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Global Agriculture + Sustainability and Resource Productivity

From liability to opportunity

How to build food security and nourish growth

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From liability to opportunity: How to build food security and nourish growth

How can public institutions, development agencies, investors, researchers, and producers work together to build a food sector that propels economic growth, meets demand, and helps to maintain social stability?

By 2050, the world will need to feed more than nine billion people, requiring nearly 70 percent more food than we consume today.[1] Moreover, an expanding global middle class will demand more meat and other protein-rich foods, while extreme weather could slash yields in important agricultural regions. At the same time, prices of wheat, rice, and a number of other basic food commodities have been rising for a decade (Exhibit 1). Volatile food prices have repeatedly led to instability—and as the exhibit shows, the volatility continues to increase.

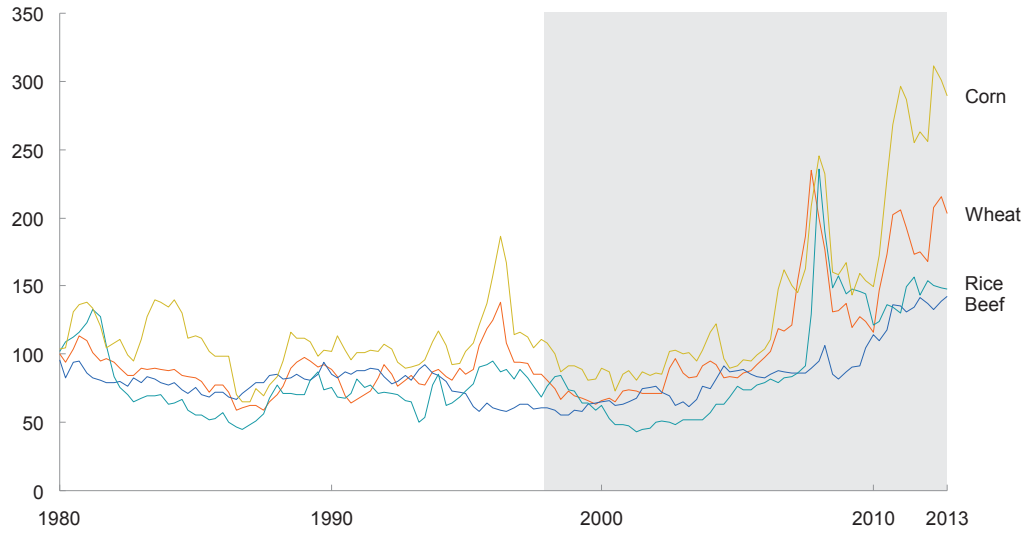
One issue is that many countries devote resources they cannot afford to short-term approaches, such as subsidies, food and cash transfers, and emergency-relief plans. In such cases, food systems come to be seen as fiscal burdens. Reducing these in favor of strategic investments in the food and agriculture sector could turn such liabilities into sources of economic opportunity.

This is not theory. Some places are perpetually in crisis. Other countries and regions have launched effective transformations that improve food security and resilience and enhance economic opportunity. In countries large and small, rich and poor, wet and arid, a resilient food economy—defined as one that can adapt to change and cope with negative shocks—stands on four building blocks:

- efficient agricultural production that takes advantage of innovative technologies and practices
- tailored trade and investment approaches
- well-functioning domestic markets
- strategic reserves of food and water

Exhibit 1 The prices of major food commodities are increasingly volatile.

Food commodities indexes,
nominal price index, 100 = January 1980



Source: International Monetary Fund; UN Comtrade; UN Conference on Trade and Development; World Bank; McKinsey Global Institute analysis

1 *Global agriculture towards 2050*, UN Food and Agriculture Organization, 2009, fao.org.

