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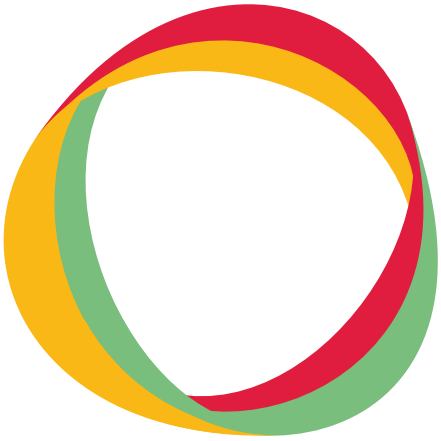
HIGHLIGHTS FROM
AN INTERNATIONAL
CONFERENCE



LEVERAGING AGRICULTURE FOR IMPROVING NUTRITION & HEALTH

10–12 FEBRUARY 2011 | NEW DELHI, INDIA | http://2020conference.ifpri.info

ABOUT THE INTERNATIONAL CONFERENCE

The 2020 Vision Initiative of the International Food Policy Research Institute (IFPRI) coordinated a global consultation process whose centerpiece was an international conference called "Leveraging Agriculture for Improving Nutrition and Health," held February 10–12, 2011, in New Delhi, India. The conference, facilitated by IFPRI with guidance from the Conference Advisory Committee, drew some 1,000 participants, including high-level policymakers, leading researchers, and practitioners from nongovernmental organizations (NGOs), international agencies, and the private sector. Participants came from all three sectors—agriculture, nutrition, and health—and represented about 65 countries.

The conference also included a number of associated activities. At about a dozen side events, other organizations presented sessions on topics and projects related to the conference topics. A Knowledge Fair, with space for exhibits, interactive displays, presentations, video viewing, social media use, and informal discussion groups, served as a forum for networking, brainstorming, and collaborating across sectors. Complete video coverage, conference papers and briefs, and slide presentations are available at the conference website: http://2020conference.ifpri.info.

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We hope that these conference highlights identify knowledge gaps, inspire new thinking, and stimulate concrete actions to leverage agriculture to improve nutrition and health.

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LEVERAGING **AGRICULTURE** FOR IMPROVING **NUTRITION** AND **HEALTH**

HIGHLIGHTS FROM AN INTERNATIONAL CONFERENCE

Agricultural development has traditionally focused on raising productivity and maximizing production of cereals. In this regard, the world's farmers and farming systems have made enormous advances, multiplying cereal production several times over in the past half century. Yet hunger, malnutrition, and poor health remain widespread and persistent problems. Nearly 1 billion people still go hungry, and billions more are malnourished. The food price crisis of 2007–08—and more recent increases in food prices—shows just how vulnerable the global food system is to disruptions related to weather and government policies. At the same time, agriculture faces a number of challenges in the coming decades, including growing population, climate change, water scarcity, land degradation, urbanization and changing diets, rising energy costs, and natural disasters. Looking ahead, agriculture faces the task of contributing to food security, nutrition, and good health for a rising number of people. Can it meet the challenge?

In February 2011, about 1,000 people came together at a conference in New Delhi to think through the interactions among agriculture, nutrition, and health and consider ways to exploit them to improve human nutrition and health. Participants helped clarify what is known about the links among the three sectors, what is not known, and where opportunities for leveraging agriculture for nutrition and health may lie.

OPPORTUNITY KNOCKS

Many people are beginning to take a broader view of agriculture's potential. It is increasingly clear that nutrition and health are linked to agriculture in many ways, yet the three sectors rarely work together to reach their common goal of improving human well-being. It is time for agriculture, nutrition, and health to join forces.

In many ways, the links among agriculture, nutrition, and health are already at work. Agriculture is the primary source of food to meet people's need for energy and essential nutrients. To get access to this food, people can produce it themselves or buy it. The agricultural system may help increase people's access to food by allowing them to produce more food, lowering food prices, raising farmers' incomes, and raising incomes among other rural people who benefit from a more prosperous agricultural sector. By improving their access to food, agriculture thus has the potential to greatly improve people's nutrition and health. At the same time, some agricultural conditions and practices can lead to disease and poor health for both farmers and consumers.

> "Leveraging agriculture for improving nutrition and health . . . is particularly important in developing countries, where agriculture is also the mainstay of a very large number of people."
>
> —Prime Minister Manmohan Singh of India

How the links among the three sectors work on a local, national, and global scale depends partly on the physical, social, legal, economic, and governance settings in which they take place. They also depend on a household's resources of time, money, land and other assets, education, health, and nutrition. Anything that affects agriculture has the potential to affect health and nutrition, and anything that affects health and nutrition has the potential to affect agriculture—for good or ill.

