

## THE NEXUS BETWEEN AGRICULTURE AND NUTRITION: DO GROWTH PATTERNS AND CONDITIONAL FACTORS MATTER?

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Although tremendous progress has been made in meeting the world's food demand, many parts of the developing world suffer from undernutrition—that is, deficiencies in energy, protein, and essential vitamins and minerals. Economic growth, which many assume naturally has a positive impact on people's nutritional status through increased incomes and food expenditures, has not translated into improved nutrition in a number of developing countries.

As part of overall economic growth, agricultural growth has an important role to play in reducing and preventing undernutrition through a number of channels. Its impact extends from increased household ability to purchase and produce more nutritious food to economywide effects, such as increasing government revenues to fund health, infrastructure, and nutrition intervention programs. Questions remain, however, about the effects of different patterns of agricultural growth on nutrition. Furthermore, other factors, such as infrastructure, the status of women (including their educational level), and land distribution, may contribute to how well agricultural growth translates into nutritional improvements.

This brief examines how different growth patterns lead to different nutritional outcomes and identifies the factors that influence the magnitude of this relationship. It aims to offer researchers insights on areas for future research and analysis and provide policymakers with potential development strategies and investment policies that will increase the likelihood of positive nutritional outcomes.

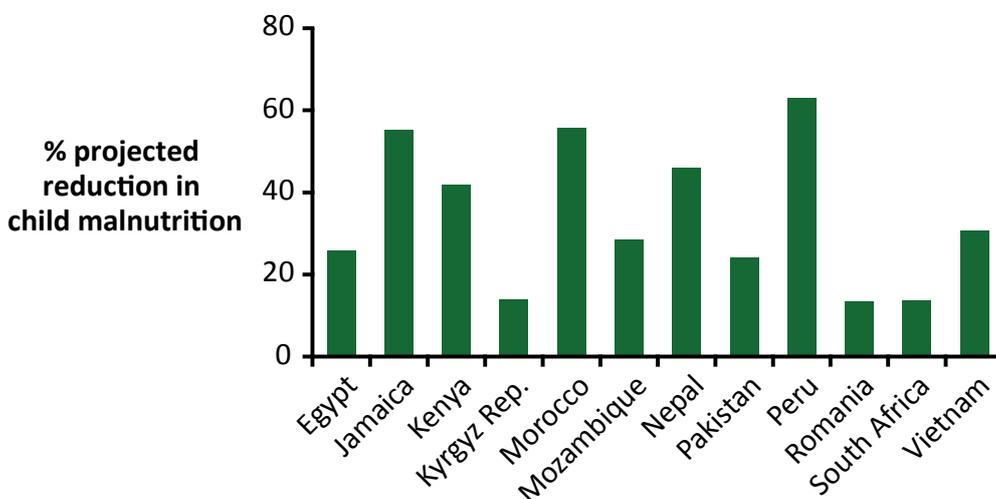
### Does Growth Matter?

Few studies have tried to explain and quantify how economic growth contributes to reducing undernutrition. One reason could be the widely accepted assumption that economic growth will ultimately lead to improved nutrition through increased incomes and food expenditures. However, the limited evidence that exists offers either inconclusive or conflicting results on the link between growth and nutrition.

A number of studies find that overall economic growth—usually represented by gross domestic product (GDP), per capita GDP, and per capita income—is only weakly associated with indicators of nutritional status and argue instead in favor of more direct nutrition interventions.<sup>1</sup> In contrast, another group of studies has found a positive and

significant link between increased economic growth and nutritional status—either unidirectional or bidirectional.<sup>2</sup> One cross-country study, for example, not only found that income growth had a positive effect on children's weight-for-age but also projected that similar income growth rates can produce significantly different reductions in malnutrition across countries over a period of about 25 years (see Figure 1).<sup>3</sup> Because many of these countries have not been able to sustain significant annual income growth, the authors argue that improving nutritional status will require balancing income growth with cost-effective health and nutrition interventions, including vitamin supplementation and nutrition education.

**Figure 1 — Projected reduction in child malnutrition rate with 2.5 percent annual growth in per capita income, 1990s to 2015**



Source: L. Haddad, H. Alderman, S. Appleton, L. Song, and Y. Yohannes, "Reducing Malnutrition: How Far Does Income Growth Take Us?" *World Bank Economic Review* 17, no. 1 (2003): 107–131.

Discrepancies in the findings of past growth–nutrition studies are commonly attributed to a number of shortcomings: poor-quality data that are often not comparable across countries, failure to recognize the nonlinear and dynamic relationship between growth and nutrition, and disregard for issues related to diet quality resulting from different patterns of growth. These limitations support the argument that, like growth, nutrition is not a homogenous entity and should not be treated as such.

