

# Fighting Hidden Hunger

**Researchers are looking for new solutions to the old problem of diets poor in vitamins and minerals.**

In the early 1980s researchers from the Johns Hopkins University School of Hygiene and Public Health studying vitamin A consumption and blindness in Indonesia noticed that children with mild night blindness and dry eyes—symptoms of vitamin A deficiency—appeared to be at a higher risk of dying in the next three to four months. To follow up, they studied 30,000 children in 450 villages on the island of Sumatra, giving children in half of the villages a large dose of vitamin A every six months and children in the other villages nothing. The findings were so dramatic that nutritionists could scarcely believe them.

“We found that two cents’ worth of vitamin A twice a year brought down mortality rates by more than 30 percent. It generated a lot of skepticism, but other studies replicated it, and they confirmed the findings,” says Keith West, an associate professor at Johns Hopkins. A lack of vitamin A, it was clear, could be lethal.

This discovery contributed to a fundamental shift in the focus of nutrition projects in developing countries. With respect to diet, instead of being concerned only with whether people were getting enough energy, development practitioners began to also concern themselves about whether people were getting enough micronutrients—the vitamins and minerals that help the body function. In the last decade or so, progress has been made—iodine and vitamin A deficiencies are on the decline—but there is a long way to go. Researchers in a number of fields are working on improving old ways of combating poor nutrition and on developing new methods of delivering nutrients to the people who need them. Their successes could lead to healthier, more productive lives for billions of people.

## The Price of Poverty

In industrial countries micronutrients are everywhere. Dozens of foods, like milk, flour, and breakfast cereal, are fortified, and multivitamin supplements are readily

available. And most people can afford to eat a varied diet that includes naturally occurring sources of micronutrients.

In developing countries, however, the problem of micronutrient deficiencies is huge. Although data are scarce, available estimates are cause for alarm. More than half of pregnant women and school-age children suffer from iron deficiency anemia, as do more than 40



In Ghana workers gather salt to be taken to a processing plant for iodization.

percent of nonpregnant women and preschool children. Some 100–250 million preschool children alone are affected by severe vitamin A deficiency. And 740 million people are affected by goiter, a symptom of iodine deficiency.

The costs of these deficiencies in terms of lives lost, forgone economic growth, and poor quality of life are staggering. According to Rebecca Stoltzfus, associate professor at the Johns Hopkins University School of Hygiene and Public Health, iron deficiency anemia in children impedes mental and physical development, damages the cardiovascular system, and can lead to death. In women of reproductive age, it can cause preterm births and contribute to maternal mortality during delivery. Susan Horton, professor of public health and economics at the University of Toronto, has found that anemia causes 65,000 maternal deaths a year in low-income countries in Asia. She esti-

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April 2000

# Developing-Country Agriculture and the WTO

*In the wake of the World Trade Organization (WTO) meetings in Seattle in late 1999, NEWS & VIEWS interviewed Kym Anderson, professor in the School of Economics and director of the Centre for International Economic Studies at the University of Adelaide, Australia, on his views on the role of trade for developing countries.*

## **NEWS & VIEWS: What are the main disadvantages developing countries currently face in the international trade arena, and how does agriculture fit into the picture?**

The key disadvantage is access to the markets of other countries, particularly for textiles, clothing, and agricultural and food products. Recent analysis suggests that a move to free trade globally would benefit developing countries almost as much as advanced economies, even though developing countries account for only one-sixth of global gross domestic product. More than one-third of that gain to developing countries from freeing all trade globally would come from reform of farm and food policies.

The agricultural policies harming developing countries involve not just high import tariffs in both rich and poor countries and tariff escalation, but also complex tariff rate quotas and a vast array of technical barriers to trade such as product standards and quarantine restrictions.

## **NEWS & VIEWS: Is the millennium round of trade negotiations, begun in Seattle under the auspices of the WTO, the best place to address developing-country trade concerns?**

The WTO round definitely is where developing countries as a group should focus their negotiations. Developing countries will continue to get occasional access to advanced-country markets through various preferential deals negotiated bilaterally or regionally, but nearly always such deals leave aside the potentially most important goods for developing country exporters, namely farm products and clothing. These occasional, limited deals also tend to discriminate against other developing countries so that, as a group, developing countries may even be worse off than without preferential arrangements.

