

Key Steps to Improve Agribusiness Competitiveness Part I: Input and Output Markets

Agriculture is central to emerging market economies. In Africa it accounts for as much as 65 percent of employment and 32 percent of output. Globally, two-thirds of the world’s poor—some 750 million people—work in rural areas. But as economies expand and production shifts to manufacturing and services, agriculture’s share of employment and GDP decreases. At the same time, the broader agribusiness industry—business activities performed “from farm to fork”—is playing a more important role in growth and development. In Part I, the emphasis is on improved land rights, better regulation of input and output markets, and better access to seeds and fertilizer that are all critical to this transition.

Shift from Agriculture to Agribusiness

The agriculture sector in emerging markets tends to evolve from widespread subsistence agriculture, employing a large share of the workforce, to more productive, larger scale agriculture, with a shift in value added from primary production to post-harvest agribusiness.

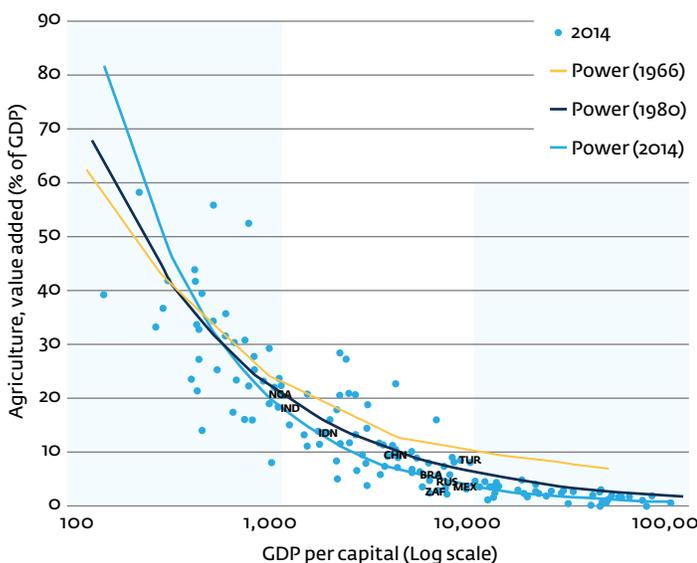


FIGURE 1 Share of agriculture vs GDP by country 1966–2014 in %

Source: World Development Indicators, 2016

Despite this dramatic shift, the importance of agriculture for development does not decline. Instead, the sector produces more food and related products more efficiently, along with additional growth in the rest of the economy.

Agriculture’s declining share of GDP is typically accompanied by increases in agro-industrial output per capita. This underscores the importance of the sector for production in emerging countries, as well as its substantial contribution to national income.¹

Formalization of Retail as a Driver of Modernization

Overall, agriculture has the potential to become an engine of inclusive growth through private and public investments that increase productivity and create a network of distribution and retail with the potential to feed millions. The formalization of retail is the primary driver of the modernization of agricultural supply chains for domestic foodstuffs and the development of processed food. And with more consumers eating outside of the home, food service—in hotels, restaurants, and cafeterias, for example—acts as a “pull” agent through the chain for agricultural products and services.

Governments in low- and middle-income economies can play a useful role in agriculture by providing public infrastructure such as roads, mitigating boom-bust cycles,

MALAWI AND BRAZIL—SUBSIDIES VS. RESEARCH

Malawi provides an example. Since 2005, after several years of draught and chronic food shortages, the government has been subsidizing improved seed varieties and fertilizers to boost maize production. The program reached most of the country's smallholder farmers, a majority of whom are women. The policy has worked well to increase harvests in the country, but it has also highlighted other weaknesses such as storage and processing capacity limitations. These programs also come at the expense of other public needs, including health, education and infrastructure.

Source: *New Agriculturist: Country profile - Malawi*, <http://www.new-ag.info/en/country/profile.php?a=2488>

A variety of goals motivate governments to implement or alter public policy toward the agriculture sector. The most common are:

- Reducing rural poverty and promoting rural development
- Providing food security
- Creating food safety and product standards
- Preserving cultural norms
- Increasing efficiency and competitiveness
- Expanding and incentivizing innovation
- Managing environmental risks
- Improving inclusion of isolated and marginalized rural communities.

