Improving African Grain Markets for Smallholder Farmers

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Acronyms

ABCD	Archer Daniels Midlands, Bungee, Cargill, and Louis Dreyfuss
AGRA	Alliance for a Green Revolution in Africa
ETG	Export Trading Group
MT	Metric tons
PE	Private Equity
SME	Small and medium-sized enterprises
WRS	Warehouse Receipts Systems

Executive Summary

East and Southern African grain markets constitute a promising avenue for improving smallholder farmers' production and livelihoods. However, the current configuration of grain markets places the production and pricing risk squarely on the farmer, the value chain actor with the least capacity to absorb that risk. Farmers struggle to profit from the grain industry because of volatile pricing, unpredictable supply requests, and quality irregularities, including arbitrary grades that provide no incentive to the farmer to improve the quality of their produce. Grain markets that surmount these challenges to become well integrated and predictable hold enormous potential to improve smallholder welfare. Effective and integrated markets can reduce a farmer's risk exposure, increase the farmer's profit, and increase yield as well as income, and traders and consumers come to rely on and invest in the farmer's production.

Grain markets move commodities through three main steps from farm to table: farmer, trader/processor, and consumer. This report considers the grain trader as a lever to improve farmer welfare through grain markets. Traders are accustomed to sourcing from smallholder farmers, which means their future growth will involve increased smallholder supply. Local traders function as independent businesses that can thrive long past the life of a grant or a development project. Finally, traders sit between producer and consumer. This position affords traders a unique opportunity to bring order to a chaotic supply chain.

Grain trading today suffers from three primary bottlenecks. The most crippling is access to finance for traders, including working capital, to fund the purchase of grain and investment capital to finance the construction of storage and processing facilities. The production of high-quality grains is still challenging as buyers do not pay for quality; so, farmers have limited incentives to increase the quality of their grains. National agricultural policy instruments, especially price stabilization instruments, and government grain purchases for strategic food reserves, affect grain trading negatively.

Building on its experience with African grain markets over the past seven years, the Alliance for a Green Revolution in Africa (AGRA) is now well-positioned to intervene to improve grain markets for the smallholder in the following three ways:

1. AGRA can offer matching grants and various forms of training and business development services to accelerate the growth of grain trading businesses,
2. Put in place a credit guarantee and investment facility to improve the flow of capital in the grain industry. This would enable grain traders and processors to make capital investments such as warehouses and grain handling equipment, and increase their working capital. In addition, AGRA can address the traders' capital crunch by offering investment advisory services to promising grain trading businesses that source from smallholders,
3. AGRA can seed regional commodity associations that will address failures in the supply chain and coordinate policy agenda.

Context and Purpose

This report explores the workings of agricultural commodity markets in East and Southern Africa. It describes how smallholder farmers interact with these markets, where opportunities for increased efficiency and equity lie, and how AGRA might capitalize on these opportunities to improve the welfare of smallholder farmers.

Focus countries for this case study research were Kenya, Uganda, Tanzania, and Zambia. Research was conducted between June and August 2015 through desk review, semi structured interviews with medium sized and large grain traders, aid agencies, farmers, and financial institutions. The authors also conducted focus group discussions with small grain traders and processors in the focus countries.

Kenya, East Africa's financial hub, is a reliable importer of grain. It benefits from the port at Mombasa and regional road networks. Tanzania is beginning to produce grain surpluses, which are most often sent to South Sudan, Kenya, and the Democratic Republic of Congo. Tanzania's heavily taxed yet still informal grain market hampers domestic and international grain trade. Uganda is also a surplus producer, with fertile land and two seasons. In contrast to its neighbors, the Ugandan Government plays a relatively small role in grain markets.

Zambia is set apart from this regional trading cluster geographically and economically. Zambia has a more developed grain market, with reliable production of surpluses, commercial farming alongside smallholder production, and the presence of multi-national agribusinesses. Zambia offers a look ahead as to where East African grain markets might go.

The report considers staple grains exclusively as AGRA focuses on staple crops that contribute to food security and improve rural livelihoods. Consumption of grains is growing in each of these countries, just as it is internationally. The maize staple in Kenya, Tanzania, and Zambia is seeing competition from wheat and rice as populations urbanize and incomes improve. Regional influences and the low price of maize are shifting Ugandan preferences away from matoke, the traditional staple, toward consumption of maize and rice.

Smallholder Farmer's Needs and Market Opportunity

Grain Markets and Rural Livelihoods

Rural livelihoods in the region depend on grain markets. Grains are the staple foods for household consumption across large swaths of Africa. Grains feature centrally in the food security and livelihood equations. A smallholder farmer who grows enough food to eat still needs cash to buy household items like soap and candles, pay school fees, and buy agricultural inputs for the following season. For many farmers, the grain harvest is the largest influx of cash they see all year.

Kenya is the most prosperous country in East Africa. Despite the boomtown of Nairobi, about half the rural population lives in poverty[1]. Aside from a few high-value cash crops grown for export, grains dominate the agricultural landscape. Half of Kenya's arable land is devoted to cereals production[2] . Yield is the main driver of the profitability of the farming enterprise. The average maize yield per hectare is 1.65 metric tons (MT), just under the quantity a farmer must produce to break even on the

[1] Defined as less than $1.25 per day. IFAD, 2005 estimate.

[2] In 2012, Kenya had *2.7 million hectares under cereal production and total arable land of 5.6 million hectares.* World Development Indicators, World Bank, 2012 estimate.

inputs invested in the field[3]. In contrast, hot and dry North Africa achieves yields of 6.1 MT, largely due to irrigation, additional technologies and capital invested.

The Kenyan grain farmer faces enormous risk with little capacity to absorb it. A smallholder farmer invests about US$100 in inputs to produce just one acre of maize (see detailed cost of production in the appendix). This is a significant sum in a country where average income hovers around $1200 per year, and much less in the rural areas[4]. A smallholder farmer then faces the risk that rains will not fall, pests or disease will invade, or birds will attack the crop. At harvest, a farmer has to hope that highly volatile maize market prices will cover his investment in the crop and bring a profit.

Often it is the most vulnerable farmers who depend on grain production and marketing for their livelihoods. Farmers growing maize include those at or near subsistence levels. These farmers hope to produce a surplus they can sell, but at least they grow enough to cover their home consumption. Farmers with access to sophisticated market schemes or associations tend to focus on higher-value export crops, such as coffee or tea, or horticultural crops such as vegetables and flowers they can sell in cities or export markets.

Are Africa's Grain Markets Broken?

In general, grain markets in Eastern and Southern Africa are functioning. A farmer with grain to sell will find a buyer, and a consumer can buy grain products at affordable prices. The challenge and opportunity alike are that farmers are not reliably producing what the market demands. From a smallholder farmer's perspective, market requests for a given quantity and quality of grain are unpredictable, as are the prevailing prices and timing of orders.

Farmers often cite a lack of market as a constraint to their production. Surprisingly, this does not imply that farmers have nowhere to sell their grain. On average, across Kenya, Malawi, Zambia, and Mozambique, 82% of villages considered market accessible had 10 or more traders visit the village, while 72% of villages deemed isolated had 10 or more traders visit[5].

Instead, farmers' complaints suggest that purchasers are unreliable year-to-year, one-year demanding soybean or another crop, and the next year buying none and that the buyers do not reliably pay what the farmers consider competitive prices. Few farmers receive forward contracts with a minimum price for their grains; this market instrument is more common in exportable cash crops. The millions of farmers who depend on under-developed grain value chains for their livelihood and sustenance are left to make production decisions based on the previous year's prices in an industry known for dramatic swings in supply and price. Consider Appendix A for detailed information on the farmer's cost of production and profits under different sale scenarios.