THE ROLE OF GROWTH

It is widely assumed that economic growth will lead to better nutrition by increasing people's

> "I urge you to use your time together to find ways for all of us to do even more: more to improve agricultural productivity, more to connect farmers to markets, more to increase access to nutritious crops and health care, and more to support the women who are growing food and caring for children around the world."
>
> —Hillary Rodham Clinton, Secretary of State, United States of America

Nutrition and Health: Big Challenges Ahead

Agriculture has succeeded in massively increasing the amount of staple grains produced, but the world still faces serious challenges related to nutrition:

- The number of hungry people rose from 873 million in 2004–06 to 925 million in 2010.
- About 115 million children are underweight, and 186 million under age five are stunted.
- Nearly half of the world's preschool-age children suffer from anemia, and one-third are deficient in vitamin A.
- Undernutrition is the underlying cause of nearly one in three deaths from all diseases in preschool-age children.
- 1.7 billion people are overweight, and 500 million of them are obese.[1]

Agriculture also poses serious health risks to both food producers and food consumers:

- Agriculture is one of the most hazardous occupations worldwide. Health risks include microbial and other pollutants from wastewater irrigation, exposure to zoonotic pathogens and chemicals like pesticides and herbicides, and accidents and exposure to extreme weather events or patterns.
- Three-quarters of emerging diseases are zoonotic in origin.
- In developing countries, 4.5 billion people are chronically exposed to aflatoxin, a highly carcinogenic natural toxin that is thought to affect 25 percent of the world's food crops.[2]

incomes and in turn their expenditures on food, as well as by raising government revenues to help fund health, nutrition, and infrastructure programs. But what does the evidence show? A look at successful episodes in fighting malnutrition reveals that for low-income countries, rapid economic growth is a necessary condition for reducing malnutrition—but not a sufficient one. Agricultural growth, in particular, is associated with increases in calorie consumption, depending on the size of the agricultural sector in a country, but it does not necessarily result in more diverse diets. Moreover, agricultural growth is often associated with reductions in malnutrition, except in India, which is home to one-third of the world's malnourished children (see box on page 10). Some middle-income countries, like Brazil, Honduras, and Mexico, have been able to improve nutrition even in the absence of rapid economic growth, perhaps because existing national income was high enough to fund effective social programs.

The type of agricultural growth that takes place also matters a great deal for nutrition. In Tanzania, for example, high agricultural growth has done little to improve nutrition because it was driven primarily by crops that poor people were less likely to grow.[3] Experience has shown that growth in staple crops contributes more to poverty reduction and calorie intake than does growth in export crops because poor farmers often lack the financial resources and technologies required to grow export crops.[4]

In the long term, the best way to conquer malnutrition is to promote a nutrition-sensitive growth strategy. Such a strategy could increase demand for and access to nutritious foods all along the value chain, mitigate the health and nutrition risks associated with agriculture, and breed more nutritious varieties of staple food crops consumed by poor people. It could promote diversification of agriculture into nutritious and high-value products like dairy, horticulture, and fish, which offer great potential for small farmers because they are land saving and labor intensive. Public support systems for agriculture, like credit and extension programs, should be made to work better for women

"We desperately need another revolution, one that deals with agricultural productivity for the smallholders. . . . We need to answer these questions: Are we growing the right foods? Are we growing them in the most efficient way with respect to inputs, water, and land? Are we growing them in the most sustainable way? And what foods are consumers actually eating in terms of quality and quantity, nutrition, and food safety?"

—Inger Andersen, World Bank and CGIAR Fund Council

"We're not headed to a good place. We're in a situation where food systems are not working. We've got nearly a billion hungry now, and we've got to prepare for feeding 9 billion by 2050. We're in a situation where smallholders farmers have not got secure livelihoods, are at risk due to climate change, and where, at least in my estimation, we may well be entering into another serious period because of rising food prices and food price volatility. We've got a lot of action underway. . . . But to take the links between agriculture, nutrition, and health to scale, we have to do a lot more."

—David Nabarro, United Nations

farmers. A more diverse and productive agricultural system will in turn accelerate growth in the rural nonfarm sector, in areas like agroprocessing. Investments in rural infrastructure could help ensure that this growth can take place and will contribute to better nutrition.

It is important to remember, however, that a growth strategy must be accompanied by investments in safety nets and education, nutrition, and health programs so that the poorest people are not left behind.

AGRICULTURE FOR BETTER NUTRITION

So far, the agriculture and nutrition sectors have tended to operate in separate spheres, and little effort has been made to use agricultural policies and programs specifically to improve human nutrition. A few programs and approaches, however, point to the significant potential for leveraging agriculture to improve nutrition.

