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Rethinking Food Policy:
A Fresh Approach to Policy and Practice

Brief 2: Understanding the food system: Why it matters for food policy

What is the food system?

There is more evidence than ever before that the food system is intimately connected to major contemporary global challenges, from malnutrition to climate change. This Brief looks at what the food system is, how it is defined and the implications of that definition for a fresh approach to food policy.

The food system is the interconnected system of everything and everybody that influences, and is influenced by, the activities involved in bringing food from farm to fork and beyond. It includes:

- the chain of activities from producer to consumer;
- the factors that influence the chain of activities and are influenced by it; these are drivers and outcomes of the food chain, which have economic, political, environmental, health and social dimensions;
- the many entities, institutions and people directly and indirectly involved;
- the connections between all these elements, meaning that action in one part of the system has repercussions across the system.

Defining the food system

The food system has been defined and depicted in many different ways, from a simple food supply chain to a web of multiple interconnecting elements.[1,2,3]

The food supply chain

At its most basic level, the food system is characterised as the activities that take food from farm to flush. Food is produced, harvested, gathered or slaughtered; cleaned, packed and stored; and typically processed in some way – from cutting and canning to complex manufacturing. Then it is distributed – transported and traded – and sold and marketed to people in myriad ways. Afterwards comes the eating, together with spoilage, waste and disposal, which also occur throughout the chain.

This is the food supply chain or food value chain: the chain of people and events through which food is produced and supplied to everyone who eats, and the value that is generated, distributed and lost through its ordinary functioning. It is typically depicted as a linear[4] or circular[5] sequence of activities. Food chains operate at assorted scales and levels, from the shortest supply chains from garden to table, to long, highly complex globalised chains. The level and type of technology adopted in the food chain plays a major role in how it functions.

Drivers and outcomes

More holistic definitions of the food system explicitly incorporate the outcomes and drivers of the food chain. For example, a pioneering definition published in 2008 focused on food security[6] – food utilisation, availability and access – as a key outcome. Some depictions include health, social, environmental and economic outcomes,[7] while others focus on specific outcomes, such as nutrition.[8]

Drivers are the factors that push or pull the chain.[9] These range from technology to demography, soil health to urbanisation, policy frameworks to people's incomes. All have economic, political, environmental, health and social dimensions.

While drivers and outcomes are typically portrayed as separate, the reality is more complex: drivers can also be outcomes, and outcomes drivers. Climate change, for example, both influences food production (such as by affecting crop yields and nutrient levels) and results from it (since agriculture is a source of greenhouse gas emissions). Food spoilage and waste are outcomes of the chain, but the functioning of the supply chain is also driven by an imperative to reduce waste.

Drivers are sometimes depicted as not part of the system, shaping it from the outside; likewise, outcomes may be viewed as "externalities" (costs or benefits borne by others outside the system).[10] In practice, though, they are *intrinsic* to the system; the food chain as we know it would not operate without them. Food contamination, for instance, is not just an unfortunate by-product, but emerges from the normal functioning of the system. So does inequality.

People

Strangely, people rarely feature in definitions of the food system.[11] In practice, though, the food system is full of people, both individuals and members of institutions, acting as drivers and experiencing outcomes. In fact, because everyone needs to eat, we are all part of the food system.

Interconnections

The use of the term "system" implies the food system is not a set of separate elements, but *interconnected* elements.[12] These interconnections have been depicted in complex, spaghetti-like diagrams with arrows going in many directions, quite different from simple chains.[13] Multiple connections exist, meaning there are many pathways between drivers, activities and outcomes that are dynamic and shift over time.[14]

Interconnecting dimensions of the food system

Economics, politics, the environment, health and society all shape, and are shaped by, the food system. They are at the root of many of the problems that food policy needs to solve – and all are affected as a result of the ripple effects when any food policy solution is implemented.

Economics

The food system is an economic system. Food is bought and sold and subject to numerous financial interactions, locally, nationally and globally. Value is generated and allocated: the food chain makes a huge contribution to most national economies. Businesses of all sizes – from farmers to transnational companies – compete with each other, as do countries. Jobs and skills in the system determine people's income and finances. People likewise have economic impact through what they buy. Yet economic inequity is widespread. For example, farmers often receive very little share in the value of a product and lack access to land; the food sector has many low paid jobs and skills gaps.[15] Barriers to new entry for producers and companies co-exist with consolidation throughout the chain, leading to an uneven concentration of value. Inequity is also apparent in the trade imbalances between more and less powerful players, for example, between advanced and developing economies, and in disparities between the nature and value of foodstuffs imported and exported.