We have reviewed hundreds of indicators to assess a country's overall food availability, affordability, and quality. Our findings underscore the progress that has been made, as well as the enormous potential to do better. For example, the dozen most productive countries deliver corn yields that are ten times that of the dozen least productive ones. Despite advances in seeds, irrigation, crop protection, and other techniques in more than 20 countries, at least a quarter of the population is chronically undernourished. Countries in sub-Saharan Africa have more than four times the global average of arable land, but because of low productivity, some of them have to use their limited foreign reserves to import a high percentage of food requirements. According to the Economist Intelligence Unit, 28 of 109 countries surveyed had insufficient food stocks to withstand a crisis.

What is required is an "integrated food economy approach": a cohesive strategy that strengthens the entire food system. This is a complicated topic, and there is no single right answer to define a nation's ideal food system, but our findings show that many countries do not yet think holistically. Our goal is to present a structured way of thinking about sustainable food systems, including innovative ways to balance scarce natural and financial resources. Certainly some of the innovations will turn out more successful than others, but our main point is that it is worth thinking hard about the food system's design. Every country can move toward a well-functioning food economy if the public and private sectors work together to plan and invest for the long term.

Efficient agricultural production that takes advantage of innovative technologies and practices

A forward-looking national agriculture strategy discourages the production of crops not well suited to the local environment and rather promotes a production strategy that builds on a country's comparative advantages. Countries have a variety of tools at their disposal with which to guide production choices, ranging from producer and consumer subsidies to national agriculture extension services and research (see sidebar "Enabling success: Research and development"). (We acknowledge that cash subsidies are controversial. While they can help a country's producers enter global markets, they too often last beyond initial adjustment periods and are used to maintain irrational production systems that suit short-term political or social objectives.)

The most effective agricultural policies facilitate end-to-end value-chain development, from promoting the right inputs to encouraging creative business models to enabling low-interest financing and risk sharing. For example, Morocco's national agricultural strategy, Plan Maroc Vert, aims to substantially increase the added value of agricultural production by 2020 while mitigating and adapting to climate change and creating more revenue for rural populations. The country is investing in agricultural productivity while improving water-resource management and reducing fossil-fuel consumption in the

Enabling success: Research and development

Public and private investment in research and development can raise farm yields while creating jobs, expanding GDP, and increasing food security.

More than half of Israel's land area is desert, and agricultural workers make up only 2 percent of the workforce. But Israel has succeeded in producing most of its own food by applying decades of agricultural R&D. It has developed potatoes that can grow in salty soil, improved greenhouse and drip-irrigation techniques, and even genetically modified insects for organic pest control.

The Netherlands, a country of fewer than 17 million people, is one of the world's largest processors of food products. Its universities and research organizations are leaders in related R&D; the public and private sectors continually invest in the renewal of agricultural-production chains.

Israel and the Netherlands are well off, but their successes can still offer lessons to less advanced economies. There are also compelling examples from emerging markets. Brazil invested in soil-conservation technology to turn nonarable grasslands into some of the world's most productive soy-export zones. Kenya has established outposts of leading agricultural-research institutes; these have bred seed varieties tailored to dry-land climates.

agricultural sector.[2] Investment in the sector doubled in the last five years, with over 1,500 specific projects. An important feature is the decision to target crops that are internationally competitive, such as citrus fruits, olives, vegetables, and fish.

Tailored trade and investment approaches

A well-planned international trade and investment strategy can help hedge against volatility and food shortages while spurring economic growth. One place to start is with the basics—getting goods into and out of the country. In 34 countries, it takes more than a month to clear customs and port inspections just to export food, according to McKinsey research. Creating trading and processing hubs can help a country gain access to food supplies even if it has limited production or resources of its own. The United Arab Emirates has created a regional trading hub to diversify supply; it has also reached processing and distribution agreements with distant places such as East Africa and Russia. Meanwhile, it is expanding the cargo capacity of the Dubai airport, regulating retail fresh-food storage to reduce waste, and aiming to meet 40 percent of its own needs for low-water vegetables.