The vast majority of farmers—more than 90%—who are not organized in a farmer group or integrated into an off-taker scheme that reliably buys their grain rely on assembly traders who go to farm gate with a bicycle or truck[6]. Sometimes the trader will be a local farmer with a large landholding who plants an early yielding grain variety, sells his harvest early, and then returns to the village to buy from his neighbors. Others are established medium-sized companies that specialize in moving grain from rural locations to central mills and other buyers. These local traders are the most common point of sale in the region[7]. The assembly traders offer farmers a market, but are unable to support farmers during the growing seasons and/or buy their produce in a consistent fashion.

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[3] World Development Indicators, World Bank, 2012 estimate.

[4] World Bank, 2013 estimate.

[5] This study took samples from Kenya, Malawi, Zambia and Mozambique. Nicholas Sitko and T.S. Jayne, "Demystifying the Role of Grain Assemblers in Rural Maize Markets of Eastern and Southern Africa," Working Paper No. 84, June 2014.

[6] Dalberg estimate of farmer organizations.

[7] Sitko and Jayne.

Grain Markets are an Underused Avenue to Improve Smallholder Livelihoods

Markets profoundly influence production even in their current disaggregated and unstructured state. Markets shape the crop portfolio, quantity, and quality of smallholder production. For example, at independence, Uganda produced no maize. Thanks to the pull of the Kenyan and now South Sudanese markets, Uganda today it produces well over 1 million MT annually, 90% of it on smallholder farms[8]. However, the current grain market configuration does not encourage the improvement of grain quality. There is no widely adopted differentiation of prices for different grain quality. Bad quality and good quality fetch the same price, although in some instances, the bad quality is rejected. Some traders invested heavily in cleaning and drying equipment and tend to pay low prices at farm or factory gate and add value to the grain through cleaning, drying, and standardized bagging.

An improved grain market for the smallholder farmer would differ from today's situation in there ways:

1. **Predictability**: A better market would offer farmers pre-season predictability. This would allow the farmer to make educated decisions at planting time, mitigating the risk that the farmer invests heavily in grain with no competitive outlet. Pre-planting contracts would also encourage farmers to adopt improved seed and fertilizer as they target high yields to meet the market quantity specifications.
2. **Quality premiums**: A better market would offer farmers a premium for quality produce, and therefore a higher margin. As grain markets grow more sophisticated, they seem to demand higher quality grain than what currently dominates regional markets. Offering farmers a quality premium affords the farmer higher prices and makes the farmer a more important actor of a value chain. This can also reduce the investment traders make in grain handling equipment.
3. **Investment in smallholder production**: A better price that rewards quality production and has predictable demands must rely on those quality producers and invest in their continued production. This may require traders and processors to engage in upstream activities to minimize interruptions and inefficiencies in their supply chains.

The market mechanism that benefits smallholder farmers requires a high level of organization and interdependence between value chain actors. In a more organized market in which traders or consumers can reliably source and store grain, the trader can sign and service a supply contract several months or even years before harvest. The trader comes to rely on the farmers to honor the supply contracts. The trader then offers farmers forward contracts and/or production support to ensure continuity of the trader's business. The grain buyer becomes a partner in solving problems such as ensuring the supply of quality seed, fertilizer, tillage and threshing services, and even liaising with researchers to establish a feedback loop between consumers, producers, input dealers, and researchers.

Sophisticated grain markets also demand predictable production of high-quality grains. Demand for high-quality grain is likely to grow with the developing middle classes in East and Southern Africa. Herein lies an opportunity to improve smallholder yields and grain quality as well as farmers' income. Companies ranging from small and medium-sized enterprises (SMEs) in Tanzania to giant multinationals in Zambia are finding that they can source quality grain from farmers when they are present and supportive throughout production. Leading international grain-trading firms like Archer Daniels Midlands, Bunge, Cargill, and Louis Dreyfuss have flourished with vertically integrated business models with the "capacity to produce, procure, process, and deliver raw material inputs that are at the heart of the modern agri-food system" (Murphy, Burch, & Clapp, 2012, p. 8).

These multinational corporations invest heavily in the quality of production and the welfare of their producers. Outside Africa, these firms have gone so far in securing production as to offer healthcare

[8] K. Kazzi, "Uganda," Global Yield Gap Analysis, available online at http://www.yieldgap.org/uganda, accessed August 2, 2015.

to American producers and mortgages to farmworkers, and work with researchers to develop customized seed and chemical packs[9]. This buyer engagement in production is starting to take root in Africa too. Trading firm Olam, which has significant investments in West African palm and cocoa, is building movie theaters and other infrastructure to make rural life more attractive to an urbanizing population, ensuring the continued availability of talented rural farmers. Cargill is beginning to invest in production on smallholder farms in Zambia, where it has an established cotton business, nascent soybean sourcing model, and has just begun to supply inputs for maize. The past willingness of traders to invest in their producers suggests that linking smallholders to profitable and reliable markets may become a powerful tool for ensuring quality grain production and improving rural livelihoods.

Country/Market	Latest price/kg (LCU)	Price percentage change			
		1 month	3 months	1 year	Next 3 months
Burkina Faso (Ouagadougo, Sankaryare)*	150.5	3.3	-2.6	-0.7	-1.1
Cote d'Ivoire (Man)	250	22.4	30.0	20.0	-2.4
Ghana (Kumasi)*	173.34	5.77	3.8	4.8	2.9
Mali (Bamako)	200	12.5	19	6.5	2.6
Niger (Lagos)*	40.19	-2.8	6.7	0.0	-1.3
Nigeria (Lagos)*	40.19	-2.8	6.7	0.0	-1.3

[9] Sophia Murphy, David Burch, Jennifer Clapp, “Cereal Secrets: The World’s Largest Grain Traders and Global Agriculture,” Oxfam Research Reports, August 2012.

Significant Actors in Grain Markets

This reference chart offers an overview of major players in the grain trading market.

	Farmer	Agro-dealer	Assembly traders	Large traders	Warehouse Receipts Systems	Off taker Schemes	Hammer millers	Formal Millers
Role	Production of grains	Supply of inputs and occasional commodity purchaser	Buy grains from farmers, aggregate in rural areas without farmer associations. Sell onto mills or larger traders.	Buy grains from out-grower schemes or assembly traders. Sell onto mills or government.	Store grains for farmers and traders and facilitate access to commodity backed loans.	Source grain from farmers by fixing floor price, often provide production support	Mill using basic technology to process grain into flour (maize) and final grain (rice)	Mill using roller mills or sanitary hammer mills, process grain into differentiated flour, final grains, and animal feed
Grain purchase point (buying from)	Production	Farmer	Farmer	Assembly traders, farmer groups	Accept any grain with minimum quantities/quality	Farmer groups	Farmer (home consumption), assembly trader	Traders, government, warehouse receipts
Grain sale point (selling to)	Various	Trader, mills	Larger trader, government, mills	Mills, institutional buyers, government, export	Mills, institutional buyers, government, export	Mills, institutional buyers, government, export	Informal markets	Consumers

	Farmer	Agro-dealer	Assembly traders	Large traders	Warehouse Receipts Systems	Off taker Schemes	Hammer millers	Formal Millers
Opportunities in an improved grain trading value chain	Sell larger quantities, earn premium for quality production, access to inputs and financing	Existing rural infrastructure, interests in success aligned with farmers	Rural networks and relationships, improved buying capacity	Well-positioned to offer forward contracts to farmers, dependable relationships with large off takers	Attractive to farmers and traders who gains more control over pricing and improved access to finance	Well-positioned to meet rising demand for high quality traceable grains	Ubiquitous in rural areas	Rising demand for high-quality maize, rice, and animal feed
Challenges to integrating in a more efficient grain trading supply chain	Limited access to finance and therefore limited adoption of yield-enhancing technologies	Limited access to finance to expand rural networks	Limited working capital to increase grain purchases and accelerate inventory turnover, limited market information, and informal nature of the business with limited growth prospect	Lack of skills and experience in organizing farmers, limited presence in rural areas	High cost of storage, few farmers can afford to wait for sale Limited number of banks accepting warehouse receipts as a tradable instrument	Access to finance, side-selling, high cost to organizing farmers	Quality concerns; high cost of upgrading machinery	High cost of goods sold, high operational costs, competition from hammer mills

Grain Traders as a Means to Improve Market Outcomes

Across the grain markets, there are three value chain steps that could serve as the focus of an intervention to improve market outcomes for smallholder farmers: The farmer, the trader, or the end consumer. Programs might also focus on the policy environment or the financial institutions that serve the grain industry.