Politics

Food is political. Food policy – all the policies that affect the food system and what people eat – is debated and contested.[16] Rules emanating from the political system, including legislation, taxes and subsidies, and other policies, affect the food chain. Power relations are inherent in the organisations which make and apply those rules, including governments, international institutions and companies. Food influences political decisions, such as when prices rise. Unequal power relations are manifest throughout the food system. Blockading food supplies has always been used as a weapon of war to weaken the enemy. Poor governance, incoherent policy-making and political cycles undermine a longer-term approach to addressing food-related challenges.

Environment

Food production needs the right environmental conditions. This means air and climate, water, the sea and land (including soil), and the diverse flora and fauna which live in and on them (biodiversity). Farmers and other food producers should be in an ideal position to nurture and restore the environment for us. Yet the modern food chain is, ironically, a major contributor to the destruction of the nature and life on which the planet depends. For example, in 2016 agriculture used over one-third of total global land area and accounted for approximately 70 per cent of total freshwater use in the world (mostly for irrigation).[17] Agriculture is the second-largest cause of outdoor air pollution[18] and up to one-third of greenhouse gas emissions responsible for climate change come from the food chain.[19]

Health

People need food to live. The food chain influences diets, nutrition, food safety and wellbeing. In a sense, modern food chains are an unparalleled success in terms of the range and availability of food that they offer. Yet the food chain is also associated with a whole host of health issues. Malnutrition and diet-related disease are between them the world's largest cause of ill-health and early death. An estimated 821 million people are undernourished. Poor diets are associated with non-communicable diseases, such as heart diseases, diabetes and cancers. Eating unsafe food is estimated to kill at least 420,000 people every year.[20,21] Antimicrobial resistance – in part resulting from the use of antibiotics in animal agriculture – is a long-term threat to human health.[22] The chronic and acute health impacts of working in the food chain are wide-ranging and include accidents that cause injuries or death; poisoning from pesticide exposure; and stress leading to mental health issues and suicide.[23]

Society

Food can act as a social glue, create community cohesion and contribute to the regeneration of socially deprived areas. Food is an important link to historic traditions and cultural representation, a focus of celebrations and source of pleasure. Culture, society and religion, the media and education all influence the beliefs and values which impact on what and how people eat. Food forms part of people's identities and social aspirations. Yet in the modern food system, loss of food culture, knowledge and skills is altering people's perception of the social role of food and leaving them open to manipulation by media and advertising.

The food system

Our depiction of the food system places the chain that brings food from farm to fork at its core. It also shows the interactions between the chain and the interconnected economic, political, environmental, health and social dimensions where the problems lie – problems for which food policy solutions are needed. These dimensions are both drivers and outcomes. When specific food policy solutions are implemented, the interconnections in the system mean all dimensions are affected, directly and indirectly, intentionally and unintentionally. It is only when the food system is considered from this holistic perspective that genuinely effective solutions to current (and future) food problems become possible.

One food system or many?

The term "food system" is generally used in one of three ways:

- **The** Food System: the interconnected system of everything and everybody that influences, and is influenced by, the activities involved in bringing food from farm to fork and beyond.
- **A** Food System: the food system in a specific locality or context.
- Food **Systems**: The totality of different types of food system in different localities and contexts (i.e. multiple forms of "a food system"). This idea of multiple food systems acknowledges the huge diversity of food systems at different scales with differing characteristics. For example, industrial systems at a global scale and alternative systems at a local scale.

