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Putting food in the driver's seat: aligning food-systems policy to advance sustainability, health, and security

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Food is a basic need, but seldom a basic policy area. Food systems are widely governed by disconnected policies distributed across a range of sectors including agriculture, education, health, environment, economy, and security. Failure to align food system strategies often results in these disparate policies operating at cross-purposes. Conventional food production and consumption practices contribute to biodiversity decline and climate change, cause diet-related health problems, are associated with worker exploitation, and create national security risks. Drawing on agroecology for cohesive national food strategies can provide benefits across all these sectors: supporting public health, environmental sustainability, economic stability, social cohesion, and national security and sovereignty.

KEYWORDS

food policy and governance, net zero, sustainability, health, food security, food systems

Introduction

The importance of food can hardly be overstated. Food is not only a basic need but also a key economic pillar with direct impacts on many drivers of economic and social function. Food systems, which comprise all the actors and relationships involved in growing, producing, manufacturing, supplying, and consuming food, involve not only agriculture and fisheries but also food manufacturing, retail, service, consumption, and waste management. In addition to providing the populace with nutrition and sustenance, these systems support many levels of commerce, interact with and alter ecosystems, profoundly influence public health, and often affect foreign policy. Food is also a vital cultural component and, at its best, a powerful convener supporting community cohesion.

Despite this centrality, food has taken a back seat in policy development. Rather than approaching the food system as a policy area, food systems are generally governed by disparate policies scattered across numerous areas such as agriculture, health, environment, education, welfare, and economic policy. Lacking integration, these policies often operate at cross-purposes, with food-related goals in one area undermining progress in others.

At the most macro scale, the global move toward easily consumable food with year-round availability has functioned in opposition to sustainability objectives. Specialization, intensification, and consolidation of food production have massive environmental costs: the food system globally is responsible for approximately 30% of greenhouse gas emissions (Crippa et al., 2021) and is the single largest factor in biodiversity decline (Benton et al., 2021). The

predominance of highly processed food is also a major factor in the global rise of diet-related diseases, such as obesity, type 2 diabetes, heart disease, and certain cancers (Rico-Campà et al., 2019; Srour et al., 2019). Additionally, large-scale consolidation creates an imbalance of power between industrial decision makers and the consumers and suppliers on whom the system relies (Oxfam, 2022).

These issues are now coming to a head in Wales, with the impacts of Brexit including increasingly divergent policy across the United Kingdom countries, deregulation at the United Kingdom level, and opportunities to develop a unique statutory framework for the Welsh food system. Wales already has the Well-Being of Future Generations (Wales) Act 2015, which mandates that Welsh public bodies work together to preserve quality of life for succeeding generations and includes seven interconnected well-being goals addressing health, equality, prosperity, resilience, community cohesion, cultural continuity, and global responsibility. In the context of food system policy, this act provides for better decision-making by ensuring that public bodies take an integrated and collaborative approach to long-term impacts. However, coordination challenges remain pronounced in Wales due to the continued fragmentation of food policy. For example, the Welsh government's recent efforts to implement a free school lunch program as a means of improving children's nutrition, reducing health inequalities, and opening up new markets for local food required the involvement of no fewer than six ministries: Education, Public Health, Economy, Local Government, Food/Environment, and Social Security. Implementation of the program is proving correspondingly difficult.

The Food Policy Alliance Cymru (FPAC), comprising researchers and practitioners concerned with the social and environmental impacts of food systems, formed in response to these and other challenges in Wales and beyond. Here we aim to demonstrate how, just as the fragmentation of food policy has had a number of negative effects for citizens, conversely the alignment of food-related policies can create synergies across government departments to achieve a wide range of policy targets relating to health and well-being, environmental sustainability, social justice, and community resilience. Within the Welsh context, the present development of a new Food (Wales) Bill is an opportunity to bring disparate food-related policies into alignment with a National Food Strategy and corresponding food system targets under the guidance of a Food Commissioner and commission. Similar challenges and opportunities arise in many national contexts as discussed, for example, in the United Nations Sustainable Development Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture (United Nations, 2022).

We argue that moving food from the back seat to the driver's seat of policy development enables an integrated agenda of mitigating and adapting to climate change, restoring and maintaining biodiversity, supporting public health and equity, improving economic conditions and social ties, and strengthening national security through *food sovereignty*—enabling people and communities to have agency over how and what food is produced, traded and consumed and engage in the policy processes that shape the food system.

