

THE FOOD SYSTEM AND ITS INTERACTION WITH HUMAN HEALTH AND NUTRITION

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The food system begins and ends with health and nutrition. Advances in the health sciences, including genomics and stem cell biology, continue to reinforce the principle that nutritious food is essential for the achievement of full physical and cognitive potential for all individuals and populations and for sustaining health through the aging process. Likewise, advances in the social and behavioral sciences are revealing the many dimensions of health, the behaviors that promote health, and the value of health in generating productive agricultural systems and sustainable development. Health is now considered a primary goal and quantifiable endpoint of food systems. It is also an emerging force in agricultural policy, driven in part by the emergence of the “triple burden” of malnutrition—the coexistence of hunger, nutrient deficiencies, and excess intake of calories leading to overweight and obesity in many poor countries—that has resulted in part from a lack of harmony between food systems and the promotion of human health.

Traditionally, an invisible firewall has separated the agriculture, health, and nutrition sectors. In university-level training and research, for example, health training, research, and projects reside in one part of the university, and agricultural training, research, and projects reside in another. This firewall extends to development organizations and governments’ single-sector ministries. Yet evidence suggests that agricultural projects would have a greater health and nutritional impact if health and nutrition goals were explicitly integrated into their design and implementation. Indeed, one would expect strong interactions and synergies between health and nutrition and other parts of the food system—not just agriculture. An integrated approach to developing agriculture and food systems and improving health and nutrition would yield more effective and efficient solutions in all of these areas.

An Overview of the Food System, Health, and Nutrition

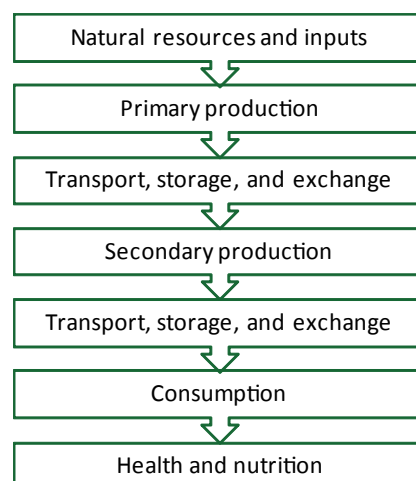
A food system may be described simply as a process that turns natural and human-made resources and inputs into food. As shown in Figure 1, such a system may consist of the resources (such as land, water, a healthy workforce, and sunshine); inputs (such as plant nutrients, pest control measures, and knowledge); primary agricultural production; secondary production or processing; and transport, storage, and exchange,

and exchange activities to make the food available at the time and place and in the form desired by consumers. Food systems need not be stagnant. In fact, if the goal is to improve them, it is useful to visualize food systems as dynamic behavioral systems that can change in response to changes in the behavior of the various decisionmakers and agents in the system, such as consumers, producers, market agents, resource owners, nongovernmental organizations, and governments.

Food systems are means to an end rather than ends in themselves. They exist to serve people. Their relations to human health and nutrition are many and strong, and they offer tremendous opportunities for improving or harming people’s well-being—opportunities that need to be fully understood and acted upon. Food systems are also closely tied to natural resources and the climate, and the sustainability of food systems and improved health and nutrition depend on the health of the natural environment.

Each of the food-system activities may interact with health and nutrition, and Figure 2 illustrates some of these interactions. The most obvious interaction is the way in which the food system makes food available to meet people’s needs for dietary energy and nutrients. Yet to achieve food security, individuals must have access to the food available, and their access is influenced by their purchasing power, their own production, and other factors. The food system may increase

Figure 1 — A food system



Source: Author.

people’s access through lower food prices brought about by lower unit costs of production, higher incomes among farmers and farm workers, and higher incomes outside the agricultural sector resulting from income-multiplier effects generated by higher farm incomes. Furthermore, changes in the food system may influence other determinants of

nutrition, such as access to clean water and sanitation. Thus, changes in food systems may improve or worsen the nutrition situation, with repercussions for other health factors. It is estimated, for example, that more than half of developing countries' child mortality is associated with malnutrition and hunger. Children who suffer from hunger or malnutrition are less resistant to several infectious diseases and more likely to die from such illnesses. The food system may also contribute to increasing or decreasing the prevalence of chronic diseases by influencing changes in the prevalence in overweight and obesity.

Although much past research and debate have focused on the impact of agriculture on nutrition, it is important to recognize that there is a two-way causal relationship. Health and nutrition may also affect agriculture and food systems. For instance, energy and nutritional deficiencies, infectious diseases, obesity, and chronic diseases may influence food systems by lowering the labor productivity of food system workers, by reducing the adoption of improved technology and the use of inputs and credit, and by leading to suboptimal use of land, water, and other resources. Labor productivity may also be influenced by infectious diseases, such as malaria and bacterial and virus contamination, associated with water management in the food system.

