employed and shown to be a marker for and in some instances a causal factor in supply chain changes. The model produced of internal and external supply chain governance has usefully combined different theoretical approaches to throw light on the particularities of the seafood chain. Considering internal governance, a more nuanced account has been given of the role of the major retailers than has often been put forward, showing how various factors may moderate their power which in any case only applies to part of the supply chain. In examining external governance influences on the supply chain it has rectified a common imbalance by supplying much greater coverage of state regulation, including the roles of key delegated agencies, to provide a comprehensive account of governance forces and impacts, covering private, public and civil society inputs. Finally, it has used the governance concept innovatively to examine a range of influences on consumers in relation to seafood. In summary then, the thesis has both extended factual knowledge of an important part of the food system and contributed to the theoretical basis for understanding food chains.

APPENDICES

Appendix 1: Some Definitions of Governance in Different Literatures

In the Political & Economic Sphere

'Governance denotes the steering capacities of a political system, the ways in which governing is carried out, without making any assumption as to which institutions or agents do the steering. For any basic order like the economy, governance needs to be understood at two levels. First, there are the basic laws, rules, standards, and principles which provide the constitutional framework for governing. Many of these rules will not be formalised but are implicit in the process of governing. Second, there are the techniques, tools, practices, and ethos of governing, associated with particular institutions and agencies. The state is always involved in governance, but often in an enabling rather than directing role, helping to establish and sustain the institutions in society, including crucially markets, which make steering possible.'

(Gamble A 2000) p111

Governance defined as: 'a co-production mode of decision-making among different types of actors, while the type of actors involved, the extent of involvement of public authorities and of partners, the outcome of the production, the decision procedures, as well as the institutional context and the type and role of sanctions all vary and define different kinds of governance mode.'

(Bartolini S 2011) p11

Governance defined as 'the shaping of the conduct of others through network forms of organization involving a wide range of non-state actors but also government, mainly through exchange and negotiation rather than through traditional state-led regulation'.

(Ponte S, Gibbon P, & Vestergaard J 2011b) p1

In Relation to Supply/Commodity/Value Chains

'Governance structures are arrangements between economic units that govern the way they co-operate and/or compete.'

(Chabaud D & Saussier S 2002) p5

'The concept of "governance" is central to the global value chain approach. We use the term to express that some firms in the chain set and/or enforce the parameters under which others in the chain operate. A chain without governance would just be a string of market relations.'

(Humphrey J & Schmitz H 2001) p20

'A governance mechanism is a means by which chain members and/or exogenous parties are able to act so as to change either the chain strategy, or

the context within which chain activities take place. Governance mechanisms can compel, coerce or encourage chain members to endorse/comply with proposed changes in chain strategy.' (Thorpe A & Bennett E 2004) p42 (footnote)

In Relation to the Sea and Fisheries

'The term "governance" is used to refer to the framework of social and economic systems and legal and political structures through which the ocean is managed.'

(Allison E 2001) p934

'Governance, as opposed to government, is the process by which economic and social measures are managed and the capacity of the institutions to manage them fairly, rationally and predictably. Governance is about institutional performance and the relationship between state, market and society. It should not be equated with or confined to state activities. The governance perspective examines the broad range of institutions that influence how public policy goals are met or fail to be met.'

(Reyntjens D & Wilson D 2004) p1

Appendix 2: Legislation Cited

The UK list is followed by the European one, each in chronological order.