Food products often undergo many stages between farm and fork, and this value chain—that is, the supply chain along which value is added to a product—offers opportunities for improving nutrition. Value-chain analysis can be used to assess why foods are or are not available in specific communities, why foods cost what they do, and how the nutrient quality of foods changes through the chain. Once problems are identified, value-chain approaches can be used to design and implement solutions to increase the availability, affordability, and quality of nutritious foods. For example, this approach can lead to increased production, better distribution, and greater consumption of fruits and vegetables or biofortified foods (that is, crops with extra nutrients bred into them). It can result in new initiatives to create more nutritious process foods or to buy nutritious products from local farmers. Value-chain approaches are only beginning to be used, so there is much more potential for them to make a difference.[5]

In Bangladesh and elsewhere, Helen Keller International is using home food production to leverage agriculture for nutrition. This scheme aims to increase households' production and consumption of micronutrient-rich vegetables, fruits, and animal-source foods to address deficiencies in vitamin A and iron, especially among young children and women. The goal is not just to achieve improve households' nutrition, but also to enhance the livelihoods of women smallholder farmers through better access to markets, agricultural services, and health and nutrition services. Participants have produced bumper crops, and in some countries, the program has reduced the prevalence of anemia in nonpregnant women and the prevalence of anemia and night blindness in young children. The model has been extended to Cambodia, Nepal, and the Philippines and now reaches more than 5 million people.[6]

And still other interventions are being tried to come to grips with the challenges: examples include local production of foods for school

"I've never really understood why when women grow fruits and vegetables, it's called 'kitchen gardens,' and when men grow the same things, it's called 'high-value horticulture.'"

—Ruth Meinzen-Dick, International Food Policy Research Institute

feeding on a wide scale in Brazil; a project to increase production and consumption of animal-source foods to improve child nutrition in Ghana; and a project to integrate agriculture, nutrition, and health services in Zambia to prevent malnutrition among young children and provide evidence on how agricultural interventions can lead to reduced stunting of children.

It is important to note that so far there is little concrete evidence on how agriculture-nutrition linkages work. In the effort to leverage agriculture for nutrition, one crucial task, then, is to compile an evidence base on these links. Many more studies are needed on the nutritional impacts of agricultural interventions, and nutritional indicators should be included in evaluations of agricultural programs. A larger evidence base on what works and what does not would make it easier to call on policymakers to do more to exploit the links between agriculture and nutrition.

"If we can get the economic aspects of food production linked to the economic indicators that we've developed in the health sector to talk about burden of disease and health impacts, then we would come a long way."

—Robert Bos, World Health Organization

AGRICULTURE FOR BETTER HEALTH

The agriculture and health sectors may work together even less than the agriculture and nutrition sectors do, and bringing them together poses its own challenges. Yet there are many links between the two sectors, and these links run in both directions, offering substantial scope for using agriculture to reduce health risks.

During production, agricultural practices related to pesticide use, migration of farm labor, use of child labor, and many farming practices can all have impacts on the health of agricultural households. At the same time, disease and poor health can sharply cut into farm households' labor, time, and assets and thereby push down agricultural production.

This situation suggests that agricultural interventions need to be designed with health effects in mind and that agriculture and health professionals should work together to minimize the negative health effects of agricultural activities. Incorporating health impact assessments into agricultural projects could be useful. Education campaigns are also needed to inform farm households about, for example, how to safely use pesticides.

The health risks continue after products leave the farm and offer opportunities for using agriculture-health linkages to improve both sectors. In developing countries, consumption of unsafe food and water is one of the major causes of preventable illness and death. Food-borne pathogens and zoonoses affect millions of people. Toxins—such as cyanide in cassava, mycotoxins in grains, or exposure to pesticide residues on fruits and vegetables—are also widespread in poor countries. Both private-sector solutions (such as collective action, cooperatives, and contract farming for small producers) and public sector solutions (such as better government regulation of food safety and better dissemination of this information) can help overcome these challenges. One private company in Ethiopia, for example, worked with local groundnut farmers to help them eliminate aflatoxin in groundnuts—an accomplishment that allowed the company to use local groundnuts to produce ready-to-use foods for use in programs for severely malnourished children.

Opportunities to exploit the links between agriculture and health can be found in helping both governments and the private sector play effective, appropriate roles; adopting risk-based analyses and interventions, which will allow nuanced approaches to health risks; and engaging stakeholders in the value-chain approach, including small-scale producers, traders, handlers, importers and exporters, retailers, consumers, and government institutions.[7]

OPERATING LEVERS FOR CHANGE

Policymakers, researchers, development agencies, NGOs, and others have at their disposal a range of tools that may help to leverage agriculture for better nutrition and health, including economic, social, governance and inclusion, and science and technology levers.

Economic Levers

Evidence is still scanty on how specific economic policies affect nutrition and health, but researchers are beginning to look more closely at these issues.

Improved nutrition depends on availability of healthy foods, people's economic access to those foods, and people's ability to absorb the nutrients in those foods. Economic levers may affect all of these components of good nutrition. As already mentioned, at the broadest level, one important lever for improving nutrition and health may be agricultural growth, or even overall economic growth. Comparing the experiences of various countries shows that economic growth is important for reducing undernutrition, but the impact of growth on nutrition declines as development progresses. At the early stages of a country's development, agricultural growth is critical for lowering undernourishment, showing that the structure of growth matters for nutrition outcomes. But malnutrition among young children—an important dimension of overall nutrition—seems to be highly unresponsive to economic growth.[8] Growth alone is not enough to solve the nutrition problem.

