



# FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

## FEED THE FUTURE ENABLING ENVIRONMENT FOR FOOD SECURITY

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### Assessing the Preconditions for Commodity Exchange Success *A Guidance Document*

November 2017

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## I. EXECUTIVE SUMMARY

Commodity exchanges have proven to be effective institutional mechanisms for enhancing the efficiency and competitiveness of agricultural markets in many countries in Latin America and Asia. However, despite growing interest and attention, they have achieved notably less success in sub-Saharan Africa. Despite the limited success of most commodity exchanges across the continent, the founder and former CEO of the Ethiopian Commodity Exchange (ECX) noted that 18 countries visited the ECX, expressing great interest in setting up additional exchanges. As a rules-based trading mechanism, a commodity exchange relies heavily on a well-functioning business enabling environment to flourish. Without the appropriate conditions in place, commodity exchanges are likely to fail.

Where appropriate, evidence suggests that structured trade through contract-based commodity exchanges may provide several benefits not present in existing physical commodity markets, including: **price discovery** (market prices based on underlying supply/demand, minimizing the possibility of intermediaries capturing large portions of the final market price without adding much value, **market transparency** (access to information on the number of buyers and sellers and quantities available on the market), and **price risk management** (protection against commodity price variation). Additionally, commodity exchanges may **reduce many key transaction costs** (such as the costs involved in identifying a buyer or seller), improve **access to finance**, and **protect buyers and sellers from broken or inadequately fulfilled contracts (counterparty risk; see Annex 2 for a definition)**. Organized smallholders capable of delivering sufficient quality and quantity necessary to trade on the commodity exchange may also see potential benefits; for example, they can take advantage of price discovery to negotiate for and receive a higher proportion of the final commodity price.

### Commodity Exchange

A competitive and transparent marketplace for rules-based trading between buyers and sellers of standardized commodity-linked contracts with clear terms related to price, quality, quantity and/or location. An exchange may facilitate efficient physical trade of a commodity or provide a venue for price risk management and speculation.

However, there are several pre-conditions for contract-based commodity exchanges to realize these benefits. The available literature suggests that each of the following pre-conditions for commodity exchange success are essential to some degree, or have been observed in varying degrees across successful exchanges. **Governance** conditions include limited government intervention, an appropriate legal/regulatory framework, and macroeconomic stability. **Commodity market** conditions include: a) market size and liquidity made possible through sufficient numbers of buyers and sellers; b) commodity storability; c) intra or inter seasonal price variation;<sup>1</sup> and d) an active financial services sector. Market **infrastructure** conditions include soft infrastructure (e.g. grades & standards) as well as physical infrastructure (e.g. roads, ICT, and storage - although in some countries physical infrastructure may not be the most significant constraint). **Exchange design** conditions include availability of warehouse management and insurance services, clearing and settlement services, dispute resolutions services, contracts that meet existing market demand, a reliable trading platform, and an effective organizational governance structure.

<sup>1</sup> The USAID FACET (2010) highlights regular seasonal price increases as a key prerequisite, noting that for the majority of seasons, the price of the commodity should increase from harvest to later in the season to cover the additional costs of depositing in a regulated warehouse receipt program (handling, storage, and regulation) and receiving financing.” Dana and Gilbert (2008) also discuss the critical importance of intra-annual price risk management particularly as it relates to capital intensive annual crop production systems.

It is crucial to recognize that each country's agricultural commodity market system will vary in potentially innumerable ways, and it is therefore difficult to disentangle the relative effect of any one of these pre-conditions separately from the others. As such, any ranking of these identified pre-conditions at this aggregate level would likely be futile or misleading. Policy makers, development partners, and investors should first conduct in-depth country-level analysis to determine whether structured trade of commodity-based contracts is an appropriate pursuit, and/or which specific reforms/investments should be prioritized in a given market system. Country level analyses should seek to identify the underlying drivers of existing trading arrangements, and the necessary steps to ensure maximum buy-in and participation from existing market actors prior to any attempts to introduce a contract-based commodity exchange.

This guidance document presents in further detail these potential benefits and limitations of commodity exchanges, the conditions for their success, including lessons learned from various countries, and alternative solutions to achieve similar objectives.<sup>2</sup> A general analytical framework is provided to enable USAID Missions, governments, and other interested stakeholders to assess whether investments introducing/expanding a commodity exchange are advisable, or whether investments would be better directed at addressing critical preconditions necessary for a successful commodity exchange.

Where conditions are not suitable for a successful commodity exchange, the document also outlines **Alternative Strategies**, which may provide benefits similar to those achieved through a successful Commodity Exchange, yet be better suited to existing market conditions. Alternative strategies include Utilizing Existing International Exchanges, Regional Commodity Exchanges, Establishing or Upgrading Auction Systems, Other Risk Management Mechanisms (such as index insurance), and Improved Market Systems Fundamentals (such as Enabling Environment Reform).

## II. INTRODUCTION TO COMMODITY EXCHANGES

A commodity exchange is a platform for buying and selling commodity-backed contracts according to a clear set of rules and terms. The trading of contracts may or may not result in the physical delivery of the underlying commodity. Spot and forward contracts most often facilitate physical trade, whereas futures and options are financial instruments that rarely result in physical delivery of an underlying commodity. Commodity exchanges can be organized under the following simplified models, though there are different operational arrangements, internal governance, and membership structures that can be employed within each.

**Model 1: Open outcry exchange for spot/forward contracts.** Contract purchase and sale are executed by buyers and sellers physically located in the same space, verbalizing or using hand signals between each other to convey their bid/ask prices and volumes. The Ethiopian Commodity Exchange has primarily utilized open outcry.

- *Sophistication:* Requires a relatively lower level of institutional and technological sophistication because futures/options are not traded, and an electronic trading platform is generally not present.
- *Who participates:* Market actors with an interest in the physical commodity itself (e.g. commercial scale producers, medium/large scale intermediaries).

**Model 2: Electronic exchange for spot/forward contracts.** Contract purchases and sales are executed via computer network rather than in-person. The Malawi Agricultural Commodity Exchange (ACE) is one example. Kudu, in Uganda, is another example of a national-level online trading platform.

- *Sophistication:* Requires a higher degree of institutional sophistication and greater access and availability of ICT to enable a stable and reliable electronic trading platform.

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<sup>2</sup> Based on a desk review of existing literature on commodity exchanges which took place in early 2017.

- *Who participates:* Market actors with an interest in the physical commodity itself and ability to access a web-based trading platform (e.g. commercial scale producers, medium/large scale intermediaries, including producer organizations).

**Model 3: Electronic exchange for futures/options contracts.** Purchase and sale of commodity-backed financial derivatives are executed via computer network. Examples include, Japan's Tokyo Commodity Exchange (TOCOM), and South Africa's Futures Exchange (SAFEX).