In countries where the government or sovereign-wealth funds direct investment, strategic deals with governments or trading houses can help mitigate risk and improve GDP. For example, Saudi Arabia has invested more than $10 billion in agricultural and livestock projects overseas, including in Argentina, Brazil, Canada, Sudan, and Ukraine. In economies where most investment is private, trade policies can help stimulate deals to close gaps in local production capacity.

Singapore, a dense city-state with a tiny agricultural base, has pursued two strategies to mitigate the risk of supply disruptions and strengthen its food economy. First, it has provided local producers with incentives to explore new technologies to increase production of eggs, leafy vegetables, and fish.[3] Second, it is using its role in international trade and its strategic location to diversify its food sources. Singapore imports less of its fruit from Malaysia, for example, and gets more from Australia, China, and the United States.[4]

Singapore has also become an important hub for importing and processing food products, to which it then adds value and exports. As a result, Singapore is now a leading exporter of some processed foods, while its large warehouses implicitly act as an emergency backup in time of crisis, improving the overall resilience of the food economy.

Well-functioning domestic markets

Efficient domestic markets matter because the route from farm to table is long, complex, and subject to disruption. A single bottleneck can lead to losses for producers and shortages for consumers.

On the other hand, cooperation can produce dramatic advances. For example, after a successful launch in Mozambique in 2011, the international brewer SABMiller extended the production of its popular cassava-based beer to Ghana in 2013. SABMiller sources raw cassava from smallholders; these often lack adequate storage, so crops must be sold immediately and at low value. To overcome this challenge, SABMiller relies on a mobile-processing unit developed by a Dutch social enterprise. By moving processing nearer to the farm, less cassava is wasted, and farmers are able to capture more value. Granted, beer is not an essential, but this example shows that it is possible to solve the processing and perishability problem that affects many critical foodstuffs.

India is using information communication technology to improve value-chain efficiency. The e-Choupal initiative grants four million farmers in 40,000 villages real-time access to market prices, weather conditions, and production techniques through Internet kiosks. These kiosks also act as aggregators through which farmers can buy inputs and sell produce. By connecting buyers and sellers, costs are cut throughout the value chain.[5]

In Ghana, traders are using bar codes and geographic-information-system technologies to monitor pineapples as they work their way through the supply chain from farm to port. This has enabled them to move the crop through the port more rapidly, reduce spoilage, and meet GlobalG.A.P. certification standards.

This kind of innovation has not yet extended to one of the world's biggest sources of food inefficiency—food waste. The UN's Food and Agriculture Organization estimates that the world wastes 1.3 gigatons of edible food every year, or more than a fifth of total agricultural output.[6] Governments can help reduce this waste by investing in infrastructure, adopting best-practice food regulations, and focusing on changes in consumer behavior. It is also important to note that, in many cases, a well-functioning market is not sufficient to ensure that all residents find available,

2 "Morocco takes the long view on green growth," World Bank Group, January 2014, worldbank.org.
3 *New Mandala*, "Singapore's food security strategy," blog entry by Guanie Lim, February 7, 2013, asiapacific.anu.edu.au.
4 Ibid.
5 "e-Choupal," ITC, itcportal.com.
6 *Food wastage footprint: Impacts on natural resources—Summary report*, Food and Agriculture Organization of the United Nations, 2013, fao.org.

affordable quality food. Even in wealthy countries with high-performing food systems, a portion of the population may be unable to access sufficient food. Inequality is growing in many countries, with market forces leading to unaffordable food for the most vulnerable populations. In the short term, governments may need to intervene directly through input subsidies (for agricultural families) or cash subsidies to rapidly address overall affordability. In the long term, a competitive, efficient food system should lower overall costs for everyone. However, there will always be especially vulnerable members of society who will struggle to grow or buy sufficient food; an important component of a government's obligation to ensure overall food security and resilience is to provide adequate assistance.

Strategic reserves of food and water

Catastrophic events—for instance, civil wars, currency collapses, or extreme weather—reveal the fragility of our global food network. Rich or poor, countries need a backup plan when primary food production or trade routes are disrupted. These stocks can be provided through a combination of public-sector projects, such as strategic grain reserves, and regulation, such as requirements that food distributors or supermarkets maintain stocks at certain levels. A country's plan will hinge on a number of factors: its dependence on international trade flows, its ability to purchase food on the global market, and the capacity of its domestic agricultural sector.