One set of levers that could affect people's economic access to healthy foods consists of the "fat taxes" and "thin subsidies" now being considered, and in some cases adopted, in the industrial countries, where overnutrition is a greater problem than undernutrition. One study simulated the effects of combining a tax on saturated fat with a subsidy for fruits and vegetables in the United Kingdom. It found that such a policy would save a substantial number of lives among people who already consume close to the recommended levels of fat, fruits, and vegetables, but it would likely not affect the diets of people who are far from the recommended levels. In addition, because poorer people tend to spend a larger share of their incomes on food, this policy would hit poor people's pocketbooks hardest. A more targeted approach to improving people's diets may be more appropriate.[9]

The most sustainable economic levers are market friendly and align with people's consumption preferences. The market for complementary foods for infants, for example, is hampered by lack of information. Home production of high-quality complementary foods is labor intensive, and the market for purchased foods is dominated by expensive branded products. Cheaper locally produced infant foods are uneven in quality, so consumers rarely buy

Want Women to Do More for Agriculture, Nutrition, and Health? Then Give Them the Tools

It has been repeated over and over—women themselves are important links among the agriculture, nutrition, and health sectors. They perform the bulk of farm labor and food processing in many countries. They prepare food and care for children and household members who are ill. And in many cases they are carrying out these tasks without the benefit of credit; access to healthcare and childcare; secure rights to land and water; sound information about agricultural production, health, and nutrition; and access to well-functioning markets.

Increasing women's access to resources and control over household income can significantly improve the health and nutrition of the family, and particularly of women and children. Agricultural development has the potential to increase the resources at women's disposal, and thereby improve nutrition and health, but only if planners work to remedy women's lack of access to the tools they need: credit, healthcare and childcare, property rights, education and extension services, and markets. When directing more tools and resources to women, though, it is important to avoid adding to the already heavy burdens on their time and labor.[10]

these local products, and in turn producers fail to invest in quality control or wide distribution. Introducing quality certification for infant foods would allow new entrants and small producers to compete with heavily advertised global brands, and thereby help families meet more of their infants' nutritional needs at a lower cost.[11]

Social Levers

Social levers involve bringing people together across sectors and within communities to jointly work toward improving nutrition and health. Experiences from a number of countries and the private sector offer some useful lessons. For example, Luiz Inácio Lula da Silva, Brazil's former president, launched the "Zero Hunger" program in 2003 to fight extreme poverty and ensure the human right to adequate food. The program initiated a number of actions and improved synergy among public policies, including income transfers, school feeding, and support for public restaurants and food banks. Among the lessons learned is that agricultural growth based on large-scale agribusiness does not necessarily lead to hunger reduction, especially if agricultural growth leads to concentration of land ownership.[12]

Whereas Brazil's experience highlights the importance of a national strategy to mobilize people, elsewhere social mobilization has arisen at the community level. In Afghanistan, for example, a project designed to bring sectors together to improve nutrition provided nutrition education—including recipes for complementary foods for infants—through myriad groups in Afghan society, including poultry groups, community health workers, school gardens, agricultural coops, and thousands of literacy circles.[13] In the Indian state of Andhra Pradesh, the Society for Elimination of Rural Poverty has stimulated social mobilization on a large scale to help raise farmers' incomes and reduce infant mortality by organizing 11 million poor women—90 percent of poor rural women—into self-help groups. The groups set up nutrition centers where women, especially pregnant and lactating women, get three hot, nutritious meals each day. By providing food for the program, small farmers have seen their profits rise. Better nutrition and health are thus driving agriculture.[14]

Business can also act as an important social lever when it empowers communities to improve their diets through improved access to information, increased incomes, or greater access to high-quality foods. Companies are increasingly recognizing that a large potential market lies at the "base of the pyramid." According to one definition of this group—people living on less than US$8 a day—this market encompasses nearly 4 billion people who spend more than US$1.3 trillion a year on food and 70 percent of whom rely upon the food value chain for their livelihoods as either producers or

Governing the Dietary Transition

How can governments promote positive synergies among agriculture, health, and nutrition? The answer may depend on where a country is along the dietary transition.

For a country where people's diets are low in both calories and micronutrients, the most effective government action is to provide missing public goods, especially rural roads. Agricultural societies cannot advance without roads, power, transport, and rule of law—as well as schools and clinics—in the countryside. At the next stage of the dietary transition, when most people in a country get adequate basic calories, some are left behind and others have an inadequate balance of nutrients, so government's task shifts to targeted delivery of services, such as income and nutrition safety nets for the urban poor and extension services for small farmers. At the third stage of the transition, the problem can become excessive calorie consumption and health problems linked to obesity. The private sector provides most goods and services at this stage, so government's task is to supply public health and safety regulations to encourage appropriate responses from commercial farmers, food companies, food retailers, restaurants, pharmaceutical companies, hospitals, and medical insurers. The challenge at this stage is to prevent the "capture" of regulators by the private industries being regulated.[15]

"Nutrition is the natural bridge between agriculture and health."