- *Sophistication:* The complex nature of transactions requires a high degree of institutional capacity and a highly functional domestic business enabling environment with a customized legal/regulatory framework governing futures/options trade.
- *Who participates:* Market actors who rarely have interest in physical delivery of the underlying commodity, but are interested in hedging price risk, or speculating on the direction of prices (e.g. commercial scale producers, large scale intermediaries, governments, member-based organizations, and financial investors including hedge funds, pension funds, institutional and retail investors).

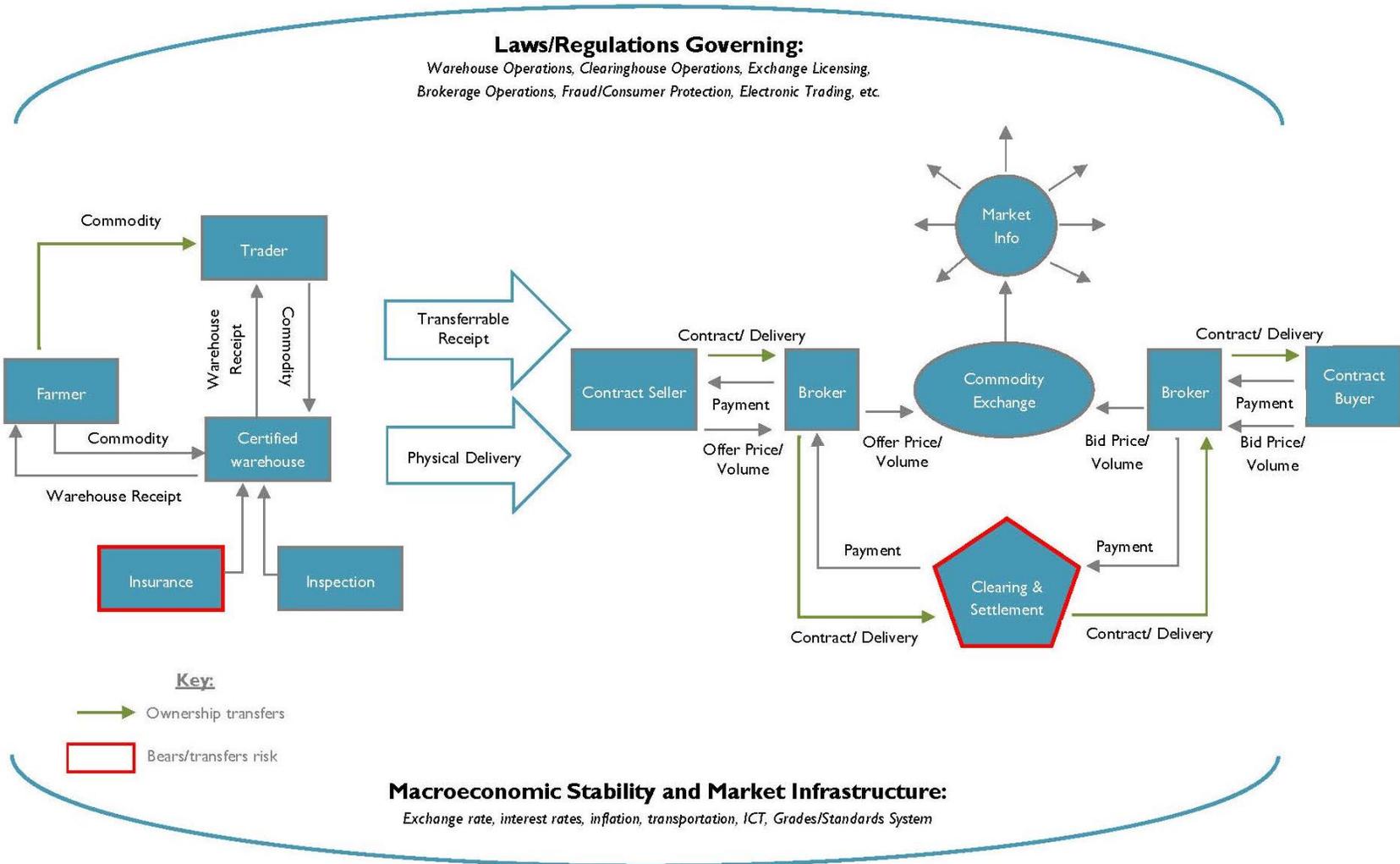
### How Exchange-Traded Contracts Work

**Spot Contract:** a contract based on the current market price (in other words, the spot price), as determined by bid and ask prices of the exchange participants in aggregate on the exchange for immediate delivery of physical commodity from seller and payment from buyer. Settlement date (see Annex 2: Definitions) is expressed as number of days after the trade (e.g. T+1, T+2.)

**Forward Contract:** an agreement between a buyer and a seller for delivery at a specified date/price. For instance, to buy XX tons of commodity at \$YY on a specific date in the future. Forwards are typically traded off the exchange, negotiated privately between buyer and seller, and clearinghouses do not intermediate these transactions. Counterparty risk is higher because a clearinghouse does not intermediate the trade. Price settlement occurs only at the end of the contract, so daily price is unavailable, increasing risk further.

**Futures Contract:** a financial instrument traded over the exchange specifying price at a specified date in the future; however physical commodity rarely changes hands. Clearinghouses intermediate these transactions, which reduces counterpart risk. Daily prices are "marked to market" which means the price of the contract is determined at the end of each trading day, (based on bids as asks) enabling contract holders to more easily sell their position (see Annex 2: Definitions) in the secondary market before the end of the contract. Futures contracts are generally more liquid (easily sold for cash), and therefore carry less risk than forward contracts.

### Diagram 1: How A Commodity Exchange Works



### III. BENEFITS & LIMITATIONS OF COMMODITY EXCHANGES

Any alternative trading system such as a formal exchange must be viewed as a mechanism to support and enhance the efficiency and value-adding nature of the existing system and actors, rather than displace them, (unless they do not add value). A wide body of literature indicates that where an accommodating enabling environment is in place, and where commodity exchanges are effectively designed, they can deliver a variety of benefits to commodity market participants. Notably, the benefits of a commodity exchange will depend on the model for exchange being deployed and the types of contracts being traded.<sup>3</sup> Below we discuss five potential benefits from a well-functioning commodity exchange, with practical examples globally.

#### Price Discovery

Price discovery is the process of determining market prices through an exchange. Although market prices generated through exchanges may not accurately reflect underlying supply and demand in the short term, the competitive, transparent, and liquid conditions on the exchange are expected to more accurately capture the “scarcity value” of a commodity over time.<sup>4</sup> When market prices reflect the underlying supply and demand of the commodity, market actors are able to make informed investment decisions, contributing to overall market development.<sup>5</sup>

Improved price discovery grants to producers a clearer understanding of end market prices. Through this improved understanding of market pricing, producers are better informed about their relative share of the end market price, and can make an informed determination whether the value of intermediary services is worth foregone income from direct sales. This may reduce the risk of intermediaries capturing a disproportionate share of the final market price, as producers can collectively bargain with buyers for higher prices (through producer organizations, for example).