For example, China has a strategic food-reserve system to cope with supply and market disruptions and to keep inflation in check. A national administration manages reserves of rice, wheat, soybeans, maize, vegetable oil, and meat in 31 provinces. Provincial and city governments hold their own reserves.

In the United Arab Emirates, the government has constructed public facilities to store 12 weeks of wheat, rice, and powdered milk. In addition, private retailers are required to stock two to four weeks of perishable reserves, including poultry and fresh vegetables. These supplies ensure availability during short disruptions.

A word of caution: poorly managed storage of food reserves can lead to massive food waste, and poorly timed or unpredictable usage of food reserves can skew prices. To avoid doing more harm than good, food reserves should be managed in a transparent, rule-based manner that does not crowd out the private sector or sow distrust among producers and traders.

Building an integrated food economy strategy

We believe that every country can and should build a sturdy, integrated domestic food system that delivers both nutrition and economic growth. Doing so requires countries to strengthen each of the four building blocks.

The transition can begin with a quantitative, comprehensive assessment of a country's position. In our work with countries, we generally begin by combining analytical benchmarking with a systematic diagnostic and conversations with national leadership to understand the complex issues of a national food system. (See sidebar "A rapid diagnostic: Lessons from Mexico.") In Exhibit 2, we profile four countries that have done this well. Each is taking different steps, but all are moving in the same direction.

In each case, the lesson is the same: success requires taking a broad approach while also making targeted investments. It also calls for collaboration across ministries and between the public and private sectors. It requires considering the wellbeing of residents of all income levels—not solving for national averages. We know that this is not easy. One approach to consider is to establish a leadership unit—whether by creating a new government agency or working within an existing one—to coordinate the transformation. This agency's task is to keep an eye on the big picture; it recommends adjustments to policies, tariffs, and regulations and comes up with ideas to close gaps or build on specific strengths.

To be successful, the agency needs high-level sponsorship, preferably from the president or prime minister. That gives it the political muscle to suggest difficult measures such as altering subsidies or land-use regulations. On a less contentious level, this unit can help to scale up extension services, accelerate licensing and technology approvals, and expand access to financing. One notable example is Ethiopia's Agricultural Transformation Agency, founded by Prime Minister Meles Zenawi in 2010. It put together a plan to raise the productivity of smallholder farmers and pastoralists, strengthen market systems, engage the private sector, expand irrigation, and reduce the number of chronically food-insecure households. Now the agency works with more than 120 public- and private-sector partners, as well as 50,000 public-sector extension workers. Many crops (especially wheat and teff) have seen double-digit yield growth rates.[7]

7 *2013/2014 Annual Report: Transforming Agriculture in Ethiopia*, Ethiopian Agricultural Transformation Agency, 2014, ata.gov.et.

A rapid diagnostic: Lessons from Mexico

The success of a country's overall food economy is contingent on collaboration among public-, private-, and social-sector stakeholders, following a road map that reflects the current situation and prioritizes interventions. An important ingredient is a diagnostic to rapidly understand performance across all four building blocks and set collective priorities for improvement.

Mexico's efforts provide an excellent illustration of what's possible; there, the government, more than 60 private-sector companies, numerous foundations, and research institutions have committed to improving the nation's food economy. A clear and evolving set of priorities guide joint efforts.

Mexico enjoys significant financial resources and abundant, high-quality land, but a diagnostic revealed big challenges:

- **Limited affordability.** Food accounts for nearly 30 percent of the average consumer-spending basket (compared with 7 percent in Switzerland and 20 percent in Brazil). Uneven production yields, low average value added in domestic food production, and a high dependence on imports partly account for the differences.
- **Food is available, but nutritional quality is low.** Mexico has the world's highest obesity rate (32.8 percent), caused in part by an average diet that is 45 percent starch, despite the availability of nutrition plans and guidelines.
- **The country is vulnerable to emergencies and shocks.** Food, already costly, faces 7 percent annual inflation; the country has limited public or private storage reserves; and more than 70 percent of the population is susceptible to extreme weather events, creating a potentially volatile situation.

