

## From Agriculture to Nutrition: Pathways, Synergies and Outcomes

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The relationship between food production and food consumption is intuitively direct. Increases in food production should lead to increased food availability, access, and ultimately, food intake. In reality, however, the relationship between agriculture and human nutrition is far more complex. The persistence of malnutrition globally despite the success of agricultural production belies any notion that under-nutrition can be solved entirely by simply increasing food production. An individual's nutritional status is the result of a complex set of inter-related factors that act synergistically and are dependent on the environment in which people live and the intra-household processes they are exposed to. A widely used conceptual framework developed by UNICEF in 1990 identifies three main underlying determinants of nutritional status: availability and access to the right amount and combination of foods of adequate nutritional quality, feeding and care-giving practices, and access to health care services.



This note discusses the direct pathways through which agricultural production can contribute to improved nutrition. It then reviews recent changes in the global environment which affect the ways in which agriculture and nutrition are linked. It concludes with a discussion of how nutrition-related objectives can be effectively incorporated into the design of agriculture programs for maximum impact on the poor.

### PATHWAYS LINKING FOOD PRODUCTION TO NUTRITION OUTCOMES

**Production for the household's own consumption.** This is the most fundamental and direct pathway by which increased production translates into greater food availability and food security at the household level. Production of fruit, vegetables, dairy foods, eggs, fish, and meat are more likely to increase the quality of diets and intakes of essential micronutrients, such as iron, zinc, vitamin A, and calcium. Animal source foods, in particular, are not only energy- and protein-dense, they also contain significant amounts of essential micronutrients in their most bioavailable form. Given favorable intra-household food distribution, these developments can greatly improve the food intake and nutrition of the more vulnerable members of the household. Some proportion of the food produced may be sold at local markets. Some households may, for instance, meet their staples requirements through their own production, while depending on markets for other products, such as fruits, vegetables, or meat. Others may rely mainly on home gardens for fruits and vegetables. Under this scenario, the role of production-for-income is secondary to the principal purpose of producing food to meet the household's own food requirements.

**Income-oriented production for sale in markets.** Market orientation brings a second pathway into play, one in which income-related production becomes more



important than subsistence-related production. Income now becomes a principal determinant of food availability and access, while the household's production for its own consumption assumes a supplementary role. Production decisions are based on tradability, the ability to sell what is produced at market, and the price it is expected to command as a commodity, more than on its desirability for the household's own use. The translation of increased production into better child nutrition depends on a series of intra-household factors and processes, including women's status, education, knowledge, health-related practices, decision-making power, control over income, and access to and use of health and sanitation services.

#### **The empowerment of women.**

The resources and income that women command by engaging in agriculture is a pathway that carries special significance for nutrition, especially among children. Women have consistently been found to be more likely than men to invest in their children's health and well-being, and the income and resources that women control wield disproportionately strong effects on health and nutrition outcomes generally.

#### **Lowering food retail prices.**

The effects of increased food production on food prices is another pathway linking agriculture to nutrition. Raising production exerts downward pressure on food prices, especially in areas where markets are less integrated and where poor people tend to be concentrated. For net food consumers, reduced prices facilitate greater access to food and essential nutrients. This, in turn, results in better health and productivity of the general workforce, while also freeing additional household resources from food to other expenditures, including productive investments.

These pathways are not mutually exclusive. Subsistence production, for instance, generally takes place alongside production for sale since few households are self-sufficient in food, and since food is not the only household

requirement that must be met. Income is therefore very important, even among households that produce principally for their own consumption. The income and price pathways are, likewise, overlapping in that the price reductions resulting from increased food supply contribute to raising real income.

## **DRIVERS OF A CHANGING AGRICULTURE-NUTRITION CONTEXT**

Over time, changing developments are driving behavior changes among food producers and consumers, and are

bearing heavily on the pathways linking production and consumption. These changes or "drivers" are also very significant for the dietary quality of consumption, and present producers with something of a moving target in terms of opportunities and risks as they endeavor to orient production to consumer demand. The drivers are agricultural technology, agricultural policy, women's empowerment, and retail food prices.

#### **Agricultural technology.**

Technology carries significance for every niche of the food supply chain. The public agricultural research and plant breeding characteristic of the Green Revolution has maintained its importance. Today, however, public research

takes place alongside the mounting presence of private sector, profit-oriented research. The development has opened entire new legal realities around intellectual property rights. Agricultural technology is extremely important for the relative prices of different food baskets and for labor demand among different agricultural production systems. Its direct applications to nutrition outcomes relate to both plant breeding for nutrient content and to fortification during food processing. Technology has had important implications for food safety as well, equipping regulatory agencies with new means of detecting food contaminants and improving the shelf life of processed food products.





**Agricultural policy.** International trade, in particular, brings agricultural policy firmly into this treatment. Trade has tremendous importance for food producers and food consumers. The macroeconomic impacts of trade liberalization on food prices are contingent on whether a country is a net food producer-exporter, or a net food consumer-importer, but more meaningful indicators are usually commodity-specific. Liberalization's impact on food producers tends to rely on whether a country's agriculture sector was protected or taxed prior to liberalization. Its impacts on nutrition outcomes rely broadly on a country's level of economic development. Least developed countries with protected agriculture sectors appear to have the least ability to capitalize on opportunities in international markets, and as a result nutrition outcomes often see negative impacts from trade reform.