Most actors trading spot or forward contracts on a commodity exchange are likely to take physical delivery of the underlying commodity, while participants trading futures or options contracts have no interest in taking delivery of the physical commodity itself. This latter group of market participants trade in futures and options either because they engage in the physical trade commodities and are seeking to establish a known

#### How Price Discovery Works

**Prices are expected to fall when:** the underlying supply of a commodity exceeds demand. Contract selling on an exchange should exceed buying, therefore driving prices down.

**Prices are expected to rise when:** the underlying demand for commodity exceeds supply. Contract buying on an exchange should exceed selling, therefore driving prices up.

Alternatively, **price speculation** may deviate from fundamentals over a given period causing market prices to be unrepresentative of underlying supply and demand – for example, the 2008 food price crisis. **While such speculation on an exchange drives price volatility, it also serves a critical function of providing the liquidity that enables price discovery. Liquidity refers to the ability to rapidly move into and out of a position, and the presence of sufficient participants and sufficient value/volume of trade on the exchange relative to the physical market.**

Over time, if the right conditions are present, the process is expected to reach a price that the market believes accurately represents underlying supply and demand.

<sup>3</sup> IFPRI, *Purpose and Potential for Commodity Exchanges in African Economies* (2010)

<sup>4</sup> Rashid, Shahidur, *Commodity Exchanges and Market Development: What Have We Learned?* (2015)

<sup>5</sup> UNCTAD, *Development Impacts of Commodity Exchanges in Emerging Markets* (2009)

future price for their commodity trade, or they are simply speculating on the direction of prices.

Evidence from India and Africa suggests that the price discovery function of commodity exchanges is more effective in widely traded, liquid markets (with large quantities and many participants), whereas in thinly traded markets, price discovery benefits are ambiguous at best.<sup>6</sup> Similarly, a study in Brazil finds that the commodity exchange performed its price discovery function effectively for heavily traded commodities, but less effectively for thinly traded commodities.<sup>7</sup> Similarly, as US agricultural markets have become more consolidated (e.g. mergers and acquisitions for vertical integration), the low volume of trade in thin markets where there are few buyers impedes price discovery. A thinly traded commodity linked contract is one that has few interested buyers and sellers, and therefore when trade occurs it may move the market significantly – the price may fluctuate dramatically. This price volatility in thinly traded markets leads to poor pricing efficiency and more substantial risk for actors. One example of a thinly traded commodity linked contract is the butter future contract trading on the Chicago Mercantile exchange. Daily trading volume of the butter future contract (as of 2004) rarely exceeded 200 contracts, while the more widely traded grain futures contracts daily trading volume regularly exceeded 50,000 contracts.<sup>8</sup>

Arriving at a price that accurately reflects underlying supply and demand (in other words, price discovery) occurs on an exchange with sufficient volume and number of transactions relative to the overall trade in the physical market. When trade on an exchange represents only a small fraction of overall trade in the market, the prices of goods traded on the exchange may inaccurately reflect underlying supply and demand, and the prices on the exchange may also be more easily manipulated by a few large trades. In Malawi for instance, only 5 percent of total domestic maize trade and 11 percent of total soybean trade was conducted on the Agricultural Commodity Exchange for Africa (ACE),<sup>9</sup> and the WFP accounted for 60 percent of total trade on the exchange,<sup>10</sup> calling into question the effectiveness of ACE's price discovery function due to limited market liquidity.

It should be noted, however, that a commodity exchange that provides **Market Information System (MIS) services** can provide price discovery benefits despite having thin market participation. For example, despite the low quantities traded on its exchange, and the low number of market participants, ACE has supported price discovery by providing prices on major markets outside of the exchange.

### Price Risk Management

Commodity exchanges allow market actors (including farmers, traders, or speculators) to protect against future price spikes or drops by locking in prices now. World commodity prices can be highly volatile within any given year, and commodity exchanges that trade in futures and options can provide financial tools for market actors to reduce their exposure to that short term price volatility. Price risk management can also be achieved through forward contracts; however, these contracts are typically traded off the exchange and without a central clearinghouse, thus increasing the risk of default by the counterparty (in other words, the buyer or seller).

Futures and options are seen as effective tools to manage intra-seasonal price risks; however, they are less effective at providing inter-year price stability due to the expiration dates of most futures and options.<sup>11</sup> Intra-seasonal or intra-annual price risk is a more serious problem for capital intensive annual crops (e.g. rice, maize, cotton) and therefore futures and options are more effective at providing price

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<sup>6</sup> Andersson, C., Bezabih, M., Mannberg A. "The Ethiopian Commodity Exchange and spatial price dispersion" (2015)

<sup>7</sup> Rashid, Shahidur, *Commodity Exchanges and Market Development: What Have We Learned?* (2015)

<sup>8</sup> Tondel, F., Maynard, L. "Is the thinly traded butter futures contract priced efficiently" 2004

<sup>9</sup> Dentoni, D., and Dries, L., *Private Sector Investments to Create Market-Supporting Institutions: The Case of Malawian Agricultural Commodity Exchange* (2015)

<sup>10</sup> Rashid, Shahidur, *Commodity Exchanges and Market Development: What Have We Learned?* (2015)

<sup>11</sup> Larson, D., Anderson, J., Varangis, P. *Policies on Managing Risk in Agricultural Markets* (2004)

risk management benefits for these crops. Perennial crops require less capital investment on an annual basis relative to annual crops and are less likely to be effectively managed with shorter-horizon futures or options contracts.<sup>12</sup> Put another way, price risk management is a more pressing need for farmers who must make significant input investment decisions upfront (e.g. how much to plant, how much debt to take, etc.) based on an expectation of a certain market price (or price range) by harvest time. When the maturity of a commodity linked contract coincides with this planting period, then those producers may effectively hedge the price risk leading up to harvest. Perennial crop commodities require heavy investments upfront, but they must then wait a matter of years before harvest. These producers typically require lower levels of annual input investments (after initial planting decisions and investments are made), focusing mainly on pruning, insecticides application, etc., and therefore on any annual basis their reliance on price risk management may not be as pressing as that of the annual crop producer. This is not to say perennial crop producers would not prefer a level of certainty of market prices, and they can most certainly be effected by dramatic market price swings after they make their capital investments. However, since commodity linked contracts are rarely structured with multi-year maturity dates, they are unable to hedge their price risk at planting time in the same way that annual crop producers are able to do with 12 month or less commodity linked contracts.

While futures and options can be used to protect against exposure to short-term price volatility, futures and options are not designed to directly reduce price volatility **in the entire market**.<sup>13</sup> This is because a trader holding the underlying physical commodity can use futures and options to set price floors on their position (see Annex 2 for definition), effectively giving up their upside (potential extra profits) in exchange for downside price protection. But the mere existence of these securities is not expected to reduce the fluctuations in price due to common price movers such as effects on supply or demand, political uncertainty, or exuberant speculation in the market, which will continue to cause price fluctuations in the broader market.