UK

<i>Year</i>	<i>Legislation</i>	<i>Chapter</i>
1934	Public Health (Shellfish) Regulations 1934	4
1951	Sea Fish Industry Act 1951	4
1955	Food and Drugs Act 1955	2
1955	Food Hygiene Regulations	2, 5
1959	Food Hygiene (Scotland) Regulations 1959	2
1966	Food Hygiene (Market Stalls and Delivery Vehicles) Regulations 1966	2, 5
1966	Sea Fisheries Regulation Act 1966	4
1967	Sea Fisheries (Shellfish) Act 1967	4
1967	Sea Fish (Conservation) Act 1967	4
1970	Food Hygiene (General) Regulations 1970	2, 5
1974	Control of Pollution Act 1974	4
1976	Fisheries Limits Act 1976	4
1981	Fisheries Act 1981	4
1984	Food Act 1984	2, 5
1984	Food Labelling Regulations 1984	2, 5
1985	Food and Environment Protection Act 1985	2
1985	Food Act (Scotland) 1985	2
1986	SI No 1272, The Sea Fish (Marketing Standards Regulations) 1986	5
1988	SI No 1218, Environmental Assessment (Salmon Farming in Marine Waters) Regulations 1988	4
1988	Merchant Shipping Act 1988	4
1989	Water Act 1989	4
1990	Food Safety Act 1990	2
1992	SI No 3163, The Food Safety (Fishery Products) Regulations 1992	5

1992	SI No 3164, Food Safety (Live Bivalve Molluscs and Other Shellfish) Regulations 1992	4, 5
1992	SI No 3165, The Food Safety (Fishery Products on Fishing Vessels) Regulations 1992	5
1994	Deregulation and Contracting Out Act 1994	2
1994	SI No 2841, The Urban Waste Water Treatment (England and Wales) Regulations 1994	5
1994	SI No 2842, The Urban Waste Water Treatment (Scotland) Regulations 1994	5
1994	SI No 2716, The Conservation (Natural Habitats, &c.) Regulations 1994	2
1995	Environment Act 1995	4
1995	SI No 12, The Urban Waste Water Treatment Regulations (Northern Ireland) 1995	5
1995	SR(NI) No 380, The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995	2
1995	SI No 731, Welfare of Animals (Slaughter or Killing) Regulations 1995	5
1995	SI No 1763, The Food Safety (General Food Hygiene) Regulations 1995	5
1996	SI No 1502, The Food (Lot Marking) Regulations 1996	5
1996	SI No 1499, The Food Labelling Regulations 1996	5, 6
1996	SR No 558, Welfare of Animals (Slaughter or Killing) Regulations (Northern Ireland) 1996	5
1998	SI No 994, The Food Safety (Fishery Products and Live Shellfish) (Hygiene) Regulations 1998	5
1998	SI No 1165, Packaging (Essential Requirements) Regulations 1998	5
1999	Food Standards Act 1999	2
1999	SI No 367, The Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations 1999	4
1999	SSI 1999/1, The Environmental Impact Assessment (Scotland) Regulations 1999	4

2001	Regulatory Reform Act 2001	2
2003	SSI No 411, The Animal By-Products (Scotland) Regulations 2003	5
2003	SI No 461, The Fish Labelling (England) Regulations 2003	5
2003	SR No 160, Fish Labelling Regulations (Northern Ireland) 2003	5
2003	SSI No 145, The Fish Labelling (Scotland) Regulations 2003	5
2003	No 1635 (W 177), The Fish Labelling (Wales) Regulations 2003	5
2003	SI No 1942, The Packaging (Essential Requirements) Regulations 2003	5
2003	SI No 2756 (W 267), The Animal By-Products (Wales) Regulations 2003	5
2003	SI No 3242, The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003	2
2003	SR No 544, The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003	2
2003	Water Environment and Water Services (Scotland) Act 2003	2
2004	SSI No 498, The Sea Fish (Marketing Standards) (Scotland) Regulations 2004	5
2005	SI No 1605, The Registration of Fish Buyers and Sellers and Designation of Fish Auction Site Regulations 2005	4
2005	SSI No 286, The Registration of Fish Sellers and Buyers and Designation of Auction Sites (Scotland) Regulations 2005	4
2005	SR No 419, The Registration of Fish Buyers and Sellers and Designation of Fish Auction Sites Regulations (Northern Ireland) 2005	4
2005	SI No 3280, The Feed (Hygiene and Enforcement) (England) Regulations 2005	4
2005	SR No. 546, The Feed (Hygiene and Enforcement) Regulations (Northern Ireland) 2005	4
2005	SSI No 608, The Feed (Hygiene and Enforcement)	4