Along with the advanced economies of the Cairns Group, developing countries need to focus on securing a much greater extent of farm trade liberalization than the aftermath of the Uruguay Round (UR) has produced. It is great that the UR began the process of getting agriculture into the WTO mainstream and led to an agreement to phase out quotas on textile and clothing trade, but very high barriers to imports of these goods remain. Developing countries could lend more support to Cairns Group efforts to reduce food trade distortions and could coordinate an effort among a broad group of their own, including clothing exporters, to topple remaining barriers. These efforts would be hindered if the least-developed countries (LDCs) were bribed to break away from other developing countries by preferential, duty-free access to high-income markets.

## **NEWS & VIEWS: Are there prospects for new negotiating partnerships that could emulate the success of the Cairns Group in the last trade round?**

The Cairns Group was a spectacular success in coalition-building. It continues to strengthen, having taken on three new Central American members recently. The next most likely developing-country group to form is exporters of textiles and clothing. If food and clothing exporters were to get together and argue jointly for dismantling protection in textiles and agriculture, virtually all developing countries would want to support their cause.

## **NEWS & VIEWS: What about the more influential nongovernmental organizations (NGOs)? Where are they likely to stand on the issues, and how will they affect the outcome of the trade talks?**

NGOs by definition are not elected representatives of the citizens of WTO member countries and are usually focused on a small subset of issues about which they

hold unusually strong, and sometimes extreme, views. Through their domestic lobbying efforts their views are already reflected, along with myriad other views, in national government positions. Hence, to the extent that such special-interest groups are influential in multilateral fora, as they were in Seattle, their views are being "double counted."

Having said that, NGOs are here to stay and will be increasingly influential, thanks to the information revolution that has substantially lowered the cost of sharing information and attracting mass media attention. How will they stand on agricultural trade liberalization? A decade ago most environmental groups were against it, but since then they have come to appreciate that there are environmental pluses as well as minuses from trade reform, and that the pluses probably dominate. Hence they are more supportive now. Development NGOs too are coming round to appreciate that both agricultural and textile reform would bring major gains to the vast majority of the world's poor. So it is possible that as they become more informed, these NGO groups could become supportive rather than sceptical of further trade reform in the next WTO round.

## **NEWS & VIEWS: Some in the EU are beginning to talk about the WTO's millennium round being a development round. Can you tell us more about this? Could it offer something different, or is it just rhetoric?**

The British, and then the EU, have popularized the idea that the WTO's next round will be a so-called development round. This is probably partly a response to claims by numerous developing countries that they benefited little, if at all, from the UR. Certainly many of them feel they had little say in drafting the UR agreements, and some have found it difficult to implement their UR commitments (for example, in services and intellectual property). Na-

turally developing countries hope that this next round will be different. Efforts are underway, with help from the World Bank and the United Nations, to provide developing countries with more technical assistance in preparing for the new round. A concerted effort is also being made to include more developing countries in the day-to-day negotiating processes at the WTO.

But the test of how serious richer countries are in making this a development round will be the extent to which they keep agriculture and textiles high on the negotiating agenda. These are the two areas that have the largest potential gains from abroad for developing countries.

**NEWS & VIEWS: Could freer trade harm some developing countries and the poorer people in those countries? If so, could the harm be offset?**

It is always possible for a country's terms of trade to deteriorate in the wake of an external shock, and a multilateral trade reform package is an external shock. But to the extent that a country participates in that reform process, it also delivers a domestic policy shock that is unequivocally beneficial to its economy. And in practice the gain from reforming one's own policies, unless that reform is miniscule, invariably overwhelms adverse terms of trade changes. Hence every economy that undertakes at least some reform is likely to gain in an aggregate sense from a new round.

