Food Systems Research to Support Sustainable Impact:

Contributions to Policy and Research Priorities for CGIAR

Food systems, which are essential sources of food, but also of income, and employment, especially for resource-poor populations in low and middle-income countries, are undergoing dramatic transformations. Driven by changes in diets, urbanization, longer supply chains, and new ways of purchasing and consuming foods, these transformations pose serious challenges to achieving healthy, environmentally sustainable and inclusive food systems for all. Rates of undernutrition and micronutrient deficiencies are still stubbornly high, while overweight, obesity and accompanying non-communicable diseases are rising – with these multiple forms of malnutrition increasingly found in the same communities, households, or even individuals.

Diets increasingly include ultra-processed, nutrient-poor foods that lure consumers with convenience, price, and taste. Growing pressures are put on the natural environment as agricultural production intensifies to meet rising national and global demand. The distance between where food is grown and where it is eaten continues to widen, adding significant environmental costs and food safety risks. Food loss and waste, especially of nutritious but perishable fruits, vegetables and animal source foods, but also for cereals and pulses, threaten system efficiency, food and nutrition security and environmental sustainability. Meanwhile, healthy diets are not affordable for much of the world's low-income population concentrated in LMICs.

Countries need support across the different domains of these transitions, with research, data, and the opportunity to learn from each other's experiences, to ensure national food systems transform in a way that provides more sustainable access to healthy and safe diets for all. The CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) has coordinated and led CGIAR efforts to meet these needs. The work breaks down into four focus areas for food system research to support the following national food system policy and program developments:

Key Messages on Food Systems Research

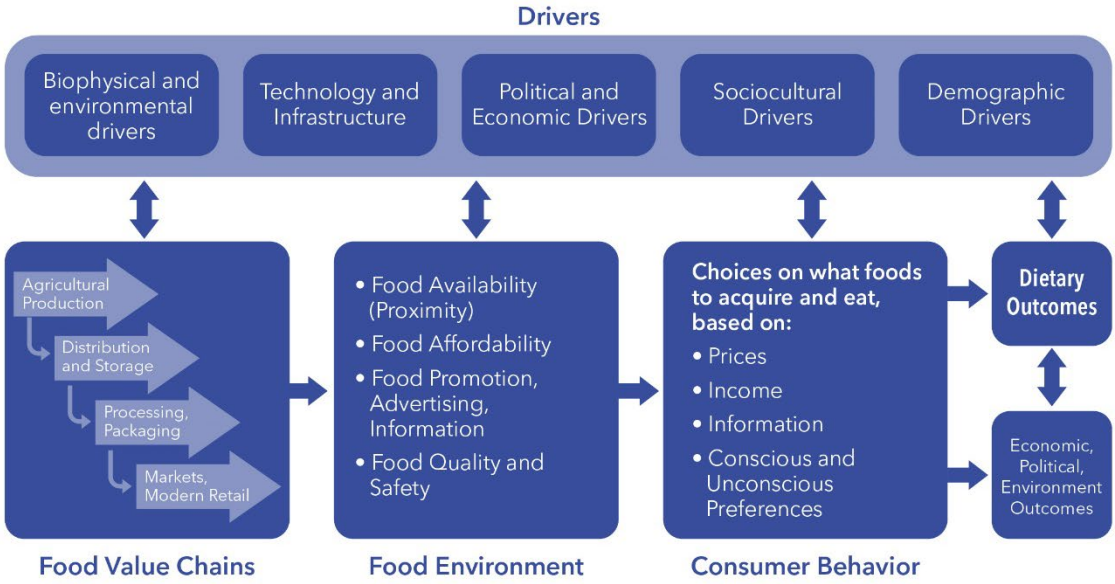
- *Starting with consumers and food environments will help research to address rapid food systems changes that promote healthier diets for better nutrition and health outcomes, environmental sustainability, economic development, and social equity and inclusiveness.*
- *Evidence is being built, using system research, for relevant, context-specific entry points relevant to addressing national goals ranging from agriculture to transport, processing to marketing, sales to consumer choice, food preparation to consumption.*
- *Research should focus on food system dynamics and highlight potential interactions, including synergies and trade-offs, between drivers, components, stakeholders and outcomes that go beyond 'simple short-term fixes'.*
- *The most challenging task is to support food governance with a systemic perspective – not considering just one food or one instrument, but acknowledging its multiscale nature, from local to global.*
- *A country presence in national policy and programme dialogue for alignment to national goals is essential.*

