

Millions Fed: Proven Success in Agricultural Development **Case Studies Summaries**

Asia

The Green Revolution in Asia (1965 to 1985)

As the Green Revolution spread across Asia, increases in food production pulled the region back from the edge of famine. Within 20 years, cereal production and yields doubled, reducing the price of food and improving livelihoods for an estimated 1.8 billion people. This success took place in Bangladesh, China, India, Indonesia, Republic of Korea, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, and Vietnam.

Improved varieties of mungbeans (1980s to the present)

The cultivation of mungbean, a crop high in protein, iron and other micronutrients, and useful in maintaining soil fertility, has grown dramatically since the 1980s. Improved varieties have contributed to yield gains of 28-55 percent that benefited an estimated 1.5 million farmers and were key factors in the 35 percent increase in Asian mungbean production between 1985 and 2000. This success took place in Bangladesh, Bhutan, China, India, Nepal, Myanmar, Pakistan, Sri Lanka, and Thailand.

South Asia

Irrigating rice (1989 to the present)

Market liberalization in Bangladesh during the mid-1980s to ease restrictions on the importation and sale of irrigation equipment stimulated the growth of irrigated rice farming. Rice production nearly doubled, benefitting about 22 million people a year.

Community Forest Management (1978 to the present)

During the last three decades, Nepal has introduced innovative policy reforms that encouraged participatory, community-based governance of Nepal's forests. Today, an estimated one-third of Nepal's population is directly managing more than one-fourth of Nepal's forest area as a means of improving and diversifying household livelihoods.

Homestead gardening (1990 to the present)

Homestead food production programs in Bangladesh, which encourage food-insecure households to grow micronutrient-rich foods, have reached 5 million individuals and contributed to combating micronutrient deficiencies, particularly among women and children.

Zero-tillage farming (1995 to the present)

An estimated 620,000 wheat farmers in the Indo-Gangetic Plains in Pakistan and India have adopted some form of zero-tillage cultivation to conserve soil fertility, improve water management, and lower their costs. These practices cover about 1.8 million hectares of land, and generating average annual income gains of US \$180-340 per household.

Seed marketing (mid-1960s to the present)

Policies and investments in India have encouraged development of improved seeds for pearl millet and sorghum— two crops that constitute the principal source of energy, protein, vitamins, and minerals for millions of the poorest people in these regions. These efforts have brought the public and private sectors together to provide estimated 6-9 millions farmers with access to modern varieties that have increased yields by 85 percent in recent decades.

Dairy sector development (1970 to 1996)

Operation Flood, a dairy development program in India, brought significant technological, infrastructural, and marketing advances to the rural milk sector. India has been transformed from a dairy-importing nation to a top producer and exporter of milk globally; millions of consumers now have better access to milk and other dairy products.

China

Land reform (1978 to 1984)

China returned more than 95 percent of the nation's total farmland (collectivized beginning in 1949) to some 160 million farm households. These large-scale reforms directly contributed to an increase in rural incomes by 137 percent, a reduction in rural poverty by 22 percent, and a 34 percent rise in grain production.

Increasing rice yields (1977 to present)

China was the first country to develop and commercialize hybrid rice – a variety that exceeded yields of other cultivated varieties by 15-31 percent, and has fed an additional 60 million people per year.

Southeast Asia

Breeding improved tilapia (1988 to 1997)

In the Philippines, tilapia bred as part of the Genetic Improvement of Farmed Tilapia (GIFT) project boosted fish yields and outputs. The project increased the availability of fish for consumers, reducing market prices and providing a cheaper source of protein for the country's poor people.

Exiting from collective agriculture (1988 to 1993)

In Vietnam, policy reforms that included a return of collectivized land to farm households shifted the country's economy to a greater market orientation, and stimulated growth in the agriculture sector at a rate of 3.8 percent per year between 1986 and 2005. Vietnam shifted from being a net food-importing country to the world's third largest exporter of rice in 1989, while dramatically reducing poverty throughout the country.

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Africa

Breeding better maize (1965 to 1990)

Applications of modern science to improve maize—a vital staple crop in East and Southern Africa—led to growth in output and yields that directly benefited millions of small-scale, resource-poor farmers. Maize yields in Kenya, Malawi, Zambia, and Zimbabwe increased annually between 1 and 5 percent – rates that are comparable to yield and production growth rates in countries such as the United States.