In fact, near-term volatility can even be an unintended consequence of commodity exchanges, particularly if liquidity is low (in other words. if the volume of contracts traded on the exchange and exchange participants are limited), market information is limited, and speculation is not **appropriately regulated**.<sup>14</sup> Appropriate regulation of speculation becomes important for Commodity Exchanges that provide futures and options. One such example of appropriate regulation comes from Japan, where in 2005, Japan amended its Commodities Exchange Law, increased minimum capital requirements for financial institutions, created new brokerage rules to limit conflicts of interest, and established a central clearinghouse jointly controlled by all exchanges in the country.<sup>15</sup> These reforms are reported to have restored confidence in the integrity of the exchange.

Importantly, commodity exchanges trading in futures or options contracts require a more sophisticated institutional environment and more highly developed financial sector than is necessary in a simpler spot/forward contract market.

### How Transaction Costs Affect Commodity Trade

Transaction costs are the costs that market actors bear through the marketing (buying and selling) of a commodity, including:

- Identifying a buyer/seller
- Negotiating contract terms
- Physically inspecting product quality
- Resolving disputes
- Transporting the commodity
- Storing the commodity
- Grading/sorting the commodity
- Financing/borrowing costs
- Licensing/certification costs
- Settling a transaction with a counterparty

<sup>12</sup> Dana, J., Gilbert, C., *Managing Agricultural Price Risk in Developing Countries* (2008)

<sup>13</sup> IAPRI, *Agricultural Commodity Exchanges and the Development of Grain Markets and Trade in Africa* (2014)

<sup>14</sup> UNCTAD, *Development Impacts of Commodity Exchanges in Emerging Markets* (2009)

<sup>15</sup> UNCTAD (2), *Overview of the world's commodity exchanges – 2007* (2009)

For instance, South Africa enacted the Financial Markets Control Act in 1990, which effectively enabled trade in futures contracts, and in India a completely separate regulatory framework was developed to govern futures trade.<sup>16</sup>

### Efficiency and Upgrading of Physical Trade

When buyers are interested in receiving the physical commodity, the exchange may improve efficiency by lowering transaction costs. Commodity exchanges can lower the transaction costs of physical trade by providing a network of licensed, bonded, and insured storage operators who are able to reduce risk of loss. Exchanges may also reduce transaction costs by providing services at a lower cost than is possible in the existing marketplace, including the costs of identifying a buyer/seller, negotiating contract terms, physically inspecting product quality, eliminating counterparty risk (See definition in Annex 2), and resolving disputes.

These cost savings can help close the gap between farm-gate prices and consumer prices; however, a significant portion of transaction costs are not directly affected by commodity exchanges such as distances to market and transportation costs.<sup>17</sup> However, without the right preconditions in place, commodity exchanges are often unable to reduce transaction costs more than the existing trade system. In Zambia, one important reason that the Zambian Commodity Exchange (ZAMACE) was unable to reduce transaction costs sufficiently was because of the high risk of contract non-compliance caused by weak contract laws and an ineffective dispute resolution service.<sup>18</sup>

Additionally, trading on an exchange is expected to be executed according to a system of industry accepted **grades and standards**. Contracts specify the quantity, and quality of the commodity to be delivered, enabling anonymous transactions and providing a basis for dispute resolution. For the market as a whole, such structured, rules-based trade arrangements require, and encourage producers and storage operators to **upgrade their quality assurance systems**.

However, upgrading of physical commodity does not always occur automatically upon introduction of a commodity exchange. For instance, in Ethiopia, where the government mandates that all trade must be done through the Ethiopia Commodity Exchange (ECX), private standards that are used to differentiate high-quality coffee had not been sufficiently integrated into the exchange's system of grades and standards in the early stages of ECX. Global buyers complained that coffee beans of different qualities are comingled, and traceability on ECX is weak, which decreased producer and trader incentives to differentiate according to quality. In response to this complaint from exchange participants, USAID and several global market actors supported the ECX to launch the IBM-enabled national traceability system which tags bags of coffees to geo-referenced washing, hulling, and cleaning stations across Ethiopia's coffee growing areas.<sup>19</sup>

### Market Transparency

Commodity exchanges can also facilitate greater transparency in the market. In existing trading systems, the volumes traded and prevailing prices are generally unknown to less dominant market actors, such as small-scale producers and traders dealing in smaller volumes. Commodity exchanges address this problem by widely disseminating market information on bid/ask prices and volumes so that all market actors can form a basis by which to make their own investment decisions.

Commodity exchanges can also promote transparency where appropriate regulatory oversight of commodity speculation is in place. As previously discussed, the role of speculators is critical in providing the volumes and liquidity necessary to achieve price discovery; however, if unchecked, speculation can

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<sup>16</sup> Kenya Institute for Public Policy Research and Analysis, *Is There Need for an East African Commodity Exchange* (2013)

<sup>17</sup> IAPRI, *Agricultural Commodity Exchanges and the Development of Grain Markets and Trade in Africa* (2014)

<sup>18</sup> Sitko, N., Jayne, T., *Constraints to the Development of Commodity Exchanges in Africa: A Case Study of ZAMACE* (2011)

<sup>19</sup> <https://www.usaid.gov/ethiopia/press-releases/ecx-launches-independent-food-traceability-system>

create instability and volatility in the market. Commodity exchanges trading in futures encourage speculation in a more regulated environment where oversight and enforcement of market rules is possible.<sup>20</sup> Appropriate regulation must ensure that fraud is not endemic throughout the market, and that the market is not manipulated by a small number of actors, thus eroding confidence in the system by the majority of actors.

Despite potential transparency benefits, many commodity exchanges also offer market participants an opportunity to trade through a method known as over the counter (OTC) or off-exchange transactions, which means only the volume of trade is indicated to other market participants, often with limited information on bid/ask and close prices. OTC trades are less regulated, and can be used by market participants who may wish to restrict full and open information regarding the trade to the rest of the market, inhibiting transparency.

