

## Food Security in a Volatile World

### Food Price Volatility

The underlying causes of the most recent increases in food prices are complex and include factors such as increased demand from rapidly growing economies (especially China); poor harvests due to an increasingly variable climate (e.g., the Australian drought); the use of food crops for biofuels (e.g., maize for bioethanol); higher energy and fertilizer prices; low food stocks; speculation on the commodity futures market; and in response to the high food prices, restrictions imposed on agricultural commodity exports by a number of significant exporters (e.g., Argentina, India and Ukraine) to protect their domestic consumers.

Developments in agriculture over the last fifty years have increased yields sufficiently to provide on average more than enough food for every person on the planet. But approximately 850 million people around the world are not able to obtain enough food to lead healthy and productive lives. The volatility and increase in food prices, which began about 2006 and led to food riots in the summer of 2008, put some 100 million additional people at risk of food insecurity.

Over 70% of the world's poor in developing countries live in rural areas and are directly or indirectly dependent on agriculture for their livelihoods. These people are the most food-insecure. Pastoralists,

fisherfolk and forest users, as well as the urban poor, are also badly affected.

### Underinvestment in domestic agricultural production for national food security

In many developing countries underinvestment in the agricultural sector, the dismantling of public support programs and the impacts of trade liberalization have undermined the small-scale farm sector and national food production capacity, leaving these countries even more vulnerable to price volatility. At both national and international levels, a sharp decline in the overall rate of growth in agricultural research and development investment in developing countries from the late 1980s onwards, especially in sub-Saharan Africa, has limited agricultural technology development that could benefit local food production. Investment in the agricultural sector has focused largely on export crops to generate foreign exchange, forcing countries to rely on continued low international food prices to meet national food demand. That strategy has failed.

The short-term responses of governments and international agencies to the current crisis, such as lowering food import tariffs and imposing export restrictions, have helped provide immediate relief to consumers, and might be viewed as necessary fire-fighting interventions, but against a fire already well ablaze. These blunt short-term policy interventions do not effectively increase food security over the long term.

Significant new drivers, and drivers of increasing urgency are forcing the pace of change. We are in a very different world than that of the Green Revolution era. Current energy, financial and climate crises increase the likelihood of future food price volatility unless national food production capacity is enhanced so that countries can better weather increasing international price and supply volatility. Developing countries need policy flexibility in agricultural decision-making, paired with significantly increased international support and investment, so they can increase domestic food production and buffer the devastating impact of price volatility on their populations.

## Current and future drivers of food price volatility

### *Energy markets*

The challenge of increasing productivity and incomes, particularly for small-scale producers, is exacerbated because high technology agricultural inputs are fossil fuel dependent and fossil fuel prices

Investment in public good research directed at improving the livelihoods of small-scale producers represents the greatest potential for increasing food security. It can have high economic rates of return, help reduce poverty and open significant opportunities in agroenterprise development and diversified, value-adding employment.

In many countries, a decline in nutritional security has resulted from an almost total dependence on a few staple crops. This increase in food insecurity, as well as significant opportunities to commercialize traditional cultivars of plants, trees and animals, and to domesticate new food and medicine crops gathered from forests, powerfully argue for increased public and private investments in agriculture.

are expected to continue to be high. The advent of modern biofuels technologies, predominantly of bioethanol and biodiesel processed from agricultural crops that are significant food and fodder sources, adds a new factor.

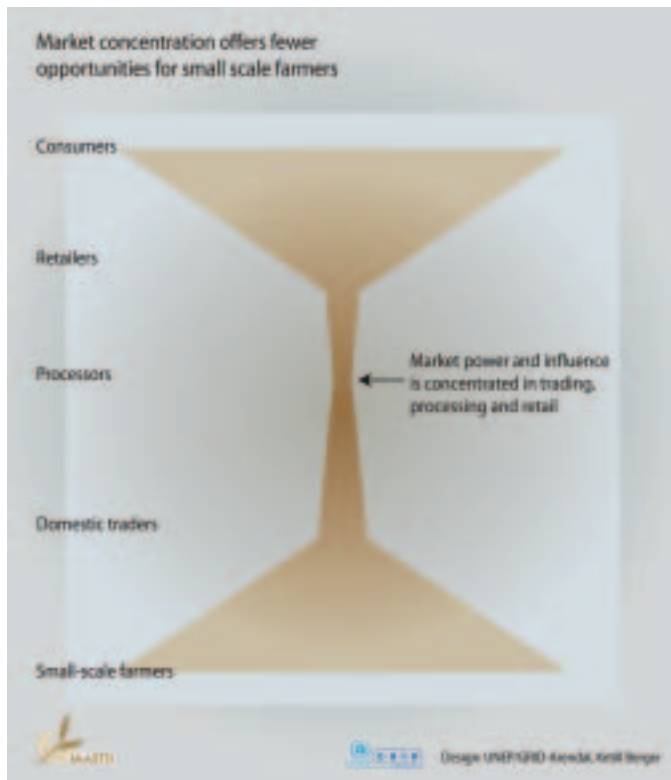
The data on net energy, environmental and economic benefits of biofuel production and use, including reduction of greenhouse gas emissions, is unclear and contested. These technologies have been shown to divert significant crop output from food markets, thereby contributing to higher food prices. In the longer term, new generations of biofuel technologies could make a limited but useful contribution to energy markets and, with targeted investments based on a comprehensive assessment of the social and environmental benefits and costs (e.g., increased land and food prices, water availability, and deforestation), could offer new income opportunities to small-scale farmers and rural entrepreneurs.