	(Scotland) Regulations 2005	
2005	SI No 3368 (W265), The Feed (Hygiene and Enforcement) (Wales) Regulations 2005	4
2005	SI No 2347, The Animal By-Products Regulations 2005	5
2006	Companies Act 2006	2
2006	Legislative and Regulatory Reform Act 2006	2
2006	SI No 1495 (W145) The Registration of Fish Buyers and Sellers and Designation of Fish Auction Sites (Wales) Regulations 2006	4
2006	SI No 14, The Food Hygiene (England) Regulations 2006	5
2006	SI No 1293 (W127), The Animal By-Products (Wales) Regulations 2006	5
2006	SI No 2841, The Products of Animal Origin (Third Country Imports) (England) Regulations 2006	5
2007	Aquaculture and Fisheries (Scotland) Act 2007	4
2007	SR No 23, The Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations (Northern Ireland) 2007	4
2007	SR No 199, Products of Animal Origin (Third Country Imports) Regulations (Northern Ireland) 2007	5
2007	SSI No 1, The Products of Animal Origin (Third Country Imports) (Scotland) Regulations 2007	5
2007	SI No 376, The Products of Animal Origin (Third Country Imports) (Wales) Regulations 2007	5
2007	SSI No 175, Town and Country Planning (Marine Fish Farming) (Scotland) Regulations 2007	4
2007	SI No 871, The Producer Responsibility Obligations (Packaging Waste) Regulations 2007	5
2007	SI No 2080, The Nutrition and Health Claims Regulations (England) 2007	2
2007	SI No 349 The Nutrition and Health Claims Regulations (Northern Ireland) 2007	2
2007	SSI No 383, The Nutrition and Health Claims Regulations	2

	(Scotland) 2007	
2007	SI No 2611, The Nutrition and Health Claims Regulations (Wales) 2007	2
2007	SI 1518, The Marine Works (Environmental Impact Assessment) Regulations 2007	4
2008	Regulatory Enforcement and Sanctions Act 2008	2
2009	Marine and Coastal Access Act 2009	2, 4
2009	SI No 463, The Aquatic Animal Health (England and Wales) Regulations 2009	4
2009	SSI No 85, The Aquatic Animal Health (Scotland) Regulations 2009	4
2010	Marine (Scotland) Act 2010	4
2010	SI No 420, The Fish Labelling (England) Regulations 2010	5
2010	SSI No 90, The Fish Labelling (Scotland) Regulations 2010	5
2010	SI No 797 (W. 78), The Fish Labelling (Wales) Regulations 2010	5
2010	SR No 54, The Fish Labelling Regulations (Northern Ireland) 2010	5
2010	SI No 490, Conservation of Habitats and Species Regulations 2010	2
2011	SI No 735, The Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2011	4
2011	SSI 139, The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011	4
2011	SSI 209, Water Environment (Controlled Activities) (Scotland) Regulations 2011	4
2011	SR 407, The Welfare of Animals (Slaughter or Killing) (Amendment) Regulations (Northern Ireland) 2011	5
2012	SI No 3082, The Producer Responsibility Obligations (Packaging Waste) (Amendment) Regulations 2012	5
2012	SSI 321, Welfare of Animals at Time of Killing (Scotland) Regulations 2012	5
2013	The Marine (Northern Ireland) Act 2013	4

2013	Aquaculture and Fisheries (Scotland) Act 2013	4
2013	SI No 1768, The Fish Labelling Regulations 2013	4
2013	SR No 219, The Fish Labelling Regulations (Northern Ireland) 2013	4
2013	SSI No 256, The Fish Labelling (Scotland) Regulations 2013	4
2013	WSI No 209, The Fish Labelling (Wales) Regulations 2013	4
2013	The Food Information Regulations 2013	4
2014	SR No 107, The Welfare of Animals at the Time of Killing Regulations (Northern Ireland) 2014	5
2014	No.951/W92, The Welfare of Animals at the Time of Killing Regulations (Wales) 2014	5

