

Back to the Future with the Global Goals

Why and how agriculture can return to its nutrition roots

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Why do we have agriculture? When addressing audiences of agricultural policy-makers, I sometimes begin by asking the group to raise their hands and vote for what is more important to them personally: their health or their income? Ninety-nine percent, of course, quickly indicate that their health is more important to them than their income. Then I ask them: In your profession, if you were Minister (even Dictator) of Agriculture, what would drive your decisions – the role of agriculture to provide incomes and jobs, or the role of agriculture to provide food to eat, and so adequate nutrition, and so a healthy nation? There is some hesitation (I presume due to their answer to the first question), but 80 percent vote for incomes and jobs, and the remaining 20 percent appear confused; many do not vote at all.

**“Dietary quality is further and further
out of reach for the poor”**

The Green Revolution some decades ago, while impressively raising productivity in response to rapid population growth, focused on a few key food staples (rice, wheat, maize). Advances in agriculture have helped the world become increasingly food secure, but there was no equivalent focus to increase the productivity of the range of non-staple foods such as vegetables, fruits, pulses, fish, and animal products, which are dense in minerals and vitamins. Consequently, the prices of food staples are 20 percent lower today than they were 50 years ago, while the prices of non-staple foods have more than doubled and continue to rise. Dietary quality is further and further out of reach for the poor.

**Agriculture’s failure to supply
a micronutrient-rich diet for the poor**

It is important to keep the above context in mind when apprais-

ing the Millennium Development Goals (MDGs). The goal of direct relevance to the nutrition and agriculture communities was Goal 1, which sought to “Eradicate extreme poverty and hunger.” Its scorecard shows impressive results; the number of people living in extreme poverty declined by more than half (1.9 billion in 1990 to 836 million in 2015), and the proportion of undernourished people in developing countries dropped by almost half (23.3 per cent in 1990–1992 to 12.9 per cent in 2014–2016). But it’s obvious that the Goal defined hunger and nourishment based on dietary energy consumption. In so doing, it unwittingly limited agriculture’s role to providing quantity and not more minerals and vitamins in diets. The reduction in that narrowly defined “undernourishment” is impressive, but what do we make of the fact that at the conclusion of the MDGs some 2 billion people – largely from the developing world – are suffering from hidden hunger caused by lack of vitamins and minerals in their diet? Almost half a million children, for example, lose their eyesight each year due to vitamin A deficiency. Women who lack adequate iron in their diets are at greater risk of pregnancy-related complications and maternal death.

The global prevalence of hidden hunger is, for the most part, due to the failure of agriculture to provide an adequate supply of minerals and vitamins to poor or low-income families that rely on staple foods for daily sustenance. But, even where the non-staple foods necessary for a mixed diet are available, they are often unaffordable to these families in adequate amounts or, if grown, to make some income.

**Increased awareness of the links between
agriculture and nutrition**

Fortunately, there is greater awareness now of the links between agriculture and nutrition, in part due to the global staple food price shocks in 2007–2008, which grabbed the attention of world leaders and triggered greater investment by donors, including President Obama’s Feed the Future Initiative. Agriculture’s most fundamental purpose is to nourish people, and well-nourished people are more likely to be healthy and productive. It will require a joint effort between nutrition-smart agricultural



Iron-rich pearl millet in India can provide consumers with up to 80% of their daily iron needs.

interventions and policies, and direct nutrition interventions such as supplementation and fortification, to eliminate malnutrition for all socioeconomic groups.

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“Agriculture’s most fundamental purpose is to nourish people”

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The newly adopted Sustainable Development Goals (SDGs) – more commonly referred to as the Global Goals – are even more ambitious and integrated than the MDGs. Their overarching focus is on creating opportunities for the poor by improving health, education and livelihoods. We at HarvestPlus are particularly excited about Goal 2, which seeks to “end hunger, achieve food security and improved nutrition, and promote sustainable agriculture.” The inclusion of both nutrition and agriculture is appropriate and necessary.

Goal 2 calls for access to “safe, nutritious and sufficient food all year round,” with indicators on reducing stunting and wasting, and meeting the nutritional needs of vulnerable populations. There are many ways that agriculture can contribute to better diets – for example, homestead gardening driven by behavior change through nutrition education, and stemming the increases in prices of non-staple foods by improving productivity through agricultural research and by reducing bottlenecks in the marketing value chain.

HarvestPlus: at the confluence of agriculture, nutrition, and public health

At HarvestPlus, we work at the confluence of agriculture, nutrition, and public health, and have long advocated closer linkages between these three sectors. Biofortification is the process of developing, through plant breeding, staple food crops that are rich in vitamins and minerals. Nutritious staple food crops are rich

in zinc, iron or vitamin A – micronutrients that can respectively reduce stunting, build brains, and strengthen immune systems in children, laying the groundwork for a healthy and productive society. Because they are high-yielding, biofortified varieties sell for the same price as non-biofortified varieties. Therefore, the extra minerals and vitamins come for free to farmers and consumers when a biofortified variety is grown/purchased and substituted one-for-one for a non-biofortified variety.