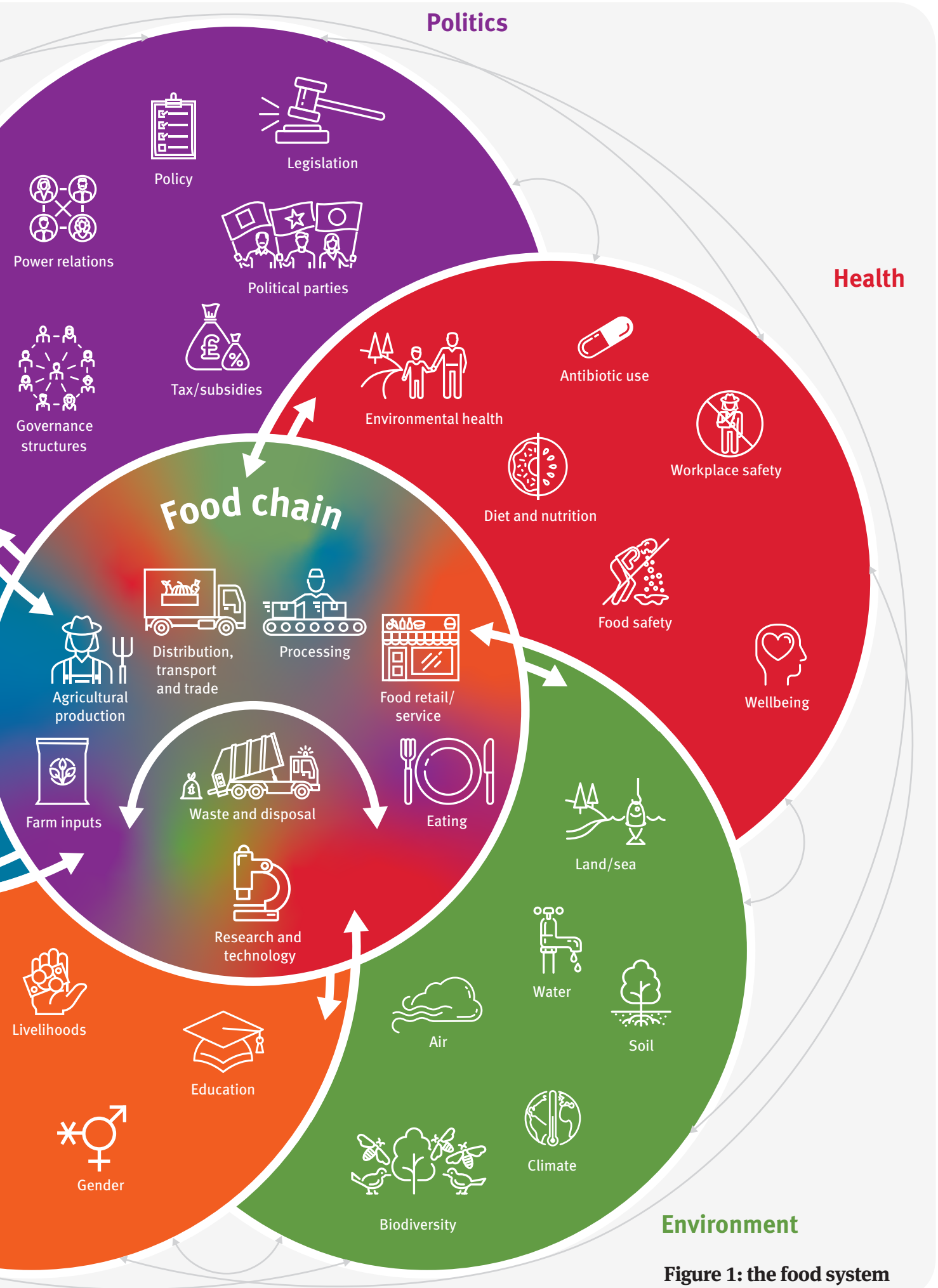

Figure 1: the food system

Identifying connections: wheat in the food system

Figure 1 (pages 4–5) is not an exhaustive model, but a visual thinking tool, intended to identify the interconnections that policy-makers need to be aware of when making decisions about food. Wheat – one of the world's most widely eaten foods – is one example of how the Figure can be used to explore the interconnections in the system and the implications of policy interventions in one part of the system for other parts.

At the start of the chain, wheat is produced by farmers, using seeds and other inputs such as fertiliser and pesticide. It is a heavily traded commodity and relies on storage and transport infrastructure. The grain is processed, for example into flour, which is the foundation of many of the most basic foods we eat: bread, noodles and pasta, sold in different forms all over the world. Wheat is also subject to waste, from grain to bread (one of the most-wasted foods).

Wheat interacts with multiple dimensions during this journey: the **environment**, in terms of the land, soil, water, air and climatic conditions it needs to grow; and the **economy**, as wheat is bought and sold. **Politically**, there are the policies and regulations that cover wheat seeds through to the end products, and there are power relations between seed-sellers, wheat farmers, traders and millers, manufacturers, retailers and consumers. The **social** dimension is also important for wheat – bread is an aspect of social identify in many cultures. **Health** matters, too: wholegrain wheat is nutritious, while refined grain is less nutritious and contributes to many of the cheap energy-dense foods associated with the global epidemic of non-communicable diseases.

There are multiple interconnections between the food chain and between these dimensions. For example:

- *Food chain, economy, environment*: Wheat is price-sensitive to crop availability, which is impacted by climate change, weather events or natural disasters.
- *Food chain, environment, health*: Wheat crops are sensitive to diseases, and may be treated with chemicals such as glyphosate to kill weeds, residues of which can remain in food and pollute water sources near farms.
- *Food chain, economy, politics*: A poor wheat harvest can lead to food price spikes, and can trigger political intervention, for example subsidies or taxation, or trade barriers between countries;
- *Food chain, society, economy*: Wheat consumption is influenced by social norms; for example, a move towards low-carbohydrate or gluten-free products, which can be prompted by media coverage. Consumption trends can then affect prices and production. In turn, production can impact what we eat, in terms of the wide availability of wheat-based processed foods.

