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# The Human Face of Trade and Food Security

## Lessons on the Enabling Environment from Kenya and India

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CENTER FOR STRATEGIC &  
INTERNATIONAL STUDIES

A Report of the  
CSIS GLOBAL FOOD SECURITY PROJECT



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# Executive Summary

Globalization has significantly changed agricultural trade, and markets are more connected and capable of delivering economic opportunity and food security now than ever before. While the market itself is the physical representation of trade, the rules governing the market are a key factor in productivity, investment, and overall food security. The system of rules and regulations governing trade and market activity, the “enabling environment” for short, directly affects how much farmers in a country will be able to produce and how food will be stored, processed, and sold. In most cases individual countries cannot meet their own food security needs and must import food and inputs (such as seed, fertilizer, and agrochemicals) from elsewhere. However, as food moves across borders, the rules become even more complex and can sometimes halt trade in food entirely.

Just as the nature of markets has changed, so has the system of rules governing the market. Informal systems, with unwritten understandings of how to conduct trade, have turned into more structured regulatory systems within and between countries. Agricultural trade is increasingly subject to formal rules at multiple levels: national, regional, and international. This includes the disciplines through the World Trade Organization (WTO) on which the debate around agricultural trade is often focused. Yet, the policies and regulations that perhaps impact the market most are shaped at the national and even local levels.

As the rules surrounding agricultural value chains and trade in food have become more comprehensive and precise, the connection between the enabling environment and the actual people it is meant to serve has become more tenuous. Issues such as traceability, technology, transport, and food loss are all governed by an increasingly complex system of policies and regulations that spans the globe; it is often difficult to bridge the needs at the farm with the requirements of international markets. The stakeholders involved in global food security have also diversified. Developed country trading partners, such as the United States, play a prominent role in international agricultural markets through private enterprise and foreign aid. It is important that the transfer of capacity and innovation is built into food security approaches in a way that fuels two-way development going

forward. In today's environment, the link between policies and people is more important than ever before, calling for a new approach to agricultural policy and regulation.

How should trade and market rules be approached in the context of food security? This study will explore the different dimensions of trade that contribute to food security<sup>1</sup>—including better access to safe and nutritious food, improvements in productivity-increasing technology, availability of storage and transport services, and generation of diverse income streams for farmers, enterprises, and countries alike—examined through the lens of the policy and regulatory environment that shapes the market. In contrast to top-down policy discussions, the study takes a bottom-up approach that follows the opportunities and challenges facing different stakeholders—farmers, consumers, innovators, traders, and developed and developing countries—that are part of the global system for trade in food. To highlight connections in the market from production through export, the study focuses on several value chains that illustrate more diverse opportunities and challenges for food security and trade, both from a market and a policy perspective: beans in Kenya, rice in India, and horticulture (fruits and vegetables) in both Kenya and India. It also showcases innovations, best practices, and areas for further emphasis.

A team from New Markets Lab (NML), a law and development center, and the Center for Strategic and International Studies (CSIS) Global Food Security Project traveled to Kenya and India over a two-week period in the summer of 2017 and met with farmers, donor programs, government and private-sector leaders, and other stakeholders to gather insight on the issues impacting trade and food security from the farmer up through international markets. These consultations combined with research conducted by NML resulted in broad recommendations for U.S. policymakers to consider so that the United States could best support food security, market-based regulation, mutually beneficial trade, and economic development.

These recommendations come at a critical time, as each of the 12 Feed the Future focus countries, including Kenya, is currently developing strategic plans under the new phase of the global hunger and food security initiative. (India is considered an aligned country.) Further, the implementation plan for the U.S. Global Food Security Strategy, which was submitted to Congress in October 2017, emphasizes the need to address the entire agricultural and food system, including trade, and underscores the importance of facilitating change in the enabling environment to strengthen markets.

- *Place income generation and market diversification at the core of food security efforts.* This would include complementing the existing emphasis on grains with a greater focus on fruits and vegetables and less commercialized crops, such as beans, that hold promise for farmers in food-insecure areas. Efforts to diversify could also address changing consumer

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1. The UN food agencies have developed a definition of food security, which entails a situation that “exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.” Food and Agriculture Organization of the United Nations (FAO), “World Food Summit: Plan of Action,” 1996, <http://www.fao.org/WFS/>. Trade is a central component of food security: not only does it directly contribute to access for safe and nutritious food, but it also impacts availability of productivity-increasing technology and helps generate more diverse income streams for farmers, enterprises, and countries alike.



preferences and nutrition needs and provide opportunities for trading partners such as the United States.

- *Focus on the practical aspects of making regional trade work, especially in sub-Saharan Africa.* In particular, implementation of regional rules and standards needs to be strengthened in areas important to food security and trade, such as regional standards and rules on inputs (seed and fertilizer), transport, storage, and cross-border trade.
- *Implement market and regulatory approaches that can leapfrog gaps in agricultural markets and food security systems.* These include farmer aggregation models, contract farming approaches, food traceability systems, pest and disease management, and agricultural financing approaches.
- *Strengthen exchange of technology and know-how through both trade and donor assistance.* This could include expanding the reach of technological solutions to address market and productivity challenges, and increasing focus on the corresponding regulatory environment at both the enterprise and institutional levels.
- *Support new models for improving market-based regulation that put the needs of farmers, consumers, and market innovators first.* These stakeholders tend to be left out of the policy-making process, and policy measures and legal approaches (which could incorporate technological solutions) could be prioritized to ensure that their needs are incorporated into the system. At the policy level, it is time to launch a food security initiative at the WTO, and it should be a focus at the upcoming Eleventh WTO Ministerial Conference (MC11) in Argentina in December 2017.



# Understanding the Country Context

The policy and regulatory aspect of trade and markets, or the “enabling environment” for short, connects trade and food. This link between government and the market often leads government to closely involve itself in all aspects of the agricultural sector through policies, regulations, laws, and, in many cases, financial support. As a private-sector leader noted, one thing that will never change is that “food is politics.”

Above all else, however, agriculture is a business, and the farmer must see a market return to remain engaged. Ultimately, food security starts with the farmer; no farmer will produce enough food if he or she does not know that there is a market accessible where food can be bought and sold at an agreeable price.<sup>1</sup> While many farmers may not engage beyond local markets, increasingly intricate global supply chains will affect the prices these farmers fetch and the inputs (such as seed, fertilizer, and agrochemicals) that go into their crops. Consumers also want to know more about the food they eat, often pressing for food to be traced back to the start of the value chain. Government plays a role as well, and the agricultural sector is often heavily regulated.<sup>2</sup> Although the public sector is one stakeholder in a more complex constellation, policy responses to food security tend to be high-level and top-down. Those who are producing and consuming food tend to be at the receiving end rather than actively helping to shape regulations that respond to their needs.

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1. Katrin Kuhlmann, “African Markets and Trade: Critical Links to Global Food Security; A Proposed Strategy for the Global Hunger and Food Security Initiative” (draft for discussion), German Marshall Fund, April 9, 2010, [https://docs.wixstatic.com/ugd/095963\\_881da8a150c04a1fb8b85adc7665341e.pdf](https://docs.wixstatic.com/ugd/095963_881da8a150c04a1fb8b85adc7665341e.pdf).

2. It is helpful here to briefly note the difference between law, regulations, and policy; these three terms will be used in the context of the enabling environment. Laws (or acts), which often must go through a parliamentary process, create a framework for governing the market and often relate to a particular sector or activity along the value chain. Regulations are created, often through administration action, to implement laws. Policy, which is the broadest category of measures within the enabling environment, provides guidance to stakeholders and government officials on what objectives laws and regulations should seek to achieve but do not tend to be legally binding instruments on their own.

The politics of agriculture can cause issues for both investors and policymakers. An Ankur Capital representative interviewed in India voiced the concern of many investors: agriculture is a risky business, often due to the public sector's involvement. To investors, government is a poor predictor of market demand. Emerging Fintech businesses are often better investment bets, rather than more political crops such as rice, in which the government is very involved in market and pricing mechanisms. Ankur Capital has chosen to prioritize Fintech investments by investing in enterprises such as Cropln, which uses digital technology to help improve fragmented markets.

Within the public and private sectors, food security, similar to trade, is a two-way street. While the links between trade and food security could be strengthened, food security remains at the top of the agenda in many nations, including this study's two focus countries, Kenya and India. In both countries, multiple questions surround trade and food security: Which crops will the government decide to promote through policy and regulatory channels, and how will this impact trade (including at the regional level)? What potential exists to add value in the market and perhaps increase exports, and how will this affect food security? Who will benefit as markets change, both locally and globally, and what are the political and policy implications? To some extent, the answers will vary depending upon the perspective from which they are approached.

It is important to note that while much of the discussion below focuses on the formal food sector, where activity tends to be heavily regulated, a great deal of trade in both Kenya and India takes place informally, as is true around the world. In Kenya, the Kenya Agricultural Value Chain Enterprises (KAVES) project, implemented by Fintrac as part of the U.S. Agency for International Development (USAID)'s Feed the Future portfolio, works closely with smallholder farmers, enterprises, and governments to address challenges in value chains, including dairy, maize, and horticulture. According to KAVES, a great deal of informal regional trade remains, and the informal system "drives itself."

According to the Food and Agriculture Organization of the United Nations (FAO), food production, transport and distribution, and retail of food are among the most common informal trade activities.<sup>3</sup> Informal food trade tends to take place outside of regulatory requirements, but those operating in the informal sector do not have the same legal protections that the formal sector offers, and informal food trade generally holds less prospect of greater income security.

Because the informal food trade sector can be both less remunerative and more unpredictable economically and legally, a number of the stakeholders consulted are working with farmers and others engaged in the focus value chains to transition from the informal to the formal sector. For example, the USAID-supported East Africa Trade and Investment Hub engages with farmers to bring them into the formal agricultural sector. The nonprofit organization TechnoServe, which is active in both Kenya and India, also helps farmers enter the formal sector through development of value chains and connection with markets.

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3. Food and Agriculture Organization of the United Nations (FAO), *The Informal Food Sector: Municipal Support Policies for Operators* (Rome: FAO, 2003), <http://www.fao.org/3/a-y4312e.pdf>.

## FOOD SECURITY IN THE KENYAN CONTEXT

Agriculture is an important sector for Kenya, accounting for approximately 65 percent of Kenya's total exports and employing about 70 percent of the rural working population.<sup>4</sup> Despite its central role in both the market and policy priorities, agriculture's share of Kenya's GDP has decreased and Kenya became a net food importer from 2010–2013.<sup>5</sup> The 2017 Global Hunger Index released by the International Food Policy Research Institute (IFPRI) notes serious food insecurity in Kenya.<sup>6</sup> While efforts are being taken to address food security, issues such as climate change and growing population density add to the challenge moving forward.<sup>7</sup> Land tenure issues, discussed below, are also a significant factor in food security in Kenya and have implications throughout all aspects of the value chain.

Similar to other countries in sub-Saharan Africa, Kenya places a priority on food security through a number of government policies and programs, many of which align with the Comprehensive Africa Agriculture Development Programme (CAADP), a continent-wide initiative that aims to sustainably improve agricultural outputs and increase access to nutritious food. Under CAADP, governments are expected to allocate at least 10 percent of national budgets with the goal of achieving 6 percent growth in the sector.<sup>8</sup> Kenya highlights a commitment to agriculture in its Vision 2030, adopted in 2008, which notes that agriculture is expected to contribute to the country's overall goal of 10 percent economic growth over the next two decades.<sup>9</sup> The Government of Kenya's Agricultural Sector Development Strategy is also aligned with the country's CAADP Compact.<sup>10</sup>

Since enacting its new constitution in 2010, Kenya has experienced a wave of legal change that has impacted farmers and other market stakeholders. The 2010 Constitution introduced a

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4. International Fund for Agricultural Development, "President's Report Proposed Loan and Grant to the Republic of Kenya and Proposed Grant under the Country-Specific Grants Window to the Food and Agriculture Organization of the United Nations for the Kenya Cereal Enhancement Programme–Climate–Resilient Agricultural Livelihoods Window (KCEP-CRAL)," March 25, 2015, 1–2.

5. S. Benin, N. Covic, A. S. El Vilaly, I. Fofana, J. Koo, N. Minot, S. Odjo, et al., *Kenya Agricultural Development Status Assessment* (Washington, DC: International Food Policy Research Institute [IFPRI], December 2016), 10–11, <http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/131060/filename/131271.pdf>.

6. Klaus von Grebmer, Jill Bernstein, Tracy Brown, Nilam Prasai, Yisehac Yohannes, Olive Towey, Connell Foley, et al., *2017 Global Hunger Index: The Inequalities of Hunger* (Washington, DC: IFPRI, October 2017), 15, <http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/131422/filename/131628.pdf>.

7. Jane Kabubo-Mariara and Millicent Kabara, *Climate Change and Food Security in Kenya* (Washington, DC: Environment for Development, March 2015), 16, <http://www.rff.org/files/sharepoint/WorkImages/Download/EfD-DP-15-05.pdf>.