Betting on the Grain Trader

AGRA can improve grain market outcomes for the smallholder farmer by upgrading the effectiveness, numbers, and reach of the local traders. The category of grain traders ranges from the individual who collects grain in a discrete area to regional traders who may grow as large as milling grain in addition to sourcing. The key criterion for inclusion is that the trader source directly from smallholders.

Prioritizing the trader in an AGRA intervention is controversial in part because traders have a poor reputation. More importantly, the focus on the assembly trader risks prioritizing the needs of the small business over the many needs of the smallholder. However, improved markets rely on capable market actors; in particular, grain markets require actors large enough to bring order and structure to complex and chaotic value chains, and nimble enough to work with smallholder farmers who produce and sell small quantities. This is a task uniquely suited for the grain trader.

Grain traders enjoy the following advantages as a focal point for intervention to improve farmer market access:

1. **Traders are already in the business**. They are often local farmers or have been dealing with smallholder products for years. Buying grains from remote areas across Africa is no simple feat. AGRA increases the chances of success by focusing on proven mechanisms that already reach smallholder farmers.
2. **Traders can bring order to a chaotic value chain**. Stakeholders in Tanzania's agricultural sector, including from seed companies, farmers, and government authorities, report that they do not know what the market will demand, which hampers investment, profits, and growth. The largest commodity traders in the world excel because they play this crucial role of coordinating the value chain. Cargill understands what General Mills wants to buy and then makes sure that all the components align such that it can deliver on General Mills' order. In Cargill's case, this may mean working with Syngenta to develop a specific hybrid, distributing seed to farmers, buying back the grain at harvest time. African traders are well-positioned to play the same role because they sit between the producer and the consumer.
3. **Traders are sustainable**. Grain traders are businesses with a bottom line. As they grow into larger companies, they tend to evolve into family-run organizations that are built to offer future family income. A successful intervention that improves the capabilities of these traders achieves results in one funding cycle, rather than creating serial beneficiaries.
4. **Traders are accustomed to working with smallholders:** Larger corporates may avoid it. Betting on the SME African trader is akin to betting on the smallholder's ability to transform their agriculture from subsistence to market oriented agriculture. The local trader's established business line is in sourcing grains from smallholder farmers. Growing grain traders' business requires growing their supply base, which demands improving smallholder production.

Disabusing the Assembly Trader Myth

The assembly trader, also known as a small-scale, local trader or middleman, is the standard villain in the grain-trading story. He is the roving salesman who squeezes the ignorant farmer on prices. In reality, assembly traders play an invaluable role in the current grain trading value chain. They can be a crucial leverage point in making a future supply chain inclusive of the smallholder.

Farmers often choose to sell to assembly traders even when other options are available for three reasons: First, assembly traders buy grains directly in villages saving the farmer time and money on transport; second, assembly traders pay cash at the time of sale in contrast to a government buyer or warehouse receipts system (WRS); third, assembly traders are willing to buy grains right at harvest before the maize dries sufficiently, undertaking to improve the quality, offering farmers their fastest route to much-needed cash[10].

Evidence suggests that traders are not scalping farmers on prices. Jayne and Sitko (2014) revealed that across four countries, traders offer farmers, on average, 80% of the retail or wholesale prices, which implies a 20% cut for transport, quality improvement, marketing costs, and margin[11]. A trader in Eldoret who buys maize from smallholder farmers pays KES2500 per bag. He sells the maize to millers at KES2800 per bag, making a gross margin of KES 300 per bag. The estimated marketing costs show that the trader spends KES 200 per bag on cleaning, drying, and transport. His net profit becomes only KES100 which is 40% of the price the miller is willing to pay. The farmer receives 89% of the miller's price.

Moreover, traders do not disproportionately disadvantage isolated farmers, offering them 93 to 96% of what they offer market accessible farmers[12]. However, on low-value commodities, these margins add up to a meaningful reduction in incomes for farmers who already earn a low margin on their cost of goods sold.

Assembly traders do tend to cheat farmers on quantities. In rural areas, most traders do not use scales. They instead prefer to use volume-based tools such as goro-goro in Kenya, or lumbesa in Tanzania. These measurements can be easily manipulated to the trader's benefit. Farmers tend to counteract traders' cheating possibilities by mixing foreign matters with the grain to increase the weight of the grain bag. Encouraging the use of weighing scales in the grain buying and selling transactions would foster the trust between farmers and traders. In addition, Tadesse and Shively (2013) found that "repeat transaction" fosters long-term and trust-based business relationships between farmers and traders (p.1173).

[10] Sitko and Jayne, 9.

[11] Sitko and Jayne, 12.

[12] Sitko and Jayne, 9.

Grain Trading Bottlenecks

Grain trading in East and Southern Africa is limited in its efficiency and ability to improve smallholder livelihoods due to three fundamental bottlenecks: Limited access to finance, the difficulty of sourcing grain quality, and policy constraints. While there are other problems in the grain-trading sector, most of them would be solved by resolving these core bottlenecks.

Bottleneck 1: Limited Access to Finance

Limited access to finance is the most fundamental barrier to building a more competitive grain trading industry. Grain trading requires both working and investment capital. ***Working capital***, the cash that traders use to buy grain for onward sale, is the most immediate need in terms of offering the smallholder farmer a competitive price.

Assembly traders face the greatest challenge in accessing working capital since they seldom have assets to collateralize a loan. Traders make profits on slim margins by rapidly turning over their grain inventory and slowly building up capital throughout the season. By the time the trader has sufficient cash to buy a large quantity of grains the price for grain has skyrocketed due to scarcity. Larger businesses that can self-finance buy large quantities when prices are low, typically by buying from numerous assembly traders and organized farmers. The lack of working capital keeps the assembly trader, the market agent closest to the farmer, from offering a high paying and predictable market to the smallholder farmers. Small-scale millers also experience the same problem as they do not enough working capital to buy large volumes of grain at harvest. A few months after the harvest, these millers turn to large traders who sell them grains at a high price.

For example, David Wilson is a farmer and trader operating on Buvuma Island in Uganda. David begins his season by harvesting and transporting his own paddy across the river to Jinja, where he sells it to Upland Rice. David organizes and pays for the complicated and costly transport of his own grain and sells it in Jinja. David then returns to buy grain from his neighbors, again transporting a small quantity at high cost. This cycle continues throughout the season. If David could buy his entire crop for the season from his neighbors at the same time he harvests his own crop, economies of scale would significantly reduce his cost of transport, and he would be able to pass savings onto his neighbors while securing a more comfortable margin. Instead, as David slowly builds up capital, larger traders beat him out to access his cash-strapped neighbors. These larger traders buy grain from their local agents, but without relationships on the island, the trader's local agents fill the bags with rocks and sand, diluting the quality of the rice. Knowing that the paddy will be low quality and the rice mill will deduct the cost of the foreign matter, the trader pays rock bottom price. The net effect of this cycle occurring across Uganda is that millers pay one fixed price for paddy, no matter the quality, the farmer has no incentive to produce excellent paddy, and margins remain slim for everyone across the supply chain.