### *Natural resource states and trends*

Conventional technologies such as classical breeding techniques, tissue culture and cultivation practices have boosted, for instance, wheat yields by up to 33% even in the absence of fertilizer. But these gains have come at huge and unsustainable costs to the environment and natural resources. Soils, water, vegetation and biodiversity remain essential determinants of food production on-farm. At the same time, the mosaic of forest, livestock and farming enterprises in the landscape will need to evolve toward multifunctional designs that conserve hydrological flows and drinking water quality and diversified farming systems to confer greater resilience in the face of market and climate shocks and surprises. These designs would develop the significant non-farm income opportunities associated with food cultures and landscapes of high cultural value.

### Market concentration

Important agricultural markets are dominated by a few firms. Globally, the seed industry is increasingly driven by North America and Europe (NAE) based transnational agrifood businesses. Many of the increases in global market concentration were

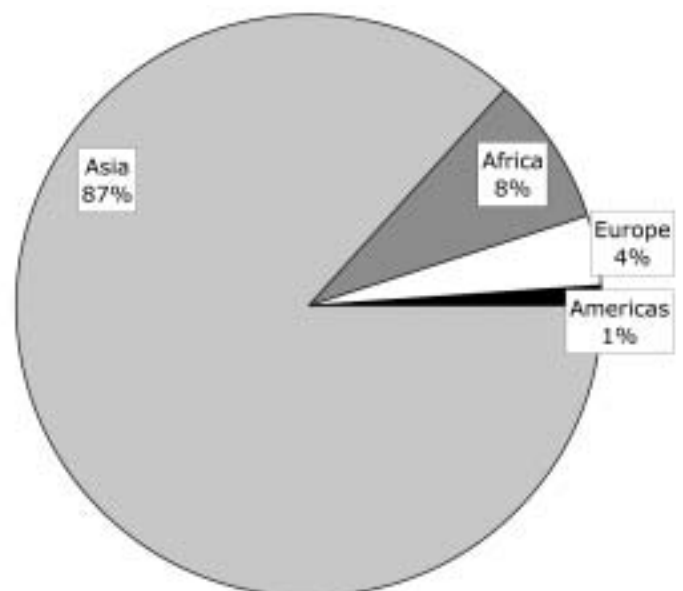


presaged by the United States seed industry, the most heavily commercialized in the world. In the 1930s, over 150 companies formed to sell maize seed, but by the mid-1960s, American farmers had mostly abandoned open-pollinated maize varieties. Between 1970 and 2000 in the USA, small private seed firms essentially vanished, with more than 50 acquisitions of seed firms by pharmaceutical and chemical firms. By the late 1990s, four firms sold 69% of maize seed. The same privatization trends are seen in Europe.

One of the more striking features of industry changes in the last two decades has been the convergence of ownership between agrochemical and seed/genomic firms. This strategy has worked well

to sell proprietary bundled lines of chemicals, genetic technologies and seeds, which can be attractive to farmers as a purchased management tool. However, such bundles can increase reliance on expensive inputs, increase farmers' costs, and reduce flexibility of on-farm management strategies for pests and weeds, as well as implementation of novel consumer-driven production systems.

Of an estimated 525 million farms worldwide, about 404 million have fewer than two hectares of land. Farm laborers, seasonal workers and those trying to make a living from 2 ha or less are net food buyers. When food prices increase they have less money for educating their children and health care.



Regional distribution of small-scale farms (< 2 ha). Source: Nagayets, 2005 based on FAO 2001c, 2004c and data from national statistical agencies.