“Biofortification actualizes and strengthens agriculture’s nutritional purpose”

Biofortification, which actualizes and strengthens agriculture’s nutritional purpose, aligns well with the Global Goals. Biofortification was in its infancy when the MDGs were established, but more nutritious varieties of staple food crops are now being grown by millions of smallholder farm families in Africa, Asia and Latin America. Biofortification is poised to scale up to reach a billion vulnerable people by 2030 – the same target date as for the culmination of the Global Goals.

“Leaving no one behind”

A key theme of the Goals is “leaving no one behind.” Biofortification targets smallholder farmers with limited access to other nutritional interventions. We recognize that urbanization continues to grow, and our goal is for biofortified staples to reach urban dwellers, but our primary focus now is on the majority of people in developing countries who subsist on the food that they grow on small plots of land in rural areas. By providing them with important micronutrients through the food crops on which they rely for daily sustenance, biofortification ensures that such rural, largely poor, populations are not left behind in the effort to improve nutrition and public health nationally and globally.

What evidence is there to show that biofortification actually improves nutrition and public health? It bears emphasizing that biofortification is new to the quiver of nutrition interventions. The first biofortified crop, vitamin A rich orange sweet potato (OSP) is being scaled up across African countries to reach millions of people. Early pilots and research studies have shown that farmers are willing to adopt and eat OSP, and that it leads to increases in vitamin A intake in infants, children and women. Children in Mozambique who ate OSP were found to be less likely to suffer from diarrhea. If they happened to contract the disease, they were found to suffer it for a shorter duration than children who did not eat OSP. We already know from other studies that vitamin A supplementation reduces the incidence of diarrhea in children, particularly the undernourished or those suffering

from severe infections. This is the first research to show that an agricultural food-based approach can have a similar effect in young children.

In India, researchers found that biofortified pearl millet bred to be richer in iron reversed iron deficiency in school-aged children within six months. In just four months, it improved iron levels significantly. Previous research had found that the same iron-rich pearl millet provided iron-deficient Indian children under the age of 3 with enough iron to meet their daily needs. Both the OSP and iron pearl millet studies were peer-reviewed and published in leading scientific journals. Similar evidence on efficacy of orange maize rich in vitamin A has also been published.

“Agriculture can make important contributions to other Global Goals”

Biofortification clearly belongs under Goal 2, but it and, by extension, agriculture can make important contributions to other Global Goals. As noted earlier, by providing a child with the nutrients essential for physical and cognitive development, biofortified crops help to improve the child’s health (Goal 3) and capacity for learning (Goal 4). For adults, a healthier life from consuming more nutritious food means greater economic productivity (Goal 8).

Biofortification also reinforces the goal of maintaining the genetic diversity of seeds, plants and animals (Goal 15), since



Young children in Uganda get a valuable dose of vitamin A by eating orange sweet potato.

it depends on the existing genetic diversity of seeds to develop nutrient-rich crop varieties. Without the diversity in the gene banks established by our CGIAR partner institutes, scientists would never have been able to conventionally breed for higher micronutrient content in our staple crops.

In addition to being more nutritious, biofortified crops boast other benefits over traditional varieties. They are high-yielding, and tolerant to threats such as viruses, diseases, heat, and drought. In other words, biofortified crops are not only nutrition-smart, they are also climate-smart (Goal 13). This means they put less stress on land and water resources compared with their non-biofortified counterparts (Goal 12).

Our programs in target countries are increasingly building and supporting markets for biofortified crops. While our primary focus remains rural, subsistence smallholder farmers, we know that these farmers usually sell any extra harvests in order to earn some income. For the same reason – higher yields and attendant earning potential – commercial farmers are increasingly attracted to biofortified crops. It makes sense, therefore, to stimulate and strengthen the market for biofortified crops, so that farmers maximize their earning potential, improve their livelihoods, and fight poverty (Goal 1).

In the majority of countries where biofortified crops have been released, women are the meal managers and are, therefore, key to improving household nutrition. Our program purposely

targets women and empowers them with knowledge on best farming, feeding, and hygiene practices to improve their own health and that of their households (Goal 5). A woman’s education has trickle-down effects not only on her immediate family, but also ultimately on the community as a whole.

Biofortification provides a template for success

Biofortification’s success in contributing to the realization of the Global Goals will equally be agriculture’s. So, what will it take to succeed? Multi-stakeholder partnerships and inter-disciplinary collaboration. By strengthening the linkages between agriculture, nutrition, and public health, biofortification provides a template that other sectors and disciplines involved in the SDGs could draw from. Biofortification is also a good example of how a broad array of stakeholders – including researchers, multilateral institutions, business, NGOs, and farmers – can work together toward an important development goal. Without effective linkages and partnerships, HarvestPlus will not be able to achieve its goal (reaching 1 billion people with biofortified nutritious foods by 2030); neither will the Global Goals.

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The Various Approaches to Bridge the Micronutrient Gap.