Improving food quality in ways that support human health will require an integrated approach that encompasses both the agriculture and health sectors and will open new avenues of agricultural research. It will require coordinated

efforts in the study of soil quality, plant varieties, crop and food engineering, food safety, climate change, plant and animal health, and food processing, among others. And because such an approach will require more diversity in the types of crops grown, with implications for all aspects of farming, it will raise new challenges for efforts to achieve sustainable agriculture.

The Poverty/Hunger/Ill-Health Trap

The interactions between agriculture, health, and nutrition mean that all three sectors play a role in the poverty/hunger/ill-health trap that afflicts millions of poor people around the world. Ultra-poverty (living on less than half a dollar a day), poor health, hunger, and malnutrition are mutually reinforcing conditions that push people into a poverty trap—a “self-reinforcing mechanism that causes poverty to persist.”¹ Widespread hunger and malnutrition combine with prevalent infectious diseases to cause poor health. Poor health and health shocks in turn have economic and productivity implications that are particularly pronounced in rural areas, where the food system is the main source of income and employment. In fact, recent research suggests that major health shocks may be the leading cause of collapse into long-term poverty. The productivity consequences of health shocks are likely to be most severe for farmers and others who undertake hard physical work. Furthermore, the income effects of health shocks will be direct and severe among semi-subsistence farmers, who may not be able to provide the labor needed

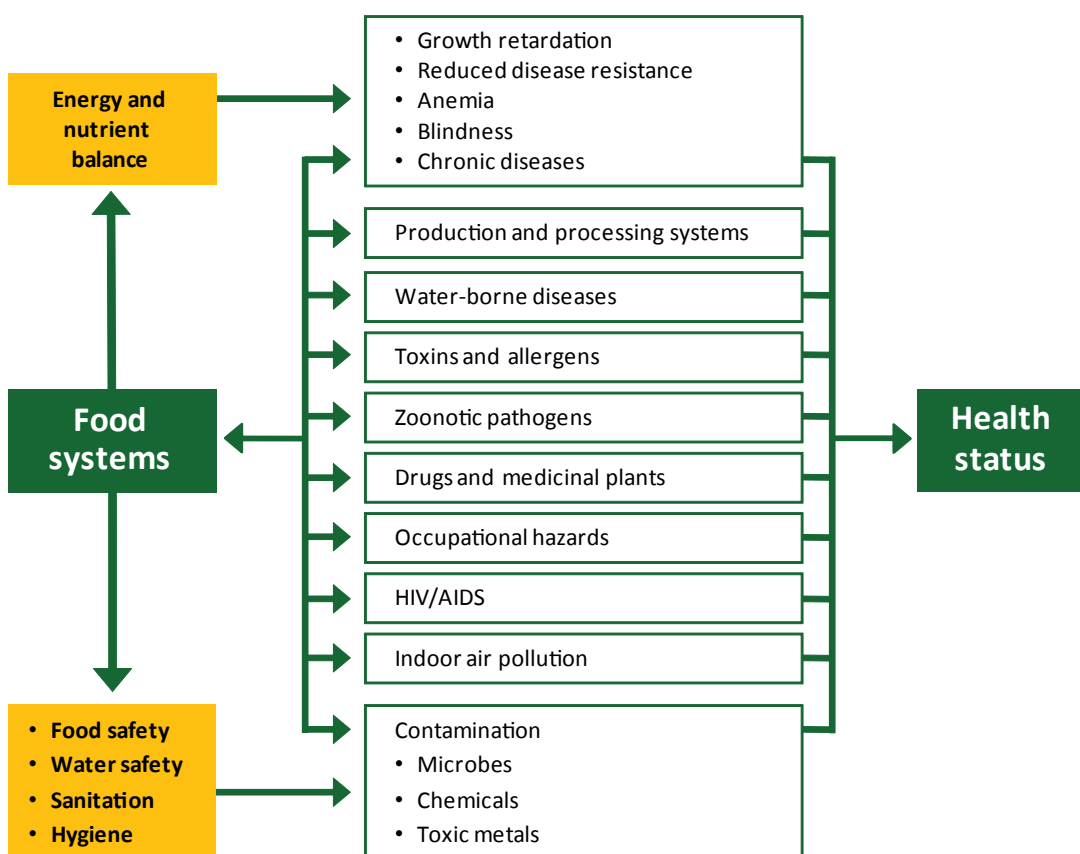
to bring the crop to harvest. The resulting poverty trap has dire implications for human well-being, cognitive development, and individual and national incomes.