European

<i>Year</i>	<i>Legislation</i>	<i>Chapter</i>
1977	Regulation EC/355/77 of 15 February 1977, On common measures to improve the conditions under which agricultural products are processed and marketed	4
1979	Directive 79/923/EEC of 30 October 1979 On the quality required of shellfish waters	4
1979	Directive 79/409/EEC of 2 April 1979 On the conservation of wild birds	2
1981	Regulation (EEC) No 3796/81 of 29 December 1981 On the common organization of the market in fishery products	5
1983	Regulation (EEC) No. 170/83 of 25 January 1983 Establishing a Community system for the conservation and management of fishery resources	4
1983	Regulation (EEC) No 2908/83 of 4 October 1983 On a common measure for restructuring, modernizing and developing the fishing industry and for developing aquaculture	4
1985	Directive 85/337/EEC of of 27 June 1985 On the assessment of the effects of certain public and private projects on the environment	4

1989	Directive 89/396/EEC of 14 June 1989 On indications or marks identifying the lot to which a foodstuff belongs	5
1989	Directive (89/397/EEC) of 14 June 1989 On the official control of foodstuffs	2
1989	Regulation (EEC) No 4042/89 of 19 December 1989 On the improvement of the conditions under which fishery and aquaculture products are processed and marketed	5
1990	Directive 90/675/EEC of 10 December 1990 Laying down the principles governing the organization of veterinary checks on products entering the Community from third countries	5
1991	Directive 91/271/EEC of 21 May 1991 Concerning urban waste-water treatment	5
1991	Directive 91/492/EEC of 15 July 1991 Laying down the health conditions for the production and the placing on the market of live bivalve molluscs	4, 5
1991	Directive 91/493/EEC of 22 July 1991 Laying down the health conditions for the production and the placing on the market of fishery products	5
1991	Regulation (EEC) No 2092/91 of 24 June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs	2
1992	Directive 92/43/EEC of 21 May 1992 On the conservation of natural habitats and of wild fauna and flora (the Habitats Directive)	2, 4
1992	Directive 92/48/EEC of 16 June 1992 Laying down the minimum hygiene rules applicable to fishery products caught on board certain vessels in accordance with Article 3 (1) (a) (i) of Directive 91/493/EEC	5
1992	Regulation (EEC) No 3759/92, 17 December 1992 On the common organisation of the market in fishery and aquaculture products	4, 5
1992	Regulation (EEC) No 3760/92 of 20 December 1992	4

	Establishing a Community system for fisheries and aquaculture	
1993	Directive 93/43/EEC of 14 June 1993 on the hygiene of foodstuffs	5
1993	Directive 93/119 of 22 December 1993 on the protection of animals at the time of slaughter or killing	5
1994	Directive 94/62/EC of 20 December 1994 on packaging and packaging waste	5
1997	Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment	4
1997	Directive 97/78/EC of 18 December 1997 laying down the principles governing the organisation of veterinary checks on products entering the Community from third countries	5
1999	Regulation EC 104/2000 of 17 December 1999 On the common organisation of the market in fishery & aquaculture products	5
2000	Directive 2000/60/EC of 23 October 2000 Establishing a framework for Community action in the field of water policy (Water Framework Directive)	2
2001	Regulation (EC) No 2065/2001 of 22 October 2001 laying down detailed rules for the application of Council Regulation (EC) No 104/2000 as regards informing consumers about fishery and aquaculture products	5
2002	Regulation (EC) No 178/2002 of 28 January 2002 Laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety (the General Food Law Regulation)	2, 5, 6
2002	Regulation (EC) No 1774/2002 of 3 October 2002 Laying down health rules concerning animal by-products not intended for human consumption	5
2002	Regulation (EC) No 2371/2002 of 20 December 2002 On	4