Off exchange transactions are often preferred by larger traders because posting a bid or ask for a large scale transaction has the potential to move the market in a direction that is unfavorable to the trader. For instance, if the market observes that a large trader is selling very large lots, then they may begin proactively selling as well to avoid the price declines that are likely to occur when large lots (relative to outstanding contracts) are sold at once. If many other traders on the exchange also follow the same strategy, then the price may rapidly and drastically drive prices on the exchange down. In this event, that large trader would find themselves unable to sell their large lot at the previously observed market price. To avoid telegraphing their strategies and having the market move against them, large traders selling (or buying) large lots see significant value in the less transparent off-exchange transactions. Nonetheless, if most of the actors on an exchange utilized this strategy for all or most of their transactions, the exchange would not be able to provide the transparency or price discovery functions that the majority of market participants expect, potentially leading to failure of the exchange.<sup>21</sup>

In Zambia, it was estimated that 68 percent of the total trade value registered for ZAMACE occurred off the exchange.<sup>22</sup> This led to low levels of transparency, limited trust in the system, and low overall trade volume. This experience demonstrated that in the existing trading system, Zambian traders were using long term buyer/seller relationships as a way to manage risk. According to the African Development Bank, anonymous trade on ZAMACE was unable to provide similar or better assurances because there was no way to screen potential trade partners and reject the risky ones.<sup>23</sup> The result was a system where the majority of existing traders decided not to participate on the exchange, which contributed in part to ZAMACE's failure. This example points to the importance of many buyers and sellers participating on the exchange, which can be encouraged through a) outreach, b) an exchange that provides effective services such as physical inspection of product quality, grading and sorting, and dispute resolution, and c) transparent information transfer related to exchange transactions (lot sizes, bids, asks, etc.), so that potential benefits to participants are clear.<sup>24</sup>

Further limiting the potential transparency benefits, open outcry trading platforms could theoretically enable buyers/traders to collude to fix prices before arriving on the trading floor.<sup>25</sup> In Ethiopia, the ECX modernized their initial open outcry platform in 2015 to enable anonymous electronic transactions, which is expected to provide less opportunity for collusion.

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<sup>20</sup> Chhajed, I., Mehta, S., *Market Behavior and Price Discovery in Indian Agriculture Commodity Market* (2013)

<sup>21</sup> <http://www.finra.org/investors/unraveling-mystery-over-counter-trading>

<sup>22</sup> Sitko, N., Jayne, T., *Constraints to the Development of Commodity Exchanges in Africa: A Case Study of ZAMACE* (2011)

<sup>23</sup> African Development Bank, *Guidebook on African Commodity and Derivatives Exchanges* (2013)

<sup>24</sup> If only a few large traders co-opt the exchange and they are transacting on information that others do not have, and they are by and large utilizing off-exchange transactions then the majority of traders will naturally feel as if the exchange is rigged and they will simply not participate

<sup>25</sup> Rockefeller Foundation, *Market Change: Ethiopia Commodity Exchange* (2013)

## Access to Finance

While a commodity exchange is supported by a functioning warehouse receipts system, commodity exchanges themselves should not be expected to provide credit directly to farmers. Nonetheless, transferrable warehouse receipts are the basis for physical trade on a commodity exchange, and may also be used as collateral by farmers and traders to secure credit.<sup>26</sup> Market intermediaries (traders) with long positions in a commodity but limited cash may increase their liquidity by transacting on an exchange. Alternatively, they may access collateral-based credit from physical commodity in storage.

Despite these potential benefits, a credit system built upon transferable warehouse receipts requires several conditions to be in place. First, it requires that a network of certified and insured warehouses is capable of ensuring the quantity and quality of commodity as indicated in the transferable receipt. Additionally, it requires a legal and regulatory framework for transferrable warehouse receipts, including clear rights related to property ownership, use, possession, and transfer. Such a credit system also relies heavily on an active banking sector that is willing to provide loans secured with commodity-based collateral.

An example of the legal/regulatory environment inhibiting collateral-based credit is in Zambia, where the government failed to sign an agreement to implement the Agricultural Credit Act of 2011. This legislation was intended to provide legal recognition of warehouse receipts as a tradeable security, and failure to enact it also resulted in the failure to create an agreed upon warehousing authority to certify and license warehouses issuing receipts.<sup>27</sup> This effectively halted the development of a warehouse receipts system that would have formed the basis for commodity-based collateralized loans and/or warehouse receipt-backed trade on the exchange.

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<sup>26</sup> USAID-FACET project, *ICT to Enhance Warehouse Receipt Systems and Commodity Exchanges in Africa* (2010)

<sup>27</sup> IAPRI, *Agricultural Commodity Exchanges and the Development of Grain Markets and Trade in Africa* (2014)

## Evidence of Smallholder Impacts from Commodity Exchanges

Although smallholders rarely trade directly on an exchange, they may still benefit. The main benefits are price discovery, market information, and third party facilitated price risk management. Commodity exchanges can disseminate market price information via rural ticker boards, mobile SMS, or web-based platforms. Geographic location will affect farm-gate prices, but prices on an exchange provide an important basis enabling producers to make informed production decisions. Additionally, governments or member-based associations can trade on an exchange to manage price risks for producers who are too small to participate directly on an exchange.

The main barrier to smallholders participating **directly** on a commodity exchanges is the minimum contract size (the quantity of commodity required by contracts traded on an exchange). The FAO estimates that in Africa the typical wheat futures contract would require 21.5 hectares of land, while a maize futures contract would require 48.1 hectares of land to meet contract volume requirements. By comparison, the FAO estimates the average farm size in Kenya is 0.86 hectares; in Nigeria it is 1 hectare, and in Malawi it is 0.72 hectares. Education is also a significant barrier, as managing intra-seasonal price volatility through exchange-traded contracts is complex.

While supply aggregation through **producer organizations** appears a potential mechanism for smallholders to participate more directly in commodity exchanges, in reality, the capacity of member-based smallholder producer organizations is typically too limited to manage their own operational finances, let alone manage price risk for members through complex futures/options instruments. Nonetheless, in certain institutional contexts, it may be a feasible approach, where **financial market education** has been undertaken. The following examples illustrate evidence of additional avenues for commodity exchanges to benefit smallholders around the world:

**Ghana Cocoa Board:** The government provides a minimum farm-gate price to farmers, and then uses farmer fees to buy put options on commodity exchanges in New York and London to hedge their own downside price risk. This is an innovative example of how exchanges can be used to provide price risk management for smallholders. Importantly, however, the use of international exchanges relies on relatively high correlation of domestic commodity prices with international prices (which relies, in part, on low barriers to trade).

**India MCX:** In India there has been higher involvement from smallholders given more proficient producer organizations, the introduction of smaller contract sizes on the exchange, and the application of ICT for price dissemination. Farmers have access to rural web-based information kiosks and the MCX uses widely dispersed rural price tickers, television, radio, and mobile technology to disseminate prices. Additionally, MCX employed interactive remote capacity building targeted towards small-scale producers.

**Mexico ASERCA:** The Mexican government provides cotton producers a minimum price guarantee under the Support Services for Agricultural Marketing Agency (ASERCA). The government hedges its price risk by using farmer fees to buy put options on the New York futures exchange. Utilizing an international rather than domestic exchange relies on highly correlated domestic prices with international prices.

**Ethiopia ECX:** In Ethiopia the ECX claims that value chain efficiencies have resulted in coffee farmers capturing 60 percent of export value, up from less than 35 percent prior to the exchange. Alternatively, Forbes shows that in 2012, coffee farmers only captured 51.6 percent of the export price, down from 57.1 percent in the year before the exchange was introduced. Clearly, more data is needed to quantify the benefits to smallholder farmers from the ECX.