8. *Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods*, Twenty-Third Ordinary Session of the African Union Assembly in Malabo, Equatorial Guinea, June 26–27, 2014, 3–4, <http://extwprlegs1.fao.org/docs/pdf/au168150.pdf>.

9. Government of the Republic of Kenya, *Kenya Vision 2030: A Globally Competitive and Prosperous Kenya* (Nairobi: Government of the Republic of Kenya, October 2007), x, [https://www.researchictafrica.net/countries/kenya/Kenya\\_Vision\\_2030\\_-\\_2007.pdf](https://www.researchictafrica.net/countries/kenya/Kenya_Vision_2030_-_2007.pdf).

10. Government of the Republic of Kenya, "The Kenya CAADP Compact: Implemented Through the Agricultural Sector Development Strategy," July 2010, <http://www.igadhost.com/igaddata/docs/Kenya%20CAADP%20COMPACT.pdf>.

devolved government structure that shifts some agricultural regulation to the county government level. Some rules are again becoming more informal and less predictable in the process. In many cases, only a select few are aware of the changing enabling environment. For example, rules on packaging have changed, and farmers are often not aware of the size of bag to use or type of crate that could help prevent food loss. The Council of Governors Secretariat was established to help counties develop a coordinated approach, but the true impact of these changes remains to be seen. It will be very important that the decentralization is aligned with national food security efforts, such as those conducted through the Food Security Steering Group, and regional efforts, including through the East African Community (EAC).

Notably, the Kenyan Constitution includes the right to be free from hunger and have adequate food of acceptable quality.<sup>11</sup> However, another constitutional provision provides leeway in enforcing this and other social rights when resource constraints exist, effectively creating an escape clause to the right to food.<sup>12</sup>

Without question, maize is Kenya's most prominent crop, and it has been a political focus due to drought, market shortages, and price spikes. As reinforced by several stakeholders, Kenya has not been able to meet local maize demand, and many voiced concern that the ongoing focus on maize distorts market potential. Maize shortages have led to greater trade within the region, with the Kenyan government recently announcing waivers of duties for both white and yellow maize.<sup>13</sup> Ethiopia, with nine million maize producing farmers, does not consider maize a staple, but has become an important source for maize imports into Kenya (see Box 1.1).

Greater diversification in the market could enable Kenya to be more food secure into the future, particularly as consumer preferences change. Kenya's Vision 2030 recognizes this need and calls for efforts to strengthen different value chains.<sup>14</sup> The Kenyan government has identified one of the value chains selected for this study, dry beans, as a strategic crop for food security. Beans are highly nutritious and a significant source of protein. They are grown and consumed throughout Kenya, with women traditionally doing the harvesting.<sup>15</sup> According to the International Center for Tropical Agriculture (CIAT), beans are the second most highly traded crop in Kenya.<sup>16</sup> However, the market for beans remains largely informal and fragmented. Beans are also included in Kenya's recently established strategic food reserve,<sup>17</sup> which is budgeted out annually. Despite this

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11. Constitution, art. 43 (1) (c) (2010) (Kenya).

12. Constitution, art. 20 (5)(c) (2010) (Kenya).

13. Gerald Andae, "Duty-Free Window for Maize Extended," *Business Daily*, July 24, 2017, <http://www.businessdailyafrica.com/markets/commodities/Duty-free-window-for-maize-extended/3815530-4028634-8kelcw/index.html>.

14. Government of the Republic of Kenya, *Kenya Vision 2030*, 43–45.

15. Infonet Biovision, "Beans," May 19, 2017, <http://www.infonet-biovision.org/PlantHealth/Crops/Beans>.

16. International Center for Tropical Agriculture (CIAT), meeting with CSIS and NML team members, July 18, 2017.

17. "Strategic food reserve" is defined under Kenya's Public Finance Management Act (Strategic Food Reserve Trust Fund) Regulations, 2015, and includes beans and maize, along with other staple foods such as fish.

## BOX 1.1. Business-to-Business Solutions to Maize Trade Challenges<sup>1</sup>

In February and March 2017, the East Africa Trade and Investment Hub (Hub), funded by USAID, and the East African Grain Council (EAGC) facilitated business-to-business (B2B) sessions between Ethiopian grain exporters and buyers from food-insecure countries in the region, including Kenya. Although East African countries were experiencing drought and food insecurity, the Ethiopian Agricultural Transformation Agency estimated at the time that Ethiopia would have a white maize surplus of 1,000,000 metric tons (MT), an unusually successful harvest on what was already a bumper crop. The connections between Ethiopia and Kenya resulted in increased sales of surplus maize, beans, and chickpeas. Although Ethiopia is not a member of the East African Community (EAC), it is a direct neighbor of Kenya's and presents a regional opportunity for diversifying maize imports, adding another trading partner for Kenya in addition to countries such as Mexico and Ukraine. Direct B2B links also provide a way to address market challenges, many of which have their roots in regulation or policy. These included issues around payment mechanisms, logistics, conformity assessment, trade facilitation, and grading/quality.

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1. U.S. Agency for International Development (USAID), "The Hub Partners with EAGC to Support Staples Trade from Ethiopia Surplus," February 23, 2017, [http://www.eatradehub.org/the\\_hub\\_partners\\_with\\_eagc\\_to\\_support\\_staples\\_trade\\_from\\_ethiopia\\_surplus](http://www.eatradehub.org/the_hub_partners_with_eagc_to_support_staples_trade_from_ethiopia_surplus); DAI, "A Trade Solution to the Food Security Challenge: Surplus Grains Worth \$93 Million Now Available to Countries in Need," March 17, 2017, <https://www.dai.com/news/a-trade-solution-to-the-food-security-challenge-surplus-grains-worth-83-dollars-million-now-available-to-countries-in-need>.

attention, the government nevertheless designated a significantly higher amount toward maize in the past year, demonstrating the continuing policy emphasis on maize.<sup>18</sup>

Horticulture (fruits and vegetables) is also playing an increasingly important role in food security in Kenya. Horticulture is one of the fastest growing sectors in the agricultural industry,<sup>19</sup> with increasing consumer demand. Farmers also see the value in the sector because they harvest and sell produce on a daily basis. Horticulture, therefore, has significance for food security both because of increased availability of a wider range of nutritious foods, and because it can generate a tangible improvement in farmer income, which enables families to purchase other foods and provide for a diverse set of needs.

## FOOD SECURITY IN THE INDIAN CONTEXT

India differs from Kenya in terms of both agricultural development and regulatory structures, although some important similarities remain. Some stakeholders positioned India as a declining

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18. Gerald Andae, "Maize Subsidy Extended as Rains Delay Harvesting," *Daily Nation*, September 21, 2017, <http://www.nation.co.ke/business/Maize-subsidy-extended-as-rains-delay-harvesting/996-4105504-367x0d/index.html>; Edwin Mutai and Gerald Andae, "Kenya: Sh90 Maize Flour Ends Mid October," *Daily Nation*, October 5, 2017, <http://allafrica.com/stories/201710050093.html>.

19. "Horticulture in Kenya—Horticulture Farming in Kenya," *SoftKenya*, 2011, <https://softkenya.com/kenya/horticulture-in-kenya/>.



Lucy Gichinga, a farmer outside of Nairobi, Kenya, prefers horticulture crops over her dairy business because she says the input is minimal, but the profit is high.  
Photo credit: Kimberly Flowers, CSIS.



agricultural power. For example, one private-sector leader stressed that “Indian agriculture is behind the curve [of] where it should be.” Other accounts noted that diversification in the Indian economy (including high growth rates for the industrial and services sectors) adds to overall development and food security.

As in Kenya, Indian agriculture represents a relatively small share of GDP (17 percent of \$2.26 trillion),<sup>20</sup> despite the large percentage of rural households (70 percent according to the FAO) involved in the sector.<sup>21</sup> Most of India’s poor (about 770 million people or 70 percent of the population) are found in rural areas, placing both food security and rural livelihoods central in agricultural development.<sup>22</sup> India’s market is also very fragmented. Most farmers (over 80 percent) are smallholder farmers.<sup>23</sup> Landholdings are by law small and difficult to consolidate. Under this scenario, the cost of production remains very high for the individual farmer working alone.

Despite India’s status as a fast-growing emerging economy, it trails behind other comparable economies in terms of food security.<sup>24</sup> The 2015 FAO food insecurity assessment ranks the prevalence of undernourishment (PoU) for India at 15.2 percent, which is greater than the global average of 10.8 percent and considerably higher than other emerging economies such as China and Brazil, at 9.3 percent and less than 5 percent, respectively.<sup>25</sup>

India has tried to address some of these gaps through policy and regulation, with mixed results. Overall, India’s food sector is heavily regulated, which often presents challenges for increasing food production and recognizing the needs of different market stakeholders. At the highest level, the Indian Constitution divides power between the Indian state and central governments, and agriculture has primarily fallen within the states’ responsibilities. There are notable areas in which the central government has been involved, however. The National Food Security Mission (NFSM) was launched in 2007 as a central government initiative designed to increase production and productivity of wheat, rice, and pulses on a sustainable basis to ensure the country’s food security. Food security in India is also promoted through the National Food Security Act (NFSA), 2013, which incorporates government programs for ensuring that food is made available to the underprivileged through public procurement and stockpiling, and aims to bridge the yield gap through dissemination of improved technologies and farm management practices.

Similar to Kenya, India is heavily reliant on grains such as rice and wheat for food security, yet India’s growing population and rising incomes are contributing to increased demand for fruits,

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20. FAO, *Statistical Pocketbook: World Food and Agriculture, 2015* (Rome: FAO, 2015), 123, <http://www.fao.org/3/a-i4691e.pdf>; World Bank, “GDP (Current US\$),” 2017, <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=IN>.

21. FAO, “India at a Glance,” 2017, <http://www.fao.org/india/fao-in-india/india-at-a-glance/en/>.

22. World Bank, “India: Issues and Priorities for Agriculture,” May 17, 2012, <http://www.worldbank.org/en/news/feature/2012/05/17/india-agriculture-issues-priorities>.

23. George Rapsomanikis, *The Economic Lives of Smallholder Farmers: An Analysis Based on Household Data from Nine Countries* (Rome: FAO, 2015), 1, <http://www.fao.org/3/a-i5251e.pdf>.

24. Michael S. Finnin, *Food Security in India, China, and the World* (Alexandria, VA: Institute for Defense Analyses, June 2016), iv, [https://www.ida.org/idamedia/Corporate/Files/Publications/IDA\\_Documents/STD/2016/D-5823.ashx](https://www.ida.org/idamedia/Corporate/Files/Publications/IDA_Documents/STD/2016/D-5823.ashx).

25. FAO, *The State of Food Insecurity in the World: Meeting the 2015 International Hunger Targets: Taking Stock of Uneven Targets* (Rome: FAO, 2015), 46–47, <http://www.fao.org/3/a-i4646e.pdf>.

vegetables, and milk. India is the world's second largest producer of horticulture products, including fruits such as oranges and pomegranates.<sup>26</sup> Domestically, horticulture out-produced grains in 2014–2015,<sup>27</sup> and the Indian government has flagged that production challenges related to climate change and postharvest loss will need to be better addressed going forward.<sup>28</sup>

As the World Bank has noted, in order to meet demand at an accelerated pace India will need a productive, diversified, competitive, and sustainable agricultural sector.<sup>29</sup> The Green Revolution was a significant factor leading to India's agricultural transformation and brought important technological change to India that continues to impact food security. Years later, however, multiple stakeholders consulted noted that more investment in technology and market infrastructure are critical. Some developments may show promise, such as an increase in the food retail business across diverse platforms including e-commerce, with a clear role for policymakers.

Scaling solutions in India, however, remains a challenge. "How do you scale up when working in such a fragmented system," asked an Ankur Capital representative, a question that many other stakeholders echoed. Given the fragmented nature of India's agricultural sector, approaches that aggregate farmers, such as farmer producer organizations (FPOs), are increasingly becoming a focus among policymakers and the private sector. As a representative from the Indian National Bank for Agriculture and Rural Development (NABARD) noted, "Agriculture has not been considered a business, but [rather] a way of life, [yet] FPOs are a good way to commercialize agriculture" (see Box 1.2). While India's experience is unique, Kenya faces similar challenges with landholding and registering collateral, and farmer aggregation models would be helpful there as well. It is also notable that these models could make farmers in both India and Kenya more attractive business partners in cross-border trade.

Land tenure, even rights to microplots, is a significant issue impacting food security in India and many other countries (including Kenya). Secure land tenure greatly improves rural households' prospects for food security and can be especially beneficial for women, as they are more likely to use their land to feed their families and children, and invest extra money earned from the sale of crops back into children.<sup>30</sup> Women often face legal and cultural barriers to land ownership. This challenge calls for laws and regulations that grant land rights as inclusively as possible, with a particular focus on women farmers, and policies that consider how property laws might interact with other customary traditions and family law.<sup>31</sup>

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26. Government of India, *State of Indian Agriculture, 2015–16* (New Delhi: Government of India, 2016), 11, [http://www.indiaenvironmentportal.org.in/files/file/State\\_of\\_Indian\\_Agriculture,2015-16.pdf](http://www.indiaenvironmentportal.org.in/files/file/State_of_Indian_Agriculture,2015-16.pdf).