—Namanga Ngongi, Alliance for a Green Revolution in Africa (AGRA)

entrepreneurs. Private companies can engage people in communities—even poor communities—as producers by empowering smallholder farmers to increase the quantity and quality of their production. They can engage community members as consumers by expanding access to high-quality products and running educational campaigns on nutrition and health. And they can engage them as entrepreneurs along the value chain by providing market information, access to financial services, and solutions to overcoming infrastructure gaps.[16]

institutions to work together. It is also important to devise incentives to get them to do so and to devote the time and resources necessary to work across sectors.

New and existing institutions can exclude some vulnerable people, such as the rural poor, minorities, and indigenous populations, so it is crucial to ensure that the most vulnerable have a voice by including the beneficiaries of programs in decisionmaking. Women are frequently among those excluded, so it is important to look carefully at how policies and programs affect women.

Getting the Message Out

Communicating how agriculture, nutrition, and health are linked is a crucial task, because the links are not always obvious or intuitive for policymakers or program decisionmakers. For instance, it is crucial to translate the results of evaluations so that they can be easily understood both by senior decisionmakers in development agencies and government institutions, as well as by program managers in the field. Although nutrition outcomes, for example, may seem self-explanatory to nutrition specialists, people who work in agriculture often do not understand the implications of such outcomes for their own work.[17]

Governance and Inclusion Levers

Bringing agriculture to bear on improving nutrition and health requires government leadership at all levels—from national to provincial to local. But political leaders do not always understand that establishing good health and nutrition goes far beyond improving human well-being and has enormous implications for economic development. Consequently, getting leaders interested in leveraging agriculture for nutrition and health can require advocacy and capacity strengthening at all levels. The importance of nutrition, in particular, is still not well understood in many places, so it may be helpful to draw on the tools of marketing to "brand" nutrition so that it gains increased prominence and to recruit passionate individuals, or policy "champions," to promote nutrition policies and programs.

Changes in policies and programs are not enough to get people in different ministries and

Finally, it takes time to change, so programs need to be designed with this in mind.

Are there specific ways to use governance and inclusion levers to better align the goals of the agriculture, nutrition, and health sectors? One option is to make cash transfers to farmers conditional on improving the integrity of ecosystems and the health of crops, to pay farmers for ecosystem services, and to invest in infrastructure for healthy food systems. Another is to use public food procurement—a policy tool available to all levels of government in all countries—to push toward healthy agrifood systems. Food procurement for schools, hospitals, and government offices, for example, could help build regional markets for healthy, sustainable foods.

Science and Technology Levers

Over the years almost all agricultural research has been directed toward increasing production

"We need to pursue a research and development agenda on diversification of cereal-based systems with grain-legumes, vegetables, horticulture crops, and oilseeds."

—Rob Bertram, U.S. Agency for International Development

of a few staple crops—now, better nutrition will depend on investing much more in nutrient-dense vegetables, which will have a rapid and effective payoff. Vegetables are one of the best sources of micronutrients, vitamins, and proteins in the human diet. An increasing diversity of vegetables—both exotic and indigenous—requires concentrated and consistent research and development attention and a substantial increase in investment. Crop breeders should focus on breeding vegetables that are high in nutrients and resilient in the face of climate volatility, pests, weeds, and diseases. More prominence should be given to the potential of small-plot agriculture. For example, home gardens in India can provide more than 100 percent of people's recommended daily allowance of beta-carotene and vitamin C, 75 percent of protein, and 20–25 percent of iron.[18]

One science tool that can connect agriculture to better health and nutrition outcomes is biofortification—that is, breeding staple crops to have a higher content of micronutrients like iron, zinc, and vitamin A. This tool has the potential to improve poor people's nutrition status in an extremely cost-effective way (see box on this page). Using biofortification has four main advantages for reaching poor people in developing countries. First, it targets the poor who eat large amounts of food staples daily. Second, biofortification targets rural areas, where it is estimated that 75 percent of the poor live. Third, biofortification is cost-effective because once the initial investment is made to develop the crops, they can be adapted to other regions cheaply and then used by farmers year after year. Finally, this approach is sustainable because it relies on the foods that people are already used to eating. Scientists have already created a sweet potato high in vitamin A and released it to farmers in Africa. Biofortification work on bananas/plantains, beans, cassava, lentils, maize, pearl millet, potatoes, rice, sorghum, and wheat is also underway. HarvestPlus biofortified crops are poised to be released in seven countries by 2013.[19]

Science and technology levers can also help fill the gaps in nutrition and health in other ways. For instance, researchers should collect and analyze more information on people's usual food consumption patterns and nutrient intakes. It can be difficult and time-consuming to collect these data, but to design effective programs, it is essential to know what populations eat now, where they obtain that food, and where the "gaps" are in their ability to meet their nutrient requirements. Another task is to come up with field-friendly and affordable methods to measure nutritional status, especially for several micronutrients simultaneously.[20]

A Better Sweet Potato: Evidence from Mozambique and Uganda

From 2007 to 2009, HarvestPlus and its partners undertook a project that encouraged selected communities in Mozambique and Uganda to produce and consume more orange-fleshed sweet potato, which contains more vitamin A than the white-fleshed sweet potato traditionally eaten there. Among other things, the project distributed potato vines, used nutrition training to create demand for the sweet potato, and offered farmers training on marketing and product development.