In an alternative model, Brazil's agriculture sector has achieved tremendous success with limited government support, assisted instead by the Brazilian Agricultural Research Corporation or *Brasileira de Pesquisa Agropecuária* ("Embrapa"). This state-owned research corporation is financed through various profitable research ventures including cattle breeding, the creation of genetically modified seeds, and development of biodegradable wound dressings. Embrapa's goal—to finance technological research tailored to the specific needs of Brazil's agricultural landscape—is one that can be applied in other emerging markets, particularly those in Africa.

A net food importer just 40 years ago, Brazil is now among the world's dominant agriculture exporters, a group that includes the United States, Canada, Australia, Argentina, and the European Union. Improvements in technology and productivity, in addition to an expansion of cultivated land, have allowed Brazil to increase agricultural production more than fivefold since the 1990s. Over the last 15 years, the country's export crop revenue has increased from \$23 billion to \$62 billion.

Source: *United States Department of Agriculture, Economic Research Service, International Markets & Trade, "Brazil", USDA*. <https://www.ers.usda.gov/topics/international-markets-trade/countries-regions/brazil/>

regulating land use, contributing to agricultural extension, and improving marketing infrastructure.² Governments can also create markets by encouraging agro-commodities trading and developing efficient value chains. In the 2000s, many emerging economies moved from taxing their agriculture to providing significant assistance, particularly through the use of price and production-linked support policies. According to the OECD, the average levels of support to agricultural producers in emerging and advanced economies are converging.³

Towards Efficient Farm Structure

The world has more than 570 million farms, the majority of which are smallholders owning two hectares of land or less (a hectare is about 2.5 acres).⁴ With the exception of countries like Japan, where average farm size is 1.5 hectares, advanced countries have much larger farm sizes. This is due to more advanced technology, farmers' ability

to purchase more land, and improvements in mechanized farming, fertilizers and pesticides. In addition, there is significantly greater availability in advanced economies of non-agricultural employment and opportunities.

In the United States, the minimum efficient scale for maize, Sub-Saharan Africa's most important crop, is about 324 hectares—well above that of the one-to-two hectare family farmer in Africa.⁵

In low- and middle-income countries in Sub-Saharan Africa, East Asia/Pacific, and South Asia, 95 percent of farms are smaller than five hectares. They account for up to 80 percent of food produced and support the livelihoods of up to 2.5 billion people.⁶ Although a major source of employment, these small farms often represent a drag on the economies of these nations because of their notoriously low productivity. As such, they can also become a poverty trap, relegating large populations to subsistence agriculture.