27. Ibid.

28. Ibid., 12.

29. World Bank, "India: Issues and Priorities for Agriculture."

30. Landesa, "Land Rights and Food Security: The Linkages between Secure Land Rights, Women, and Improved Household Food Security and Nutrition," March 2012, <http://zpmppd2mggwg34rgsm60dldr9-wpengine.netdna-ssl.com/wp-content/uploads/Landesa-Issue-Brief-Land-Rights-and-Food-Security.pdf>.

31. Ibid.

## BOX 1.2. Good Regulatory Practices for Farmer Aggregation Models<sup>1</sup>

Different models for farmer aggregation have been tried in developing economies, including cooperatives and FPOs, with varying degrees of success. In India, the cooperative model was fraught with politics, but legal changes that allowed FPOs to be registered as corporations under the Companies Act have had a positive effect over the past decade. The development of FPOs has signaled a significant change in the market with the potential for new and innovative business models in the agricultural sector, ranging from production to marketing. FPOs have been instrumental in improving access to transport services and delivering inputs and have helped lower the cost of production while also bringing farmers higher prices through selling in bulk. Governance of farmer aggregation models can require a careful balance in policy and practice; the Overseas Cooperative Development Council (OCDC), with support from USAID, developed the Cooperative Law and Regulation Initiative (CLARITY) to establish principles for assessing the legal and regulatory environment for cooperatives and other aggregation models, including FPOs. The CLARITY principles range from an efficient regulatory framework to promotion of equitable treatment and access to markets, and some of these principles can be seen in India's regulatory framework for FPOs.

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1. Cooperative Law & Regulation Initiative (CLARITY) and USAID, *Enabling Cooperative Development: Principles for Legal Reform* (Washington, DC: CLARITY/USAID, 2006), [http://www.clarity.coop/pdf/PUB\\_Clarify\\_one.pdf](http://www.clarity.coop/pdf/PUB_Clarify_one.pdf).

## REGIONAL TRADE

The country context for Kenya and, perhaps to a lesser extent, India would not be complete without acknowledging the importance of regional trade. Particularly in sub-Saharan Africa, where many countries are either landlocked or so small that local markets cannot provide adequate opportunity, food security and trade tend to be regional challenges.<sup>32</sup> While regional markets can often provide the missing link to connect supply from local producers with both consumer demand and businesses that have access to larger markets, they can also be difficult to navigate from a policy and regulatory perspective. Building these markets relies on the right policy and regulatory solutions at both the regional and national levels (where regional rules are “domesticated” and implemented). When the rules of the market work well in practice, regional harmonization can

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32. Steve Haggblade, “Unscrambling Africa: Regional Requirements for Achieving Food Security,” *Development Policy Review* 31, no. 2 (March 2013): 149–176. For example, political borders

separate surplus millet and sorghum producers in southern Mali and Burkina Faso from deficit markets in half a dozen surrounding countries; surplus maize and bean producing zones of Uganda from deficit markets in Kenya, southern Sudan and Rwanda; food surplus areas in northern Mozambique and southern Tanzania from intermittently deficit markets in Malawi and eastern Zambia; and livestock exporters in Mali, Mauritania, and Niger from coastal markets all across West Africa.



Female farmers in India face legal and cultural barriers to land ownership, even though they are more likely to use profits from farming to invest in their children's health and education.  
Photo credit: Kimberly Flowers, CSIS.

*When the rules of the market work well in practice, regional harmonization can create the economies of scale necessary to expand business opportunities, foster competitiveness, and connect producers to international markets.*

create the economies of scale necessary to expand business opportunities, foster competitiveness, and connect producers to international markets.

Kenya is a member of two significant regional trade agreements (RTAs): the East African Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA). With the recent addition of South Sudan, the EAC has six member states, and a population of 163 million.<sup>33</sup> COMESA has 19 member states and a population of 390 million,<sup>34</sup> the majority of which work in the agricultural sector. These RTAs cover diverse aspects of the

33. "South Sudan Becomes EAC's Sixth Member State," *Sudan Tribune*, March 3, 2016, <http://www.sudantribune.com/spip.php?article58197>.

34. Office of the U.S. Trade Representative (USTR), "Common Market for Eastern and Southern Africa (COMESA)," May 9, 2014, <https://ustr.gov/countries-regions/africa/regional-economic-communities-rec/common-market-eastern-and-southern-africa-comesa>.

regulated economy, including seeds, transport, packaging of food, food safety standards, and cross-border trade. Additional issues, such as fertilizer regulation, are becoming a focus as well. While the breadth of rules and effectiveness of their implementation varies, regional RTAs have a growing impact on the market. In addition, the EAC and COMESA are working to harmonize with the Southern African Development Community (SADC); the resulting Tripartite Free Trade Area would cover 17.3 million square kilometers, an area nearly twice as big as China or the United States.<sup>35</sup>

While the size of its market makes India a different player in regional trade, RTAs have been important to India as well. India has formed a free trade area with the Association of Southeast Asian Nations (ASEAN) and is also part of the South Asian Free Trade Area (SAFTA) and the Asia-Pacific Trade Agreement (APTA). These agreements have helped open markets for India. India is now the largest exporter of agricultural products to least developed countries (LDCs), especially in South Asia.<sup>36</sup>

In a number of areas highlighted throughout this report, a greater regional focus could enhance progress toward food security. However, stakeholders often stressed that building regional markets requires time and a great deal of education. The market will not advance through regional trade agreements alone; further action will be needed to make these agreements come to life.

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35. Calestous Juma and Francis Mangeni, "The Benefits of Africa's New Free Trade Area," Belfer Center for Science and International Affairs, June 11, 2015, <https://www.belfercenter.org/publication/benefits-africas-new-free-trade-area-0>.

36. U.S. Department of Agriculture (USDA) Foreign Agriculture Service, "India Sees Surge in Foreign Agricultural Exports to Least Developed Countries," September 23, 2014, <https://www.fas.usda.gov/data/india-sees-surge-agricultural-exports-least-developed-countries>.

## The Enabling Environment and the Farmer: Governing the Market from the Bottom Up

The farmer lies at the heart of food security in every country in the world, but he or she will not produce beyond what the family consumes if there is no way to sell or store surplus.<sup>1</sup> In many countries, including Kenya and India, farmers often operate on small plots of land without access to larger markets and productivity-enhancing inputs. The limitations smallholder farmers face create particular challenges for governments, which see a political conundrum inherent in the smallholders' need to scale up. Do governments necessarily know what is best for farmers or understand the full range of market dynamics? Are policies and regulations aligned with farmers' most pressing needs? As one private-sector representative noted, "Government wants to be the savior of the smallholder," often with unintended negative consequences.

In Kenya, drought and market conditions have made maize a challenging crop for many farmers; some stakeholders noted that crops other than maize (such as sorghum in East Kenya) could be better suited for market and production. As discussed below, common crops, such as beans, that have not been fully commercialized do not experience a significant payoff in the market, with implications for farmers in terms of income and access to higher performing inputs. Yet, these crops are familiar to farmers and have a high return in terms of food security.

*One of the greatest challenges for the farmer—which presents an inevitable puzzle for government policies and rules—is how to make agriculture remunerative in the market.*

One of the greatest challenges for the farmer—which presents an inevitable puzzle for government policies and rules—is how to make agriculture remunerative in the market. TechnoServe representatives cited "economic return" as the "greatest challenge" to agricultural development and food security. While the staple crops discussed in this report have experienced challenges, horticulture

1. Kuhlmann, "African Markets and Trade," 2010.

seems to be forging a different path. As companies such as Go4Fresh India, which has become the leading organic producer in Mumbai, have shown, agriculture can be highly remunerative under the right circumstances and can create opportunities for farmers, including small and vulnerable farmers, along the supply chain.

Horticulture has many unique characteristics that point to its potentially heightened role in food security efforts. Farmers of fruits and vegetables are better able to increase income faster because horticulture, unlike staple crops, can be harvested more frequently. “You can’t do that with other value chains,” noted Go4Fresh CEO Maruti Chapke. This allows fruits and vegetables to contribute to food security through both increased income for the farmer and improved access to nutritious foods. Organizations such as TechnoServe are seizing on these opportunities and working directly with farmers in Kenya and India to connect them to market opportunity and match supply with demand. Horticulture provides a path for engaging smallholder farmers in the market, while increasing productivity and reducing food loss to enhance food security. In India, the shift from rice, which one organization cited as a “loss-making crop,” to horticulture has produced marked results, with farmers’ annual incomes going up within a short span and families now staying in one place rather than migrating with crop cycles.

Fruits and vegetables also link naturally to more competitive regional and international agricultural value chains. Through these relationships, small farmers can gain the knowledge to spot other market opportunities, expand their production, or perhaps even strike out on their own and start related businesses capable of adding value and providing off-farm jobs.

In Kenya, the horticultural market is expanding. Tomato production is increasing, with production up from three metric tons (MT) to four to five MT per farm.<sup>2</sup> TechnoServe is working with 20,000 tomato farmers spread across four regions to help address gaps in the supply chain.<sup>3</sup> For example, a partnership with Syngenta has brought an improved tomato seed variety and better agricultural practices to farmers. However, challenges such as unpredictable weather, expensive logistics, poor transport, and lack of markets persist.

## ACCESS TO INPUTS

Access to quality inputs is another pressing issue for farmers, and here the policy and regulatory aspect is particularly significant. In Kenya, few farmers have access to high-quality seed outside of those producing hybrid maize. A range of stakeholders, ranging from private-sector groups such as the Seed Trade Association of Kenya (STAK), to nonprofit organizations such as the One Acre Fund have been amplifying the need to bring improved seed for a more diverse set of crops to the market.

*Access to quality inputs is another pressing issue for farmers, and here the policy and regulatory aspect is particularly significant.*

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2. TechnoServe, meeting with CSIS and NML team members, July 21, 2017.

3. Ibid.

During a site visit to Giwa Farms in Kenya, an impressive woman-run horticulture and dairy farm, owner Lucy Gichinga highlighted that although fruits and vegetables bring a higher profit, accessing quality inputs, including seed, is a pressing challenge. Most seed that is sold ends up not performing well, and it can take years to find a reliable seed retailer. Accessing fertilizer is also difficult, and fertilizer can be very expensive in the market. While the Kenyan government has programs in place on both seed and fertilizer, government-supported suppliers are located only in specific places that are far from where many businesses operate, sometimes making it more expensive than buying inputs in the market.

A number of donor programs are focused on bridging this market gap. The Alliance for a Green Revolution in Africa (AGRA), for example, has worked to build a robust network of agro-dealers, including in Kenya. To highlight the impact of these interventions, a single entrepreneur who benefitted from AGRA's efforts now provides agro-supplies to almost 200 other farmers every day and is able to offer financial services to a network of over 14,000 farmers.<sup>4</sup> The Syngenta Foundation for Sustainable Agriculture has developed a scalable flagship project in India to train rural villagers, many of whom are young, to be agricultural entrepreneurs who set up small shops to provide inputs, facilitate connections to the market, and provide credit solutions for farmers. In 2014, the program reached about 6,000 farmers, and the Syngenta Foundation's target is to reach up to 200,000 farmers,<sup>5</sup> an increasing number of whom are women.

Local stakeholders and donors have also focused heavily on the enabling environment for seed and other inputs, because many governments, including Kenya, tend to have intricate regulatory systems governing inputs. As several stakeholders noted, Kenya has focused on improving its regulatory system for seed in line with good regulatory practices. While additional steps remain, if this momentum continues and Kenya simplifies its regulatory processes in line with market needs, it could emerge as a regional model. For some crops, such as maize, farmers can somewhat readily access improved seed, although for other crops, such as beans, good seed is more difficult to find. Difficulty accessing quality seed can be attributed to both the regulatory environment within the country and region and the lack of commercial interest in certain crops. Efforts have also focused on improving national-level breeding programs, investing in new varieties, and expanding research and commercial activity across a wider range of crops, including neglected and underutilized crops that are central to food security (see Box 2.1).

Kenya's private sector has become better organized and has advocated for change in the enabling environment. The industry association, STAK, was formed in 1982 to improve the enabling environment for seed and recently pushed for updated seed regulations that would authorize private seed inspectors and enhance the government's capacity to test and certify seed. While this change is new (the regulations went into effect in 2016) and still under implementation (including training of field inspectors and work with local companies to register new seed varieties), other countries,

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4. Alliance for a Green Revolution in Arica (AGRA), "Agro-Dealer Businesses Thriving in Kenya," August 16, 2017, <https://agra.org/agro-dealer-businesses-thriving-in-kenya-2/>.

5. Syngenta Foundation India, "Agri-Entrepreneur Model: Scaling Up Agriculture Development," February 2017, <https://www.syngentafoundation.org/smallholders-india>.





Kavita Kishore Patil, a successful agricultural entrepreneur trained by the Syngenta Foundation, has provided nearly \$50,000 in loans this year through a partnership with a local bank, giving farmers access to credit and high-quality inputs that she sells through her shop.