	the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy	
2004	Regulation (EC) No 852/2004 of 29 April 2004 On the hygiene of foodstuffs	5
2004	Regulation (EC) No 853/2004 of 29 April 2004 Laying down specific hygiene rules for food of animal origin	5
2004	Directive 2004/12/EC of 11 February 2004 amending Directive 94/62/EC on packaging and packaging waste	5
2005	Regulation (EC) No 183/2005 of 12 January 2005 Laying down requirements for feed hygiene	4
2006	Directive 2006/88/EC of 24 October 2006 on animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals (the EU Directive on Aquatic Animal Health)	4
2006	Directive 2006/113/EC of 12 December 2006 On the quality required of shellfish waters	4
2006	Regulation (EC) No 1924/2006 of 20 December 2006 On nutrition and health claims made on food	2
2006	Regulation (EC) No 1925/2006 of 20 December 2006 On the addition of vitamins and minerals and of certain other substances to foods	2
2007	Regulation (EU) No 834/2007 of 28 June 2007 On organic production and labelling of organic products	2, 5
2008	Directive 2008/56/EC of 17 June 2008 Establishing a framework for community action in the field of marine environmental policy (the Marine Strategy Framework Directive)	2
2009	Directive 2009/147/EC of 30 November 2009 On the conservation of wild birds (the Birds Directive)	2
2009	Commission Regulation (EC) No 710/2009 of 5 August 2009 amending Regulation (EC) No 889/2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007, as regards laying down detailed rules on	5

	organic aquaculture animal and seaweed production	
2009	Regulation (EC) No 1099/2009 of 24 September 2009 On the protection of animals at the time of killing	5
2009	Regulation (EC) No 1069/2009 of 21 October 2009 Laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal By-products Regulation)	5
2009	Regulation (EC) No 1010/2009 of 22 October 2009 Laying down detailed rules for the implementation of Council Regulation (EC) No 1005/2008 establishing a community system to prevent, deter and eliminate illegal, unreported and unregulated fishing	4
2009	Regulation (EC) No 1224/2009 of 20 November 2009 Establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy	4
2011	Directive 2011/92/EU of 13 December 2011 On the assessment of the effects of certain public and private projects on the environment	4
2013	Regulation (EU) No 1380/2013 of 11 December 2013 on the Common Fisheries Policy	4
2013	Regulation (EU) No 1379/2013 of 11 December 2013 On the common organisation of the markets in fishery and aquaculture products	4
2013	Implementing Regulation (EU) No 1418/2013 of 17 December 2013 Concerning production and marketing plans pursuant to Regulation (EU) No 1379/2013 of the European Parliament and of the Council on the common organisation of the markets in fishery and aquaculture products	4

Appendix 3a: Outline Questions for Seafood Companies

Lead in comment:

My research is about how supply chains for seafood (fish) work in practice and I want to ensure that the views of companies like yours are fully represented. I'm looking particularly at how the supply chain deals with issues like quality, food safety and sustainability.

Questions

1. First I'd like to ask about your role in the company - how would you describe it? (*Clarify understanding of company business - primary/secondary/mixed processing or trading only. Number of employees, turnover. At end, agree anonymised reference term to be used*)

2. Thinking about your supplies - I know there can be lots of pressures about where to source, problems with some species, standards, sustainability questions - What problems do you have in getting what your company needs? (*Probe for quality, food safety and sustainability issues & traceability systems, relationships with suppliers.*)

3. Coming to your customers, companies can experience all sorts of demands, different demands from different customers, perhaps differences between what customers want and are willing to pay for - What sort of requirements do your customers have? What problems do you have with your customers? (*Probe for quality, food safety issues & traceability systems, sustainability, any differences from different types of customer & how requirements met*)

4. You're affected by a lot of legislation and government requirements generally - Is it helping or hindering what you do? (*Probe - changes in standards, results*)

5. You have probably been in the business for some time - How have things changed from when you started? (*Probe - relations with suppliers/customers, quality demands, traceability*)

6. What do you feel are the key challenges that your business (company) faces at the moment?

Appendix 3b: Outline Questions for Organisations

1. Please describe your role (in relation to the seafood industry/seafood supply chains).
2. What do you think are the key issues/problems on the supply side for the seafood industry? What are producers, processors doing about quality, food safety, sustainability? To what extent have traceability systems been implemented and what difference have they made?
3. On the demand side, do you think that requirements have changed in relation to quality, food safety, sustainability? Do the large supermarket chains have specific requirements? How do the requirements of retailers and foodservice differ?
4. What do you think has been the impact of regulation/government legislation? How much is positive, how much is negative? (*Probe if appropriate - fisheries, food safety, labelling, traceability*)
5. Which type of companies in the chain have the most influence on determining what is produced & prices?
6. What are the biggest changes you have seen in your working life with the seafood industry? What has been good and bad about changes that have happened?
7. What do you think are the big challenges for the seafood industry? What changes do you expect to see in the future?