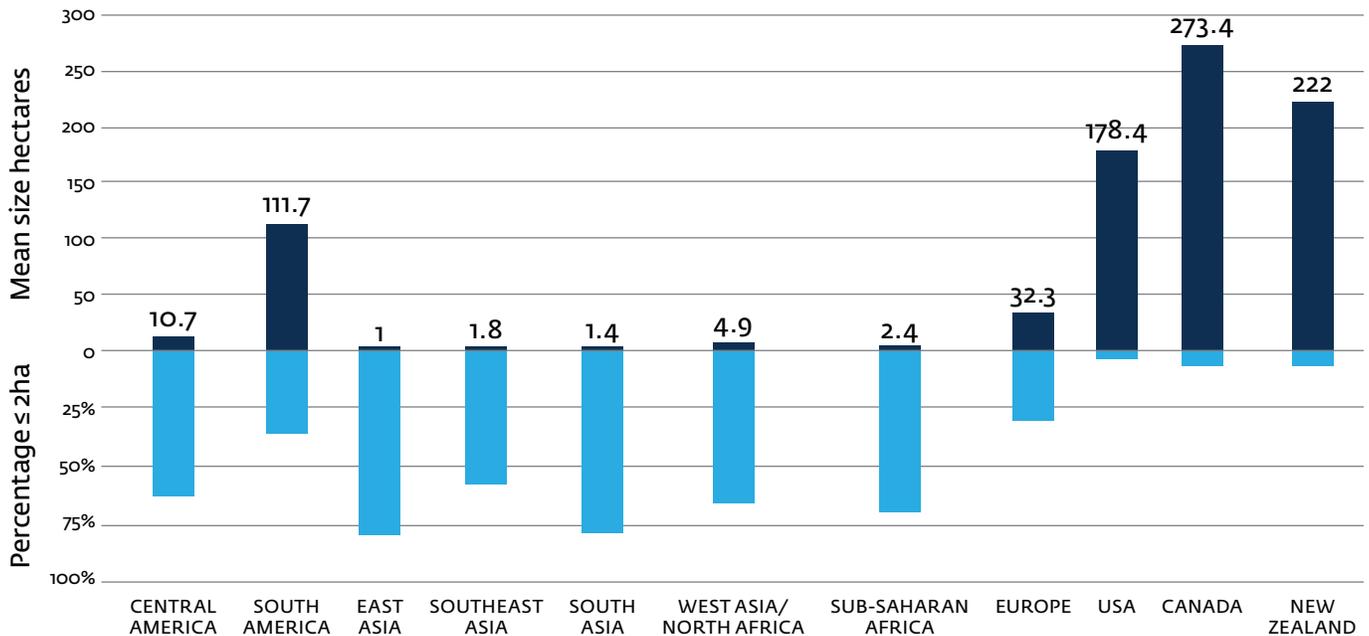


FIGURE 2 Average farm size by region

Source: Reproduction of data based on OECD, Trade and Directorate Committee, “Strategies for Addressing Smallholder Agriculture and Facilitating Structural Transformation,” July 9, 2015, which sources from Eastwood, et al., 2010 based on FAO estimations.

In fact, small farms are unproductive even in advanced economies. Japan’s government provides small farmers with generous subsidies in spite of crop performance, and also protects them with trade barriers to imports, citing the cultural significance of the sector. For example, there is a 778 percent tariff on imported rice in the country.

Minimum efficient farm size—the size threshold below which a farm cannot make a profit—is a part of the overall evolution and development of any country’s agricultural sector. Yet it is also a function of managerial efficiency, the type of farming activity, and geographic location. It can be as small as one or two hectares on irrigated high-value cropland in parts of Asia, or up to 100 times that size in dry-land areas of Latin America.⁷

Larger, vertically integrated commercial farms take advantage of economies of scale and the synergies that come from advanced farming skills and technologies. These include access to credit, as well as management of the financial, logistical, and marketing aspects throughout the agribusiness chain.⁸

Enhancing Competition and Competitiveness

Emerging markets can achieve higher levels of success by improving agricultural value chains, from the initial land and seed required, all the way to marketing and final distribution.⁹ However, developing countries continue to

encounter obstacles to such improvements, including:

- Erratic or arbitrary regulatory policies in input and output markets, including import or export policies
- A lack of smallholder access to the necessary skills, technology, and finance
- Weak infrastructure and high transport costs
- A lack of access to secure (and tradable) land rights

In many high-potential agriculture countries such as China, Ethiopia, Tanzania, Central Asian republics, Cambodia, and Vietnam, government participation in and preemption of private, profit-driven enterprise remains an issue.

The impact of each of the constraints listed above and the ability to mitigate it vary by crop value chain and geographic location.

Effective Land Rights

Effective governance of land rights is essential to creating the right incentives for farmers to put land to its most profitable and productive use. In most advanced economies, land rights are secure and ownership is legally recognized, making it easier to buy and sell land. Such rights offer farmers the incentive to invest time and capital in developing their land, which in turn can boost food security and land asset value. Farmers can also use their land as collateral to borrow money for essentials such as equipment, fertilizer, and seeds.