Photo credit: Kimberly Flowers, CSIS.

such as Zambia, have seen a marked benefit to the development of the seed sector through similar policy changes.<sup>6</sup> With STAK, the Kenya Plant Health Inspectorate Service (KEPHIS) also recently launched a significant effort to combat counterfeit seed: the seed scratch-off sticker labels. As of October 2017, seed packages of up to 10 kilograms will now include a label for the farmer/buyer to scratch off. The label will reveal a unique four-digit code to send via text message

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6. The legal systems in both Zambia and Zimbabwe allow for accreditation of private seed inspectors, and both countries have relatively well-developed seed sectors, reportedly due in part to policy changes such as this. South Africa pioneered private seed inspection and certification in sub-Saharan Africa through the South African National Seed Organization (SANSOR). Notably, however, South Africa has a much different regulatory system, essentially following a “truth in labeling” approach similar to the U.S. system that relies upon the private sector to maintain quality with government enforcing standards once seeds reach the market. This “ex post” type of regulatory system is widely perceived within sub-Saharan Africa as unobtainable, however, at least in the short term, and most countries continue to regulate market activity before it occurs (an “ex ante” approach), with some signs of a hybrid approach, such as in Kenya, Zambia, and Zimbabwe.

## BOX 2.1. A New Model Platform: The African Orphan Crops Consortium<sup>1</sup>

The African Orphan Crops Consortium (AOCC) is a unique multistakeholder platform that brings together the efforts of government, scientific, academic, private-sector, and nongovernmental (NGO) partners to bring a more diverse set of crops with higher nutritional content into the main-stream market. Among others, it includes the African Union's New Partnership for Africa's Development (NEPAD); Mars, Incorporated; AGRA; and the World Wildlife Fund. AOCC focuses on crops that have been largely ignored by researchers and the private sector and those that have missed the huge technological advances that have allowed for increases in yield and disease and pest resistance in crops such as maize, wheat, and rice, despite being staples for up to 250 million small-holder African farmers. The platform is conducting genome mapping (and putting all of its data in the public domain) and developing a new cohort of researchers focused on 101 so-called orphan or neglected crops, including millet, sorghum, baobab, and cassava along with varieties of beans, lentils, fruits and vegetables, and nuts.

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1. African Orphan Crops Consortium, "Home," 2017, <http://africanorphancrops.org>; African Orphan Crops Consortium, "Plant Breeding Academy: Boosting Africa's Food Supply with Improved Indigenous Crops," December 4, 2013, <http://africanorphancrops.org/plant-breeding-academy-boosting-africas-food-supply-with-improved-indigenous-crops/>; John Vidal and Mark Tran, "Decoding 'Orphan Crop' Genomes Could Save Millions of Lives in Africa," *The Guardian*, June 1, 2013, <https://www.theguardian.com/science/2013/jun/02/genetic-mapping-plan-to-boost-africa-crops>.

to verify whether the seed is genuine, thus addressing the significant challenge of fake seed in the market.<sup>7</sup>

Notably, STAK and other industry stakeholders have also advocated for greater focus on crops such as beans, cassava, and potato in order to build Kenya's market and improve food security. STAK has been a partner in a market innovation to share information on both market participants and the enabling environment, which will be important as Kenya's seed sector grows. The Seed Sector Platform Kenya (see Box 2.2), promoted by STAK and the Kenyan government, brings critical information to stakeholders, helps encourage greater participation in the market, and improves access to higher quality seed, with far-reaching implications for food security.

Despite improvements to Kenya's seed regulatory system, it reportedly can still take around 33 months to release a new seed variety in Kenya. Most new varieties released are for maize, although there has been a slight increase in the release of other varieties (mainly beans and cowpea; and also recently new sorghum varieties).<sup>8</sup> The number of steps involved in the regulatory process for releasing seed is one of the main factors that impacts the time involved in releasing new seed varieties. A separate process for certifying seed, a regulatory process common in sub-Saharan

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7. Amos Kerich, "No More Fake Seeds as Labels, Mobile Authentication Launched," *Star*, October 24, 2017, [https://www.the-star.co.ke/news/2017/10/14/no-more-fake-seeds-as-labels-mobile-authentication-launched\\_c1652405](https://www.the-star.co.ke/news/2017/10/14/no-more-fake-seeds-as-labels-mobile-authentication-launched_c1652405).

8. Edward Mabaya and John Mburu, "Kenya Brief 2016: The African Seed Access Index," The African Seed Access Index (TASAI), December 2016, 2, <http://tasai.org/wp-content/uploads/TASAI-Brief-Kenya-2016-LR-CIRC-1.pdf>.

## BOX 2.2. Seed Sector Platform Kenya<sup>1</sup>

The Seed Sector Platform Kenya is an example of a technology-based innovation that will bridge farmers' access to the market and address a critical issue in trade and food security. The Seed Sector Platform includes over 5,000 registered agro-dealers in Kenya and uses technology to respond to farmers' needs in accessing high-quality seed reliably and consistently. Developed by AgriExperience and Kenya Markets Trust, and supported by STAK, the Seed Sector Platform is a set of three searchable databases: (1) SeedWorks, which provides information on different seeds available in the market; (2) SeedShop, which includes information on sellers and distributors of seed at the local and county level; and (3) the Seed Industry Directory, which not only includes sector experts in seed and other inputs but other resources, such as financial services, as well. The Kenyan government is a key partner in the Seed Sector Platform, both promoting its success and drawing from lessons learned to help tailor policy formulation and implementation of the regulatory system to better serve farmers.

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1. Seed Sector Platform Kenya, "Welcome," 2017, <http://www.seedsectorplatformkenya.com>.

Africa for verifying quality standards, is also required and adds to the time it takes to get new seeds into the market.<sup>9</sup>

Local and international stakeholders also cited the importance of implementing harmonized regional seed rules, which would make it easier and quicker for quality seed to get to farmers. While efforts are under way, many countries still have work to do in making sure these systems work in practice. Ultimately, the success of these regional efforts will rest upon how well countries domesticate regional rules and recognize each other's national regulatory systems as seed starts to move across borders. Stakeholders also stressed the need for ramping up educational efforts to make sure that local stakeholders are aware of the rules governing regional markets. For example, Kenya's new seed regulations reference the COMESA Seed Trade Harmonization Regulations, but many market stakeholders are not fully aware of what the regional rules entail.

In many cases, however, the market for inputs does not match food security needs. Beans in Kenya are an example of this disconnect. Although legumes are not commercialized like grains, they are consumed in large quantities and have significant nutritional benefits. Research to produce better varieties is a focus of donor support, including the Bill & Melinda Gates Foundation, particularly in the tropic regions through partners such as the CIAT, yet many farmers do not have access to the improved technology. Trade in beans remains largely informal (in fact, over

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9. Katrin Kuhlmann and Yuan Zhou, *Seed Policy Harmonization in the EAC and COMESA: The Case of Kenya* (Basel, Switzerland: Syngenta Foundation for Sustainable Agriculture, September 2015), [https://www.syngentafoundation.org/sites/g/files/zhg576/f/seeds\\_policy\\_kenya\\_case\\_study\\_sept15.pdf](https://www.syngentafoundation.org/sites/g/files/zhg576/f/seeds_policy_kenya_case_study_sept15.pdf).



Beans in Kenya are consumed in large quantities and have significant nutritional value. Yet trade is largely informal and farmers lack access to high quality varieties.

Photo credit: Kimberly Flowers, CSIS.

90 percent of bean trade in Eastern and Southern Africa is informal),<sup>10</sup> and most farmers lack access to more productive bean varieties and needed market services. Unlike crops such as maize, the informal nature of bean trade deters uptake by the private sector. However, CIAT is working with farmers to increase education on the value of high-quality seed, including certified seed. Due to the challenges with commercializing beans, CIAT is also exploring a regional approach—commodity corridors—to demonstrate economies of scale and the market possibility of improved bean seed (see Box 2.3). Donors may be focused on creating trade, but, according to CIAT, “there is a need to demonstrate gains to the private sector and demand for quality seed” before trade will occur.

As evidenced by Vision 2030, the Kenyan government has also been proactively involved in the fertilizer sector. Similar to seed, fertilizer is subject to complex regulations, and all fertilizer must be registered and approved before being marketed to the farmer. High costs, attributed to challenges with regulations and the transportation and distribution systems, often result in a decrease in

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10. Birachi Eliud, Buruchara Robin, Odhiambo Collins, Kalemera Sylvia, and Jean Claude Rubyogo, “Bean Corridors: A Novel Approach to Scale Up National and Regional Trade in Africa,” Pan-African Bean Research Alliance (PABRA), October 2017, [https://cgspace.cgiar.org/bitstream/handle/10568/80540/PABRA20\\_Bean\\_Corridors\\_BRIEF.pdf?sequence=5](https://cgspace.cgiar.org/bitstream/handle/10568/80540/PABRA20_Bean_Corridors_BRIEF.pdf?sequence=5).

### BOX 2.3. CIAT Bean Corridors<sup>1</sup>

Regional trade could be the solution to commercializing beans and perhaps other neglected crops. CIAT and the Pan African Bean Research Alliance are rolling out Bean Corridors, which are made up of production, distribution (distribution and aggregation centers, warehousing and storage, and commodity exchanges), and consumption hubs (market and retail outlets, dealers, and processing units). The nine Bean Corridors follow the geography of the market across 17 countries. They will address production and distribution bottlenecks and market failures (including cross-border trade barriers) to ensure that improved bean seed and market opportunities reach smallholders, many of whom are women, and better bean varieties reach consumers. Through a regional approach, greater formality and commercial opportunity could enter the market, better linking farmers to the market and providing a platform for sustained engagement with policymakers.

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1. Eliud et al., "Bean Corridors."

fertilizer use. Counterfeit fertilizer remains a serious issue as well. Due to these dynamics, the market for fertilizer is not diverse, despite innovations that could help the smallholder farmer. Agrochemicals are similarly heavily regulated, and pests remain a significant challenge for both Kenyan and Indian farmers, as discussed in greater detail in the section on traceability in Chapter 4. Overall, farmers' inability to determine which inputs to use (and in what quantity) has an impact throughout the value chain.

The market for inputs has evolved somewhat differently in India, where seed and other inputs are not as heavily regulated, yet use of inputs remains controversial in India as well. Despite a more open regulatory system for seed, Indian farmers do report issues with getting good quality seeds at reasonable prices, particularly for rice,<sup>11</sup> due perhaps to the lack of adequate storage for seed and a knowledge gap between farmers, government employees, researchers, and suppliers.<sup>12</sup>

Another difference between the Kenyan and Indian systems for regulating seed is treatment of biotechnology. Regardless of regulatory approach, as one company representative noted, "There are a lot of emotions [around] seed." In Africa, the commercial sale of biotech seed is largely prohibited, although some countries, including Kenya, are examining restrictions on biotech seed and considering whether importation for research purposes should be permitted under the law.<sup>13</sup>

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11. Suresh P. Singh and Nitesh Kumar, "Rice Seeds Availability in India and Bangladesh: Farmer's Perspective," Briefing Paper No. 4, CUTS International, 2014, [http://www.cuts-citee.org/RISTE/pdf/Briefing\\_Paper14-Rice\\_Seeds\\_Availability\\_in\\_India\\_and\\_Bangladesh\\_Farmers\\_Perspective.pdf](http://www.cuts-citee.org/RISTE/pdf/Briefing_Paper14-Rice_Seeds_Availability_in_India_and_Bangladesh_Farmers_Perspective.pdf).

12. Suresh P. Singh, Saurabh Kumar, Nitesh Kumar Singh, and Neha Jain, *Rice Seeds: A Study of Availability and Accessibility in Bangladesh and India* (Jaipur: CUTS International, March 2014), viii, [http://www.cuts-citee.org/riste/pdf/Rice\\_Seeds-A\\_Study\\_of\\_Availability\\_and\\_Accessibility\\_in\\_Bangladesh\\_and\\_India.pdf](http://www.cuts-citee.org/riste/pdf/Rice_Seeds-A_Study_of_Availability_and_Accessibility_in_Bangladesh_and_India.pdf).

13. International Service for the Acquisition of Agri-biotech Applications (ISAAA), *Global Status of Commercialized Biotech/GM Crops: 2016*, ISAAA Brief No. 52 (Ithaca, NY: ISAAA, 2016), <http://www.isaaa.org/resources/publications/briefs/52/download/isaaa-brief-52-2016.pdf>.

In October 2016, the Kenyan National Biosafety Authority granted permission for the Kenya Agricultural and Livestock Research Organization (KALRO) and the African Agricultural Technology Foundation (AATF) to test genetically modified maize seeds, but the Kenyan National Environmental Management Authority later reversed this approval. In India, the government allows biotech seed into the market, but this has been limited mainly to cotton seed (BT Cotton). Kenya has also taken a less restrictive stance on BT Cotton, although this position does raise important questions for food security.