The result? People started growing and consuming the orange sweet potatoes in significant numbers, and these potatoes became an established part of the diet in project households. Increased consumption of orange sweet potatoes led to significant increases in vitamin A intakes, equal to roughly 100 percent of the daily requirements for young children (age 6–35 months), older children (age 3–5 years), and adult women.[21]

The recent gradual slow-down in agricultural productivity growth points to the need for more resources for agricultural science and technology research and development. Given the considerable gestation period needed for original field research to translate into scalable and replicable technology interventions—and for those technologies to be disseminated widely enough to achieve measurable impact—it becomes clear why the pipeline of innovation, discovery, and dissemination must be kept full. Good public policies can do a great deal to lead to the ultimate success and impact of science and technology innovation and create a favorable environment for technology to make a difference. Public policies can help target innovations more successfully. Although a great deal of science and technology research focuses on agricultural production, the "reproductive" domain of the household (such as women's ability to care for children) is also in need of science and technology and good policy interventions.[22]

REGIONAL PERSPECTIVES

Africa

Poor nutrition and health remain persistent problems in Africa, where one in four people suffers from malnutrition, 53 percent of pregnant women are estimated to be anemic, and high rates of infectious disease in rural areas kill a disproportionate number of malnourished children. At the same time, however, there is a new focus on agriculture in the region. The Comprehensive Africa Agriculture Development Program (CAADP), for example, calls on African governments to raise agricultural spending to 10 percent of national budgets. It thus presents an opportunity for countries to productively exploit the links among agriculture, nutrition, and health as they revise their agricultural policies and direct more funding to that sector. CAADP explicitly spells out policies to help increase production of highly nutritious foods.[23]

Some other initiatives are already underway to try to leverage agriculture for improving health and nutrition in the region. The West African Health Organization and its partners, for example, are working regionally to address the need for greater dietary diversity and diet quality by promoting green leafy vegetables, local fruits, indigenous staple foods, and animal source foods.[24] At the national level, for example, Ghana's National Development Planning Commission was involved in a program that linked agriculture, nutrition, and health and took responsibility for ensuring that the three sectors worked together at the district level and that communities had the health and agricultural facilities and materials they needed.[25]

Further progress, though, will depend on action at the national, district, and local level, but many policymakers at these levels still do not see nutrition as a development issue that should play a role in agricultural planning. With many economic activities dependent on physical labor, factors that affect labor—like undernutrition and disease—also affect productivity and in turn economic development. Spreading this message and raising the profile of nutrition in African policymaking circles will require advocacy from senior policymakers who champion the issue. Pressure from well-informed media and results-oriented development partners can also help spur government action.[26]

South Asia

Malnutrition is disturbingly high in South Asia. In India, resources should be devoted to improving the nutrition status of the bottom 40 percent of people in India by improving the Public Distribution System (which should be extended to include pulses and seed oil), subsidize food prices for the poor, maintain national food self-sufficiency, and raise the production and consumption of coarse grains and cereals and other nutritious foods. Investments are also needed in, for example, irrigation, agricultural extension, agricultural technologies, rural infrastructure, and information technology.[27]

The experience of Bangladesh points to the challenge of achieving sustainability when designing programs to improve people's nutrition and health. Programs often rely on NGOs for funding and support; when NGO funding stops, so do the programs.[28] Nepal has gone from being a food-surplus economy to a food-

"Being food secure at the national level is great. But there are people who are falling through the cracks. Who are these people? The female-headed households, the people who have very little or no land, the laborers—these people are not being reached by most of the programs we have put in place."

—Agnes B. Kalibata, Minister of Agriculture and Animal Resources, Rwanda

deficit economy, and malnutrition and infection are widespread among women and children. Improved coordination among the government, NGOs, and donors and use of evidence-based approaches could help address the high rates of malnutrition and illness.[29] In Sri Lanka most poor people are involved in agriculture, so agricultural threats are also health threats. To incorporate nutrition goals into agriculture and rural development projects, the following actions should be taken: expand cash crop production, introduce hybrid varieties, create effective and appropriate extension services, make agricultural credit available to male and female producers, and expand food crop production.[30]

East Asia

Most people in East Asia depend on agriculture for their livelihoods, and most farmers cultivate small farms of less than one hectare. Fluctuations in food prices thus affect the incomes of small farmers, with consequences for both production and consumption. And farmers still have problems getting access to high-quality seeds, fertilizers, water, rural infrastructure, and machinery for processing. Although East Asia does not suffer from as much undernutrition as some other regions, problems of malnutrition remain.