IMPLICATIONS FOR JOBS

Economic growth and development in emerging markets is leading to a decline in the percentage of people employed in agriculture. Rising labor productivity and wages in manufacturing and service sectors are drawing millions of farm workers to non-farm employment. There is also a push toward larger, better capitalized, and more mechanized farms that require fewer workers.

Because farm employment falls precipitously as farms grow in scale, agriculture is unlikely to be a primary vehicle for long-term job creation in many emerging markets on this growth path. Instead, new job opportunities must come from sectors beyond the farm in downstream agribusiness, and also in manufacturing and service sectors concentrated in urban areas.

People move from subsistence agriculture to better livelihoods, whether on more productive farms or in manufacturing and services jobs in urban areas. China is the prime example of this. In scarcely more than a generation, hundreds of millions of Chinese farmers found higher paying jobs in cities, and some 500 million people emerged from poverty as a result.

Source: Hofman, Bert. 2014. "How Urbanization Can Help the Poor." China Daily, April 17.

Legally recognizing land ownership has boosted farmers' income and productivity in Latin America, Asia, and some transitional economies in Eastern Europe and the former Soviet Union. Efficient land registration institutions that create stable and transferrable rights to private property are critical in this regard. This is a top priority for many emerging market countries, and much progress has been made on this front. There are numerous examples of ongoing, cost-effective programs for cooperative public-private efforts to improve land registration throughout low- and middle-income countries such as India, Rwanda, Sierra Leone, and Cabo Verde.

At the same time, it is important to recognize the challenge of adapting from systems of communal ownership that persist in rural areas of Africa, for example. Full-fledged land ownership may exist only in urban and peri-urban areas, while communal or government ownership continues to be practiced in the hinterlands. These deep-seated cultural norms complicate land ownership and land rights

reform. Despite the complexity of the problem, there are some potential solutions such as granting long-term usage rights on agricultural land. In such situations, countries need to move carefully and deliberately on land rights issues.

Better Regulation of Inputs and Output Markets

The quality of seed used in farming is almost as important as the farmland being cultivated. Poor quality seeds bring poor yields, or even crops that are detrimental to animal and human health. In addition, the inconsistent use of seed and fertilizer is a major contributing factor to low crop yields, particularly in several African countries, and the problem is aggravated by infrequent rain, variable weather, and a lack of expertise.¹⁰

A key driver of regulation and control for many countries is technology, including genetically modified (GMO) seeds that suit the climate of a country, the salinity level of the soil, or resistance to drought and disease. Brazil's Embrapa modified a variety of grass called brachiaria, which was imported from West Africa to produce grass feed for livestock, to suit Brazil's climate. It also developed soybeans modified to grow in a tropical climate, among other genetically modified seeds that can be cultivated on the dry lands of the Cerrado or the plains of Mato Grosso. Brazil is now the world's largest producer of genetically modified crops after the United States.

Despite its benefits, the GMO issue has been a key driver of regulation and control in many countries. Farmers in Europe, notably France, have fought vigorously against the introduction of genetically modified seeds into their soil due to the risk of contaminating or changing the structure of surrounding plant species. Many countries prohibit or closely regulate the use of GMO seeds for various reasons, both cultural and economic.

There are other non-GMO options for improved seed, however. Most notably, hybrid seeds are genetically developed by crossbreeding varieties with desirable traits, without use of transgenic engineering. These hybrid seeds are much less controversial and still provide improvements in yield, climate resilience and crop management.

Enabling Seed Innovation

There are other methods for boosting market confidence in seeds. They include monitoring seed quality by regulating seed registration and certification, market entry of seed providers, and the sale of seed across borders. Regulations that achieve seed quality and safety cheaply and quickly are