**Changing consumption patterns.** The demand for higher value, micronutrient rich foods increases as incomes rise and livelihoods diversify around expanding markets, many of them urban. Increasing incomes and urbanization drive changes in demand that provide food suppliers with market signals that tend to reorient agricultural production away from the cultivation of staples and toward higher value products. For smallholders in particular this reorientation is often in effect compulsory, since the viability of farming lower value staple crops relies on much larger scales of production than are possible on small farms. The ability of poor producers to respond may depend on the success of arrangements like contract farming, which enable poor farmers to link their production with large, often supermarket-led supply chains.

**Food Marketing Systems.** The large-scale consolidation of food retail and rapid expansion of the food processing and food service industries have dramatically influenced the basket of food items available, particularly as more and more people work farther from home and are more likely to purchase meals prepared outside the

house. These food marketing systems are also influencing what is being produced by farmers around the world through their extensive networks of suppliers.

## AGRICULTURAL PROGRAMS AND NUTRITION OUTCOMES

Agricultural programs that have nutrition-oriented objectives are generally classified by the commodity they support. Programs supporting staple crops like maize and rice tend to focus principally on aggregate production and food availability, while those covering fruits, vegetables, and animal-source products carry more potential

for addressing micronutrient deficiencies. Their ultimate effects on consumption are often assumed to follow naturally as a result of increased income. Income effects are, of course, commonly monitored and evaluated, and at times evidence does emerge to suggest a positive relationship between increased income and increased food expenditure and more diversified diets. The nutrition outcomes achieved by these programs have been surprisingly mixed. However, evidence from recent programs suggests that nutritional outcomes improved significantly when the following elements are incorporated into program design.



**Incorporate nutrition outreach and behavior change.** Programs with components devoted to educating beneficiaries and informing them about the nutritional qualities of the foods they produce and consume have better nutritional outcomes than those that do not. For instance programs that promote the cultivation of home gardens should purposefully promote public awareness of the practical utility of certain garden fruits and vegetables in addressing nutrition issues such as vitamin A deficiency. Communication of information about health issues like appropriate child-care and feeding and food preparation practices, water sanitation, care giving, and food safety issues carry great importance for nutrition by addressing health as a neces-

sary condition of good nutrition. Throughout most of the developing world, and particularly in rural areas, women are the principal agents fulfilling these roles.

**Empower women as agents of improved nutrition outcomes.** The essential role of women in delivering health and nutrition outcomes make them a natural priority for programs with nutrition-related targets. Research in Africa, Asia, and Latin America has consistently found women to be more likely than men to invest additional income in their children's health and nutrition. Experience also shows that women who are reached by agricultural programs that relay information on nutrition issues are particularly effective in delivering improved nutrition and health outcomes in their households. The positive effects of increases in women's income on childhood nutrition and dietary practices appear most pronounced among the lowest income groups and among households with high dependency ratios—in which a large proportion of household members are nonearning dependents. In general, women assume disproportionate responsibility for the care of the most nutritionally vulnerable members of the household.

While women are usually the *principal* agents of household health and nutrition, they also tend to be exceptionally *constrained* agents in terms of time and resources. An inventory of the roles they play caring for children and the elderly, collecting water and fuel wood, preparing food, weeding, working in income-generating activities, etc. reveals a picture of people under excruciating pressure. It is, therefore, essential that programs that target women in these roles do not impose additional requirements on their time, and purposefully seek opportunities to relieve them of existing burdens whenever possible.

**Take local contexts into account.** Designing programs to accommodate prevailing agricultural and nutritional conditions entails developing a sound understanding of producers' priorities, incentives, assets, vulnerabilities, and livelihood strategies. Understanding the motives and constraints that affect household consumption decisions is no less important than understanding those that affect production decisions. Local perspectives of socioeconomic realities are often shaped by cultural norms

that bear heavily on the rationales behind household economic decisions. The subjective reasons that underlie household production and consumption decisions are largely inaccessible to program personnel from outside the participating community. Indigenous knowledge and livelihood strategies are very often tacit and may reflect a local understanding of opportunities and risks that has important practical implications for nutrition programming—implications that may not be obvious to outside observers. Involving beneficiaries in the design, implementation, monitoring, and evaluation of programs improves the likelihood that nutrition objectives will be achieved and that they will be sustainable.

**Provide small producers with support to capitalize on changing market demand.** Anticipating and responding to changing demand is a vital imperative for farmers in general, but among poor farmers in developing countries the stakes are particularly high. Most of these farmers produce to meet their household consumption and, therefore, much of the demand that they are satisfying is their own. With respect to the proportion of food they produce for the market, the changing agricultural context has important implications for the prices that they are paid for their products while increasing demand for high-value food sources represents an important opportunity to earn more income. Yet switching to new and unfamiliar crops and producing for foreign markets with stringent food quality and safety requirements are also fraught with risk, and both opportunities and risks need to be addressed by agricultural programs. The programs that provide these farmers with improved access to appropriate technologies and extension services, adoption of good agronomic practices, and timely market information would facilitate their ability to make the transition and empower them to produce for and sell to large supply and value chains, linking them to food retail and food service concerns.

There is good reason to anticipate that nutritional outcomes will become more prominent in the calculus by which the value of agricultural programs is rated. Linking production goals with nutrition-related targets is something that agricultural planners are likely to be called upon to do more often.

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