Advancing agroecology

To achieve these goals, we propose a food policy approach rooted in *agroecology*. Agroecology is the science and practice of applying ecological principles to optimize the relationships between plants, animals, humans, and the environment, including the establishment and maintenance of a sustainable and fair food system. Through these relationships, agroecology supports food production, food sovereignty, and nutrition, while restoring the ecosystems and biodiversity that are essential for sustainable agriculture. This agroecological approach goes beyond minimizing harms to actively contribute to environmental and public health and economic resilience. These benefits are achieved through *place-specific* design and organization of farms, livestock, crops, and landscapes, drawing on unique local characteristics and conditions, and conserving cultural heritage and local knowledge.

While such approaches often build on and may seek to restore certain pre-industrial practices, they also leverage contemporary knowledge, technology, and connectivity to strengthen and support enduring food systems. Advanced understanding of soil science, ecosystem management, and climatology are employed to complement traditional practices. Processing facilities, transport networks, and renewable energy generation are strategically integrated with food production. Online connections are cultivated to facilitate collaborative networks and expand consumer education and access.

This agroecological approach is not merely theoretical: successes are already being demonstrated at the community scale. In Wales, a number of community "food hubs" have been supported by United Kingdom charities in order to facilitate cooperative relationships among local producers, distributors, and citizens. Some of these efforts focus on supplying publicly funded schools, colleges, care homes, and leisure facilities with locally grown food. Additionally, the "Our Food" initiative in the Brecon Beacons supports small farming enterprises that utilize environmentally sustainable practices in supplying in-person and online local markets. Malmo, Sweden's third largest city, offers another example. After 10 years of focus on local, organic procurement, more than 80% of fresh food provided within public institutions (e.g., hospitals, council buildings, and schools) comes from organic-certified farms in the city vicinity (WWF, 2012).

These community-scale efforts can bring a number of benefits including strengthening community ties, supporting ecologically sound farming practices, increasing local availability and consumption of fresh produce, educating youth and adults about nutrition and sustainable agriculture, and reducing waste through cooperative networks. However, in order to be effective and sustainable over the long term, community-scale efforts require linkage to broader national food systems. A comprehensive policy approach can incentivize, reward, and assist community-scale efforts that produce public benefit; incorporate worker protections along the full supply chain; pool and share knowledge, including assisting with network building and sharing best practices; and ensure that policies and regulatory approaches across all domains line up in support of sustainable food system goals including public and environmental health and economic development.

Six-part framework for food systems priorities

We propose a six-part framework of strategies for food systems policy that can harness the benefits of agroecological approaches to support food systems that are equally strong in environmental, economic, social, and agronomic dimensions. Each of these strategies dovetail with and amplify one another.

Strategy 1: Food for all

Beginning with the clear objective of producing and providing nutrition for all citizens sets the baseline for a "driver's seat" food policy. Pursuing *Food for All* requires a national strategy for assessing and optimizing capacity for food growing and processing as well as ensuring dignified access and affordability, including an adequate benefits and emergency support system. Upholding children's right to food (part of the UN Convention of the Rights of Child, Article 27) is a central element of this strategy. Another key feature of a Food for All strategy is providing access to land for interested citizens, households, and cooperatives to grow their own food.

Strategy 2: Food for public health

Beyond the first objective of sustenance, pursuing *Food for Public Health* prioritizes producing and providing food that improves health status. In Wales, as in many industrialized countries, this involves recognizing low levels of consumption of fruits and vegetables (among the Welsh population, averaging 2.5 servings per day for those over 11 years of age; Food Foundation, 2021). Food for Public Health focuses on producing sufficient vegetables to meet individuals' daily requirements, facilitating consumption of fresh foods by shortening supply chains through community-scale production and distribution, and aligning economic incentives with the provision of highly nutritious foods rather than non-nutritive consumables such as ultra-high processed foods, sweets, and alcohol. This strategy also involves an education component, particularly in primary and secondary schools. Policies supporting Food for Public Health require careful consideration to avoid creating new hazards: for example, a sugar tax that does not address other types of sweetening additives can lead to increased consumption of artificial sweeteners with a number of deleterious health effects.

Strategy 3: Net zero food system

Setting forth a *Net Zero* objective for the national food system provides a sturdy framework for orienting toward community-scale hubs that reduce transport emissions, emphasizing minimally processed foods, and shifting away from high levels of meat production. Key components of this strategy also include policies to reduce food waste and import policies that account for environmental impacts of imported foods at every point along the supply chain.