Within countries there can be losers though. A particular group of households could lose either because of a rise in the prices of the things on which they spend the most, and/or because the industry in which they work declines due to greater import competition. Income distribution, however, is almost certain to improve in these countries if protection of the high-employment sectors, namely food and clothing, is reduced.

**NEWS & VIEWS: What are the new trade agenda issues, and what bearing will they have on the negotiations?**

What Seattle showed is that there is no consensus on what new issues ought to

be included in the next WTO round. Globalization has raised the relative importance of foreign investment policies, as well as numerous domestic policies that impinge heavily on the international competitiveness of various industries. Among the latter are environmental and labor standards. So it is not surprising that such things as competition, environmental, and labor policies have been raised as trade-related issues. Environment and labor issues have become more prominent also because they have the support of sharply focused NGOs whose cost of collective action has plummeted with the information revolution.

Whether these new issues *should* be included is a separate matter. On the one hand, there is a risk they could direct negotiator attention away from mainstream trade policy issues. But on the other hand, ignoring issues such as labor and environment will cause the parties pushing those particular agendas to paint the WTO as irrelevant. This will make it harder for advanced economies to muster the political support necessary to reform farm and textiles policies that would benefit developing countries.

**NEWS & VIEWS: What are the chances of a more open and fairer trading system, especially for agriculture, emerging in the near future?**

It depends on what is meant by "near future." Technically the WTO agricultural negotiations started at the WTO in March 2000. But in terms of outcomes, nothing can be expected until a more comprehensive round is launched, because only then are intersectoral tradeoffs possible. Such a launch seems most unlikely before the latter half of 2001, and possibly later still. Once it is launched, the negotiations will take time—the UR took eight years to conclude.

I am confident, however, that perseverance will be rewarded, because the huge levels of agricultural protection in industrial countries cannot be justified on either efficiency or equity grounds, and greater policy transparency is exposing that fact to ever-larger numbers of voters. ■

## Cutting Child Malnutrition

It takes more than just food to cut child malnutrition in the developing world, according to a new 2020 Vision discussion paper. *Overcoming Child Malnutrition in Developing Countries: Past Achievements and Future Choices* by Lisa C. Smith and Lawrence Haddad presents the results of pioneering research on what factors have helped reduce child malnutrition in the developing world in the last 25 years.

Women's education accounted for a large share of the reduction in child malnutrition, owing to its strong influence on child nutrition. Increases in per capita food availability came next in importance, followed by improvements in health environments and women's status.

The magnitude of child malnutrition is serious and projected to remain so, according to the study. Today about one-third of the children under age five in developing countries—167 million children—are malnourished. Even under the most optimistic projections of future levels, as many as 128 million children could still be malnourished in 2020.

These numbers point to the need for strong action to accelerate improvements in the underlying factors responsible for good child nutrition, particularly women's and girls' education, say Smith and Haddad. Their discussion paper makes policy recommendations in a number of areas based on their findings.

To download *Overcoming Child Malnutrition in Developing Countries*, Discussion Paper 30, from IFPRI's website, go to [www.cgiar.org/ifpri/2020/welcome.htm](http://www.cgiar.org/ifpri/2020/welcome.htm). ■

## New Members Join 2020 Advisory Committee

Mark Malloch Brown and Leonard Good are the newest members of the 2020 Vision International Advisory Committee. Malloch Brown is administrator of the United Nations Development Programme, and Good is president of the Canadian International Development Agency. ■

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mates that iodine deficiency causes losses of adult productivity equal to 3.3 percent of gross domestic product (GDP) in Pakistan, and a group of economists at the Administrative Staff College of India estimates that in India iron deficiency causes losses equal to 1.25 percent of GDP.

Iron and vitamin A deficiencies are often linked to poverty. “Poor people frequently cannot get access to a sufficient quantity and variety of high-quality foods that are rich in nutrients,” says Rafael Flores, an IFPRI research fellow.