**South Africa SAFEX:** South Africa has the largest and most successful commodity exchange in Africa, but the benefits to smallholders has been limited overall. One reason for this may be that although SAFEX invested very early in face-to-face education with small groups of farmers, the price dissemination system is web-based, rather than mobile based, and fewer South African smallholders have internet access. South Africa's experience compared to India's suggests that face-to-face sensitization alone may be ineffective, while broad rural access to digital information coupled with long-term farmer education may prove more effective.

**Malawi ACE:** In Malawi, the WFP trades on ACE to execute their Purchase for Progress initiative, which was designed to procure grain from smallholders. WFP's participation on ACE was made possible through a Bid Volume Only (BVO) system that ACE introduced. This allows a buyer to bid on a specific lot, and suppliers can offer to sell the commodity at a price they specify. This is the opposite of the more typical exchange contract executed through Offer Volume Only (OVO) whereby buyers compete on price based on volume offers from suppliers. WFP's participation on ACE is a double-edged sword: while it enables ACE to generate enough fees to sustain operations, the lack of buyer diversity on the exchange threatens its liquidity.

## IV. ASSESSING THE ENABLING ENVIRONMENT FOR SUCCESSFUL COMMODITY EXCHANGES

In considering the usefulness and viability of a commodity exchange, a critical first step is to assess the existing flows and functions within a given commodity market and identify the underlying drivers of existing trading arrangements. The next step, which is the explicit scope of this section, is to assess the conditions that are expected for a well-functioning commodity exchange to deliver on its potential benefits.

To this end, the following sections present guidance for carrying out a quantitative and qualitative analysis of the enabling environment for commodity exchanges. The assessment should be conducted by a relevant expert or team of experts through a literature review as well as detailed on-the-ground stakeholder interviews. Once information and data on each condition is gathered, the analyst(s) should summarize the factors limiting the likely success of a commodity exchange, as well as the factors expected to contribute to a successful commodity exchange.

The analytical results may not necessarily provide a clear “go/no go” decision for development agencies or potential public and/or private investors regarding support for the development of an exchange. Instead, the analyst(s) should consider the sum total of all the information gathered to provide a holistic assessment of the enabling environment for commodity exchanges.

The conditions for success to be analyzed are organized into four categories:

- Governance Conditions: the context under which rules are designed and enforced.
- Commodity Market Conditions: the characteristics of the crop and its existing trading system.
- Market Infrastructure Conditions: the nuts and bolts that enable or hinder trade.
- Exchange Design Conditions: the inter-workings of the exchange as a market institution

### Governance Conditions

#### **What is the anticipated level of government intervention in the market?**

A commodity exchange relies on the free movement of prices due to market forces – physical supply and demand and speculation. Therefore, political tolerance for food price volatility and rules based decision making that avoids unpredictable market interventions is generally seen as a fundamental requirement for well-functioning commodity exchanges.<sup>28</sup> The prices of food commodities are often a hot button political issue. Policy makers have been known to enact policies designed to dampen food prices for the benefit of net food consumers (e.g. maize in Zambia), and policies designed to increase food prices for the benefit of net food producers (e.g. rice in Thailand).

If there are uncertainties in the market about if and how the government will intervene to influence food prices, then commodity exchanges are unlikely to be successful. Price control measures such as export bans or food stock releases reduce private incentive to store a commodity (for fear that prices will only fall in the future), and it also provides a context for insider trading on an exchange because actors with proprietary information about government intentions have an advantage over other market participants.<sup>29</sup> Overall, these ad hoc interventions reduce interest in participating on the exchange. This limits the trade volume and number of market actors willing to participate, despite the fact that volume and a large number of market actors are part of what an exchange needs to succeed.

There are a range of examples globally that support the importance of limited or at a very minimum predictable government intervention, particularly with regard to market price interference. The success of Malaysia’s Bursa and South Africa’s SAFEX have, in part, been attributed to a government commitment

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<sup>28</sup> African Development Bank, *Guidebook on African Commodity and Derivatives Exchanges* (2013)

<sup>29</sup> Sitko, N., and Jayne, T. *Why are African Commodity Exchanges Languishing? A Case Study of the ZAMACE* (2012)

to avoid intervention in the market's pricing mechanism. Alternatively, while Argentina's Rosario is one of Latin America's most successful exchanges, its contracts for soybeans, corn, wheat, and beef were negatively impacted by government imposed export quotas that were introduced in 2002. The failure of ZAMACE in Zambia has been blamed in part on the government's ad hoc food price interventions, and Zimbabwe's ZIMACE was ultimately shut down by the government due to their unease with private market pricing of food commodities.

### Suggested Indicators or Methods for Measurement

<p><b>Government intervention</b></p>	<p><b>Qualitative:</b> Desk study to identify past periods of government intervention and market liberalization + comprehensive/customized market actor survey to determine perceptions of government tolerance of food price volatility and likelihood of intervention.</p>
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### Are contracts enforceable between arms-length parties?

A commodity exchange is active in trading contracts that stipulate the quality, quantity, location, and date of delivery of a specified commodity. As a foundation of contract enforcement, a clear and widely respected framework for property rights is needed to address issues such as nonpossessory interest and creating property interest in property that does not yet exist. If there is no foundation of property rights for contract enforcement, or if actors on the exchange cannot rely on their trade partner honoring the contract, they will be unlikely to participate on the exchange.<sup>30</sup>

Additionally, in the event of a contract breach (e.g. disagreements over physical delivery may entail quantity or grade/standards inconsistencies), it is important that an efficient default resolution process is in place to mediate and solve the issue.<sup>31</sup> Limited contract enforceability and high costs of dispute resolution create a reluctance for market actors to trust the exchange system, and it also encourages untrustworthy actors to co-opt the system and shirk their contract responsibilities. This is expected to create a vicious cycle of limited uptake and involvement of market actors on the exchange resulting in low overall volumes traded and/or small numbers of actors, both of which inhibit efficient price discovery.

ZAMACE's failure can be blamed on a number of confounding factors. But one of the more critical underlying deficiencies in the Zambian enabling environment leading to ZAMACE's demise was its **weak contract laws and high costs of contract enforcement through the court system**. This led to a predisposition for untrustworthy actors to trade contracts on the exchange with the knowledge that the terms of the contract could not be properly or efficiently enforced. This in turn led the majority of market actors to avoid the anonymous trading of the exchange in favor of the less efficient but also less risky long term relationship-based trade in the physical market which they had grown to trust.