Strategy 4: Farming for nature and climate

In addition to Net Zero goals, this strategy capitalizes on the capacity of food production to *improve* ecological conditions through agroecology. Through policies that support and incentivize practices that work in concert with nature such as inclusion of on-farm wildlife habitats, organic farming, plant diversity, crop rotation, and integration of livestock as natural composters and weed managers, *Farming for Nature and Climate* will restore ecosystem health and mitigate against climate change, both essential for present and future food production (Defra, 2021). These policies may also involve taking some lands out of the food production system to make space for nature-based solutions to tackle the nature and climate emergencies.

Strategy 5: Sustainable seafood

Marine management policies for coastal countries are also integral to sustainable food systems. *Sustainable Seafood* policies not only address overfishing and destructive practices such as blasting and trawling but also tie together coastal development policies and management of waterways to reduce pollution and erosion affecting marine life. Putting in place effective monitoring technologies is an essential component of this strategy to document fishing activities and assess the health of aquatic ecosystems such as seagrasses, marshes, and coral reefs.

Strategy 6: Sustainable food sector jobs and livelihoods

A final policy dimension crucial to a sustainable food system concerns the treatment of and protections for food sector workers. For a food system to function effectively in support of well-being, those who earn their living within the food system must be enabled to receive a living wage and fair return for their labor. *Sustainable Food Sector Jobs and Livelihoods* policies ensure that food sector work, whether on land or sea, is free from exploitative practices. This strategy goes beyond focusing on individual businesses or merely mandating higher wages to develop structures that support food sector work that is varied, engaging, and empowering, with ample opportunities for career advancement at all levels.

Tools for food systems policy effectiveness

These six strategies cannot be pursued in isolation, as each component has implications for and effects on the other strategies. A driver's-seat food system policy will require a number of tactical approaches to ensure cohesion and effectiveness. We propose the following approaches as guiding principles for implementing the six-part framework.

Audit

Developing a sustainable food systems policy begins with conducting comprehensive legislative, policy, infrastructure, land, and skills gap analyses. A comprehensive audit using the six-part framework can identify which existing policies and practices support or detract from the environmental, public health, social, and security goals reflected in the six strategies. For example, a city might consider what it currently provides in terms of healthy food access, particularly for those living in food deserts or lacking transportation to grocery stores; how it supports local food production through measures including urban agriculture, community gardens, and small-scale farming; how it supports sustainable food procurement through local and responsible producers; how it reduces food waste through

measures such as composting, food recovery programs, and education campaigns; how it coordinates food policy across areas such as public health, transportation, and economic development; and how it builds resilience in the food system to shocks and disruptions such as natural disasters, pandemics, and economic downturns.

Policy integration

In pursuing policy adjustment and development, discussions concerning food production, supply, and consumption should consider all six strategies, aiming to simultaneously support as many dimensions as possible and avoiding conflicting goals. The agroecological approach allows for food systems policy to concurrently address climate and ecological emergencies, public health crises, and food insecurity. Examples include farm support schemes that maintain and enhance resilient ecosystems while producing more healthy food close to consumers; public procurement of sustainable locally produced food for hospitals and school meals; and local cross-sector food partnerships to share knowledge and resources, shorten supply chains, and reduce waste.

Investment

Public investment in the food system should reflect actual public costs and public benefits across all six strategies including health, environmental, and security risks and advantages. Examples include agricultural investment schemes to cover the true costs and public benefits of sustainable farming; capital grants to support short supply chain infrastructure (e.g., food hubs, small scale horticulture, and local processing facilities); investment in workers to develop the agroecological farming and production skill base; and public provision of healthy food in schools, hospitals, and other keystone institutions.

Education

The public education system and community engagement efforts are essential tools for equipping citizens with the knowledge and skills to purchase, cook, and eat—and even grow—foods that support a healthy and sustainable diet. Education is also vital to developing the agroecological skills and knowledge base for work within a sustainable food system. Examples include integrating food skills in public education curricula at every level, embedding nutritional and food-growing skills courses in community programming, and developing apprenticeship schemes within sustainable food sector endeavors.

Accountability and enforcement

Effective food systems policy must include compelling monitoring and enforcement mechanisms. Through transparent processes involving citizen and stakeholder engagement, policymakers should set, track, and share clear targets for each of the six strategies. These targets must be accompanied by effective enforcement mechanisms. For example, third-party certifications and labeling programs could be used to verify that food products meet certain standards or criteria such as organic or fair trade. Inspections and audits of food processing plants, farms, and restaurants could ensure compliance with food safety and other regulations. Penalties and sanctions for violations could result in fines, suspension or revocation of licenses or permits, or even criminal prosecution in extreme cases. Traceability and tracking systems, public reporting, and whistle-blower protections could further support transparency.