### Climate change

About 30% of global emissions leading to climate change are attributable to agricultural activities, including land use changes such as deforestation. The relative prices of carbon, oil, nutrients and farm outputs, as well as human ingenuity in designing appropriate policies and institutions, will determine the profitability of emission reduction and sequestration for farmers. This transition towards climate

change adapted agricultural systems is all the more challenging, given the anticipated agroenvironmental consequences of meeting increased income-related demand for animal product protein.

In many parts of the world, farmers already experience less predictable rainfall and temperature, extreme weather events and unpredictable shifts in zoonotic diseases, plant health and insect predator-prey dynamics. Effective adaptation will require significant evolution of the current market-based drivers and the institutional incentives that set directions for AKST and support development of improved crop traits. Innovations in policy, infrastructures and the 'rules of the game' to focus greater attention generating and delivering public goods ASKT, as well as greater investments in farmer education and training, will be needed.



Source: FAO

## Hidden dimensions

One of the barriers to faster and wider transitions to sustainable agriculture and rural development is the lack of adequate, widely used forms of accounting that capture the full environmental and social costs of current food and farming systems. These accounting methods are needed to inform assessments of new and emerging options. For example, water footprint estimations indicate that many current forms of agriculture are unsustainable. Available data

indicate that few if any countries are feeding their populations solely from their own water resources. Some see market transport of 'virtual water' in food along the chain from producers to consumers as an effective and efficient way to mobilize the world's water resources; however, in areas of water stress the movement of virtual water can decrease the resilience of food and farming systems.

Moreover, international trade in agricultural commodities and food, as currently organized, sets consumers in different countries into competition for the same land and water resources. For example, the global average agricultural land availability is 0.25 ha per person, yet food consumption in many countries, particularly developed countries, makes a much larger claim on this resource.

## Choosing options that work

The IAASTD reports were accepted by governments at a time of intensifying debate on food security, options for action and the implications for knowledge, science and technology policies. The case for renewed effort and attention to food security has been made and seems to be widely accepted. Governments are still debating the role of food sovereignty – the right of peoples and sovereign states to democratically determine their own agricultural and public goods policies.

The IAASTD points toward urgent areas for more policy and AKST focus, finding that:

- Food security in different countries around the world will be best served by seeking a diversity of pathways depending, in part, on history and context.
- Differences in tradition, history, context and resource endowments argue for rules that permit flexibility on national agricultural and trade policy and technology choices to strengthen the

domestic small-scale farm sector and its contribution to national food security.

- Developing country governments will need to facilitate adequate remuneration and a minimum level of price stability for their small-scale sector to encourage increased domestic food production and increased investment in improved agricultural practices. Policy options include regulation of middlemen and a renewed direct role for government in providing credit and marketing for the small-scale sector.
- Support for collective efforts of farmer organizations will be needed to achieve more equal access to and distribution of the benefits of trade.
- Strengthen regionally managed reserves of emergency foodstocks, which can help buffer future price shocks.
- Improve tenure and access to resources, credit and insurance for small-scale producers to increase the sector's contribution to national food security, as well as improved rural livelihoods and environmentally sustainable management of agricultural landscapes.
- Address market concentrations, especially in grain markets, at the global level.
- Increase public investment in agriculture (market roads, AKST, R&D, extension, marketing information and services, postharvest facilities, support for cooperative marketing, etc.) in food insecure developing countries.
- Mobilize the capacities of supermarkets and other public and private actors along value-adding chains to offer consumers affordable, safe, healthy, fair trade foodstuffs that demonstrate commitment to poverty reduction, environmental and climate change goals.
- Promote the diversification of production systems through inclusion of locally important species/crops to develop a wide range of marketable natural products that can generate income

for the rural and urban poor in the tropics and provide ecosystem services, such as soil and water conservation.



Source: FAO, 2004



The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) provides information on how agricultural knowledge, science and technology can be used to reduce hunger and poverty, improve rural livelihoods and human health, and facilitate equitable environmentally, socially and economically sustainable development. The full set of IAASTD reports includes a Global and five sub-Global reports and their respective summaries for Decision Makers as well as a Synthesis Report, including an Executive Summary. The reports were accepted at an Intergovernmental Plenary in Johannesburg in April 2008.

The assessment was sponsored by the United Nations, the World Bank and the Global Environment Facility (GEF). Five UN agencies were involved: the Food and Agriculture Organization (FAO), the UN Development Program (UNDP), the UN Environment Programme (UNEP), the UN Educational, Scientific and Cultural Organization (UNESCO) and the World Health Organization (WHO).

IAASTD Issues in Brief are taken directly from the IAASTD Reports published in 2008 by Island Press.

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to order go to [www.islandpress.org/iaastd](http://www.islandpress.org/iaastd).