Appendix 3c: Outline Questions for Retailers

Lead in comment:

My research is about how supply chains for seafood (fish) work in practice and looking particularly on how the supply chain deals with issues like quality, food safety and sustainability. Retailers have a deep influence on and knowledge of the whole supply chain which is important to include.

Questions

1. First I'd like to ask about your role in the company - how would you describe it? *(At end, agree anonymised reference term to be used)*

2. Thinking about your supplies - I know there can be lots of pressures about where to source, problems with some species, standards, sustainability questions ... What problems do you have in getting what your company needs? *(Probe for quality, food safety and sustainability issues & traceability systems, relationships with suppliers.)*

3. On the customer side, what sort of conflicting demands do you have from consumers? *(Probe for quality, food safety issues & traceability & sustainability issues & how requirements met)*

4. How much does the regulatory environment affect what you do... Is it helping or hindering? *(Probe - changes in standards, results)*

5. In your time working on the seafood category have there been any significant changes? *(Probe - relations with suppliers/customers, quality demands, traceability)*

6. Turning to the future, what do you feel are the key challenges for your company in continuing to provide the seafood offer you want?

Appendix 4: Eight Vignettes of Interviewed Seafood Companies

Northern-based fish smoker, wholesale & retail

Close to the small harbour, empty but for a couple of boats on the foreshore, lie the premises of the company, a yard surrounded by the factory, shop and tiny office. The director is the fourth generation to run this family firm. He wonders whether any of his children will want to come into the business and even whether he wants this life for them. But he is very proud indeed of his kippers which are sold to a top supermarket chain, to hotels and in wholesale markets. The business with more than £1million turnover has 16 employees. Once the herrings for the kippers came from fishing ports up and down the coast; when they came in for a limited season, 'people went mad for them in a short space of time'. Now the herring come in frozen from Norway and there is a reliable supply for smoking all the year round.

Fishing boats, wholesale and retail

A small but integrated business owning boats and fishing quota as well as running wholesale operations and a shop is situated on a waterway on the southern coast. The fishermen are share partners and the operation is dedicated to getting the best prices for them, bypassing auctions, by selling direct to a range of customers from the local housewife to the House of Lords and exporting to 'all of Europe'. There are 19 employed staff and the annual turnover is about £3 million. The company provides infrastructure it believes essential to the viability of fishing in the local area.

Sourcing from day boats

In a small office overlooking the quay of a small south-western port, two merchants exchange thoughts with the researcher on the state of fishing locally. Their two separate businesses buy via the local auction from small day boats which are generally believed to constitute a sustainable form of fishing because the quantities they catch are relatively small. The businesses are thriving, one selling to wholesalers, the other to upmarket restaurants and

small supermarkets 'in areas where people can afford our products'. But they are aware that the volume of current landings is much lower, perhaps half, of what they were ten years ago. Views range on the reason behind the change: French pair trawlers that decimate breeding sea bass, the general tendency of fishermen to ultimately 'catch it to extinction and then stop', warmer sea temperatures that are changing fish movements, inadequacies in management. They agree that they want to see improvements in fisheries management.

The trader

In an office above Billingsgate market a firm of traders keeps the supply of fish flowing. This company just deals with fresh fish with three teams covering European sea species, exotic fish and the largest section, salmon. It's a dynamic situation: 'The thing's always floating, there are things that are running short and things are running long. Prices are floating about all the time. Your supply and demand is stopping, starting.' Meanwhile the company's stall is operating down below in the market. The stalls held by about fifty separate companies cover a vast range of products from all over the world, from live eels and lobsters to large exotics as well as frozen and smoked items while professional buyers mill about with domestic customers in the aisles.