### Loading Nutrients into Foods

The biggest global micronutrient success story is probably the fortification of salt with iodine. Iodine deficiency leads to mental impairment, even at mild levels. “If you did nothing about iodine deficiency, many schoolchildren would be performing at a level close to mental retardation,” says Werner Schultink, senior adviser on micronutrients at UNICEF. Fortunately, adding iodine to salt is a cheap process, and 70 percent of the world’s population now consumes iodized salt, according to Schultink.

The appeal of fortification is that it does not require people to change their eating behavior. It does require, however, getting nutrients into the foods they already eat. Most Latin American countries have mandatory fortification of flour, says Venkatesh Mannar, executive director of the Micronutrient Initiative, which organizes and supports micronutrient programs worldwide. “The advantage of wheat flour is that you can add several nutrients, including vitamin D, B vitamins, folic acid, and iron. But the choice of vehicle for fortification is very limited in many countries.” A food to be fortified must be available to and consumed by the entire population, and it must be “fortifiable.”

The greatest micronutrient deficiencies tend to be in South Asia, where rice is a staple. “One problem is you can’t cheaply fortify rice,” says Horton. “You could coat the grain, but people

wash rice. Or you can break down the grain, fortify it, and reconstitute it, but this is 10 times more expensive than fortifying wheat flour, and people tend to pick out the broken grains.”

“The other big issue, equally important,” Horton explains, “is that because rice is processed in so many places, often by small processing plants, it is very difficult to use as a fortification vehicle.” Because of these difficulties, some Asian countries are beginning to fortify other local staples, like soy sauce in China, fish sauce in Viet Nam, and noodles in Thailand.

The Micronutrient Initiative is leading a project to fortify salt with iron as well as iodine. “It’s quite a challenge getting both iron and iodine in salt because they compete with each other,” says Mannar. “Our solution was to encapsulate each iron and iodine molecule.” The new double-fortified salt is about to be tested in a few countries.

### Vitamin Pills for All?

A range of efforts are underway to fortify foods, but why can’t aid agencies simply circumvent the difficulties of fortification and distribute micronutrient supplements to the people who need them? In some cases, that is what they are doing. Supplementation seems to work best for vitamin A, which can be stored in the body for six months. This means that supplements can be given just twice a year.

“Supplementation used to be considered a short-term solution until dietary solutions kick in, but it now seems to be a longer-term prospect,” says Schultink. This is because varied diets that include a range of nonstaple foods depend on long-term income increases for the poor. Moreover, recent research has shown that vegetable sources of beta-carotene, which is converted to vitamin A in the body, are not as well absorbed by the body as previously thought.

At certain stages of life, supplementation may be the only way to get people all the nutrients they really need, even people who eat a varied and nutritious diet. This is particularly true during pregnancy, when both the mother and the fetus have an enormous demand for a range of

nutrients. “We still need to provide iron supplements during pregnancy,” says Stuart Gillespie, research fellow at IFPRI. “It’s a fallacy to think we can phase them out. But by targeting supplements to people who need them the most, we can reduce the number of people getting supplements and reduce costs.”

Even if you can get the pills to the people who need them, individuals will not always take them. “If you give pregnant women iron and make sure they take it every day, their iron status will be much better,” says Mannar. “But in the real world, there are issues of compliance. Communication is a huge part of it.”

### New Ways of Eating

Nutritionists agree that part of the solution to micronutrient deficiencies is convincing people to make their diets more nutritious. So far, however, most attempts to change people’s eating behavior have been unsuccessful. “It’s often difficult to make dietary changes using local foods if you’re poor. You can’t afford a nutritious diet,” says Stoltzfus.

One project designed to increase vitamin A consumption among the poor in northeast Thailand showed positive results. The project promoted vitamin A-rich foods as something used by loving and caring mothers, focusing on a locally grown vegetable—ivy gourd—rich in vitamin A that people could cultivate themselves. “It’s not that we were interested in promoting only one green vegetable,” says Suttalak Smitisiri of the Institute of Nutrition, Mahidol University, Thailand. “We promoted the ivy gourd as representing other green vegetables. And we chose green vegetables not because they are the best sources of vitamin A but because they are the most-available sources for northeast Thailand.”