For a number of countries in East Asia, agriculture means rice production. Impressive gains in the productivity of rice farmers in recent decades have helped raise incomes and reduce hunger. For example, after the fall of the Khmer Rouge, Cambodia attained rice self-sufficiency in 1995 and produced a rice surplus in 2009 owing to new technologies and more productive farming systems. Poverty and undernutrition, however, are still widespread there.[31] It is important to promote more diverse diets and educate farmers in the region about the potential for growing more nutritious crops, such as fruits and vegetables. Scarcity of land is also an important issue in the region. Many malnourished children come from households that have tiny plots of land or no land at all and are thus unable to produce their own nutritious food.

A holistic community-based approach to linking agriculture, nutrition, and health has worked well in some countries, including Thailand. Experience there shows the importance of teaching people about nutrition at the community level, teaching agricultural skills, and making sure farmers have the land, credit, and postharvest technologies they need. Special attention to improving the nutrition and health of women and children is a crucial component of success.[32]

A Long-Running Mystery: Why Does India Remain Undernourished?

For decades, rates of child undernutrition in India have remained stubbornly high. Undernutrition also affects one-third of all Indian men and women. At the same time, India is the second-fastest-growing economy in the world. Whereas economic growth in other countries has often been accompanied by reduced child malnutrition, this has not been the case in India. The jury is still out on the reasons for the apparent disconnect between agriculture and nutrition in India. Factors may include changes in diets away from coarse grains and pulses and toward fats, an inefficient Public Distribution System for food, other livelihood shocks and stresses, and the feminization of agriculture, which may have a detrimental effect on women's ability to care for themselves and their children if not accompanied by measures to empower women. Agriculture can only do so much—other drivers of undernutrition, such as poor healthcare and sanitation, are key too. What is clear is that because of India's sheer size, overcoming undernutrition there would actually make a large dent in poor nutrition globally.[33]

Latin America and the Caribbean

In Latin America hunger overlaps with overweight and obesity, sometimes even in the same family, so efforts are needed to deal with both undernutrition and health problems related to overnutrition. Argentina, for example, has recognized that overweight is concentrated among its poor citizens. Joint public and private action is needed to help reduce sugar, salt, and saturated fat in manufactured food products.[34]

Some countries are beginning to find innovative ways to exploit the links among agriculture, nutrition, and health. Brazil, for example, has one of the world's largest school feeding programs, which brings together agriculture, nutrition, and health. School feeding is just one of many social programs that have helped cut poverty and hunger in Brazil, but these programs still have not reached all poor and marginalized groups, so more remains to be done.[35]

Central American countries have also come together to make use of the linkages among agriculture, nutrition, and health. Multisectoral approaches are underway at both the regional and national levels. In all of these efforts, participatory communication is key to achieving results, and monitoring and impact assessment are essential.[36]

High-Income Countries

One needs to look no farther than the high-income countries, where overweight and obesity are reaching epidemic levels, to see that adequate food supplies are not synonymous with good nutrition and health. Governments in many of these countries have adopted policies that maximize the export value of crops and enable low food prices at home. Four decades ago, when a "cheap food" policy in the United States pushed down the percentage of income spent on food by nearly 50 percent, the amount spent on healthcare more than tripled. Much of the increase was tied to dietary disease.[37]

To avoid the more deleterious health outcomes apparent in the high-income countries, more policy coherence is needed across the health, nutrition, and agriculture sectors. Unfortunately, no examples exist of cost-effective country-wide approaches to decreasing overweight and obesity. Unlike some interventions with proven effectiveness—such as breastfeeding or micronutrient interventions—the preliminary evidence suggests that preventing overweight and obesity will require approaches that are much more multisectoral. Educational programs on nutrition and health in schools and communities can build awareness, but they must also take into account the psychology of consumers and the difficulty of changing their behaviors.[38]

These experiences point to lessons for other countries with rising incomes: it is crucial to think about nutrition policies now to ensure that income growth does not lead people to shift from eating nutrient-rich foods, grains, and vegetables to eating foods high in fat and sugar. Once obesity sets in, it is extremely difficult to reverse.

STRENGTHENING THE EVIDENCE BASE

The development community currently has an enormous appetite for impact evaluation. More than ever before, donors want to know whether the programs and projects they are funding are bearing fruit—in short, they want to know what works. Evaluations are valuable because they serve two main purposes: they provide accountability, and they offer a chance to learn how well particular approaches work in meeting their goals.

The idea that development activities can exploit the links among agriculture, nutrition, and health still suffers from a weak evidence base.

"There is a tendency to ask the question, 'Should we invest in agriculture, or nutrition, or health, to improve nutrition?' This is the wrong question. It's not either/or. We need to invest in agriculture and in the complementary types of investments in other sectors that will bring about improvements in nutrition."