# Getting to the Market: Market Connectivity and Postharvest Services

What happens on the farm is only one part of the food security equation. As food moves from the farm into the market, market connectivity presents both opportunities and challenges. For farmers, improved market connectivity—through infrastructure and improved regulatory implementation—can help secure increased income, bring businesses to scale, and open up access to needed inputs and services. Improved market connectivity also helps economies diversify and move into levels of the supply chain that deliver more value, including processed foods. A range of issues, all with links to the regulatory system, arise at the market level that impact farmers, consumers, and governments and directly affect food security. These include availability of storage, postharvest treatments, and transport services. Adherence to standards is also a significant policy challenge in most value chains, including horticulture and grains.

*For farmers, improved market connectivity—through infrastructure and improved regulatory implementation—can help secure increased income, bring businesses to scale, and open up access to needed inputs and services.*

Ultimately, many farmers in Kenya and India struggle to market the food they produce. At the farm level, this dynamic makes it difficult for farmers to know how much food to grow. At the market level, consumers cannot get the food that they need. In India, the regulatory structure sets up state-governed markets through the Agricultural Produce Marketing Committee (APMC) system. The Indian government is also involved in market pricing through minimum support and statutory prices for certain crops, which the state purchases whenever the price falls below a prescribed threshold.<sup>1</sup> While these interventions are often done with

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1. Neha Tomar, "APMC Act in India: Rising Food Inflation a Decade Story," *International Journal of Social Science & Interdisciplinary Research* 2, no. 7 (July 2013): 39, <http://www.indianresearchjournals.com/pdf/IJSSIR/2013/July/5.pdf>.



At Go4Fresh, a leading organic producer in Mumbai, an employee sorts and packs fresh eggplant, a postharvest service that connects produce from smallholders to new markets. Photo credit: Kimberly Flowers, CSIS.

the intention of protecting farmers' interests and encouraging increased production, they can limit rather than encourage the market in some cases.

Postharvest services are often needed to address gaps in the value chain and increase the capacity to process and store food, connecting the production stage to later stages of the value chain. These include sorting, grading, cleaning, packing, cooling, transport, and cold storage services (see Figure 3.1). While farmers sometimes perform these services, outside service providers become more prevalent as markets develop, particularly in areas such as storage and transport. Regardless of the degree to which the farmer is directly involved, the availability and quality of these services are an important factor in farmers' ability to reach markets and safeguard the profits they earn for their produce.

There is ample room for government to tailor policy responses to strengthen farmers' links to needed market services. From a regulatory perspective, simplifying market entry requirements (for example, licensing regimes) and allowing for open competition in the market can help ensure that



farmers are able to access the services they need. While hard infrastructure is often needed, simpler postharvest technology can have a more positive impact over the long term than complex (and costly) projects. Identifying proper harvest timing, upgrading containers used for handling and transport, and improving on-farm storage practices have all been more successful than large-scale efforts in many cases, which sometimes encounter problems with site location, high energy costs, and lack of trained local personnel.<sup>2</sup>

## STORAGE AND FOOD WASTE

Storage is one of the main challenges in most developing markets, and this certainly holds true in both India and Kenya. Food loss remains a rampant challenge, accounting for 20–22 percent of production in India.<sup>3</sup> Postharvest losses for cereals in East Africa are difficult to accurately estimate but can range from 5 percent to over 30 percent.<sup>4</sup> As one company representative stressed, “Food loss is a sin.”

The disconnect between the farmer and the market is often a root cause of food loss and waste, and the policy environment also plays a role. If prices are not remunerative, farmers often will not transport the crop to the market and will instead dump produce. Go4Fresh India estimates annual fruit and vegetable loss at approximately \$6 billion (or 400 billion rupees) per year and it is actively working to cut waste by one million MT by 2030 through support to one million fruit and vegetable farmers. Go4Fresh’s responsible sourcing model enables farmers to capture a larger share of what the consumer pays (the farmer’s share can be as low as 10 percent under traditional market structures).

Storage is typically addressed at the national level through policies such as storage standards, although the interconnected nature of markets necessitates that both storage and food safety standards, discussed below, align with regional and international standards. These include standards set by the Codex Alimentarius Commission (Codex), the International Organization for Standardization (ISO), and the Hazard Analysis and Critical Control Points (HACCP), which is a risk-based, science-based tool used by both the private and public sectors to establish efficient

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2. Lisa Kitinoja, *Use of Cold Chains for Reducing Food Losses in Developing Countries* (La Pine, OR: Postharvest Education Foundation, December 2013), <http://www.postharvest.org/Use%20of%20cold%20chains%20PEF%20white%20paper%2013-03%20final.pdf>.

3. Paul Artiuch and Samuel Kornstein, *Sustainable Approaches to Reducing Food Waste in India* (Cambridge, MA: MIT Independent Activities Period Research Project, February 2012), [http://web.mit.edu/CoLab/pdf/papers/Reducing\\_Food\\_Waste\\_India.pdf](http://web.mit.edu/CoLab/pdf/papers/Reducing_Food_Waste_India.pdf).

4. F. Rembold, R. Hodges, M. Bernard, H. Knipschild, and O. Léo, *The African Postharvest Losses Information System (APHLIS): An Innovative Framework to Analyse and Compute Quantitative Postharvest Losses for Cereals under Different Farming and Environmental Conditions in East and Southern Africa* (Luxembourg: Joint Research Centre, Institute for Environment and Sustainability, 2011), iv, <http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/15877/1/lbna24712enc.pdf>.

and effective food safety practices. Training at the national level, including through industry associations, can help ensure that standards align.

Transport is critical to addressing both food waste and farmer remuneration, as transport services connect numerous stages of the agricultural value chain. Inefficient regulation of transit charges, freight tariffs, and transport services can contribute to costs and delays, while regulatory limitations on competition are a factor in the emergence of cartels that further increase the cost of transport services. According to the World Bank, Africa's transport costs are the highest in world<sup>5</sup> and almost twice the level of other developing regions.<sup>6</sup>

Different regulatory requirements among regions and between countries can impede movement of agricultural goods across borders (for example, conflicting regulations among neighboring countries on axle weight requirements for trucks). In East Africa, regulatory challenges and excess duties charged on the transport of produce from one county to (or through) another can be a significant factor in food loss. In addition, the FAO estimates that transport costs can make up as much as 77 percent of export costs.<sup>7</sup> Due to its central role in export costs and trade competitiveness, the World Bank estimates that a 10 percent drop in transport costs would result in a 25 percent increase in total African trade.<sup>8</sup> On a similarly promising note, the Organization for Economic Co-Operation and Development (OECD) estimates that a 10 percent improvement in infrastructure and transport related to trade is capable of increasing exports for developing countries by 30 percent.<sup>9</sup>

In addition to storage, transport, and financial services, other services are critical to growth of the agricultural sector, including information and communication technology (ICT) and energy services. These market services also tend to be heavily regulated (for example, limitations on service providers or restrictions on trade in needed components) and should be assessed in terms of food security as well as overall economic development.

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5. Nannette Christ and Michael J. Ferrantino, "Land Transport for Exports: The Effects of Cost, Time and Uncertainty in Sub-Saharan Africa," *World Development* 39, no. 10 (October 2011): 1749–1759. Transport costs can account for up to one-third of GDP and can represent much of the export value for many landlocked countries. In Rwanda, for example, transport costs accounted for up to 40 percent of the value of coffee exports in 2009.

6. Committee on Trade, Regional Cooperation and Integration (CTRCl), "Trade Facilitation to Promote Intra-African Trade," Fourth Session, Addis Ababa, Ethiopia, March 24–25, 2005, <http://www1.uneca.org/ctrcli/4TradeFacilitationIntraAfricanTrade.aspx>.

7. FAO, "The Special Challenge for Sub-Saharan Africa," High Level Expert Forum—How to Feed the World in 2050, 2009, [http://www.fao.org/fileadmin/templates/wsfs/docs/Issues\\_papers/HLEF2050\\_Africa.pdf](http://www.fao.org/fileadmin/templates/wsfs/docs/Issues_papers/HLEF2050_Africa.pdf).

8. Supe Teravaninthorn and Gaël Raballand, *Transport Prices and Costs in Africa: A Review of the International Corridors* (Washington, DC: World Bank, 2009), <https://openknowledge.worldbank.org/bitstream/handle/10986/6610/461810PUB0Box3101OFFICIAL0USE0ONLY1.pdf?sequence=1>.

9. Evdokia Moïse, Claire Delpeuch, Silvia Sorescu, Novella Bottini, and Arthur Foch, *Estimating the Constraints to Agricultural Trade of Developing Countries*, OECD Trade Policy Papers No. 142 (Paris: Organization for Economic Cooperation and Development, January 2013), [http://www.oecd-ilibrary.org/trade/estimating-the-constraints-to-agricultural-trade-of-developing-countries\\_5k4c9kwfdx8r-en](http://www.oecd-ilibrary.org/trade/estimating-the-constraints-to-agricultural-trade-of-developing-countries_5k4c9kwfdx8r-en).

## COLD CHAIN

For value chains with high perishability and the need for climate-controlled storage (which can also be important to address pests and disease challenges), the cold chain is particularly critical. These value chains include not only fruits and vegetables but grains as well. A functioning cold chain prevents food waste, helps maintain the nutritional value of foods, and ensures that more food reaches the market, with extended shelf life and improved quality.<sup>10</sup>

Cold or “cool” chain integrates all aspects of postharvest logistics<sup>11</sup> and is often a regulatory requirement. The U.S. Food Safety Modernization Act is one example. A farmer, handler, or trader often has little incentive to invest in the cold chain, because gaps in other parts of the supply chain limit the added value of the investment. A farmer, for example, would not invest in an evaporative cooler unless there was also refrigerated transport on the way to the market. As the cold chain has improved, additional issues have surfaced in both Kenya and India. In Kenya, the Horticultural Crops Development Authority (HCDA) partnered with the Japan International Cooperation Agency (JICA) to build pre-cooling and cold storage facilities, yielding some important lessons. First, training tends to produce longer-term benefits than infrastructure development alone. Second, the location of cold chain facilities is significant. In Kenya’s case, cold storage within airport grounds would be ideal. Finally, growers need to be able to trust distribution agreements, or there will be a challenge transferring produce to cold storage.<sup>12</sup>

In India, efforts to enhance the cold chain have been rooted in policy, beginning with a 2007 national Technical Standards Committee, established to develop and implement cold chain infrastructure. As in other areas, India’s national policies pave the way for state-level action, and state efforts have been largely focused on the horticultural sector. In Rajasthan, a policy scheme was introduced to link groups of producers to processors and markets by enhancing supply chain management. Previous analysis by New Markets Lab suggested that targeted policy interventions—such as improving the refrigerated transport licensing regime by extending validity periods, improving the licensing renewal process, and supporting interstate movement of vehicles—could promote improved cold chain access within and between states.

In addition to access to adequate storage, collateral and access to finance are critical challenges for many small farmers. As a private-sector representative in India pointed out, “Supply to warehouses is not guaranteed, and contracts mean nothing here.” Stakeholders in Kenya also voiced this concern. Farmers, particularly resource-poor smallholders, are often unattractive credit candidates for financial institutions because of their inability to hold sufficiently recognized collateral and the unpredictable, fragmented, and unstructured nature of much of the agricultural sector.

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10. Kitinoja, *Use of Cold Chains for Reducing Food Losses in Developing Countries*, 4.

11. Although cold chain and cool chain are often used interchangeably, a cool chain specifically refers to the agricultural value chain for handling fresh tropical fruits and vegetables, which do not require higher temperatures than is acceptable in cold chains. The difference is significant as cool chain technology can be simple, low cost, and easy to manage. *Ibid.*, 7.

12. Lisa Kitinoja, *Identification of Appropriate Postharvest Technologies for Improving Market Access and Incomes for Small Horticultural Farmers in Sub-Saharan African and South Asia*, WFL0 Final Grant Report (Alexandria, VA: World Food Logistics Organization, March 2010), <http://ucanr.edu/datastoreFiles/234-1847.pdf>.

**Figure 3.1. Example of Cold Chain System**



Source: Sajjadur Rahman and Martin Swapan Pandey, "Cold Chain Can Save Food Supply Chain," *Daily Star*, September 16, 2014, <http://www.thedailystar.net/cold-chain-can-save-food-supply-chain-41858>.

### BOX 3.1. Warehouse Receipt System

The warehouse receipt system (WRS) is a model designed to improve liquidity in rural areas and encourage standards-based warehousing of agricultural commodities. Storage and quality control of produce deposited by farmers are provided in exchange for a financing instrument, a warehousing receipt (WR), which is a type of secured collateral and enables farmers to obtain short-term loans and working capital. For the farmer, the WRS helps to maintain quality of produce and provides a way to receive payment even before product goes to market, thus ensuring that quality food reaches the market and is not disposed of in frustration. The WRS also gives farmers a vehicle for obtaining credit, which can be a challenge for many small farmers.

Legal frameworks are central to both the need for and success of the WRS. In India, the national Warehousing (Development and Regulation) Act 2007 and various rules and regulations established the legal and institutional framework for WRS and govern the registration, accreditation, and management of warehouses that operate in the system. This process, which is directly linked with the horticultural sector, must also be implemented at the state level. In India, the system could be strengthened through stronger links with quality control measures and remedies for breach of contract. Kenya is also taking steps to introduce a WRS with its Warehouse Receipt System Bill, although legislation will need to be reintroduced during the next session of parliament. Unlike other countries (for example, South Africa), Kenya does not have a structured trading system in the commodities market, and contract law is at times unreliable and not enforced. This makes the WRS a potentially useful tool in Kenya and other countries in which the legal and agricultural systems still have gaps.