Grain traders also need ***investment capital*** to finance the construction of storage facilities and the acquisition of grain handling equipment. Within this, we can segment the need for investment capital into three groups:

- The ***small trader*** cannot secure a realistic bank loan to finance construction and business growth. In theory, a loan for physical infrastructure should be easy to finance since a physical asset secures it; however, banks prefer to see collateral that can be re-purposed for something other than the risky grain business, and they prefer to have urban collateral. These traders rarely have sufficient collateral or banking history to satisfy the bank's requirements.
- ***Medium-sized traders*** who have proven ability to source grain grow by strengthening their capabilities for a reliable supply of high-quality grain to a buyer. A trader requires two things to make this leap: The first is cleaning and drying equipment to ensure grain meets buyer specifications. Second is a warehouse or silo to store grain through as prices rise or until the buyer is ready to source it. This equipment can cost anywhere from $250,000 for a six-ton warehouse with cleaning and drying equipment to $7 million for a sophisticated grain silo.
- ***Established traders:*** Another facet of the investment capital crunch is not a challenge but an opportunity to reshape existing markets. Established traders and millers have a variety of investment options available, along with the muscle to secure and service bank loans. When making investment decisions, they reasonably divert cash to the highest return on investment projects. At this stage in East and Southern Africa, those projects tend to be at the value addition step of the supply chain, such as the processing of animal feed or specialty flour. With more investment capital or matching grants, these players might simultaneously invest in their top priority projects and in bringing their sourcing infrastructure closer to farmers, which would reduce transport costs and raise farm gate prices.

Basic Element is the largest maize miller in Tanzania. Basic Element currently has storage and a mill in Dar es Salaam, far from the productive Southern Highlands and Congolese markets. The company would like to put up a silo for 10,000 tons along with grain handling equipment in Makambako, but the $500,000 investment takes a backseat to the young company's constructing a new mill and an animal feed plant. While all three investment options appear profitable, the new mills and animal feed plant will have a higher rate of return. The company has prioritized those to projects over the Makambako silo, which would more directly serve smallholders. At present Basic Element does not foresee building at Makambako until 2020 at the earliest.

Why are financial institutions failing to meet capital needs? The region is dotted with banks, even those endeavoring to serve agriculture, as well as private equity funds, who committed $4.2 billion to Africa in 2014 alone. And yet the capital available is not serving the needs of the grain business.

Banks have high collateral requirements, sometimes up to 150% of the value of the loan, which many traders cannot meet. Banks prefer to take this collateral in urban areas, where property values are higher and more stable. It is also time-consuming and costly for many businessmen to get title to their property.

Banks prefer to see a history of banking transactions before lending, and many traders operate on cash businesses. For trade finance, the loan a trader might take against an existing international contract to buy within his own country, banks ask for 3 to 8 years of trading history, which makes it hard for a trader to enter the business, especially in countries like Tanzania and Zambia where the government periodically bans exports of key grains.

Assuming a loan is indeed issued, the high fees and interest rates can be prohibitive. Fees alone can come to 20% of the total loan value and are charged before the loan is disbursed. The interest rates range from 12% in Kenya to 25% in Uganda. Rates can be more than twice as high when the lender

is a microfinance institution. In a low-margin business such as grain trading, a 25% interest rate can wipe out any profit.

There are **guarantee funds** offered by AGRA and other development partners. These funds offer banks the first line of defense against default. However, recipients past AGRA guarantees continued to rate agriculture high risk and are unwilling to relax the requirements to expand their lending base. Bankers report guarantee funds can make agricultural lending yet more high-risk because if lenders find out that their loan is guaranteed, they are more likely to view it as a gift and default.

For example, a 1 million shilling loan might become 850,000 KSH when the bank disburses it, because the bank charges government fees, its own processing and insurance, and takes interest payments before issuing the loan itself.

Private equity funds can finance the growth of grain trading businesses, primarily on the long-term investment side. However, these private equity (PE) funds face numerous challenges in scaling to meet the need for investment capital in the African grain industry.

Private equity firms with commercial growth-targets are ill-suited to investing in African grain markets for the following reasons:

- Private equity firms provide investment rather than working capital and rely on the traditional banking system to secure the working capital. The implication is that PE investment does not solve the primary challenge grain trading businesses face.
- The private equity model prefers to take control of the business through equity ownership, which many entrepreneurs are unwilling to provide.
- Only Africa's largest trading businesses are investable options for the for-profit funds, which have an average deal size worldwide of $128 million[13].
- Private equity firms typically have a turnaround time that is too short (5 to 7 years) for the low-margin trading business.
- Private equity firms have limited exit options for their investments and almost all of which are unpalatable to the founding entrepreneurs.

A successful case of private equity investment in African grain trading came in 2012 when Export Trading Group (ETC), one of the largest grain traders operating across Africa, took on $200 million in investment from the Carlyle Group. ETG's size is unparalleled by other local firms, and still was still a path-breaking move for Carlyle. This money was reportedly invested in a smallholder-sourcing model in Tanzania. In 2015 ETG's management bought the shares back from Carlyle. This is a promising development for the sector, but the scale is hardly replicable for the vast majority of trading firms.

Bottleneck 2: Difficulty of Sourcing High-Quality Grain

As traders grow, they encounter a new challenge. It is hard to source large quantities of high-quality grain. The grain quality challenge is twofold from both consumer and producer perspectives. The average consumer of East and Southern African grain is not informed about the health risks of poorly managed grain. In Tanzania, for example, the most popular form of maize meal is purchased from one of the thousands of local hammer mills, despite the visibly poor sanitary conditions. This includes

[13] Authors' calculations from "Global Private Equity Report 2015," Bain & Company.

ferrous residue that hammer mills leave in maize meal and the absence of screening for pesticide residue and aflatoxin.

Farmers with high-quality maize in rural Tanzania will be paid the same price as a farmer who produces low-quality maize. In fact, a trader will mix the two products together to achieve the average quality grain consignment. There is little incentive for the farmer to do better. The grain is accepted or rejected by the buyer, rather than bought at a price that reflects the quality. Maize prices in Kenya, for example, can fluctuate from a harvest low to 150% or 300% of harvest price as supplies grow scarce. This encourages farmers to try to harvest early and dry the maize insufficiently to sell before the harvest deluge or store their maize (often with inadequate storage technology) as long as they can. When buyers complain of poor quality maize, it is, in large part, their own doing for the lack of predictability in the market, rather than the farmer's incompetence in production.

Only a few points in the system exert pressure for better quality grain. The first is the wealthy urban consumer who is conscious of the health risks of low-quality maize. Some professional Tanzanians in Dar es Salaam go as far as growing and milling their own maize to ensure their safe supply that does not contains pesticide residue. The second is the institutional buyer. This group includes the World Food Program, which is a significant buyer in a sea of small buyers but is not large enough to drive change across the region. Breweries are also trying to source high-quality grain domestically, using grain traders as intermediaries whenever possible.

There are three ways a trader can improve the quality of the grain, and there are best used in tandem:

1. Investing in storage facilities equipped with grain handling equipment such as dryers and cleaners. Traders can invest in these facilities, yet they often lack the capital to do so.
2. Building business relationships with farmers and reduce the time farmers store grain in inappropriate storage facilities. Traders or other off-takers can communicated their preferred grain standards and train farmers on grain quality assurance.
3. Traders can also partner with service providers to ensure that farmers have access to mechanized post-harvest handling services for key operations such as drying, shelling or threshing.

Bottleneck 3: Policy Barriers

Government interference is an issue primarily for maize in Kenya, Tanzania, and Zambia, where grain pricing is deeply political. Uganda does not have a national grain reserve and has been mostly a free market under President Museveni.