1. **Reverse Thinking: Putting Diets First**: Instead of only starting from policies and innovations that attempt to shape food production, it is critical to consider the diet from the perspective of consumer demand.
2. **Food System Innovations**: For the desired transformations to occur, countries must harness the combined power and potential of innovations in technology, infrastructure, and institutions to foster sustainable food systems developments that promote healthy diets.
3. **Enabling Environment**: An enabling food environment calls for designing and adapting food systems policies while cognizant of potential trade-offs and reducing unintended consequences. This requires participation from the private sector on market opportunities that support food system transformation in a positive way.
4. **Ensure No One is Left Behind**: Poor people, those living in rural and peri-urban areas, ethnic minorities, youth and women are just some examples of groups frequently left behind.

Policymakers should look for inclusive growth strategies and opportunities for everyone to benefit from improved diets and market opportunities created as food systems transform.

While definitions of food systems vary, the following key components are generally accepted (Figure 1): (1) ***drivers:*** external factors like urbanization, technology development, climate change and economic growth; (2) ***components***: including food production, distribution, allocation, and the public and private food environment; and (3) ***outcomes***: related to healthy diets, environmental sustainability, economic development and social equity and inclusiveness. Very little is known about potential interactions (both synergies and trade-offs) between drivers, components and their outcomes. Until recently, most international reports' food systems analysis focused primarily on improving food production efficiency under different conditions of population growth and climate change or on improving markets and institutions to reduce transaction costs and risks. Very few have emphasized demand for food or conditions for guaranteeing access to healthy diets. Even fewer studies use a systems perspective or explore governance for a responsive and adaptive food environment, in spite of trade-offs between different food system components being increasingly registered and needing to be explicitly navigated when developing food system innovations. There is no real consensus on how to make transformations operational (beyond simple technical fixes) or give attention to changes in interactions between stakeholders and adjustments in food system dynamics. Systems research can help build evidence for relevant entry points from agriculture to transport, processing to marketing, sales to consumer choices, preparation to consumption.

Figure 1: Conceptual framework of food systems for diets and nutrition



Progress Toward Food Systems for Healthier Diets

CGIAR food systems research, through A4NH's Food Systems for Healthier Diets (FSHD) flagship, moves along a deliberate trajectory from diagnosis and foresight assessments of national and sub-national drivers of food system transformation, to testing concrete innovations and interventions, to scaling up and anchoring successful actions, in collaboration with relevant stakeholders from national to subnational levels, supported by a country presence in identifying entry points helpful to delivering on national goals. At the forefront of food systems research, A4NH work has focused on the following four areas:

Food system analysis: implementing a food system approach requires using a comprehensive set of indicators to measure both the current state of food systems and their development pathways and to support comparison and shared learning. A set of resources at different levels of the food system, mostly at the national and global level, are now

available through the Food System Resource Center for stakeholders to draw upon. The resources include a growing collection of indicators for different food system components. For example, a set of 20 indicators assessing food system performance in the four dimensions (environment, economic, social, and food security and nutrition) was used to develop a global map of food system sustainability across 97 countries. In Vietnam a comprehensive set of local indicators shows how food systems are changing over space in rural, urban and peri-urban sites. The work also highlights major challenges: critical data gaps exist for all components of the food system, but especially for monitoring consumer choices and the food environment; and uneven data availability across countries hinders analysis of entry points for food systems changes.

Another challenge is to make information useful so that policymakers can find entry points to improve food systems outcomes. Country-level research provides a baseline of understanding from which to identify potential national action and to create opportunities for other countries to learn. A4NH concentrates on four focus countries; examples of this extensive work includes A4NH working with national partners to jointly determine a food systems research agenda, agendas have been released in Vietnam, Bangladesh and Ethiopia.

Food system innovations and interventions: Innovations to improve food system outcomes are necessary to modify barriers or constraints faced by system agents, such as food producers, processors, distributors, retailers, and consumers. These innovations can be defined as a policy incentive or regulation, institutional process, change in knowledge, technology, or a combination thereof that is either not used or not widely used within a food system, to influence food system dynamics for improved outcomes.