Pest- and disease-resistant cassava (1971 to 1989)

Strategies to destroy a mealybug insect infestation reduced yields losses by 2.5 tons per hectare for this important subsistence crop in Nigeria, Ghana, and Uganda. The introduction of disease-resistant cassava contributed to making an additional 1.4 million tons of cassava flour available a year, enough to feed 29 million people.

Re-greening the Sahel (1980 to present)

Improved agricultural and environmental practices in Burkina Faso and Niger that encouraged the sustainable management of soil, water, forests, and crops led to the rehabilitation of millions of hectares of farmland, producing enough food and income to sustain about 3 million people in the region.

Increasing cotton production (1992 to 2006)

Well-timed policy reforms, including efforts to strengthen the role of farmers' organizations in the cotton sector, have made Burkina Faso the leading African exporter of this crop, based on a three-fold increase in production since the early 1990s, generating an estimated 235,000 new jobs in the agricultural sector.

Unlocking the market for fertilizer and maize, (1990-2007)

Policy reforms in the early 1990s contributed to the rapid growth of private investment in fertilizer and maize marketing in Kenya. The proportion of small scale farmers having ready access to fertilizer retailers increased dramatically during the nearly two decades in which reforms were undertaken, with fertilizer use rates for maize rising from 56 percent in 1996 to 70 percent in 2007, and contributing to improved yields and availability of this important food crop throughout the country.

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Global

Defeating wheat rust (1955 to the present)

Breeding of rust-resistant wheat varieties in Mexico spawned a global effort to fight the deadly fungi that threatened global wheat production in the 1950s. As a result, 117 million hectares of land under cultivation were protected from wheat rust, ensuring the food security of 60-120 million rural households.

Conquering cattle plague (1950 to 2001)

Control programs in the last 20 years have brought rinderpest, a livestock virus, to the edge of eradication, the first time a disease has been eradicated since smallpox in humans. The programs have protected an estimated 40 million livestock keepers from experiencing losses in milk, meat, and hide production, as well as losses of household income and assets.

South America

Improving soil fertility (1989 to the present)

In the Pampas in Argentina, the usage of zero-tillage cultivation techniques, along with the introduction of herbicide-resistant soybean varieties, improved soil fertility by reversing decades of erosion. These innovations created 200,000 new agricultural jobs, and provided the international market with supplies of soybeans to keep global food prices low.

Millions Fed: Proven Success in Agricultural Development **Selection criteria, types of successes, and lessons learned**

Criteria for selecting success stories

After first determining that an initiative directly involved agriculture in at least one developing country, 20 case studies were selected out of nearly 300 nominations based on the following criteria:

- **Importance**—the intervention should have tackled an important food-security problem by addressing the needs of a vulnerable group;
- **Scale**— the intervention should have operated at scale, measured in terms of whether the number of beneficiaries exceeded several hundred thousand individuals or whether the intervention was, at a minimum, national in coverage;
- **Time and Duration**—the intervention should have been (1) fully operational at scale long enough to generate significant reductions in hunger or improvements in food security and (2) implemented in the past 50 years;
- **Proven Impact**—the intervention should have been supported by documented and rigorous evidence of a clear and measurable impact on individual or household hunger or nutritional status; and
- **Sustainability**—the intervention should have been sustainable, whether in financial terms (cost-effectiveness) or in broader social, political, or environmental terms.

Successes were identified in six areas:

- intensifying staple food production
- integrating people and the environment
- expanding the role of markets
- diversifying beyond the production of major cereals
- reforming economy-wide policies
- improving food quality and human nutrition

Major lessons learned

The following are often critical to success:

- Sustained investment in agricultural research and development to bring science and technology to bear on challenges in agriculture
- Sustained investment in complementary areas, such as irrigation, rural roads, education, and market infrastructure
- Creation of strong private incentives to encourage farmers, entrepreneurs, and companies to invest in agriculture
- Cooperation and collaboration among diverse groups, such as public research institutes, government agencies, community-based organizations, international organizations, and private companies
- Good timing, whether by chance or design, and good planning
- Creation of space for experimentation and innovation to encourage adaptation to local challenges
- Support for community involvement, including the use of local knowledge and practices
- Leadership capable of championing a movement for change, demonstrating what can be done, or marshaling political or financial resources.