Established traders, particularly multinationals in Zambia, complain that competition from food reserve agencies limits a company's ability to plan procurement and invest in their businesses. Companies struggle to take positions when the national government is the largest buyer in the market, liable to buy well above market price, and later offload grain to millers well below its value. The unpredictability and distorted pricing can keep even established traders from honoring their contracts.

In Zambia, *for example*, each year the government buys about one-third of the maize harvest. Much of this maize then rots in strategic.

Governments pursue these policies to stabilize prices for the farmer and the urban consumer of maize meal. It is politically essential to secure the urban supply of affordable maize meal. Protesters will hit the streets in an upset over even small increases. It may be that governments keep maize prices lower than is realistic for the domestic production capabilities and will continue to do so since the urban consumers are the most influential constituents. To mitigate the potential fallout from rural interest groups, some governments provide input subsidies to reduce the cost of goods sold.

National grain boards can disadvantage smallholders by tying up capital with disbursement delays. Even though grain reserve agencies pay higher and pan-territorial prices, the farmer's revenue when

selling to the government may be lower than when selling to a trader once delays and travel costs to receive payment are counted. Farmers have to wait between three months and six months and have to travel to receive payments.

Season 2013/2014: Case of Chibombo District

All the costs and calculations are in Zambian Kwacha

Marketing costs	Selling to Traders				Selling to FRA		
	Quantity	Price per kg	Total		Quantity	Price per kg	Total
	1 MT	1	1000		1MT	1.2	1200
Transport to the buying post	20 bags	5	100		20	5	100
Travel expenses - to receive payments		0	0		3	100	300
Interest forgone (3% per month for 3 months)		0	0		3	36	108
Net payment received			**900**				**692**

As shown above, the price that the Zambian Food Reserve Agency (FRA) offers may be 20% higher than the one traders offer. However, traders pay cash upon delivery while FRA pays after three to six months. Moreover, farmers who sell to FRA must travel to the designated ZANACO bank to receive payment. Most of the time, they travel to the bank multiple times before the actual payment is made. The net revenue for farmers who sell to traders is 13% higher even when the time value of money is not considered. When the time value of money is considered, their revenue becomes 30% higher than the proceeds of those who sell to the Zambian Food Reserve Agency (FRA).

Traders are also vulnerable when they sell to the government. They will buy from farmers, sell to the government since it advertises the highest prices, and then wait for payment. In the meantime, the traders have no working capital, so they stop going to the village to buy from the farmers, reducing farmers' outlets.

Another form of market interference that hampers industry development is ***export ban***, which is imposed periodically in Tanzania and Zambia. The government's goal is to keep stocks in the country in the case of a food shortage. In practice, governments do not have sufficiently robust data and supply chain management systems to accurately estimate the available supply before imposing export restrictions. An export ban keeps a domestic trader from honoring international contracts. Discounting for the risk of an export ban reduces the price paid to farmers over time.

Tax policies also hamper grain industry development. Grain levies are of particular concern in Tanzania and Kenya, where *cess taxes* (grain levies) are one of the revenue streams for district and county governments. Local taxes are charged on a truckload of Tanzanian and Kenyan grain each time it passes from one district or county to the next. These high taxes (cess) limit internal trade by reducing the profitability of grain traders.

The ***lack of regionally enforced harmonized standards*** allows the proliferation of informal low-quality grain trade. Informal bicycle traders crossing the border will beat a formal trader on cost every time, saving in part on sanitary conditions and grain standards. Border inspections to ensure quality would buffet the growth of the off-takers that are buying high-quality grain while improving safety along the food supply chain.

Hammer mills are ubiquitous in rural areas, operating under the radar of regulation. They often steal electricity off the grid, do not observe sanitary standards, and use equipment that leeches iron shavings into maize meal. For example, even the largest grain companies in Tanzania, such as Bakhresa and Mohammed Enterprise, cannot compete with these informal mills on cost. The result in Tanzania has been that large millers have all but left the maize industry, leaving it to informal players who offer little predictability and no premiums to farmers.

Figure 1: Left is one of a hammer mill's 48 blades at the start of the day. Right is the blade after a day of milling. The iron residue is most often left in the maize meal. A rough estimate from a miller is that 7 MT of iron shavings are consumed in maize meal each day in Dar es Salaam alone.

Poor Transport Networks

Finally, grain trading, along with nearly every other industry in the region, would benefit from improved road infrastructure. Transport costs from rural areas to urban markets are high. In theory, these costs should be passed along to the consumer, but because of government price regulations, they are not. Instead, the high transport costs are subtracted from what the trader can afford to pay the farmer.

Recommended Interventions

Matching Grants

Companies selected for a growth trajectory by AGRA program officers based on their potential to grow and source more grain from smallholder farmers also receive matching grants of between $250,000 and $500,000. The grants can be directed to several business needs, depending on the company's plans, feedback from fundraising consultants, and AGRA's analysis of what the company most needs to grow and source more grain from smallholders.

The most common use for the grant would be building a warehouse with cleaning and drying equipment; this costs at least $250,000. Warehouses will enable traders to aggregate their grain, bring it to a uniform high quality, and store it until market prices rise, or until a contract buyer requests delivery. Traders with such infrastructure in place can compete for contracts to supply large consumers, such as schools, hospitals, and millers. Institutional buyers prefer to source their food supply from a trader with a warehouse to maintain grain quality. Successful traders, such as those in Zambia, see quantities sold growing along with demand for high-quality maize. Traders then look backward to their producers, farmers, and begin to invest in their production and pay a premium for high-quality grain.

In tandem with the grant funding, AGRA can offer **business development and advisory services** from seasoned professionals to early-stage business people in grain trading. Such advice can cover such issues as how to cash flow a grain trading business, cost-effective equipment and warehouse arrangements, and regional trading opportunities. AGRA could also establish training for managers of such companies via a "Commodity Enterprise Management Institute" housed within a university or institute located within the region.

The secondary benefit to building storage is that it increases the trader's collateral against which the trader can take a loan for working capital. If a company's key operational constraint is sourcing high-quality grain, the matching grant could be used to cover several years of extension service officers working with farmers on behalf of the company.

The program of matching grants and investment and loan capital infusion through professional services will together help grain trading companies increase the volumes they trade, and accordingly, the volumes they source from smallholder farmers.

Capital Raising Advisory

AGRA can sustainably address the key challenge that traders face (limited access to finance) by providing advisory services for the immediate capital needs that include capacity building to improve the company's long-term bankability. To develop an ecosystem of grain trading companies across a country, AGRA's program staff will select about 10-grain trading companies across the country that serve varying geographies.

While traditional bank rates are high (between 18 and 30% for a trading firm), more affordable loans and equity are possible within the region. Promising small and medium-sized businesses that expertly seek funding are finding capital at affordable rates, often in the mid-single digits. There is debt finance available for promising businesses, an overabundance of equity tagged for use in Africa, as well as impact investment capital that could be deployed specifically to these businesses that source from smallholders. AGRA can enable trading firms closest to farmers to tap into this capital.

Investors are avoiding grain trading firms because they are at high risk with limited collateral. Specialist consultants can reduce the operational risks by improving the company's accounting, transparency, and supply chain management, making the traders investable opportunities. A consultant would review a promising grain trader's operations and finances, evaluate its potential, and work inside the company to improve its processes and business plan. Once the company's records and plans are high quality, then the consultant will lead the company through funding cycles, looking at international and domestic sources of capital.