Most projects seeking to change diets, however, end with people’s returning to their old ways. “Dietary approaches have worked in only limited settings,” says Mannar of the Micronutrient Initiative. “They require lots of inputs and education. When they are

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# Global Trade Alone Will Not End World Hunger

**Jacques Diouf**

***Whatever agreement emerges from the next round of multilateral trade negotiations, one thing is clear: Developing countries must be allowed to give priority to their agriculture sectors.***

Few nations have experienced rapid economic growth and reduction of poverty without first developing domestic agriculture. Economic growth based mainly on exports is not sufficient for broad-based development. Export-led economies frequently benefit only a small segment of the population, bypassing the often-poor majority.

With 790 million people enduring hunger and malnutrition in the developing countries, the UN Food and Agriculture Organization believes that eliminating hunger should be the world's overriding priority. Further liberalization of the global trading regime will not be enough to pull the least developed countries out of poverty.

The huge subsidies and protection that some high-income nations dole out to their farm sectors reduce the chance that farmers in developing countries can "grow" their way out of poverty and hunger. Farm subsidies and protectionism distort world markets and discourage investment in the agriculture sector of developing countries. In the rural areas where most of the world's poor and hungry live, subsidies paid to farmers in richer nations are yet another blow to local farm production.

Just as troubling is the pronounced drop in external assistance to developing countries' agriculture. There is little evidence at this time that private capital will replace public investment in agricultural research and extension, irrigation and infrastructure.

The Uruguay Round agreement on agriculture granted the developing countries "special and differential treatment." That treatment should be made more effective. Developing countries need to negotiate greater access to export markets. Such access is one of the most effective and sustainable kinds of economic assistance.

Globalization can have important benefits for developing countries, stimulating productive enterprises and encouraging investment and technology transfer. But further trade liberalization must be carefully phased in. Import restrictions should not be removed overnight or domestic food security may be harmed. At the same time, produce needs to be improved.

The FAO was mandated by the 1996 World Food Summit to assist developing countries to participate in multilateral agriculture trade negotiations as well-informed and equal partners. Because many developing countries do not have enough technical and legal specialists, the FAO is leading an umbrella program for training, which explains World Trade Organization agreements and prepares specialists to analyze issues likely to come up in future negotiations.

The program shows specialists how to benefit from the process, how to minimize adverse effects, how to evaluate carefully proposals made by other negotiators and how to develop their own negotiating positions.

To meet the need for technical assistance in low-income countries, the FAO launched a program for food security, which focuses on sustainable expansion of agricultural production and productivity. It is designed to provide adequate and nutritious food at the national and household levels. It operates in 55 countries, focusing on some of the most vulnerable groups in society, particularly women and the poor.

Trade globalization will not end hunger and poverty, but it has a critical role to play. If developing countries are given an equal opportunity with the wealthier countries to develop agriculture and export farm goods, all will gain. The benefits will be felt both in the North and the South. As the number of

hungry people decreases and incomes rise, demand for goods from the wealthier countries can be expected to rise.

It is the moral responsibility of the international community to ensure that globalization does not lead to an ever widening gap between the poor majority and the wealthy few. This would further inflame passions that already bring people into the streets, demonstrating against what many see as manipulation of the world trading system by a cabal of super-conglomerates and the governments that support them.

*Jacques Diouf is director-general of the Food and Agriculture Organization of the United Nations. This article originally appeared in the International Herald Tribune on February 18, 2000. ■*

## New Publications

To download these or other 2020 Vision publications from IFPRI's website, go to [www.cgiar.org/ifpri/2020/welcome.htm](http://www.cgiar.org/ifpri/2020/welcome.htm). To receive announcements about new IFPRI publications, subscribe to the NEWatIFPRI listserv at [www.cgiar.org/ifpri/new/NEWatIFPRI.htm](http://www.cgiar.org/ifpri/new/NEWatIFPRI.htm).