The prevalence of poverty traps points to the importance of strategies that integrate health, food, nutrition, and environment. Christopher Barrett has noted that “all past cases of rapid, widespread progress out of poverty have been causally associated with the transformation of food systems.”²

An Integrated Approach

The interactions between the food system and human health and nutrition illustrated in Figure 2 point to several

Figure 2 — Interactions between food systems and human health



Source: Author.

potential areas for integrated action that can serve the goals of all three sectors. Examples include the following:

- ◆ **Zoonotic diseases.** Many of the health problems affecting humans—including measles, tuberculosis, AIDS, avian and swine influenza, and mad cow disease—originated with animals. A better understanding of disease transmission mechanisms and extensive surveillance for early detection of disease outbreaks could help strengthen both agricultural systems and human health. E. Fuller Torrey points out that four other factors will also require attention: (1) the relationship between animals and humans and reconsideration of the sharing of living space; (2) modes of transportation that facilitate transmission of infectious diseases; (3) animal slaughter practices and other food-processing activities; and (4) ecological and environmental shifts such as urbanization, climate change, and deforestation.³
- ◆ **HIV/AIDS.** In parts of Africa, food insecurity and AIDS coexist and interact in a vicious circle. Agricultural policies and programs that are responsive to HIV/AIDS considerations can further both AIDS-related goals and agricultural productivity goals. Collaboration among nutritionists, agricultural economists, and program managers could help improve programs designed to improve food security for households and communities.⁴
- ◆ **Crop protection.** Better agroecological pest management in agriculture could help reduce pesticide use and thereby protect farmers from exposure to excessive pesticides and consumers from toxins in the food supply. An integrated crop management approach would consider crop diversity and resiliency and incorporate host-plant tolerance and resistance when possible, relying on chemical pesticides as a last resort.⁵
- ◆ **Sustainable management of natural resources.** Agriculture, nutrition, and health all have important links to the natural environment. Unsustainable management of land, water, and other natural resources can lead to soil erosion, siltation in watersheds, seasonal water scarcities, and water-borne and insect vector-transmitted diseases, with negative effects on agricultural yields and incomes as well as on nutrition and health. In contrast, sustainable

management of land and water and preservation of biodiversity can help improve health and nutrition not only directly, but also indirectly by maintaining agricultural yields and incomes.⁶

- ◆ **Food safety.** Given the weak food control systems, poor infrastructure, lack of resources, and improper food handling common in many developing countries, food- and water-borne diseases impose a high burden on poor people, yet they are often overlooked, unreported, or ignored. Improvements should be made to food safety along the entire food chain, from production to storage, transportation, and processing. Also needed are improvements in surveillance systems and in public awareness of basic hygiene and food safety measures. It is important to recognize, however, that if improving food safety raises the cost of food, it may threaten the food security of the poorest people.⁷

These kinds of integrated approaches, as well as other poverty-reducing policies that promote agricultural productivity, improve rural infrastructure, and strengthen domestic markets, will help create sustainable health and nutrition improvements.

Approaches like these, however, take time to show impact. In the short term, complementary programs and policies, such as income and transfer programs and primary healthcare, are needed.⁸ Many poor people who suffer from chronic hunger, malnutrition, and health problems are defenseless against income shocks caused by production, market, or employment losses. Without safety nets or some other insurance mechanism, income shocks can result in severe suffering, further nutrition and health deterioration, and death. Safety net programs, and the mechanisms to target them to beneficiaries, need to be context-specific and take into account what is known about how households behave, including how household decisionmaking relates to gender (see box). It is important to view such programs not as unproductive handouts, but as investments in human resources and future economic growth and stability. Not only are health and nutrition intrinsically important measures of well-being, but they can make workers more productive and thereby help transform food systems into vehicles for greater economic growth and poverty alleviation.

Empower Women to Play an Effective Role

The link between health and productivity is particularly important for women—partly because of the role women play in food production, food preparation, and child care and partly because of their special vulnerabilities related to reproductive health. The limited communication between agricultural and health research is an obstacle to women's ability to meet nutrition and health goals.

Women are key players in food systems—in Africa, for instance, they account for 70 percent of farm labor and perform 80 percent of food processing. They are certain to play a large role in producing increased food supplies to meet rising demand. But women must be given the power to play their role in agriculture effectively. They will require access to land rights, water-use rights, credit, extension services, and well-functioning markets for inputs and outputs. In many areas women smallholder farmers are attempting to raise their incomes through better access to output markets, and supermarkets are offering new market opportunities. But these opportunities also present smallholders with new competitive conditions, requirements for improved food safety, and demands for consistency in quantity and quality, which they may have difficulties meeting.

Agricultural projects and policies must therefore take context-specific gender norms and women's heavy time demands and constraints into account. Both women and men should be involved in developing priorities and implementation strategies for projects and research for the food system.⁹

The Bottom Line

Human health and nutrition are both the foundation of a strong food system and the expected outcome from such a system. An integrated, multidisciplinary, systems approach to research and development in human health and the food system, with due consideration to natural environment issues, thus offers great advantages over single-sector approaches, irrespective of whether the goal is improved health, improved nutrition, improved food systems, or sustainable management

of the natural environment. In fact, the achievement of all four goals can be pursued in a systems approach. Any trade-offs among them can be explicitly identified and assessed, and double, triple, and quadruple wins are possible. Given the new awareness of the strong interactive relationships that exist among health, the food system, and the natural environment, existing firewalls between them should be broken down so that the advantages of an integrated, systems approach can come into play for the world's poor and hungry people.

NOTES

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