AGRA has several routes to provide investment advisory:

- AGRA could hire an outside firm, such as Open Capital Advisors or Lion's Head. A company would charge from $20,000 to $100,000 depending on the needs of the business and the investment potential. AGRA might negotiate a bulk rate for the many projects it will carry out across the continent. These companies are proven fundraisers. They would work with a company for between 6 weeks and 6 months.
- Hire talent into AGRA. This method builds internal capacity and offers AGRA greater control. It would also build knowledge within the institution about fundraising processes for SME agribusinesses. Hiring these specialists will be both difficult and expensive. The team would likely need a combination of former investment bankers and management consultants, who understand what companies need to do to attract investment, and have prior experience in agriculture and agribusiness.
- Hire freelance consultants with prior experience in capital raising and grain trading.

AGRA will pursue the hybrid approach that was successful in professionalizing and attracting capital to seed companies: Hiring freelance consultants knowledgeable about both grain trading and the financing options available to fund a young firm.

Many of the grain traders that AGRA will look to develop have already received business development services from AGRA or another development partner. In the case of prior AGRA beneficiaries (SMEs), this first round of business development services primarily focused on registering the business, developing a basic business plan, teaching company staff proper accounting, and auditing their accounts as well as helping these SMEs secure loans from financial institutions. Investment advisory

is the next step for promising SMEs. Fundraising sums exceeding $1 million requires more time and expertise than the firms have yet been offered.

Establish Regional Commodity Associations

In countries where there is no "developmental state" such as Rwanda and Ghana, the existence of a strong business association contributes to the improvement of the business environment. It creates a "growth coalition" between businesses and governments (Taylor, 2012, p. 16, 30). AGRA can seed the establishment of local organizations to unite business and government in solving logistical and policy challenges in the grains supply chain.

Stakeholders would include government representatives, traders, seed companies, fertilizer companies, agro-dealers, processors, prospective investors, farmers, financial institutions, and research institutes. This would become a self-perpetuating association that meets at planting time, mid-season to plan for the trading season, and then at the end of the season to discuss that season's challenges and look ahead to the following year. The associations would facilitate the development of clusters of agricultural productivity/transformation, offering an exchange of information to coordinate each stage of the value chain. On the policy side, the associations would offer a coordinated voice to a fragmented industry.

To launch these local associations, AGRA would use grants to develop business plans and local leadership teams to carry the groups forward. These would be membership associations funded by dues or members' contributions. At a later stage, the regional associations might collaborate nationally[14] .

Additional Intervention Options to Support Grain Traders

Commodity Markets Fund

AGRA could address the challenges in access to finance directly by creating an *agricultural investment and loan fund*. The fund's core business would be to **serve the financing and business development needs of traders, mills, and other off-taker schemes** sourcing from smallholders. This fund would offer loans, convertible debt to equity loans at reduced rates, and equity investments.

- The loans would be structured to serve the working capital needs of local traders who require at least $1 million per season to profitably trade in grains. These loans would have a short turnaround time of six to eight months, depending on the country and crop.
- For capital investments, such as in grain storage or a mill for a trader that chooses to enter value addition, the fund can offer convertible loans or equity. The equity investments would take an exit timeline of up to 10 years, with the most likely exit scenario being sale back to the entrepreneur.

The second and smaller component of the fund would ***develop SMEs that are improving smallholder access to markets***, forming an ecosystem around quality grain that feeds an invested trader. This SME might be a company that fabricates or operates mobile shelling machines in rural areas or a tech start-up that offers agronomic services to farmers.

[14] At present there are not national level associations for specific grain commodities in most of these countries; Tanzania has such an association for rice at the national level, which is working to stem Pakistani rice imports.

In practice, the fund's investment professionals would identify a trader reliably sourcing quality grain from smallholders, and provide equity investment to facilitate the construction of a warehouse and loans for working capital to buy grain for the season. As the business begins to succeed and sources larger quantities of grain from smallholders, it might find that its further growth to supply contracts with buyers concerned about quality is limited by the need for quality inputs. At this stage, it would benefit the fund's investment, the trading business itself, and the farmers supplying grain to have capital available to invest in the next crucial point in the supply chain. This might be an agro-dealer network to provide reliable inputs, or a mobile farming equipment company that provides small combine harvesters to farmers on credit.

It would be ideal to ask the trader to provide all of these services; however, it may not be realistic to press one growing business to rapidly incorporate the new business streams that an ecosystem of productive smallholders will eventually require to develop their farms. Instead, a better fit would be to identify emerging local entrepreneurs already providing these services and use the fund's capabilities to help them do it at a larger scale.

A key ingredient in the fund's success will be the ***integration of investment or loan capital with business development services***. From the time that the fund signs an investment or loan agreement with the company, the fund will hire a local business development consultant to steward the company's growth and minimize the risk that the business fails. A configuration in which the client for the business development services is the fund investing in the growth of the business, rather than a development agency, ensures alignment of interests and will encourage better consultant performance. It also allows a feedback loop through which the consultants can advise the fund on follow on investments necessary to develop the quality grain infrastructure in that trader's value chain.

The ***goal of the fund*** will be to maintain its capital over a 10-year cycle, rather than turn a profit. Any profits will go to funding onward scouting of investments. The business development costs are unlikely to be covered by the proceeds of the fund and will require a separate infusion of capital from AGRA.

A fund whose goal is to preserve its capital will not be acceptable to existing private equity firms and perhaps not even to impact investors, who are focused on achieving near market-level returns to prove the viability of the model. To establish the fund, AGRA could:

- Work with existing partners such as Pearl Capital, Injaro, or African Agricultural Fund, should they agree to the low return targets;
- Handle the investments in house (which may carry a higher risk of default because of the "gift" perception of a loan or investment from a development institution);
- Create a new fund exclusively focused on grain trading;
- Partner with nascent initiatives such as the Agricultural Storage Investment Fund. Development banks have pledged to fund this initiative. It is slated to operate in Zambia, with over $80 million available, and Malawi, with about $25 million available.

Facilitate Multinationals' Investment in Inclusive Business Models

While in the past major companies have been looking to work with smallholders for social responsibility purposes, there is growing indication that they are looking to work with smallholders for their own core business expansion. Barring significant policy barriers, it is all but inevitable that multinationals come to take a dominant role in African agriculture over the next century. The opportunity for AGRA as an organization skilled in building public-private partnerships is to ensure that these companies enter the market in a way that reduces rural poverty. AGRA can encourage the companies to integrate smallholders into their supply chains by subsidizing the upfront costs of engaging with smallholder farmers and helping the companies to build their capacity of working with smallholders.

From the perspective of a multinational company entering smallholder agriculture in Africa, the greatest operational challenges are the management time of working with farmers and ensuring that they produce quality grain.

AGRA and other donors can thereby reduce multinational's time and transaction costs of working with smallholders either through well-organized farmer groups or through local entrepreneurs.

Farmer groups: Fewer than 10% of smallholders are organized into farmer groups, and they can be unreliable due to management challenges.

Local entrepreneurs: A more reliable route is the establishment of local agri-entrepreneurs. USAID's PROFIT+ program in Zambia is training 200 Community Agricultural Dealers (CADs) in a catchment area serving 140,000 farmers. These entrepreneurs have developed businesses in mobile agricultural machinery, agro-dealing, and grain trading. Cargill and Export Trading Group are relying on these entrepreneurs to buy commodities.

Multinationals are able and willing to invest in improving quality once they have a network of smallholders supplying grain. Improved grain quality becomes the multinational's interest.

A partnership between Cargill, TechnoServe, and the Gates Foundation in Zambia demonstrates how this approach has already succeeded. In developing a new proposal to the Gates Foundation to improve the soybean value chain in Southern Africa, TechnoServe invited Cargill to participate as an off-taker. The Gates Foundation offered Cargill a 10% first loss guarantee, which the firm drew on for the first year alone. TechnoServe provided technical support by working with regulatory authorities and researchers to ensure that Cargill had the right seed variety and other inputs to distribute to their out-growers and trained its extension workers.