—Marie T. Ruel, International Food Policy Research Institute

Early Training Lays the Foundation for Future Collaboration

The training of professionals in agriculture, nutrition, and health has traditionally taken place in compartments, with few linkages. By the time professionals in the three sectors have completed their education, they no longer speak the same "language." Given that the goal of each of the sectors is to improve human well-being, students and young professionals should be trained in how the three sectors are tied together. Even though professionals in the three sectors should retain a deep expertise in their subject area, they could be given a greater familiarity with the main concerns and opportunities of the other sectors. By developing cross-disciplinary programs, educational institutions can produce graduates and professionals who—in their capacity as extension workers, healthcare providers, or nutrition counselors—can effectively translate the linkages between agriculture, health, and nutrition in the field for the benefit of all.[39]

There are few systematic reviews of agricultural projects with explicit goals related to nutrition and health, and the reviews that do exist often show only weak links—perhaps because the links are in fact weak or because researchers have not found the best ways of evaluating such programs. An important job for researchers is to determine not only what works, but why. There is still little understanding of precisely how agriculture affects nutrition and health, and filling this knowledge gap would be of real value for decisionmakers trying to design the most effective programs and policies.[40]

The effort to amass more evidence on how best to use the links between the three sectors faces a real challenge. The agriculture, nutrition, and health communities use completely different methods and indicators to measure impact, and the different communities tend not to understand one another's concerns and objectives. There is a great need for a shared language and a shared set of indicators for measuring results.

Evaluating interventions that seek to integrate agriculture, nutrition, and health is also difficult for the same reason that other evaluations are difficult. Experiments that randomly assign people to intervention groups and control groups are ideal for measuring the results of an intervention, but this method is not always feasible. It is important to remember that many other kinds of rigorous evaluation are also possible, including anthropological techniques and modeling. Adding nutrition and health indicators to the data that are regularly collected in developing countries would also help a great deal.[41]

"We need to have real-time monitoring of results. We can't wait five years to see if we've been doing things the right way. We need to be able to assess and adjust regularly."

—Diane Jacovella, Canadian International Development Agency

"Sectors don't matter, projects don't matter. Results matter."

—Joachim von Braun, Center for Development Research (ZEF)

LOOKING AHEAD

A number of gaps in research and action remain to be filled. As already mentioned, researchers face the task of collecting much more evidence on the links among agriculture, nutrition, and health and on how they can be effectively exploited to improve human well-being. But it is also important not to be paralyzed in the face of a lack of evidence. For instance, more could be done to change the incentives embedded in agricultural policies to encourage farmers to produce more highly nutritious foods. Looking at the whole bioeconomy—including agriculture's role in producing food, feed, fiber, energy, and new industrial raw materials—may offer perspectives on how to make the whole system function more effectively for better health and nutrition. Food cannot be viewed just like any other commodity—it is a basic human need, like air, and policies must reflect this reality.

Finally, any solutions designed to leverage agriculture for better nutrition and health will have to work in the context of a rising global population, growing incomes that lead to changing diets, and climate change that will likely put pressure on already scarce resources.

What, then, should the first steps be? The International Food Policy Research Institute (IFPRI) has identified elements of a way forward, including the following (the full "Way Forward" statement appears at http://2020conference.ifpri.info/publications/the-way-forward/):

Fill the Knowledge Gaps

- Learn more about how different patterns of agricultural growth affect nutrition and health.
- Invest in research, evaluation, and education systems capable of integrating information from all three sectors.
- Fill the gap in governance knowledge at the global, national, and community levels.

Do No Harm

- Mitigate the health risks posed by agriculture along the value chain.
- Design health and nutrition interventions that contribute to the productivity of agricultural labor.
- Look carefully at the downstream effects of subsidies for production or consumption on consumers' nutrition and health.

Seek Out and Scale Up Innovative Solutions

- Scale up successful interventions.
- Design agriculture, nutrition, and health programs with cross-sectoral benefits.
- Incorporate nutrition into value chains for food products.
- Use all available levers for change.
- Increase consumers' nutrition literacy and highlight the consequences of dietary choices.

Create an Environment in Which Cooperation Can Thrive

- Focus on partnerships among agriculture, nutrition, and health.
- Develop mutual accountability mechanisms among the three sectors.
- Correct market failures.
- Use communication and advocacy to bring about change.

The world faces major challenges in producing the right quantity and quality of food to achieve good nutrition and health for all people. Yet this is also a moment of great opportunity. New attention to agriculture, growing evidence on the importance of nutrition for human and economic development, and the increasingly global nature of both infectious and noninfectious diseases are starting to create a greater willingness to consider joint solutions. Although the effort to exploit the synergies among agriculture, nutrition, and health is still in its infancy, this effort offers real potential for improving the lives of millions of people worldwide.

"We have generated a lot of information about the potential for synergies among the three sectors, and this potential becomes clear when we start talking to one another. Policymakers have the chance to capture an enormous opportunity to improve people's lives. Let us show them the way forward and support them in doing it."

—Shenggen Fan, International Food Policy Research Institute

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