Small manufacturing company in the east of England

Whitefish comes in frozen blocks and fillets to this small company in the east of England where it is first cut up on the sawing line into chunks or fingers and then turned into frozen dishes such as battered chunky cod, fish pies and fishcakes on three manufacturing lines. The 70 strong workforce is locally recruited: 'A lot of people are like - my sister works here, my dad works here, two of my aunties work here. If any jobs are coming up they'll say get 'em in.' The customers are mainly retail, including one of the smaller supermarket chains. In the office above the factory there is a small kitchen where products can be cooked for the daily taste checks and new products assessed.

Large manufacturing company in the east of England

In a large industrial park are the extensive premises of a major manufacturer with a turnover around £100 million, employing 600 people recruited from several different countries. Serving most of the supermarket chains, it produces coated fish products, prawn cocktails and seafood based meals. The factory has some sophisticated equipment such as large kettles for cooking sauces which are then machine-shot into plastic bags to be cooled and chilled ready for the lines. The manufacturing lines themselves use a lot of labour, with the various ingredients, for example vegetables and fish placed in the cartons by hand with perhaps a mashed potato topping finally delivered mechanically. Human labour is seen to be necessary even in such a large scale operation to get accurate results.

Salmon processing

At one of the sites of the second biggest producer of salmon in Scotland (though Norwegian-owned) the speedy and efficient processing system is displayed. The fish are moved alive from the farm cages in the large tanks of a wellboat. Close to the shore they are whisked through a pipeline to emerge in the slaughter unit where they are swiftly stunned, machine slaughtered, checked by a worker and bled. After a period of chilling the salmon pass through machines which head and gut them to be sent whole or through a different set of machines to fillet and trim, producing another set of products. Despite the sophisticated mechanisation, there is still a considerable amount of labour to check and finish and a high proportion of the staff originate from Eastern Europe. Two hours after arrival on land, the salmon, now transmuted into products, are speeding in refrigerated lorries to a myriad of destinations.

Manufacturing and trading company

A state-of-the-art 30,000 square feet processing plant in southern England is the home of a large manufacturing and trading company. But the investment is equally in its people, the in-house sustainability champion, the technical teams that maintain standards both internally and of raw material coming in and the

peripatetic auditors who may be working for the company in South America or India or anywhere they have actual or potential suppliers of seafood. The number employed is well over 200. The company has pioneered some important developments in British seafood consumption, imports considerable amounts and produces chilled packaged fish and fish dishes for premium supermarket ranges.

Appendix 5: Analysis Topics List

The analysis of the interviews proceeded by breaking down each script into the topics mentioned by the respondent as described in chapter 3 (section 3.4). Topics were grouped under the following headings: governance; traceability, quality & food safety; sustainability & fisheries management; standardisation; consumption; the business; other. The topics are listed below under the relevant headings.

Governance

Governance-power (includes information about supply chains)

Contractual relations

Marketing/pricing

Profitability

Regulation

Traceability, Quality and Food Safety

Food safety

Quality

Traceability

HACCP

Sustainability & fisheries management

Fisheries management

Fisheries science

Certification/MSC

Sustainability

Standardisation

Standardisation/size of fish

Standardisation of fish and chips

Consumption

Foodservice

Retail

Consumers (including health issues and demand generally)

The Business

Interviewee role

Labour

Premises

Products/Functions (include wild/farmed, chilled/frozen)

Sourcing

Techniques

Other

Change

Future

Fish and chips sector

Appendix 6: University Research Ethics committee approval



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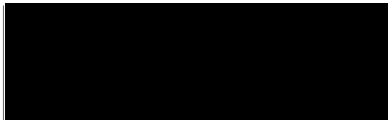
Dear Ms Greenwood

Re: "Supply Chains for Seafood"

I am writing to you to confirm that the research proposal detailed above has been granted formal approval from the City University Research Ethics Committee, following Chairs action taken to approve the proposal.

Should you have any further queries relating to this matter then please do not hesitate to contact me. On behalf of the Research Ethics Committee I do hope that the project meets with success and many thanks for your patience.

Kind regards



Dr Naomi Hammond
Assistant Registrar (Research)
Secretary to Research Ethics Committee

Email:
Tel:



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