A main challenge is catalysing additional demand for more nutrient-dense foods, such as fruits and vegetables. FSHD has experimented with understanding how to catalyse more demand in several ways:

1. Testing a model of disseminating nutrition information about fruit through school children in peri-urban Hanoi (Vietnam), with the goal of teaching parents through their children. Preliminary results suggest children increased knowledge, but parents did not;
2. Developing and screening a video promoting higher consumption of fruits and vegetables to residents of Addis Ababa, Ethiopia, to learn about whether it could affect their demand; that will be featured on television, and
3. Developing and testing a set of consumer-oriented interventions in Vietnam and Nigeria, including vouchers designed to reduce the cost of purchasing selected fruits and vegetables.
4. Design appropriate interventions based on knowledge on the role of processed foods and out-of-home prepared foods

Another potential win-win type of intervention is to reduce food losses and waste, particularly for more nutritious foods such as fruits, vegetables, and animal source foods. Context-specific, locally owned interventions to reduce post-harvest losses on tomato value chains in Nigeria; also to analyse food loss as a food system outcome. Better information about food losses or waste are necessary to better understand the constraints to reducing loss or waste and design innovations to reduce them.

Policy engagement and capacity building: Researching and engaging in food system governance with a systemic perspective implies considering not just one component (such as food safety), or just one group of decision-makers (such as agriculture ministers). Acknowledging its multi-scale nature, from local to global, is perhaps one of the most challenging tasks facing those engaged in food systems transformation. The mix of public and private sector actors, characterized by different (and often conflicting) agendas and priorities; the interaction of public policies with civic norms and individual consumers' behaviour; dovetailing strategies of producers and distributors operating at international, national or local levels, require a thorough understanding and predicting food system dynamics.

In the last few years, several policy regulations and experiments have been implemented that try to reduce the negative effects of the rapid changes observed in modern food systems, with some promising results. In Mexico, Thailand and Chile, for instance, sugaary drink taxes and front-of-the-pack

warning labels have been used with some success to influence reformulation of unhealthy food products by the private sector, as well as to discourage the purchase of such foods. Social protection programs, when combined with behaviour change communication, have been shown to substantially improve nutrition outcomes in low-income households. Finally, recent experience shows that, when it comes to interventions, city-region is often the more effective scale.

While engaging in the sphere of food system policy or trying to guide/advise decision makers about "what needs to be done to improve food systems" decisions have to be made now; one cannot hide behind the lack of data or the difficulty of embracing a multi-sectoral, multi-actor, multi-scale vision to act. Food systems are among the major sources of environmental, health and social externalities; the COVIC-19 pandemic is a vivid illustration of this reality.

It is vital to also engage and build capacity among stakeholders at the national level to act towards building food systems that support healthier diets. In FSHD this has been done at different levels: involving national level professionals to develop food based dietary guidelines in Ethiopia, retailers to increase fruits and vegetable intake in Vietnam and Nigeria, but also eager young scientists at MSc and PhD level from the focal countries to help develop future leaders in all four countries.

Next steps and further research priorities

Against this backdrop of on-going work, several key areas for future research emerge:

- Greater **understanding of consumers and food consumption choices** and the relationships with existing and changing food environments. It is critical to know what drives consumption decisions toward healthy or unhealthy choices; how availability, affordability, consumer messaging and acceptability influence those decisions and what effective mechanisms or policy instruments exist or should be developed to support informed and healthier choices by consumers in different contexts.
- Understanding the **role of private actors and market systems** in food provision, processing and distribution from farm gate to the consumer plate by identifying robust approaches to improve the delivery/availability of key food groups such as vegetables, fruits, milk, eggs, fish, and meat while guaranteeing food safety, reduced spoilage and efficiency. Strategies to engage the local, national and global food industry are needed to improve nutritional density of processed and prepared foods, increase micronutrient availability, eliminate aflatoxins and proactively enter into product reformulation aligned with the population's nutrition needs. Ultimately, circular food economies employing ICT solutions can be helpful to improve traceability, reduce food loss and waste, improve nutrient cycling from consumption back to production and increase consumer confidence in the quality of their foods.
- Situating and analysing these components in **specific contexts** with local system actors to understand interactions, governance and outcomes. This includes unpacking drivers to understand food system transitions between countries and along a national and sub-national urban-rural continuum, constructing tools and approaches to systematically assess environmental, economic and nutrition performance, and assisting national and sub-national actors in designing and testing interventions to improve their priority outcomes.
- **Co-designing and co-developing effective tools and processes** to take the pulse of the food system, identify options, analyze trade-offs between multiple food systems outcomes related to economic, environmental and health goals, design interventions and evaluate outcomes with national and sub-national actors.
- Develop explicit **institutional arrangements to accelerate learning** (platforms, networks).
- Finally, to support the needed country engagement for food systems research calls for a **strong country presence** in national policy and program dialogues to identify helpful research entry points synergistic to delivering on national goals.

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