## Do Sectoral Growth Patterns Matter?

Past experience has shown that agricultural development can serve as an engine of growth and poverty reduction, primarily for two reasons: (1) there are backward and forward links in production and consumption between agriculture and the rest of the economy, and (2) the majority of the poor live in rural areas, so agriculture makes up a large share of their income, expenditures, and employment. The question we face now is to what extent can agricultural growth—and growth in particular subsectors of agriculture—be a springboard for nutritional improvement through such channels as increased agricultural production and lower food prices.

Although empirical evidence on the nutritional impacts of agricultural growth is limited, it shows that the impact varies across measures of undernutrition and stages of development. One cross-country study finds that agricultural growth in particular is associated with a reduction in underweight and leads to reduced stunting in more food-insecure countries, with the exception of India.<sup>4</sup> While evidence from the analysis also suggests that the effect of agricultural growth on calorie intake is significant, its effect on diet diversity—used as a rough proxy for micronutrient consumption—is minimal. A study on Yemen shows that although agricultural growth can lead to large reductions in undernutrition, its impact on stunting is only about 10 percent of its impact on calorie deficiency.<sup>5</sup> Furthermore, cross-country evidence from the study shows that the growth–nutrition relationship varies according to a country’s economic status, with the largest impact occurring at low levels of per capita GDP.

Within the agricultural sector, individual subsectors—like staple crops or livestock—have different impacts on development outcomes. Whether growth in a subsector is pro-poor and pro-nutrition depends on (1) its linkages with rest of the economy, (2) its initial size and geographic concentration, (3) its growth potential, and (4) market opportunities. A study in Tanzania, for example, found that high agricultural growth did little to improve nutrition because it was driven primarily by crops less likely to be grown by the poor.<sup>6</sup> Other studies have also found that growth in staple crops contributes more to poverty reduction and calorie intake than does growth in export crops, given that poor farmers often lack the financial resources and technologies to cultivate crops for export. These differences in the impacts of agricultural subsectors are amplified by regional variations in natural resources and economic conditions in many developing countries,

so maximizing the potential of specific agricultural subsectors to improve nutrition requires regionally differentiated strategies.

Policymakers can thus boost the effectiveness of growth—in terms of poverty reduction and improved calorie and micronutrient intake—by seeking to accelerate growth with stronger links to specific population groups and regions and to specific subsectors like vegetables, fruits, and livestock. Research on the effects of different growth patterns on nutrition needs to go beyond calorie intake to include a range of indicators of nutritional status, including micronutrient intake and wasting, underweight, and stunting among children.

## How Do Conditional Factors Affect the Links between Growth and Nutrition Outcomes?

Many factors related to underlying conditions affect the links between growth and nutritional outcomes. Given the same rate of economic or agricultural growth, improvements in these factors will result in better nutrition outcomes whereas lack of attention to these conditional factors can result in an overestimation of the impact of growth on nutrition.

**Land distribution:** Justification for land reforms has been based on the assumption that land is one of the most valuable productive resources in agriculture-based economies. Not only do land endowments provide individuals and households with a source of income, but they also facilitate farm households’ access to food from their own production, which is especially important in areas with underdeveloped markets. When land distribution is more egalitarian, income and nutritional benefits from growth will be more widely shared. In fact, one of the main features distinguishing China from other developing countries with high growth and high malnutrition rates—such as India—is China’s relatively egalitarian distribution of land and virtual lack of landlessness.

**Women’s status:** Gender inequality in nutrition—resulting from women’s weak land rights; lower levels of education; and lack of access to credit, extension services, and technologies—has been widely documented, especially in South Asia. However, many past growth–nutrition analyses have overlooked the potential impact of gender-based variables. When women have more control over household resources, children’s nutrition has been found to be higher. Furthermore, households in which women have more resources often spend more on household and child nutrition—diet quantity and quality—than do male-dominated households. In fact, low-income female-headed households often exhibit better nutrition than higher-income male-headed households. While agricultural growth that benefits women can lead to improved household and child nutritional status through higher incomes among women, it can also have a negative impact on nutrition by changing time and labor allocation patterns, which reduces women’s time for childcare and the quality of food provided by the mother.

**Rural infrastructure:** A large body of evidence has closely linked investment in infrastructure—including roads, water, sanitation, and electricity—with growth in agricultural productivity and poverty reduction, and infrastructure is also positively related to better nutrition through a variety of channels. Improved infrastructure can promote income growth by raising agricultural productivity, lowering production and transaction costs, and removing bottlenecks that impede the participation of the poor in the development process, thereby facilitating increased access to, availability of, and consumption of food among larger segments of the population. It also improves people’s access to more and better healthcare and sanitation services. A number of country studies have found a positive association between the quality and quantity of infrastructure development and nutritional status. However, evidence also shows that the magnitude—and, at times, even the existence—of the nutritional impact of improved infrastructure differs across population groups.