So policy interventions can have unintended consequences: for example, policies that facilitate the industrialisation and commodification of wheat to maximise yield and profitability could negatively impact the environment, which in turn could *diminish* yield and undermine resilience. Increased monocropping may also have social impacts by limiting the cultivation of other significant indigenous crops.

A holistic approach could bring positive change across the system. Policies designed to increase diversity in wheat production along the chain might support:

- plant-breeding research on diverse and nutrient-rich or culturally important varieties;
- more environmentally friendly production;
- training and business support to increase the number of millers and bakers;
- processing techniques that preserve nutrients;
- less advertising of highly processed, energy-dense foods;
- educating children about how bread is made.

Potential benefits of this across the system might be not only improving the resilience of growing crops, but also reducing pesticide levels in food and pollution, and improving farm workers' conditions; cutting back on transport needs; building skills and creating jobs; stimulating a market for value generation through new, interesting and culturally important grains, and a supply of locally produced foods; and ensuring less bread is wasted because it is more highly valued. This would require joining up researchers, plant breeders, investors, farmers, millers, bakers, nutritionists, caterers, teachers and the people who eat wheat across the system.[24]

Implications for a fresh approach to food policy

Understanding the food system as the interconnected system depicted in Figure 1 requires a different way of thinking – and acting – when looking for food policy solutions.

1 There are many parts of the food system where action can be taken

Policies typically address problems in one part of the system. Yet treating food problems as part of a food system means actions can be taken at multiple points. To improve diets, for example, interventions can directly target consumers, such as through education, but also target food production and retailing. Likewise, they could target the economic aspects of the system, such as industry consolidation, or the social aspects, such as encouraging community engagement around eating. The case of wheat on page 6 illustrates that actions to encourage people to eat higher quality bread could be taken in multiple ways, such as increasing the diversity of wheat varieties, educating children about how bread is made and regulating the quality of flour used in bread.

2 Policy actions in one part of the food system have consequences for other parts of the system

Recognising that the food system is interconnected means any policy intervention to address one part of the system will impact on other parts. For example, policies that regulate workers' wages in the food system could impact food prices received by farmers, and those paid by consumers, with mixed implications for nutrition and health. Policies that aim to reduce the intake of high calorie, fatty, sugary and salty foods may have an impact on the economics of businesses, leading to push-back against such policies. This can lead to unintended consequences: global efforts to improve environmental standards for the production of specific crops may have unintended impacts on the production of other crops vital for rural incomes; policies to promote national economic competitiveness in wheat production may end up having consequences for water quality. Thus any policy intervention to address one part of the system should be assessed for its impact elsewhere and decisions taken about what to prioritise and/or how best to manage the trade-offs.

3 There are opportunities to develop policy solutions which address multiple problems simultaneously

Just as the connections in the food system mean policies can have unintended consequences, they also mean policy solutions can bring multiple benefits at once. This has been termed "connecting the food system for 'co-benefits'".[25] For example, policy interventions could aim to promote foods which are generally good for people's health but also protect nature, such as through redesigning food-based dietary guidelines to take account of both human and planetary health. Or agricultural development programmes – for instance supporting farmers in the wheat supply chain (see facing page) – could promote production diversity of micronutrient-rich crops, using more sustainable methods, to benefit farmer income, health and the environment. Page 6 also illustrates how acting across the food supply chain to increase the diversity of grains being grown and eaten could have multiple positive benefits.

4 Knowledge about different parts of the food system needs to be brought together

Devising food policy solutions holistically means bringing together people and organisations who work in, or on, one part of the system to enable them to see the whole system. This is true for policymakers, civil society groups working on different parts of the system, private sector businesses in a particular part of the chain and researchers.

Psychologists and social scientists are needed to understand why people eat the way they do; nutritionists for how those diets impact health. Agronomists, farmers and vets are needed to understand food production; food technicians for how to process and package it; soil and climate scientists and ecologists for how food cultivation and processing impact the environment; economists for how markets work, retailers and caterers on sales approaches. Policy analysts, educators and media specialists are needed for what interventions to take and how they should be communicated. We also need to listen to people's first-hand experiences of the problems in the food system.[26] All of these different disciplines and voices are required to inform food policy.

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This Brief was written by Kelly Parsons, Corinna Hawkes and Rebecca Wells, and externally peer-reviewed. Suggested citation: Parsons K, Hawkes C, Wells R. Brief 2. What is the food system? A Food policy perspective. In: Rethinking Food Policy: A Fresh Approach to Policy and Practice. London: Centre for Food Policy; 2019. Funded by the Wellcome Trust. We thank George Miller for copyediting, and Rosalind Sharpe and Annabel de Frece for reviewing internally.

Funded by the Wellcome Trust

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