The warehouse receipt system (WRS) offers a potential solution to challenges with storage, credit, finance, and enforcement of contracts (see Box 3.1). For horticulture and some grains, access to climate-controlled storage can be one of the most effective ways to reduce food loss, if produce can reach the storage facility.

Warehouse receipt systems are one example of an approach that would leapfrog challenges in both market infrastructure and regulation, although any WRS requires a solid legal infrastructure to work well. Other models for improving agricultural finance, which can work despite challenges presented by small landholdings and lack of registered land as collateral, include lease financing and nonbank financial services. Along with WRS, such services are receiving greater focus as well. Finally, farmer aggregation models (see Chapter 1) can be a critical link with postharvest services, including processing, in all developing markets including Kenya and India.

# Tracing Food Back to the Market: Standards, Food Safety, and Consumer Protection

Around the world, the nature of markets is changing, as are consumer preferences. Consumers and trading partners increasingly require that food is traceable from the farm up through the market, and regulation around standards and traceability is becoming more comprehensive. Standards in the market have become central to the opportunities available to the farmer and the quality assurance that consumers expect. These standards include the conditions under which the food was grown, the amount and type of pesticides and other agrochemicals used in production, and packaging and labeling standards. A range of regulatory responses, including alignment with international standards, licensing procedures, and monitoring and certification exist to address standards challenges.

Implementing food safety systems can be costly, and it can be especially difficult for developing countries and their producers to absorb these costs. In East Africa, it is estimated that these expenses and other nontariff measures, when combined with postharvest losses, can leave as little as 20 percent of the market price to the farmer.<sup>1</sup> Standards alone are but one element; packaging and labeling are also central to protecting food from being damaged or contaminated. Packaging and labeling requirements not only benefit the consumer, they can be helpful to the farmer as well, provided that these rules are known, and compliance is user friendly. In many cases, regulations on the type of packaging, size, and cleanliness are applied differently depending on the market. In many developing countries, manufacturers may not have access to the necessary supply of packaging materials, making it difficult

*Consumers and trading partners increasingly require that food is traceable from the farm up through the market, and regulation around standards and traceability is becoming more comprehensive.*

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1. Moisé et al., *Estimating the Constraints to Agricultural Trade of Developing Countries*, 13.

to follow regulations. Many value chains also lack technology and trained personnel to provide proper nutrient labeling and enforce the rules on the books.

Governments often enforce food safety through inspection, which can be an effective tool in some cases but is often resource intensive. Inspections are common at different stages in many value chains, including seed certification and commercialization, food production and processing, and importation. Allowing the private sector to self-inspect, which can be monitored through government enforcement, is a good regulatory practice that can help more evenly spread regulatory burden and resources. Kenya is moving in this direction in some cases, such as recent regulatory changes that allow for authorization of private seed inspectors, and sharing the burden of enforcement can be critical in standards and traceability as well.

As agricultural products are traded in larger markets, standards, which are ultimately intended to ensure food quality, tend to become more exacting and complex. Standards also come from both the public and private sectors, and the two streams of market control are not always coordinated as closely as possible. Regulations on food safety, quality, and labeling requirements may call for sophisticated systems for food safety management. While this burden tends to fall on manufacturers and exporters, it does impact farmers who sell their produce for processing purposes or who may hope to move their activities up the value chain to reap higher profits. At a more macro level, a study by the Asian Development Bank indicates that food safety standards for processed food exports tend to have a negative impact on developing countries, which often lack the capacity to meet complicated standards.<sup>2</sup>

In India, out of the total production of fruits and vegetables, nearly 76 percent is consumed in fresh form, while only 2 percent of vegetable production and 4 percent of fruit production are processed.<sup>3</sup> The fruit and vegetable processing industry in India is highly decentralized and largely small-scale (250 tons per year capacity).<sup>4</sup> In contrast, large Indian and multinational companies have capacities in the range of 30 tons per hour.<sup>5</sup> The most viable processed items in India are currently fruit pulps and juices, fruit-based ready-to-serve beverages, canned fruits and vegetables, jams, squashes, pickles, chutneys, and dehydrated vegetables. More recently, products such as frozen dried fruits and vegetables, frozen pulps, fruit juice concentrates, vegetable curries in restorable pouches, and canned mushrooms and mushroom products have become more prevalent in the food processing industry. Some products in which India would appear to have an advantage, such as orange juice concentrate, are imported rather than processed domestically. In Kenya, the market could have the potential to respond to growing international demand for tropical juices, but this industry has not yet developed, perhaps due to gaps in the supply chain.

Stakeholders noted that for the Indian fruits and vegetables sector in particular, the potential for high employment and better returns to farmers will fully materialize only if product and food safety

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2. Ibid., 19.

3. Ministry of Food Processing Industries, Government of India, "Investor's Portal of MOFPI: Fruits and Vegetables," accessed November 16, 2017, <http://foodprocessingindia.co.in/sector-profile/fruits-andvegetables.html>.

4. Purushottam Bung, "Indian Fruit Processing Industry: Import and Export Analysis," *Dharana* 6, no. 2 (July–December 2012): 71–85.

5. Ibid., 75.

standards are consistently met and enforced throughout the country.<sup>6</sup> Under the current APMC system, the Mandi, or market yard, off-takes produce from farmers, but ensuring standards and traceability remains a challenge throughout the APMC system. Given that processed foods are increasingly geared toward export markets, standards will become more of an issue, and again some of the burden will trickle down to the farmer even without on-farm processing. India's public and private sectors have attempted to address these challenges. For example, a private company in India created GrapeNet, a type of software with an online database that helps improve traceability and monitoring, and ensures that international standards are met for all stakeholders in the Indian table grape export supply chain.<sup>7</sup> As a response to GrapeNet's success, the Indian government later developed HortiNet, which includes mangoes and vegetables.<sup>8</sup>

In the area of standards, India does provide an instructive example of a regulatory structure that incorporates producers' needs. Under the National Fruits and Vegetables Grading and Marketing Rules, most recently amended in 2012, India established different tiers of standards tailored to produce's different purposes. This includes minimum standards for all produce, voluntary standards for internal trade, and mandatory standards for goods set to be exported. The plan also includes investment in postharvest services and infrastructure and a scheme targeting grading at the producer level that is designed to allow farmers to subject their produce to simple tests and receive a grade before the produce is sold. Small measures can make a big difference because they help producers comply with standards and ensure that prices are commensurate with the quality of the produce.<sup>9</sup> They also allow farmers to capture the extra value that should be earned as a consequence of following stricter food safety and quality standards, and may encourage more farmers to reach larger markets.

Export market standards can be a significant factor in determining which markets to target. The European Union is a main export market for Kenya's horticultural produce, and the Economic Partnership Agreement (EPA) between the EAC and the European Union (which Kenya has signed) is the main legal instrument that facilitates this trade. According to one stakeholder, Kenya sends 80 different kinds of vegetables to Europe, 70 of which are produced by smallholders (often under contract farming arrangements). Regulatory requirements for entering the European market include conformity checks, maximum residue levels of pesticides, and a range of private standards. These requirements became stronger in the 1990s when the European industry saw an increase in plant and animal health diseases in imports. In 1997, European vegetables and fruits businesses

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6. Swaniti Initiative, "Food Safety in India: Regulatory Framework and Challenges," 2015, <http://www.swaniti.com/wp-content/uploads/2015/06/Food-safety-in-India-1.pdf>.

7. Danashree Shukla and Elisa Sabbion, "Electronic Traceability of Agricultural Products in India: The Case of GrapeNet," Brief No. 15, UN Network of Experts for Paperless Trade and Transport in Asia and the Pacific (UNNEXt), August 2015, 2, <http://www.unescap.org/sites/default/files/Brief15.pdf>; Logicsoft, "GrapeNet: Traceability Solution for Fresh Grapes Exported from India," accessed November 16, 2017, <http://food-traceability.logicsoft.online/grapeNet-grape-traceability-software/>.

8. The Agricultural and Processed Food Products Export Development Authority (APEDA) has GrapeNet for grapes and AnarNet for pomegranate, while mango and vegetables exporters are registered with state horticulture departments.

9. "Regulatory Enablers for Spices and Horticulture Value Chain in Kota Division, Rajasthan, India," New Markets Lab, 2016, 120–121.



developed the EUREPGAP Fruit and Vegetables Certification (there is a similar GlobalG.A.P. certification for non-EU trade), which importers must meet in addition to European Council regulations. As is true with market services, training can play a critical role. For example, India has a program focused on capacity building and standards harmonization designed to address the lack of information around standards and promote the implementation of better standards for export.<sup>10</sup>

Internationally, some products, particularly horticultural products, can spend years in the pipeline for export approval. For example, the International Food and Agricultural Trade Policy Council noted that products destined for the U.S. market could wait 2–5 years or more for a green light from the U.S. Animal and Plant Health Inspection Service (APHIS), despite already having approval to export to Europe.<sup>11</sup> For exports of fruit and vegetables to the United States, one HACCP requirement is to reduce microbial contamination. In countries that do not mandate HACCP, the burden shifts to exporters, who must either spend on reducing risks or export to other countries that do not have such strict rules.<sup>12</sup>

Based on discussions with enterprises, exporters will sometimes target markets with less complicated standards. Based on research and consultations, the Middle East appears to have more user-friendly food safety standards than the European or U.S. markets. Kenyan mango is one example; it is exported only to limited destinations, mainly in the Middle East, due to the challenging quality standards in other markets. Notably, regional markets—particularly within sub-Saharan Africa—can sometimes be the most difficult to access, both in terms of standards and duties. Addressing this hurdle will be of paramount importance to food security efforts going forward.

## PEST AND DISEASE MANAGEMENT

Despite the complexities inherent in compliance with stricter standards, however, there are clear benefits. Control of pests and food toxins has become increasingly critical in several respects. These include market entry, environmental considerations, and impact on consumers. Mycotoxins common in maize and other grains, peanuts, and pulses (anything stored wet), such as aflatoxin, present serious health dangers, sometimes even death. The Bill & Melinda Gates Foundation has invested in research to study best practices and more cost-effective testing and mitigation techniques for aflatoxins prevalent in East Africa.<sup>13</sup> Grain pests, such as maize lethal necrosis (MLN), stand to devastate crops and can also pose a health threat to consumers. Postharvest mitigation is

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10. Seconded European Standardization Expert in India (SESEI), “Objectives,” 2016, <http://sesei.eu/sesei/objectives/>.

11. Richard Pasco, *AGOA Countries: Challenges and Considerations in Exporting Horticultural Products to the United States* (Washington, DC: International Food and Agricultural Trade Policy Council, July 2010), <http://www.agritrade.org/Publications/documents/AGOA-HorticulturalProductImportstotheU.S..pdf>.

12. Donna Roberts and Barry Krissoff, “Regulatory Barriers in International Horticultural Markets,” USDA Economic Research Service, January 2004, 3, [http://usda.mannlib.cornell.edu/usda/ers/WRS/2000s/2004/WRS-01-09-2004\\_Special\\_Report.pdf](http://usda.mannlib.cornell.edu/usda/ers/WRS/2000s/2004/WRS-01-09-2004_Special_Report.pdf).

13. IFPRI, “New Project, Funded from the Bill & Melinda Gates Foundation, to Reduce Aflatoxin Contamination of Crops in Kenya and Mali,” press release, June 26, 2009, <http://www.ifpri.org/news-release/new-project-funded-grant-bill-melinda-gates-foundation-reduce-aflatoxin-contamination>.

just as important as on-farm crop selection and harvest. While prevention from exposure is important, complete removal of the toxin is impossible, so diligent drying and storage procedures are the most effective ways to mitigate aflatoxin contamination postharvest.<sup>14</sup>

Policymakers have an important role to play in addressing pests and food toxins, including development and enforcement of regulations covering areas such as food safety, storage, and proper use of pesticides. Both developed country governments and the private sector can assist in this area. There are effective training programs; for example, Mars Incorporated has opened a Global Food Safety Center in China that works collaboratively on mycotoxin research and food safety standards.<sup>15</sup>

Use of chemicals and pesticides can be critical in addressing pests and disease. This is a difficult area to both regulate and enforce, and multiple considerations need to be balanced in doing so. In India, reports of use of unregistered chemicals are not uncommon, and Kenya faces similar challenges. Farmers often do not like to use agrochemicals, despite the need to deal with pests, so improper use is common. Environmental issues play an increasing role as well. While these issues are addressed by national and sometimes regional rules, greater harmonization across legal systems and better implementation are needed.

Pest management involves detection of pests, preventing the spread of new pests, and integrated pest management (IPM) techniques (see Box 4.1). The exact IPM technologies used will depend upon the specific plant and its pest; however, some generally used good practices—such as introducing new crop varieties, rotating crops, and diligent plant inspections—can help with overall impact on crop yields. IPM also addresses sustainable pesticide use, which is typically a challenge for farmers.