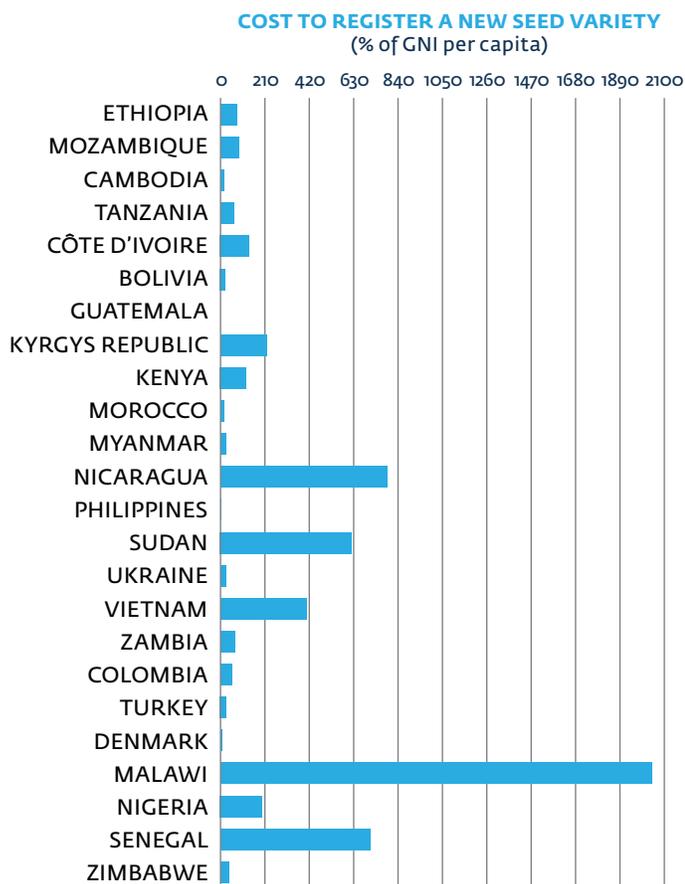


FIGURE 3 Seed registration costs as percentage of income per capita by country income classification

Source: EBA full data set, from <http://eba.worldbank.org/>

the most effective. For example, In Vietnam it costs more than 400 percent of GDP per capita to register a new seed variety¹¹ (Figure 3).

Government intervention can also cause costly delays. In Kenya and Uganda it takes almost two months to obtain a license for a seed business. In addition to the high license fee (nearly 100 percent of GDP per capita in 2015), firms need to prove their significant technical experience and financial resources.¹² In Ethiopia and Tanzania, public seed company monopolies maintain exclusive rights to seed distribution for multiple crops.

Excessive regulation, where the government has a monopoly on seed production, can prevent farmers from taking advantage of improved seed varieties. However, reducing regulatory burdens can have the opposite effect. In Bangladesh, reduced government intervention beginning in the early 1990s liberated the seed market and encouraged 280 small domestic seed companies to enter the market by 2013.¹³

The establishment of a dynamic, innovative private seed sector in emerging market countries requires the removal of unnecessary legal and regulatory barriers to participation by private firms. It also requires harmonization of cross-border regulations in order to create enough scale for markets. Moreover, refraining from direct state involvement in the production and sale of seeds can allow for market entry of quality seed distributors.

Effective fertilizer markets

Fertilizers are another critical input for farms. They can significantly improve soil quality, yet they remain expensive for farmers in emerging markets. On average, farmers in the United States pay \$133 per ton, and those in Ireland pay 175 euros (about \$206). Fertilizer costs rise dramatically in certain emerging countries due to currency fluctuations, import duties, shipping fees, transportation taxes, bribes, etc., as the product moves from the port to the farmer.

Fertilizer use in developing countries is also constrained by inefficient administrative procedures. These include security components and a general lack of infrastructure. Nigeria is an example where poor administration and inadequate regulation have a constraining effect. In 2015, the country attempted to ban imported fertilizers, a policy that doubled the price of all fertilizers and benefited domestic fertilizer monopolies while proving costly to farmers and reducing yields significantly.

In addition, governments can intervene to simplify the registration process for fertilizer distributors. A 2016 World Bank Group report on agriculture found that the number of required procedures to register new fertilizer products varies substantially across 40 countries surveyed. For example, the approval time for a new product can range from 15 days in Vietnam to over three years in Nepal. The cost of registration ranged from zero to 1,065 percent of per capita income.¹⁴ Clearly, reducing registration times and costs could directly contribute to an increase in crop yields in many countries.