### Suggested Indicators or Methods for Measurement

<p><b>Contract enforceability</b></p>	<p><b>Quantitative:</b> Contract enforcement capacity indicators: # of Procedures, # of Days to Enforce a Contract, and Cost as a percent of Claim Value. <i>Source: DoingBusiness.org</i></p> <p><b>Qualitative:</b> Comprehensive survey of existing market actors to determine perceptions/experiences with contract enforcement, risk of shirking, formal dispute resolution, attitudes toward anonymous trading, and role of long term relationships in the existing trading system as a form of risk management.</p>
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<sup>30</sup> Kenya Institute for Public Policy Research and Analysis, *Is There Need for an East African Commodity Exchange* (2013)

<sup>31</sup> IAPRI, *Agricultural Commodity Exchanges and the Development of Grain Markets and Trade in Africa* (2014)

**What is the institutional capacity for legal and regulatory enforcement?**

Regulators are responsible for providing the framework within which an exchange will operate – these are the rules of the game. One of the most important elements of an exchange is convincing potential and existing participants that fair and evenly enforced rules of conduct are in place to prevent cheating.<sup>32</sup> Otherwise, participation will remain limited and volumes will not be sufficient to support a successful commodity exchange.

Additionally, the anonymous nature of trading on commodity exchanges raises the risks of contract breach without appropriate regulation.<sup>33</sup> Trustworthy and capable (both technically and administratively) regulatory bodies are needed to design and enforce the rules that govern clearinghouse operations, warehousing operations, futures trading, electronic trading, exchange licensing, brokerage operations, fraud, insider trading, and consumer protection.<sup>34</sup> A capable legal/regulatory context builds trust on the part of market actors that enables them to transition from relationship-based trading that is common in developing country commodity markets, towards anonymous trading that is necessary on commodity exchanges utilizing electronic trading platforms. Government often plays an important role in an external regulatory oversight function, although self-regulation of the exchange’s rules is also an important first line of defense against unsavory practices such as collusion and fraud.

China’s DCE and Japan’s TCO have both experienced scandals on the exchange which could have led to a loss of trust in the system. Japan experienced a major fraud incident and rapidly instituted a Commodities Exchange Law that reformed the industry, strengthened regulatory oversight and restored market faith in the system. China experienced 10 scandals between 1994 and 1997, resulting in more than \$1 billion in trader losses, which led to stricter oversight from the China Securities Regulatory Commission, reformed exchange rules, and closing markets to outside investors.<sup>35</sup> Although the approaches differed, each illustrate the role of a central regulatory authority to enforce, and revise exchange rules as necessary.

**Suggested Indicators or Methods for Measurement**

<p><b>Legal/Regulatory Capacity</b></p>	<p><b>Quantitative:</b> Financial Information Infrastructure Index<sup>36</sup> (scaled from 1-10 and reflects scope, quality, availability of credit reporting, legal framework for credit reporting, and availability of credit registries. <i>Source: WDI of the World Bank.</i></p> <p><b>Qualitative:</b> Comprehensive survey of existing regulatory bodies to determine regulatory roles in the institutional framework, as well as any technical and administrative abilities/gaps therein.</p>
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**Does the country experience general macroeconomic stability?**

Commodity-based futures and options contracts are financial instruments. So for market actors to participate in a commodity exchange, the macroeconomic environment must be stable enough to support both a healthy physical and financial market. This requires that a government implement the fiscal and monetary policies that provide stability in currency exchange rates, interest rates and inflation rates – characteristics that were notably absent in Zimbabwe prior to the failure of ZIMACE. Where these

<sup>32</sup> IIED/Sustainable Food Lab, *Commodity Exchanges and Smallholders in Africa* (2011)

<sup>33</sup> Sitko, N., Jayne, T., *Constraints to the Development of Commodity Exchanges in Africa: A Case Study of ZAMACE* (2011)

<sup>34</sup> African Development Bank, *Guidebook on African Commodity and Derivatives Exchanges* (2013)

<sup>35</sup> UNCTAD, *Overview of the world’s commodity exchanges – 2007* (2009)

<sup>36</sup> The Financial information infrastructure index is based on factors which cover credit reporting data, the basic legal framework for credit reporting, and the availability of public registry data for fixed and moveable collateral, corporate registries, and court records. This data can provide a helpful first step in understanding the sophistication of the legal/regulatory framework within which financial markets are operating. The qualitative survey of existing regulatory bodies is essential complementary data to more comprehensively understand the rule making and enforcement capacity present.

monetary indicators are distorted or fluctuate wildly while a trader has an open position<sup>37</sup> on a contract, then costs and risks of transacting on the exchange will increase, and participation is likely to be limited.<sup>38</sup>

### Suggested Indicators or Methods for Measurement

<b>Macroeconomic Stability</b>	<b>Quantitative:</b> Inflation rate (% change in CPI); Real Interest Rate (%), Currency exchange rate volatility (% change in local currency against basket of currencies, or against USD).
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## Commodity Market Conditions

### *Is the market for the commodity of sufficient size and liquidity?*

Thinly traded commodities, or commodities whose trade is dominated by a few large buyers are not good candidates for contracts on an exchange<sup>39</sup>. A high volume of trade and large number of traders must be active in the underlying spot market for two reasons: 1) market thinness makes it difficult to achieve high enough trade volume on the exchange to spread fixed operational costs across all transactions, leading to higher per unit transaction costs on the exchange; and 2) market thinness also may lead to market manipulation because a small number of actors may be able to influence price.<sup>40</sup> As a general rule of thumb, studies have estimated that minimum volumes to capitalize an exchange are approximately 20,000 tons; however, if the exchange assumes high fixed costs due to wholly owned storage networks, then the volume requirements could easily be at least 40,000 to 60,000 tons.<sup>41</sup>

The caveats related to the operational design of an exchange illustrate an inherent challenge to estimating the minimum market size and liquidity to support a successful commodity exchange. This is because many of the quantitative indicators for success rely to a great degree on other conditions in the enabling environment, the structure of the market, and variations of the operational design of an exchange.

For instance, in 2012 Ethiopia's ECX attracted \$1 billion in trade value, Zambia's ZAMACE attracted \$36 million in trade value, and Malawi's ACE generated \$9 million in trade value equating to approximately \$2 million, \$72,000, and \$18,000 in exchange fees, respectively.<sup>42</sup> With \$1 billion trade value and a 0.2% commission, Rashid estimates that the ECX generated a respectable \$2M in revenues to pay for its operations in 2012; however, it has done so with the direct policy support put in place in 2008 which mandated export commodity trade to be executed through the exchange. ZAMACE failed in part due to limited liquidity relative to market size and the ability of a small number of actors to manipulate exchange prices. Despite only \$9m in trade value, ACE continues to operate, despite low volumes and low liquidity, due in part to its low cost operational model of leveraging third party storage facilities, and perhaps also to the financial support they receive from international donors. This is in contrast to an early-stage challenge faced by ECX, which struggled with high operating costs due to the increased operational costs of wholly owned and operated storage facilities.

<sup>37</sup> An open position refers to the period after a position on a contract has been taken (either short or long) but prior to its maturity date. This could involve for example, committing to deliver a commodity at a certain price without yet having delivered the commodity at the agreed price, which would put that trader at risk of losing money through the transaction.