IPM techniques will hopefully be useful in fighting another pest causing serious damage in Africa: the fall armyworm. Since the invasive pest first appeared in Nigeria in 2016, it has already spread to at least 14 other countries.<sup>16</sup> The pest is most damaging to smallholder farms, because it feeds on multiple crops (counteracting the benefits of the common technique of intercropping), rapidly reproduces, and can develop resistance to pesticides.<sup>17</sup> Solutions will require extensive technical and political coordination between public and private sector actors, which should emphasize an early warning system.<sup>18</sup> Because effective pesticides are so expensive, poorer farmers stand to gain the most by using innovative IPM.

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14. E. O. Monda and A. E. Alakonya, "A Review of Agricultural Aflatoxin Management Strategies and Emerging Innovations in Sub-Saharan Africa," *African Journal of Food, Agriculture, Nutrition and Development (AJFAND)* 16, no. 3 (July 2016): 11126–11138, [http://ajfand.net/Volume16/No3/ILRI\\_paper\\_11.pdf](http://ajfand.net/Volume16/No3/ILRI_paper_11.pdf).

15. Mars, "Food Safety," 2017, <http://www.mars.com/global/science-and-innovation/science/food-safety>; Institute of Food Technologists (IFT), "Mars Opens Global Food Safety Center," September 29, 2015, <http://www.ift.org/food-technology/daily-news/2015/september/29/mars-opens-global-food-safety-center.aspx>.

16. CGIAR, "Fall Armyworm Devastates Crops in Sub-Saharan Africa: A Quick and Coordinated Regional Response Is Required," June 2, 2017, <http://www.cgiar.org/consortium-news/fall-armyworm-devastates-crops-in-sub-saharan-africa-a-quick-and-coordinated-regional-response-is-required/>.

17. Ibid.

18. Ibid.

## BOX 4.1. Integrated Pest Management<sup>1</sup>

Integrated pest management (IPM) is a sustainability-focused method of improving agricultural production that emphasizes the reduction of harmful pesticides and an ecosystem-focused approach to pest management. Countries approach IPM in different ways, and some have more robust regulatory schemes than others. The FAO has released guidelines on best practices that provide a good starting point for implementing an IPM program. IPM approaches can include sticky traps, pheromone traps, clean stock (tissue culture), parasitic wasps, friendly soil fungus, barrier crops and crop rotation, among other approaches. In Kenya, barcodes are being used to help smallholders trace produce, linking IPM to traceability.

1. FAO, *International Code of Conduct on the Distribution and Use of Pesticides: Guidance on Pest and Pesticide Management Policy Development* (Rome: FAO, June 2010), 16–17, <http://www.fao.org/3/a-a0220e.pdf>; Fintrac Inc., *USAID-KAVES Value Chain Analyses* (Washington, DC: USAID, June 2013), [http://pdf.usaid.gov/pdf\\_docs/PA00M2SX.pdf](http://pdf.usaid.gov/pdf_docs/PA00M2SX.pdf).

## TRACEABILITY

Traceability systems, which follow food from production through export, are becoming more prevalent, particularly as a tool for dealing with food hazards and contamination. Although often mandated by regulation, some of the best solutions for addressing traceability come from market-driven initiatives, including those that rely upon technology to bridge market expectations with regulations and standards (see Box 4.2).

Traceability can present a challenge within local markets, however, and the absence of standards (or poor implementation of standards), as noted above, can give rise to challenges when goods are

## BOX 4.2. Traceability through Technology

Donors and private enterprises are increasingly looking to information and communication technology (ICT) as a way to enhance traceability and adherence to standards. One example is Farmforce, a traceability and farm management mobile app developed by the Syngenta Foundation for Sustainable Agriculture that has received support from other donors, including the Swiss government and USAID, and has now been divested into a privately owned company. Farmforce helps smallholder farmers gain access to formal markets by using technology to improve the relationship between growers, off-takers, manufacturers, and markets. Farmforce helps monitor production and inventory levels and traces food from the production level, digitally documenting compliance with food and sustainability standards such as GlobalG.A.P. and FairTrade.

Another example of a technological approach to building relationships between farmers and the market is Markit Technology, a digital contracts platform used in Kenya for several horticultural value chains, including onions, French beans, and fruits. Peace Tech has recognized Markit Technology, drawing an important connection between food security and peace and stability.

exported. In India, some private sector stakeholders, such as INI Farms, work with the government to develop and implement standards, including pre-export standards, especially for pesticides.

Custom farming models, including contract farming, are also becoming more popular, as the need to connect food with certain specifications and standards intensifies. In addition to improving standards, contract farming can enhance farmers' incomes and productivity, as well as improve access to inputs and finance. Legal frameworks governing contract farming can make a

*Legal frameworks governing contract farming can make a critical difference for farmers.*

critical difference for farmers. The International Institute for the Unification of Private Law (UNIDROIT), International Fund for Agricultural Development (IFAD), and FAO have created a joint *Legal Guide on Contract Farming* that holds great promise for implementation across markets.<sup>19</sup>

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19. International Institute for the Unification of Private Law (UNIDROIT), FAO, and International Fund for Agricultural Development (IFAD), *Legal Guide on Contract Farming* (Rome: FAO, 2015), <http://www.fao.org/3/a-i4756e.pdf>.

# The Two-Way Nature of the Market: Trading Partners, Global Value Chains, and Market Innovation

Food self-sufficiency is a peculiarly obtuse way of thinking about food security.

—Amartya Sen

Healthy food economies generally produce food domestically—both staple and cash crops—and supplement these with imports of crops not grown at home. Yet, many governments, including Kenya and India, view food security as primarily a national challenge. While it is true that governments must develop solutions to food security within their borders, answers increasingly rely upon leveraging the interconnected nature of markets, trading relationships, and the public and private sectors.

This inherent tension in trade—what to produce domestically versus what to import—is nowhere as acute as in debates over food security. As one private-sector leader noted, “Every country wants to do everything by itself rather than focusing on what they can produce best, something which could make them better collaborative partners.” Some countries, such as Thailand, South Korea, Indonesia, Japan, and Singapore, have managed to focus on their inherent strengths, using trade to fill in the gaps where they are not as able to respond. This focus seems to be easier for smaller countries, but the politics of trade and agriculture are never absent, which does have long-lasting implications for global cooperation to address the pressing challenge of food insecurity.

*This inherent tension in trade—what to produce domestically versus what to import—is nowhere as acute as in debates over food security.*

Policy will always play a role, although perhaps national governments could be as strategic about the agricultural sector as they are with industrial policy. This would include balancing the role of

the government (including through policy and law) with the private sector and addressing gaps in regulation and the market as well as a series of policy measures aimed at addressing gaps in infrastructure and technology.<sup>1</sup> The strategic policy and regulatory interventions discussed in this study also appear to fit within such an approach.

What is the role of global trading partners in an area that is so driven by national politics? The United States continues to play a significant role in trade and food security, as an exporter of agricultural commodities and expertise, donor, and influential voice in global policy debates and can be an important partner in the future economic development and food security of both Kenya (and its neighbors) and India. Traditionally, the United States has been a major exporter of bulk commodities such as grains, cotton, and tobacco.<sup>2</sup> More recently, however, exports have shifted toward higher-value animal-based products, horticulture, and consumer-ready beverages, all of which will see a growing market in countries such as Kenya and India.<sup>3</sup> The World Bank estimates that sub-Saharan Africa's food economy in particular is set to expand significantly, reaching a possible \$1 trillion by 2030.<sup>4</sup>

## GLOBAL TRADE POLICY AND TRADE FACILITATION

Internationally, the World Trade Organization (WTO) has long been a policy arena for agricultural trade debates, although it is notable that food security has not been explicitly addressed through the WTO. We heard little of the WTO during the consultations that underpin this report, other than scattered sentiments that the WTO has ceased to be centrally relevant. One private-sector representative even said that "the WTO has lost its fangs."

Much of the recent debate on agriculture at the WTO has revolved around developed country agricultural subsidies, which developing countries insist distort international markets. This remains a pressing issue globally. As markets such as Kenya and India grow, the issue of subsidies will increasingly take on a different dimension, with focus shifting to how these governments support their agricultural sectors. India currently provides a great deal of support to farmers through different schemes, ranging from financial support to improved access to agricultural inputs. Another dimension of India's domestic support schemes, the opportunity to stockpile food in anticipation of a possible shortage, was heavily debated internationally. WTO rules do allow developing countries such as Kenya and India to engage in stockpiling for food security purposes, provided this

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1. Gopalakrishnan and Thorat propose an organized policy approach for agriculture that includes, for example, technology incubation, agricultural finance and risk institutions, institutional governance, FPO and other aggregation models, better collaboration between central and state institutions on rural infrastructure and subsidies, and skills development. R. Gopalakrishnan and Ysp Thorat, *What India Can Do Differently in Agriculture: Sarthak Krishi Yojana* (Mumbai: Tata, October 2015), <http://www.tata.com/pdf/Sarthak-Krishi-Yojana.pdf>.

2. USDA, "Exports," August 9, 2017, <https://www.ers.usda.gov/topics/international-markets-trade/us-agricultural-trade/exports/>.

3. Ibid.

4. World Bank, *Growing Africa: Unlocking the Potential of Agribusiness* (Washington, DC: World Bank, March 2013), xiv, <http://documents.worldbank.org/curated/en/327811467990084951/pdf/756630v10REPLA0frica0pub03011013web.pdf>.

activity is kept to an agreed upon level (*de minimus* in trade terms) and does not exceed 10 percent of food production. India and other developing countries have called for a reassessment of this in light of food security needs, but a long-term solution to this issue has not yet been developed. Complicating things further, developing countries that are less advanced than Kenya and India, including the least developed countries (LDCs), stress that these measures may further distort a market in which they struggle to compete under normal circumstances.

Defying the assertion that the WTO is no longer relevant, however, is the significant recent milestone concluding the WTO Trade Facilitation Agreement (TFA), an action that improves the movement of products across sectors, including food. The TFA includes commitments on a number of “customs formalities . . . transparency in development of laws and regulations, information availability, and cooperation among regulatory bodies, both nationally and across countries.”<sup>5</sup> The WTO TFA includes a specific provision on the release of perishable goods once the appropriate checks are done. This provision is particularly important for women and small-scale traders who often trade in perishables at the border and may face long wait times and unsafe conditions. As a new model of a multilateral trade agreement, the WTO TFA also recognizes differences in countries’ regulatory systems and capabilities and both phases in reforms and links to aid funding to helping countries address their most pressing needs.

Implementation of the WTO TFA will take time, but its impact is already evident. The government of Kenya, which was the first African country to host a WTO Ministerial Conference in December 2015, was quick to sign on to the agreement and has begun to implement its provisions. Likewise, due to the WTO TFA, Mumbai Customs has now enhanced its single-window clearance system, making it the nodal point for the Food Safety and Standards Authority of India, Plant Quarantine Service, Animal Quarantine and Certification Services, and the Food and Drug Administration. Previously, traders would have had to seek clearances from each of these agencies individually, but now Mumbai Customs requires only one document and electronically obtains clearances, which has reduced the waiting time from 10 days to 1–3 days.<sup>6</sup>

WTO disciplines inform a number of areas important to food security, ranging from establishment of science-based rules for food safety standards, appropriate standards on labeling and quality requirements, and improved movement of goods across borders. However, notable gaps remain.

One is in the area of export bans, a policy tool that has been frequently used in the face of the food price shocks and market volatility following the 2007–2008 food crisis. While often used as a policy tool to avoid domestic food price increases, price controls and export restrictions often exacerbate price instability and shortages of staple commodities. As further evidence of multilayered and interconnected legal and regulatory systems, country-level policies are often tied to weak domestic institutions and legal and regulatory distortions in larger global markets. For example, IFPRI’s research notes a connection between restrictive export taxes and international trade

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5. New Markets Lab and Southern Agricultural Growth Corridor of Tanzania Centre Ltd., *A Legal Guide to Strengthen Tanzania’s Seed and Input Markets* (Nairobi: Alliance for a Green Revolution, April 2016), 89, [https://docs.wixstatic.com/ugd/095963\\_3a4f751a4c83488982341082f530aa32.pdf](https://docs.wixstatic.com/ugd/095963_3a4f751a4c83488982341082f530aa32.pdf).

6. Risk Management Division, Mumbai Customs, meeting with CSIS and NML team members, July 27, 2017.

distortions such as tariff escalation policies that discourage economic specialization, innovation, diversification, and processing, thus creating a systemic issue in broader markets.<sup>7</sup>

Agricultural issues are a major discussion point for the December 2017 Eleventh WTO Ministerial Conference (MC11) in Buenos Aires, Argentina, and the scope of discussion could be expanded to better address food security challenges. A few different regional groups have sent in proposals ahead of the discussion, including blocks of developing and LDC countries. These groups, along with developed countries, have prioritized a few different measures that greatly impact food security, and some have explicitly drawn links between food security issues and distortionary trade measures.<sup>8</sup> Public stockholding and domestic support remain important issues, although other areas would warrant action at the multilateral level. For example, effective approaches are lacking with respect to export bans but are badly needed, and this is an area in which the WTO could play a greater role.<sup>9</sup> Also needed are scaled-up solutions to build stronger legal institutions that can help avoid or mitigate food crises or other shocks.