TABLE 1 National average price for urea, USD per ton, September 2017

World	Malawi	Uganda	Burkina Faso	Burundi	Mali
237	534	556	565	818	508

Source: National Fertilizer Prices, [AfricaFertilizers.org](http://afoqa.mfarms.org/national/), <http://afoqa.mfarms.org/national/>

In general, the commercial price in Africa for urea, a form of nitrogen fertilizer, was two to three times the world average in 2017.¹⁵ Such price differences increase significantly for more advanced and effective compound fertilizers that provide greater crop nutrition.

Overall, fertilizer consumption is meaningfully correlated with levels of economic development. According to 2014 World Bank data, low-income economies used 13.5 kilograms of fertilizers per hectare of arable land; lower-middle income economies used 120.6 kg per ha; and middle-income economies used 153.7 kg per ha.¹⁶ These differences have significant implications for crop yields and farm incomes. A decrease in the amount of fertilizers used in high-income economies (137.4 kg per ha) relative to middle-income economies can be primarily attributed to greater fertilizer efficiency, although such factors as climate, soil conditions and different crops could also affect results.¹⁷

Governments in countries like Brazil have intervened by offering subsidies to reduce farmers' fertilizer costs. Brazil is now the world's fifth largest fertilizer consumer, producing about 30 percent of its needs and importing the rest. It is the world's second largest importer of both phosphate and potash.¹⁸

Many emerging market nations including India, Nigeria and Kenya have failed in their attempts to provide fertilizer subsidies. This is often due to corruption, with middlemen reselling subsidized fertilizer intended for smallholders at black market rates. Nigeria's system became so corrupt, with fertilizer reaching less than 11 percent of recipients, that it was halted in 2012.¹⁹ This problem is not unique to fertilizer, however, as corruption dooms many types of subsidy programs.

To tackle such issues, Kenya set up a pilot e-fertilizer Subsidy Management System in 2015 that allows farmers to request, redeem and reconcile fertilizer vouchers—and bypass middlemen.²⁰ India, which launched its most ambitious fertilizer reform in 2017, has established a direct-benefit transfer authentication system to transfer subsidies directly into the accounts of farmers.²¹ These transparency programs, supported by information technology advances, will have significant benefits to input markets going forward.

Conclusion

The public and private sectors must play complementary roles in promoting competition in agribusiness across emerging markets. Governments can improve land rights through efficient land registration, and can implement

better regulation of input and output markets. This includes controlling and liberalizing the registration and quality of inputs such as seeds and fertilizer. Government intervention can reduce risks and transaction costs related to trade barriers, high tariffs, and safety standards, while improving transparency through use of better technology.

At the same time, overly restrictive trade or licensing policies can distort markets and drive costs higher, with negative impacts for both producers and consumers.

Subsidy programs can be effective if they are well structured and managed, though they may fail in low governance environments. There are emerging examples of new approaches to ensuring that subsidies reach farmers and incentivize beneficial behavior.

In addition, private enterprises can play an effective role in improving food supply chains and increasing the proliferation and distribution of new and better seed varieties and effective fertilizers.

In general, when governments limit their involvement to regulation, all benefit. It is important to emphasize that this is not a matter of deregulation, but of smarter regulation. Overall, the private sector can significantly increase efficiencies and output in agriculture if governments design and implement smart regulations and avoid overregulation.

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ADDITIONAL EM COMPASS NOTES ABOUT PRIVATE SECTOR OPPORTUNITIES IN AGRIBUSINESS

This is the first of two notes covering opportunities for private enterprise in emerging markets as agriculture evolves towards agribusiness. This note addresses public vs. private sector roles in the context of competitiveness; the second note (Note 50) will address research & development, logistics and marketing. Please see also two additional notes about opportunities for private enterprise through Climate Smart Agribusiness: *Precision Farming Enables Climate-Smart Agribusiness* (EM Compass Note 46) and *From Farm to Fork: Private Enterprise Can Reduce Food Loss Through Climate Smart Agriculture* (EM Compass Note 47).