From this successful collaboration, Cargill has expanded its operations in Zambia. Cargill presently sources soybeans, cotton, and maize, providing all inputs on credit and extension, and serving as the contractual off-taker for soy and cotton, while asking the farmer pay back their loans on maize before selling on to a buyer of their choice. This model now works with 62,000 Zambian farmers, and is expected to include 200,000 by 2018. Cargill is using Zambia as a test case for its Africa strategy, suggesting that this smallholder model is likely to continue with limited development agency support.

This scenario assumes that a company has decided to invest in a given country. It does not consider the company's political risk assessment. With unfavorable political, climactic, or macroeconomic environments, the company might avoid investing altogether. This is a likely result in a country like Tanzania with a history of heavy government interference in grain markets. If AGRA is interested in reducing the upfront political risk barrier for a multinational, it could take one or all of the following steps to encourage multinational investment:

1. Arrange a first loss guarantee to the foreign investor to reduce their risk exposure. For American companies, work with trade promotion agencies such as the Overseas Private Investment Corporation (OPIC) to inexpensively insure the company's risk. If a number of companies are interested in U.S. government support, AGRA might organize a consortium to access political risk assurances.
2. Offer three years of matching grants for extension services as an incentive to reduce the upfront cost and improve quality from the outset.

Policy Advocacy

AGRA's policy advocates should continue to advocate for governments to discontinue export bans and ensure that the policy changes are communicated to border posts. In addition, AGRA can partner with governments and private sector companies to design and implement appropriate price stabilization instruments and models that crowd in private sector investment.

Discouraging a government-run reserve agency is politically fraught. AGRA can publish research on and encourage the testing of alternative grain reserve systems based on the private sector. In this set-up, the government would issue an annual contract to a significant local trader to source and store a strategic grain reserve. This is the system now used in the U.S. and Europe. The Grain Council of Uganda is working to pilot such a system as well. With a proven private-sector system in place to secure a strategic grain supply, it will be easier for AGRA to encourage the government to leave the trading business. AGRA could work to change public opinion on the issue by commissioning an independent research report on the effect of national grain policies on market development, and the downstream effect on a farmer's welfare.

This year trading firms in Zambia prevailed upon the government to enter the market at the end of the season and to buy less than half its average position, acquiring only 500,000 MT. The private sector bought at $130 per ton paying cash. The Food Reserve Agency entered the market two months after and offered $150 per ton buying on credit with high default risks. If this market entry sequence is successful, AGRA might work to publicize the change and share it with its partners.

AGRA can also encourage government partners to enforce grain trading standards, including those on sanitary conditions in trade. Often the requisite laws exist, but national governments do not have the capacity to enforce them. AGRA might experiment by developing a public-private partnership to test out funding a standards enforcement system. AGRA might execute this plan by convening the Kenyan and Ugandan standards agencies, alongside trader, farmer, and transport associations, to discuss a strategy to implement the legally stated standards. Trading firms who lose business to the informal trade may be willing to invest in a certification system, creating a cost-sharing arrangement with AGRA to hire Afri-Cert, a past AGRA investee, to screen maize at border crossings for sanitary conditions. Afri-Cert could establish infrastructure and send personnel to work hand-in-hand with government inspectors with a view toward eventually handing the system off to the government entirely. This can be done in collaboration with East Africa Trade Mark that is working with the East Africa Community to improve cross-border trade environment. Of course, the problem of informal trade is as long as Africa's many borders. The only sustainable and comprehensive solution will be improved governments' capacity to police their own borders.

Interventions Benefiting other Value Chain Levers

The grain trader is just one of a number of levers that an agricultural organization might choose to improve the functioning of grain markets to best serve smallholder farmers. For the purposes of reaching a large number of mostly ungrouped farmers investing in low-value crops like maize, the trader is the most promising entry point for AGRA. The primary competitors are mechanisms that aggregate and predict end-user demand to offer forward contracts.

A review of interventions focusing on improving grain markets through other points of entry reveals that they do not offer the scale, sustainability, or access to the most rural farmers that working through a grain trader provides.

Limited Reach of Warehouse Receipts Systems (WRS)

Warehouse receipts systems are a relatively recent donor backed innovation in the grain markets. They are secure storage facilities linked to banks that offer farmers a percentage of the present market value of the commodity for depositing the grain at the warehouse. The farmer can then store the grain at the warehouse and wait for prices to rise, later finding a seller willing to pay a scarcity premium. At this point, the buyer pays through the bank that advanced the loan, and the balance of proceeds goes to pay the warehouse operator for storage fees, and the remaining proceeds go to the farmer.

There are three challenges to this system's use to improve smallholder incomes:

- First, storage is expensive relative to the cost of the commodity;
- Second, individual farmers rarely have quantities large enough for the warehousing system to accept, so their reach is limited to aggregated farmers;
- Third and most importantly, most farmers can't afford to wait for the full proceeds of their grain sales.

One way to reform the system for the future might be to further integrate the operations of a WRS system and a bank, such that the bank essentially buys the received grain, stores it at the warehouse until sale time. In this scenario, which would be similar to a derivative, the bank earns a cut of the upside of the grain markets and can advance the farmer the expected sale price for the grain.

Distant Future for Commodity Exchanges

Commodity exchanges are another much-lauded development for grain markets in the region. Many countries in East and Southern Africa have passed laws and created regulatory frameworks for exchanges, including all the four focus countries in this study. Investors are standing up a regional exchange, already active in Rwanda and Nigeria. At present, the volumes going through this NASDAQ powered exchange are still far too small to justify the initial investment. Stakeholders involved in the exchanges believe that they operate profitably only in systems with large volumes of high-quality grains.

In short, commodity exchanges are a promising development for the region, but the vast majority of agribusiness has much ground to traverse before benefitting from commodity exchanges. Smallholders in particular, will have to solve quality, quantity, and aggregation challenges before benefiting from the exchanges.

Purchasing Platforms

The World Food Program (WFP) coordinates a sourcing platform that is available to a variety of buyers. While WFP's tonnage requirements are modest, they are a large buyer in a largely informal market with many small players. Often they are the largest buyer just after the government. WFP's Purchase for Progress (P4P) program has evolved into Patient Procurement Platform (PPP) aggregates the needs of end-users, and offers forward contracts to farmers. The challenge for these platforms, much like commodity exchanges, is that much of the market remains informal. The implication is that many of the most rural farmers who sell grain into local markets will be left out of the platform.

Farmer Organizations

Farmer organizations (FOs) would be the clearest path to better integrating grain markets from farmer level. However, farmer organizations do not reach 91% of the smallholder farmers in sub-Saharan Africa[15] . They have been most effective and widespread in improving agricultural production through market access in exportable cash crops. In these high-value products, companies or extension agents organize farmers to reduce the transaction costs of producing and exporting a uniform high-quality crop.

FOs can be fraught with complex internal politics. Past AGRA grantees that work with FOs have reported hiring mediators to resolve disputes within farmer groups. They see trouble in particular when they have leadership transitions, inadequate bookkeeping, or a lack of professional staff. However, these are challenges that affect the durability of any SME in a start-up phase[16]. Farmer organizations have proved the most sustainable when they are able to provide high-quality services to their members.

While they can reduce transaction costs for companies, market access through farmer organizations are not a viable next step for AGRA's work in grain markets. They thrive in a broader ecosystem that supports farmer production and marketing. FOs will suffer from the same limited marketing channels and unpredictable specifications that affect large farmers and small traders. They cannot independently solve the market access challenges that hobble grain markets. FOs can, however, be a crucial part of the organizing strategy for traders and large off-takers as they develop the capacity to trade in large and predictable volumes in grain markets.