**Health status:** Health and nutritional status are directly linked through a synergistic relationship. Illness impairs nutritional status by reducing both appetite and the ability of the body to absorb nutrients, which in turn lowers the individual’s resistance to further illness. Health status can also have a significant impact on nutrition by affecting a household’s ability to take part in productive activities that generate food or income to purchase food. Working through these pathways, sickness and death have been shown to result in a reduction of cultivated land, food production, and crop varieties. Absenteeism and the loss of labor resulting from ill health can lead to changes to cropping patterns and declines in crop diversity, with affected households switching to less labor-intensive crops—such as root crops—that are often lower in nutritional value.

## Strategies and Investments for Pro-Nutrition Growth

Given the dynamic relationship between agricultural growth and nutritional status, nutritional improvements can be addressed in a number of ways. The question is how to set priorities and allocate limited public resources.

### Growth strategy

The relationship between growth (whether nonagricultural or agricultural) and nutrition is not straightforward, and more solid research is needed to support evidence-based policymaking and strategy formulation. For growth strategies to maximize their effect on nutrition, the different impacts of specific economic and agricultural policies and conditional factors on growth–nutrition links need to be taken into account. So far, nutrition has not been widely used as an objective of economic or agricultural growth strategies. Food and nutrition fall under several government entities (including ministries of agriculture, social affairs, and health), with the result that nutrition is often a political and institutional orphan. It is thus difficult to incorporate nutrition effectively into a country’s main agricultural strategy, which is designed

mostly by the ministry of agriculture.

Growth strategies need to be designed with a nutritional lens and should take into account what types of sectoral and subsectoral practices and policies can enhance nutrition. These strategies could include the following:

- ◆ increasing demand for and access to nutritious foods along the entire value chain through consumer knowledge and awareness campaigns;
- ◆ mitigating health and nutrition risks associated with agriculture, such as water-borne, food-borne, and zoonotic diseases as well as occupational injuries and health hazards; and
- ◆ breeding more nutritious varieties of staple food crops that are consumed by poor people in developing countries through biofortification initiatives, such as the HarvestPlus Challenge Program of the Consultative Group on International Agricultural Research (CGIAR).

Setting priorities and sequencing such interventions as part of a pro-nutrition growth strategy will depend on country-specific conditions, stages of development, and institutional capacity.

### Investment strategy and fiscal policies

Public investments in rural infrastructure and agricultural research have been shown to have one of the largest impacts on poverty reduction and economic growth in a number of developing countries. There is no empirical evidence, however, showing how different types of public spending affect nutrition. Given that public resources in most developing countries are scarce and the opportunity cost is high, decisionmakers should seek to allocate public resources more efficiently, taking into account positive and negative spillover effects on nutrition. Research on the effects of public investment should be expanded to include nutrition in order to give policymakers information on how to prioritize public spending according to nutritional and other development outcomes.

Fiscal policies, like taxes on unhealthy foods and subsidies on nutrient-rich foods, can also be used to maximize positive and minimize negative spillover effects on nutrition. While taxes on foods rich in saturated fats can be useful in generating government revenue, studies in developed countries show that such policies need to be complemented by interventions that discourage the consumption of these foods, including subsidies on nutrient-rich foods such as fruits and vegetables. More research is needed on the impacts of these kinds of policies in developing countries.

## Conclusion

A new paradigm for agricultural development is needed, whereby agricultural growth leads not only to increased production and reduced poverty but also to improved nutrition. The question facing many developing countries is how to set priorities and sequence interventions to maximize the benefits from the dynamic and nonlinear relationship between growth and nutrition while also paying attention to the role of conditional factors.

Growth alone, however, is not sufficient to address undernutrition. Other complementary interventions, such as targeted nutrition programs for women and children, will be needed. It is also important to identify the likely trade-offs between implementing pro-nutrition growth strategies, pursuing other objectives such as poverty reduction, and using other instruments such as targeted nutrition programs.

To help policymakers make sound decisions about priorities and sequencing, more research is needed on the impact of different sectoral patterns and public investment

policies on nutrition and how this impact varies across different economic, geographic, and social conditions. This research needs to be based on more comprehensive nutrition data, including micronutrient intakes across different segments of the population.

Finally, strong institutions and governance, as well as monitoring and transparency, are vital to ensure that nutritional objectives are not left out of the development process and that pro-nutrition growth strategies and investment policies are effective.

## NOTES

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