- ¹ IFAD (The International Fund for Agricultural Development). 2016. “Rural Development Report 2016, Fostering Inclusive Rural Transformation”, Rome, p. 27.
- ² Agricultural extension refers to the provision of scientific research and new knowledge to agricultural practices through farmer education.
- ³ OECD (Organisation for Economic Co-operation and Development), 2015, “Agricultural Policy Monitoring and Evaluation 2015”. Paris, p.1.
- ⁴ Cervantes-Godoy, Dalila. 2015. “Strategies for Addressing Smallholder Agriculture and Facilitating Structural Transformation.” *OECD Food, Agriculture and Fisheries Papers No. 90*, OECD Publishing, Paris. See p.10.
- ⁵ Duffy, Michael. 2009. “Economies of Size in Production Agriculture.” *Journal of Hunger & Environmental Nutrition* 4 (3-4): 375-92, see figure 7.
- ⁶ IFAD (The International Fund for Agricultural Development). 2016.
- ⁷ Hazell, Peter. 2011. “Five Big Questions about Five Hundred Million Small Farms.” Paper presented at the IFAD Conference on New Directions for Smallholder Agriculture, Rome, January 24-25.
- ⁸ Collier, Paul and Stefan Dercon. 2014. “African agriculture in 50 years: smallholders in a rapidly changing world?” *World Development* 63 (November): 92-101. See p. 95.
- ⁹ Byerlee, Derek, Andres F. Garcia, Åsa Giertz, and Vincent Palmade. 2013. “Growing Africa: Unlocking the Potential of Agribusiness”. Washington, DC: World Bank.
- ¹⁰ Byerlee et al. 2013. p. 104.
- ¹¹ World Bank. 2016. “Enabling the Business of Agriculture 2016: Comparing Regulatory Good Practices”. Washington, DC. World Bank. See p. 14; World Bank Group Indicators.
- ¹² Fintrac, “Agribusiness Regulation and Institutions (Agri) Index”. USAID – EAT Enabling Agricultural Trade, January 2015, p. 25.
- ¹³ Fintrac. “State of the Evidence: Seed Policy Reform.” USAID – EAT Enabling Agricultural Trade. http://eatproject.org/docs/State_of_the%20Evidence_in_Seed_Policy_Reform.pdf
- ¹⁴ World Bank. 2016. “Enabling the Business of Agriculture 2016: Comparing Regulatory Good Practices.” p.20.
- ¹⁵ National Fertilizer Prices. AfricaFertilizers.org. <http://afoqa.mfarms.org/national/>
- ¹⁶ World Bank Indicators - Food and Agriculture Organization, Fertilizer Consumption (Kilograms per Hectare of Arable Land), World Bank. <https://data.worldbank.org/indicator/AG.CON.FERT.ZS>
- ¹⁷ Mellor, John W. 2017. “Agricultural Development and Economic Transformation. Promoting Growth with Poverty Reduction. Palgrave Studies in Agricultural Economics and Food Policy.” New York: Palgrave MacMillan, p.97.
- ¹⁸ “Brazilian Potash, Phosphate and Fertilizer Market”, Harvest Minerals, <http://www.harvestminerals.net/brazilian-potash-phosphate-andfertilizer-market>; see also <http://chartsbin.com/view/34178>
- ¹⁹ *The Economist*. “African agriculture: A green evolution”, economist.com, March 12, 2016.
- ²⁰ *Business Daily*, “Fertiliser distribution to go online this year after esubsidy test runs”, January 24, 2016. <http://www.businessdailyafrica.com/Fertiliser-distribution-to-go-onlinethis-year/-/539546/3047514/-/m9avek/-/index.html>
- ²¹ *The Times of India*. 2017. “Centre Set to Roll Out Big Fertilizer Reform from June”. March 24, 2017.