The diagnostic suggested several interventions for Mexico, many of which are under way as part of a road map to improve food security and economic growth:

- **Transform local agricultural productivity.** Reducing import dependence and lowering food costs rests in part on closing the gap in productivity between northern and southern Mexico (with as much as an eight times difference in yields). The country recently launched MasAgro—a ten-year, $138 million collaboration among Mexico's Ministry of Agriculture, the International Maize and Wheat Improvement Center, donors, and the private sector.
- **Create more value from local food production.** Mexico's VIDA program (spawned from the World Economic Forum's New Vision for Agriculture) is bringing together more than 60 companies and the government to mobilize over $740 million in new investment and engage more than 600,000 farmers by 2018—adding to local economies and building a food system more resilient to food inflation and shocks.
- **Encourage healthier eating.** Efforts include public and private marketing campaigns.

Mexico's food economy is pioneering collaborations among the government, local and international companies, academics, and donors, with careful investments to maximize food security, health and wellness, and economic growth. A rapid diagnostic can help other countries launch similar initiatives by quickly assessing the root causes of food-economy challenges and building consensus to launch joint interventions.

While governments have an essential role, building a strong food economy is not a massive public-works project. Success requires partnerships across society.

GrowAfrica, for example, builds on public-private partnerships led by the World Economic Forum's New Vision for Agriculture initiative to spur private-sector investment, expand knowledge, and share best practices. The program supports country-level initiatives by mobilizing governments, companies, donor agencies, and farmer organizations to provide technical assistance, financing, best practices, and monitoring and assessment. By the end of 2013, GrowAfrica

Exhibit 2 Four countries show different ways to improve food economies.

Netherlands: high income, resource scarce

- Used a 2-pronged strategy to transform scarce resources into a leading industry
  - Grew high-value crops: developed >10,000 hectares of high-tech greenhouses
  - Focused on value addition and trade: 12 of the 40 largest food producers have major hubs in the country, and the Netherlands now boasts €79 billion in agricultural exports, the 2nd-highest total value in the world

Malawi: low income, resource abundant

- Sought to move the fertile country from relying on subsistence agriculture to using food as an engine for growth
  - Large national input-subsidy program allowed even small, poor farmers to grow food efficiently
  - Government and aid programs focused on market and trade reforms to capture sustainable growth in agriculture

Brazil: upper middle income, resource abundant

- Invested in untapped resources to become a leading commodity producer
  - The Embrapa program transformed unused land through research and investment, helping to more than double exports between 1982 and 1997
  - The country is now focusing on roads, trains, storage, and processing to facilitate trade and increase competitiveness

Ethiopia: low income, resource scarce

- Nearly halved extreme poverty by building resiliency in a drought-prone environment
  - Improved yield in a difficult environment by investing in small farmers—with irrigation, power, agricultural research, and high-quality inputs (such as fertilizers and seeds)—and through local farmer-training networks
  - Built roads and grain storage to ease food crises and undertook extensive nutrition outreach to reduce malnutrition

Source: McKinsey analysis

had helped secure more than $7 billion in private-sector commitments for agricultural investments across ten African countries. These commitments have come from more than 120 companies, which in 2013 alone invested $976 million, reaching nearly three million smallholders through new services, sourcing, contracts, or training and creating 35,000 new jobs.[8]

Safe, affordable food is a necessity. That this does not exist for 800 million people is a tragedy. But it is possible to do better. By rejecting orthodoxies and accepting the value of an integrated, evidence-driven approach, every country can build a food economy that will nourish its future.

8 *Agricultural partnerships take root across Africa*, GrowAfrica Secretariat, May 2014, weforum.org.

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