- 2020 Vision Discussion Paper 30, *Overcoming Child Malnutrition in Developing Countries: Past Achievements and Future Choices*, by Lisa C. Smith and Lawrence Haddad (53 pages).
- 2020 Vision Brief 64, *Overcoming Child Malnutrition in Developing Countries: Past Achievements and Future Choices*, by Lisa C. Smith and Lawrence Haddad (2 pages).
- 2020 Vision Brief 65, *Combining Internal and External Inputs for Sustainable Intensification*, by Ruerd Ruben and David R. Lee (2 pages). ■

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scaled up, they rarely work, so they tend not to be sustainable.”

### Putting the Nutrients in Staple Crops

One new strategy for supplying micronutrients to the poor in developing countries involves making the staple foods they eat more nutritious by using conventional plant breeding and biotechnology. This is potentially a low-cost, sustainable strategy: it would not require people to change their eating habits and would not impose the recurring costs that accompany fortification and supplements. The greatest potential for improving nutrition status on a wide scale probably involves rice, which is a staple for billions of people in Asia.

Howarth Bouis, an IFPRI senior research fellow, leads a collaborative initiative among international agricultural research and nutrition centers to breed for nutritionally improved staple food crops. Because different varieties of a crop can have different levels of micronutrients, plant scientists can breed for this trait, he explains. “Iron is in every rice endosperm, with lots of variation in levels. Plant breeders can take a high-iron rice and cross it with a high-yielding plant,” says Bouis.

In fact, as part of this initiative the International Rice Research Institute in the Philippines has identified an iron- and zinc-dense rice variety that is also high yielding and disease resistant. One potential obstacle to this approach is that plant sources of iron usually contain compounds that impede iron absorption by humans. “In a pilot feeding trial at a Philippine convent, the iron status of the sisters improved after eating this high-iron rice for four months,” according to Glenn Gregorio, IRRI’s coordinator of the research. A larger-scale trial with a control group is planned to see if results can be confirmed.

For vitamin A, a conventional plant breeding approach is out of the question, because there is no known rice variety that contains beta-carotene in the endosperm (the milled rice grain). So re-

searchers at the Swiss Federal Institute of Technology used genetic engineering to transfer beta-carotene from another species into rice. In January 2000 they announced that they had created a so-called golden rice, which contains beta-carotene, by inserting two genes from the daffodil and one gene from a bacterium into the genetic material of a rice plant.

“The benefit of having the beta-carotene in the crop is that the delivery system is already there,” says Gary Toenniessen of the Rockefeller Foundation, which helped fund the research. “The current generation of improved varieties is being grown in rural areas not being reached by supplements, for instance.”

Although golden rice contains only small amounts of beta-carotene, it is an exciting first step in the effort to make staple crops more nutritious. Getting this variety to farmers will still require putting the beta-carotene into rice varieties preferred by farmers and consumers, nutritional and biosafety studies, and field trials. Commercial adoption of golden rice is several years away.

“We hope that our example will encourage other scientists and granting agencies to follow the golden rice case with other traits and other crop plants important for food security in developing countries,” says Ingo Potrykus, who led the Swiss research team.

“Nutrient-dense staple crops could play a major role in reducing malnutrition, but up to this point substantial funds have not been invested in the strategy,” says Bouis.

### No Single Solution

Iron, iodine, and vitamin A are not the only micronutrients that need attention in developing countries—they are just the ones that nutritionists know the most about. But evidence is growing that other micronutrient deficiencies may be as serious. Marie Ruel, a research fellow at IFPRI, says, “We have only recently started to pay attention to zinc deficiency, which has symptoms just as serious as those of iron and vitamin A deficiencies.”

No single solution is likely to solve the micronutrients problem. “The consensus among nutritionists now,” says

Flores, “is that we need to use a combination of approaches: fortification, supplementation, and food-based approaches, including plant breeding. If we wait for a food-based approach alone to work, we will not solve the problem. The magnitude of the problem is so big that we can’t wait.”

In the end reducing poverty may have the greatest impact on people’s nutrition by giving them access to a variety of foods and making it possible for developing countries to afford fortification and supplementation efforts. In the meantime researchers are pursuing new avenues to broaden the options for combating this persistent problem. ■

*Reported by Heidi Fritschel*

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