## TRADE TECHNOLOGY AND KNOW-HOW

While the United States and other developing markets take on many roles as trading partners and donors, sharing technology and market knowledge is perhaps one of the biggest contributions. Technology is helping to break down barriers in the market, empowering farmers and citizens with the information to make informed choices, address labor and productivity challenges, and access better inputs, services, and opportunities along value chains. In addition, sharing knowledge of market systems, policy approaches, and solutions could help surpass current gaps in value chains and regulatory systems.

In Kenya, multiple U.S. development projects place a priority on technology exchange and market development. As part of the U.S. Global Food Security Strategy, USAID supports a number of projects designed to bring improvements to key value chains (including horticulture), encourage policy reform, facilitate better access to higher quality inputs such as seeds and fertilizer, and enhance market access for smallholder farmers.<sup>10</sup> The Kenya Feed the Future Innovation Engine (KFIE) program is particularly focused on technology and improves farmers' access to pest and

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7. Antoine Bouët and David Laborde Debucquet, "Food Crisis and Export Taxation: The Cost of Non-cooperative Trade Policies," *Review of World Economics* 148, no. 1 (2012): 209; Antoine Bouët and David Laborde Debucquet, *Economics of Export Taxes in a Context of Food Crisis*, Discussion Paper 00994 (Washington, DC: IFPRI, June 2010), <http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/2291/filename/2292.pdf>.

8. World Trade Organization (WTO), "The Short-Term Price Volatility in Agriculture Need for Stability for Small-Scale Farmers in Developing Country Members: Submission by the G-33," TN/AG/GEN/45, May 29, 2017.

9. Global Harvest Initiative (GHI) and New Markets Lab, *International Trade and Agriculture: Supporting Value Chains to Deliver Trade and Food Security* (Washington, DC: GHI, 2013), [http://www.globalharvestinitiative.org/Policy/GHI\\_Trade\\_Paper\\_2013.pdf](http://www.globalharvestinitiative.org/Policy/GHI_Trade_Paper_2013.pdf); Andrea Durkin, "Grow Markets, Fight Hunger: A Food Security Framework for U.S.-Africa Trade Relations," Chicago Council on Global Affairs, March 2015, [https://www.thechicagocouncil.org/sites/default/files/Global%20Ag%20Trade%20Paper\\_v5\\_1.pdf](https://www.thechicagocouncil.org/sites/default/files/Global%20Ag%20Trade%20Paper_v5_1.pdf).

10. Feed the Future, *Kenya FY 2011–2015 Multi-Year Strategy* (Washington, DC: Feed the Future, June 2011), 28, <https://feedthefuture.gov/sites/default/files/resource/files/KenyaFeedtheFutureMultiYearStrategy.pdf>.



drought resistant technology, while also encouraging crop variety research on improved seeds, pest control, and food safety for maize, sorghum, millet, sweet potato, cowpea, and pigeon pea. The USAID-supported East Asia Trade and Investment Hub (see Chapter 1) is also playing a central role in facilitating regional trade and greater harmonization of rules, including through the EAC Common Market Protocol. Donors also support the World Bank's *Enabling the Business of Agriculture* report, which evaluates legal, regulatory, and policy measures that affect the sustainability and quality of agricultural systems around the world.<sup>11</sup> The right policy and institutional interventions can improve productivity and generate new opportunities in value chains important to food security.

Investors are focusing on technology and knowledge sharing as well. Ankur Capital in India, which has over half of its portfolio in agriculture, focuses on technological applications rather than commodities, looking for investments that are innovative and efficient. Overall, technological applications have significant implications with respect to streamlining the value chain and providing rapidly updated information to producers, consumers, and related businesses.

Technology transfer can flow in many directions. Kenya and India are part of a unique south-south technology exchange through programs such as the Feed the Future Innovation Transfer Platform and the India-Kenya Dairy Innovation Bridge Program, both supported by USAID, which are designed to build south-south technology exchange and capacity development.<sup>12</sup> Other programs, such as the Cereal System Initiative with South Asia (CSISA), are focused on spreading climate-specific practices successfully used in India to neighboring economies such as Nepal and Bangladesh.<sup>13</sup>

Another area of importance to technology is intellectual property (IP) protection. IP can be instrumental in encouraging entrepreneurship and market growth, even among smaller enterprises. For Kenya and India, as elsewhere, IP is becoming more widely acknowledged as a driving force in agricultural development. Kenya, for example, has made strides to improve its legal system to protect the IP of technology such as seed. Farmers also are becoming better educated about IP, which is gradually helping to curb the abundance of counterfeit product in the market. Legal training for IP and seed technology is important also. This is an area in which diverse partners, ranging from New Markets Lab to Monsanto and the New Partnership for Africa's Development, are engaged.

Finally, issues in the national-level legal and regulatory environment not only impact national stakeholders, they have a profound impact on cross-border trade and investment as well. Both private-sector actors and trading partners rightly focus on the national policy environment in countries around the world, which can have a significant impact on farmers, consumers, and investors alike.

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11. World Bank, *Enabling the Business of Agriculture 2017* (Washington, DC: World Bank, 2017), v, ix, <http://eba.worldbank.org/~media/WBG/AgriBusiness/Documents/Reports/2017/EBA2017-Report17.pdf>.

12. USAID, "Food Security and Agriculture," September 14, 2017, <https://www.usaid.gov/india/agriculture-and-food-security>.

13. Ibid.

## Recommendations

The system of rules and regulations that trade policy establishes to govern the market is a central factor in ensuring that markets diversify and deliver greater food security. Putting the needs of small farmers and other market stakeholders first will be key to unlocking this potential.

We recommend:

- *Place income generation and market diversification at the core of food security efforts.* Although many countries, including Kenya and India, continue to focus on grains such as maize and rice, horticultural crops (fruits and vegetables) show potential to significantly improve farmer incomes, bring nutritious foods to the market, and provide opportunities for trading partners such as the United States. In addition, a number of crops, including beans, are both nutritious and well-known to farmers. Helping to encourage use of improved seed and stronger market links for commercially neglected crops must be part of food security efforts going forward. The legal and regulatory environment will shape how the market develops and, ultimately, the choices that farmers—and even consumers of food—make.
- *Focus on the practical aspects of making regional trade work.* The potential of regional trade has been generating a great deal of buzz, particularly in sub-Saharan Africa where food-insecure areas are often separated from food-producing areas by national borders. Strengthening links between market stakeholders and improving implementation of regional rules and standards can provide great benefits. For the latter, this includes many areas important to food security and trade, such as food safety standards and sanitary and phytosanitary (SPS) rules; regulation of inputs (seed and fertilizer); market rules relating to transport, storage, and processing; and many aspects of moving food across borders, including transparency in customs administration and greater cooperation at the border, where the cost of food is often driven up due to delays and duplicative procedures. Practical interventions, tied to how markets operate and are regulated, could be scaled up, such as the East Africa Trade and Investment Hub's initiatives that help connect regional market stakeholders and improve harmonization. Improving implementation of regional rules and standards is

incredibly important and not only requires high-level commitment but also day-to-day practical problem solving and training. Efforts to facilitate access to regional markets can help link farmers to markets and create a simplified and harmonized market for international trading partners as well.

- *Implement market and regulatory approaches that can leapfrog gaps in agricultural markets and food security systems.* As this report highlights, a number of market and regulatory gaps exist that make it difficult for farmers and other stakeholders to benefit from trade and food security. These include the disaggregated nature of markets, challenges with holding collateral and enforcing contracts, lack of awareness of how to meet standards in the market and manage challenges such as pests and disease, and poor access to inputs such as seeds and fertilizer. Addressing gaps in the market through right-sized solutions for improving food traceability, pest and disease management, and food safety standards could have a transformational effect. Approaches could include sustainable IPM techniques that present farmers with realistic pest management options as well as tailored approaches to improving cold and cool chain storage, both of which are especially needed in the horticultural sector. In the area of food safety standards, a combination of locally tailored solutions and U.S. expertise (for example, experience with food safety standards) could help link food-insecure nations with global value chains. Regulatory approaches can help address market gaps as well. This might include incorporation of global guidelines on farmer aggregation models (the CLARITY principles), which can be instrumental in fragmented markets with small landholdings such as India. Contract farming models could also address a number of challenges, including adherence to standards and access to inputs. Warehouse receipt systems are being rolled out in both Kenya and India to bridge needs in finance, storage, lack of secured collateral, and contract enforcement and will require additional stakeholder engagement and legal implementation.
- *Strengthen exchange of technology and knowledge.* Trade is not just about the physical exchange of goods and services; two-way economic development and global food security will rely heavily upon trade in technology and knowledge as well. Through private investment and donor assistance, expanding the reach of technological solutions to address market and productivity challenges, and increasing focus on the corresponding regulatory environment at both the enterprise and institutional levels, can have a profound impact on food security and market development. Technology solutions can range from approaches such as seed scratch-off labels in Kenya, which combines two relatively simple technologies that allow farmers to ensure they are purchasing quality seeds, to online portals such as the Seed Stakeholder Platform in Kenya, to approaches to food traceability. South-south exchanges of technology and knowledge should be encouraged because they are often better tailored to address needs in food-insecure areas.
- *Support new models for improving market-based regulation that put the needs of farmers, consumers, and market innovators first.* Given the close nexus between the physical market and the regulations surrounding it, the main stakeholders in the market, including farmers and consumers, need to be given more of a voice in the policymaking process in order to

ensure that both trade and food security can be enhanced. In most markets, rules are not implemented consistently, often impacting farmers and smaller service providers the most. Greater transparency and more consistent implementation in regulatory processes could be encouraged through technology platforms, bottom-up policy approaches, and grassroots efforts. Breaking down the components of the market—and focusing on how and why they are regulated nationally, regionally, and globally—could help ensure that the rules of the market reflect both realities and, importantly, future potential. This goes for both national-level law and regulations, which will directly impact food security and investment potential in the future, and policy formulation at the regional and multilateral levels. Globally, the WTO is still needed, and the Eleventh WTO Ministerial Conference in Buenos Aires, Argentina, in December 2017 is the perfect opportunity to put food security back on the global policy table.

# About the Author and Project Director

**Katrin Kuhlmann** is the president and founder of New Markets Lab (NML), a nonprofit law and development center. She is also a lecturer at Harvard Law School and an adjunct professor at Georgetown University Law Center, and she serves as a member of the Trade Advisory Committee on Africa of the Office of the U.S. Trade Representative (USTR). Her areas of focus include trade and development, economic law and regulation, entrepreneurship, regional trade, and international legal and regulatory reform. She is published widely and frequently speaks on these topics, and she has testified before Congress on several occasions. Ms. Kuhlmann is a member of the advisory boards of the Law and International Development Society (LIDS) at Harvard and Georgetown Law Schools, the Bretton Woods Committee, the Trade Policy Forum, and the Trade, Finance, and Development Experts Group of the E15 Initiative led by the International Centre for Trade and Sustainable Development and the World Economic Forum. She serves on the boards of Listening for America, the Washington International Trade Association, and the Malaika Foundation and is a member of the Portland Communications Advisory Council.

Ms. Kuhlmann was previously a Wasserstein Public Interest Fellow at Harvard Law School and a senior adviser at the Corporate Council on Africa. Earlier in her career, she was trade negotiator at USTR and practiced international law at Skadden Arps and Dewey Ballantine. Before founding NML, she held leadership positions in several nonprofit organizations and think tanks, including positions as a senior fellow and director at the Aspen Institute and transatlantic fellow at the German Marshall Fund. She holds degrees from Harvard Law School and Creighton University and was the recipient of a Fulbright scholarship to study international economics.

**Kimberly Flowers** is director of the Global Food Security Project and the Humanitarian Agenda at CSIS. The Global Food Security Project examines and highlights the impact of food security on U.S. strategic global interests and provides long-term, strategic guidance to policymakers to ensure that U.S. foreign assistance programs are efficient, effective, and sustainable. The Humanitarian Agenda is a center-wide initiative that leverages the expertise of CSIS programs to explore the most complex humanitarian challenges of the twenty-first century.

Prior to joining CSIS in 2015, Ms. Flowers was the communications director for Fintrac, an international development company focusing on hunger eradication and poverty alleviation through agricultural solutions. From 2005 to 2011, she worked for the U.S. Agency for International Development, serving overseas as a development, outreach, and communications officer in Ethiopia and Jamaica, supporting public affairs in Haiti after the 2010 earthquake, and leading strategic communications for the U.S. government's global hunger and nutrition initiative, Feed the Future. Ms. Flowers began her international development career in 1999 as a Peace Corps volunteer in Bulgaria, where she founded a young women's leadership camp that continues today. She also served as a Peace Corps Response volunteer in Jamaica in 2004. She is a magna cum laude graduate of William Jewell College, studied at Oxford University, and is an alumna of the Pryor Center for Leadership Development.



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