Agro-Dealers

Local agricultural shops, agro-dealers, have developed (many with AGRA's support) as important distributors of agricultural inputs. In an optimal model, one hub agro-dealer in a central location has a network of shops in remote villages, allowing the hub to source inputs for its spoke shops. The average village has between 300 and 500 family farms, most with fewer than two hectares. The volumes required to supply one village do not warrant sending a 30-ton truck (the smallest viable shipment) from the capital city or the port, where inputs are typically distributed or brought into the country. Agro-dealer networks essentially aggregate the demand for a region and supply them collectively. They benefit farmers primarily through proximity; a local sale point for inputs reduces the time and transport costs of buying bulky inputs like fertilizer. As agro-dealers have developed, many have also begun to offer agronomic advice.

Agro-dealers can benefit farmers with grain to sell. Their business model already demands proximity to the farmer, storage, and logistics expertise. The agro-dealer's interests align with the farmer: A farmer earning a profit in grain returns the next season to buy more inputs from the dealer.

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[15] Dalberg presentation.

[16] Correspondence with Fadel Ndiame, August 2015.

However, agro-dealers are not a recommended option for improving grain markets at scale across the region. Many agro-dealers are fully absorbed in their existing business model, which demands expertise across a range of product categories, crops, and business disciplines. Encouraging agro-dealers in AGRA's network to expand their portfolio into a volatile market such as grain trading endangers the solvency of these businesses, which are crucial to input delivery and, ultimately, food security. In addition, agro-dealers use storage facilities for chemicals. An agro-dealer entering grain trading will likely use the same storage for food as for chemicals, which introduces public health risks. Several agro-dealers, particularly those operating in markets with a short agricultural season, are entering grain trading to respond to the needs of the farmers they supply. While AGRA can continue to support the expansion of these agro-dealer networks, they will not be a critical link in the trading intervention strategy.

Appendix

A: Cost of Production and Profit Based on 1 Acre of Maize

A farmer's margins on 1 acre in Eldoret, Kenya with a yield of 1.8 MT of maize

US$1 =KES100

SCENARIO A: Farmer Sells Maize to Local Trader

Farmer margin, selling to trader at farm gate	KES	USD
Farm rent	3000	30
Ploughing	3,000	30
Harrowing	1,500	15
Seed (10 kg)	1,760	18
Planting	1,500	15
Fertilizer (75 kg)-basal	2,700	27
Top dressing	1,500	15
Herbicide (1 liter)	1,100	11
Spraying/weeding labor	160	2
Stalking	1,000	10
Harvesting	1,700	17
Transport of unshelled maize (10 x 20 bags to farm gate)	200	2
Sorting (20 x 20 bags)	400	4
Shelling (30 x 20 bags)	600	6
Total cost per acre	*20,120*	201
Revenue from sale to trader (KES1,800 X 20 bags	*36,000*	360
Farmer profit	*15,880*	159

Trader margin, buying at farm gate	KES	USD
Payment to farmer (KES1,800 x 20 bags)	36,000	360
Storage (35 x 20 bags x 6 months)	4,200	42
Drying (with a mobile dryer)	2,240	22
Transport to aggregation center (KES50x20bags)	1,000	10
Transport to the buyer (100 x 20 bags)	2,000	20
Cost of capital, assuming 20% interest rate, held for 6 months	4,544	45
Total trader costs	*49,984*	500

Trader margin, buying at farm gate	KES	USD
Revenue, selling in Eldoret central market (KES2800 x 20 bags)	*56,000*	560
Trader profit	*6,016*	60

SCENARIO B: Farmer Sells Maize to Group Savings Cooperative

Farmer margin, selling to cooperative	KES	USD
Farm rent	3,000	30
Ploughing	3,000	30
Harrowing	1,500	15
Seed (10 kg)	1,760	18
Planting	1,500	15
Fertilizer (75 kg)-basal	2,700	27
Top dressing	1,500	15
Herbicide (1 liter)	1,100	11
Spraying/weeding labor	160	2
Stalking	1,000	10
Harvesting	1,700	17
Transport of unshelled maize (10 x 20 bags to farm gate)	200	2
Sorting (20 x 20 bags)	400	4
Shelling (30 x 20 bags)	600	6
Transport to aggregation center (50 x 20 bags)	1,000	10
Total cost per acre	*16,520*	165
Revenue from sale to cooperative	*44,000*	440
Farmer profit	*27,480*	275

Cooperative costs	KES	USD
Payment to farmer (2200 x 20 bags)	44,000	440
Storage (35 x 20 bags x 6 months)	4,200	42
Drying (with a mobile dryer)	2,240	22
Transport to storage center (50 x 20bags)	1,000	10
Transport to the buyer (100 X 20 bags)	2,000	20
Cost of capital, assuming grain is bought with group savings	-	-

Cooperative costs	KES	USD
Total cooperative costs	*53,440*	*534*
*Revenue, selling in Eldoret central market (KES 2800 * 20 bags)*	*56,000*	*560*
Cooperative profit	*2,560*	*26*

SCENARIO C: Farmer Sells Direct to Market*

Farmer margin selling direct to market	KES	USD
Farm rent	3,000	30
Ploughing	3,000	30
Harrowing	1,500	15
Seed (10 kg)	1,760	18
Planting	1,500	15
Fertilizer (75 kg)-basal	2,700	27
Top dressing	1,500	15
Herbicide (1 liter)	1,100	11
Spraying/weeding labor	160	2
stalking	1,000	10
Harvesting	1,700	17
Transport of unshelled maize (10 x 20 bags to farm gate)	200	2
Sorting (20 x 20 bags)	400	4
Shelling (30 x 20 bags)	600	6
Transport to aggregation center (50 x 20 bags)	1,000	10
Storage (35 x 20 bags x 6 months)	4,200	42
Drying (with a mobile dryer)	2,240	22
Transport to storage center (50 x 20bags)	1,000	10
Transport to the buyer (100 X 20 bags)	2,000	20
Total farmer costs	*30,560*	306
*Revenue, selling in Eldoret central market (KES 2800 * 20 bags)*	*56,000*	560
Farmer profit	*28,440*	284

**This scenario is hypothetical. Transport costs would be significantly higher (~$450), transporting such a small quantity using existing transport infrastructure.*

B. Simplified Calculation of Margins Based on One Bag of Maize

A trader in Eldoret who buys maize from smallholder farmers pays KES 2500 per bag. He or she sells the maize to millers at KES 2800 per bag, making a gross margin of KES 300 per bag. The estimated marketing costs show that the trader spends KES 200 per bag on cleaning, drying, and transport (7% of the millers' price). His net profit becomes only KES100, which is 4% of the price the miller is willing to pay. The farmer receives 89% of the miller's price.

Value captured in KES and percentages		
Farmer	2500	89%
Grain handling cost	200	7%
Trader's margin	100	4%
Total	**2800**	**100%**

References

Jayne, T., & Sikto, N. (2014). Demystifying the role of grain assemblers in the rural maize markets of Eastern and Southern Africa [Working paper No. 84]. *Indaba Agricultural Policy Research Institute.*

Murphy, S., Burch, D. & Clapp, J. (2012). Cereal secrets: The world's largest grain traders and global agriculture. Oxfam Research Reports. Retrieved from http://www.oxfam.org/sites/www.oxfam.org/files/rr-cereal-secrets-grain-traders-agriculture-30082012-en.pdf

Tadesse, G., & Shively, G. (2013). Repeated transaction in rural grain markets of Ethiopia. *The Journal of Development Studies, 49*(9): 1172-1187.

Taylor, S.D. (2012). Influence without organizations: State-business relations and their impact on business environments in contemporary Africa. *Business and Politics, 14*(1), 1-37.

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