Grassroots innovation

The place-specific nature of agroecology relies on locally distinct conditions, knowledge, and opportunities. Effective food systems policy should facilitate and capitalize on innovative approaches and new technologies emerging from local practice and experience. Examples include supporting farmer-led research; collaborating to drive more equitable resource distribution, for example through community grants to develop new business models; providing online platforms for peer-to-peer networks across the food system; and actively identifying and amplifying successful innovations to regenerate soils, improve animal welfare, and restore natural environments.

Global responsibility

This final principle focuses on ensuring that policy decisions made at home do not negatively impact people or places abroad. To support sustainability over the long term, import policies must not displace environmental or social costs elsewhere. Examples include fair trade policies, ensuring food supply chains are deforestation-free, and withdrawing any procurement agreements that contribute to human exploitation.

Conclusion

The food system has the potential to be a central lever in addressing present climate and nature emergencies, public health challenges, and issues of equity and accessibility. Whereas the past 50 years have seen increasingly unsustainable food system practices relying on vast global distribution networks, today local farmers, and communities are demonstrating the viability of nature- and climate-friendly small-scale production and supply chains and the positive impact of building relationships back into the food system. The six-part framework and implementation principles proposed here can support and link together community-scale efforts to establish food systems that simultaneously care for people and the planet. At the national scale, this agroecological approach can contribute to national security by establishing food sovereignty, which emphasizes ecologically appropriate and socially equitable production, distribution, and consumption as ways to sustainably and independently meet all citizens' basic need for nutritious food.

We note that an accessible first step in many settings is to begin with public procurement. As an initial move toward an integrated, driver's-seat food systems policy, decision makers can ensure that when public money is spent on food—for example in schools, hospitals, and government buildings—these purchases reflect national

environmental, public health, and social objectives. Public procurement can set the bar and promote a transformation toward agroecological principles by procuring sustainably grown and raised, highly nutritious food from local growers and suppliers committed to fair labor practices. Assuring coherence between stated public and environmental health objectives and public spending on sustainable food production is an excellent step by which governments can demonstrate leadership in this critical area while also catalyzing the development of critical infrastructure.

A second, more complicated step could involve building and moderating localized communication platforms to better support collaboration among growers, food processing facilities (e.g., mills and abbatoirs), distribution channels, and direct-to-consumer sales. Such platforms could also incorporate locally collected and remotely sensed data on climatic, hydrological, and soil conditions along with population information and other indicators relevant to food supply and demand. Developing and maintaining these clearinghouses for collaboration and data sharing could help empower the development of local networks that can access relevant public and research knowledge through data dashboards and training in their interpretation and use. This move toward leveraging technological advances to facilitate local collaborations and democratize data avoids the nostalgic stance of trying to re-create a pre-industrial food system.

We acknowledge the difficulty of transforming systems that are deeply entrenched and largely controlled by multinational actors whose priorities may not align with long-term sustainability and local sovereignty. Equally, individual decision making is likely to be governed by short-term considerations and price signals. However, the climate crisis together with the data revolution present an unprecedented opportunity to shift policies and practices. With extreme weather events, sustained high temperatures, and depleted soils making conventional approaches less effective and more expensive, there is a growing willingness to explore alternatives even among large-scale producers, as seen for example in the switch of Oreo's parent company, Mondelēz, to sustainable cacao. At the same time, the increasing availability of agroecological data and rapidly advancing capability to process this data for projections and modeling can allow more decision makers to understand and visualize the consequences of sustainable vs. unsustainable practices. The growing global movement toward data sharing and transparency, for example through the work of the international Research Data Alliance, can be expected to further disrupt patterns of exploitation and manipulation that have long been hidden from public view.

Just as good food has the power to nurture the body, good food policy has the power to foster community cohesion, biodiverse ecosystems, and fair labor practices, resulting in resilient food systems delivering wellbeing objectives. There are many untapped opportunities to re-gear food policies to ensure they all move in the same direction of sustainability, including farm policies, rural development, planning, horticultural development, and trade and marketing. Now is a crucial time to build for the future, with the COVID-19 pandemic and the cost-of-living crisis exposing the vulnerabilities of current food systems reliant on foreign trade and underpaid labor. Designing more resilient, sustainable, and just food systems is a vital part of preventing future food crises and creating an enduring foundation of public and environmental health.

Author contributions

Food Policy Alliance Cymru developed the ideas presented in the manuscript. EA and AS developed the framework for the manuscript. EA wrote a first draft of the manuscript based on previously written Food Policy Alliance Cymru materials where ideas were developed. Food Policy Alliance Cymru, EA, and AS all worked on subsequent versions of the manuscript until finalized. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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