<sup>38</sup> IFPRI, *Purpose and Potential for Commodity Exchanges in African Economies*, (2010)

<sup>39</sup> Although it should be noted that good contract design (providing contracts that meet buyers' needs) could be an important factor in attracting additional international buyers. This could improve the conditions needed for a commodity exchange as discussed in the exchange design section below.

<sup>40</sup> Sitko, N., and Jayne, T. *Why are African Commodity Exchanges Languishing? A Case Study of the ZAMACE* (2012)

<sup>41</sup> IAPRI, *Agricultural Commodity Exchanges and the Development of Grain Markets and Trade in Africa* (2014)

<sup>42</sup> Rashid, Shahidur, *Commodity Exchanges and Market Development: What Have We Learned?* (2015)

### Suggested Indicators or Methods for Measurement

<b>Market size and liquidity</b>	<p><b>Quantitative:</b> Indicators of market size -- Total Production Volume (MT), Total Export Value (Million US), Share of export commodity (%)<sup>43</sup>. <i>Source: FAOStat.</i></p> <p><b>Qualitative:</b> Survey to determine the number and diversity of market participants (traders, processors, producers) in target commodity<sup>44</sup>.</p>
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#### Is the commodity storable?

A trade can only take place on an exchange if both parties (buyer and seller) are confident of the availability of the commodity at a particular place and time.<sup>45</sup> Therefore, the quantity and quality of the commodity must be able to be maintained in storage until delivery takes place. This indicates that highly perishable commodities such as fresh fruits and vegetables are more difficult to establish contracts on an exchange; whereas storable commodities (e.g. grains, cotton, coffee, frozen products) are more appropriate. In addition to storability, it is important that the commodity is stored appropriately, according to the commodity-specific conditions required such as temperature and humidity. The integrity of the commodity must be able to be maintained in storage through capable, certified, and insured storage operator service providers.

Table 1 presents the main commodity contracts traded on exchanges around the world, illustrating the size of the exchanges by value traded, and the focus on storable commodities. It is very uncommon for highly perishable commodities to be used as the basis for contracts traded on an exchange, and publicly available data did not reveal any exchanges currently trading contracts on fresh produce.

**Table 1: National Commodity Exchanges, Main Commodity Contracts Traded, and Values Traded**

Country (Exchange)	Main Commodity Contracts Traded	Value of Contracts
USA (CBOT)	Soybean oil/meal, maize, wheat, oats, rice	\$2.3T/year
China (DCE)	Corn, soybeans, soybean meal, soybean oil	\$2T/year
India (MCX)	Soya bean/oil, guar, chana, rape seed, menthe oil	\$463B/year
Brazil (BM&F)	Coffee, cattle, corn, soybean, sugar, ethanol, cotton	\$282B/year
Malaysia (Bursa)	Palm oil	\$258B/year
South Africa (SAFEX)	White maize, wheat	\$104B/year
Argentina (ROFEX)	Soybean, wheat, corn, sunflower	\$9B/year
Colombia (BNA)	Wheat, yellow and white corn	\$4B/year
Ethiopia (ECX)	Coffee (>90%), sesame, beans	\$1B/year
Zimbabwe (ZIMACE)	Maize	\$500M/year (Failed)
Panama (BAISA)	Yellow corn, rice, tomato sauce, pork	\$150M/year
Zambia (ZAMACE)	Maize, wheat, soya	\$36M/year (Failed)
Malawi (ACE)	Rice, wheat, beans, groundnut	\$9M/year
Peru (BPP)	Hard yellow corn	~\$1M/year
Nigeria (ASCE)	Cotton, cassava, coffee, ginger, sesame	\$ unknown (Failed)
Uganda (UCE)	Coffee, sesame, maize, beans, soya	\$ unknown (Failed)
Ghana (GCX)	Maize, rice, soybean	TBD (trade to start 2017)

<sup>43</sup> Refers to share of commodity produced that is exported in the physical market. Commodity exchanges can succeed without internationally traded products. However, viable and established export markets are a positive indicator for market size and potential.

<sup>44</sup> It is not possible to definitively quantify the number of market participants that would be considered liquid. Instead, the analyst will need to examine the number of participants relative to market size, and compare to observations in other markets that trade in those commodities to estimate whether sufficient liquidity is present.

<sup>45</sup> IFPRI, *Purpose and Potential for Commodity Exchanges in African Economies* (2010)

**Suggested Indicators or Methods for Measurement**

<b>Storability</b>	<b>Qualitative:</b> Identify conditions necessary for storage of target commodity or commodities – such as storable lifespan under requisite conditions such as temperature, humidity, etc.
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**Does the market for the commodity experience price variation within or across seasons?**

Even with limited price variation, with the right market preconditions in place, Commodity Exchanges have the potential to provide many benefits through spot and forward contracts. However, price variation is a pre-requisite to increase demand for price risk management through futures contracts. If there is no price variation throughout the year (within seasons, or across seasons), then there is no need for actors to hedge their positions by locking in prices or to speculate on future price directions.<sup>46</sup> Intra-annual, or seasonal price variations are considered a more significant concern for producers of annual crops such as cotton and maize, but less of a concern for producers of perennial tree crops where much of farmers’ capital investments are made several years prior to harvest. Importantly, futures contracts are considered more effective at intra-annual price risk management and less effective at inter-annual price risk management primarily due to the average maturity of contracts which tend to be less than one year.<sup>47</sup>

There are two overarching reasons to consider why intra-annual price risk management is less important for perennial crop producers than annual crop producers: 1) the period between planting and harvest is significant, often several years with many tree crops. The producer is less worried about price variations within any particular year during this period. So the intra-annual price risk management function of commodity based contracts are inconsequential to them during this period unless they are interested in speculating on price direction; 2) the annual input investments of perennial crops relative to annual crops are low and therefore hedging against annual investment losses is less critical. A producer of hybrid cotton or maize for instance must invest in seeds, soil management (fertilizer, land prep, etc.), water management (drip equipment, fuel, etc.), weeding labor, and other considerations. A coffee producer may only invest within any given year in pest/disease management, labor for pruning and harvest. Their major capital investments have been made in prior years. While they would ideally like price assurances, managing intra-annual price variations is arguably less critical to them relative to annual crop producers.

Interestingly, the ECX in Ethiopia trades over 90 percent of its contracts on coffee, and they offer only spot contracts – suggesting that the ECX is designed to upgrade physical trade in coffee rather than offering price risk management benefits through futures.

**Suggested Indicators or Methods for Measurement**

<b>Temporal price volatility</b>	<b>Quantitative:</b> Average intra-year price changes in target commodity. Collect secondary data on market prices, and/or conduct market surveys at different points through the course of the year (recognize 1 year of data is likely insufficient as it may not represent the long-term average of a commodity’s price fluctuations).
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**Are financial service providers active in the market?**

Involvement from local banks and other financial service providers in intermediary roles on a commodity exchange is critical.<sup>48</sup> If the domestic financial sector is actively lending to actors along a commodity chain, then this indicates they recognize the profitability of the sector. In this case, they are more likely to engage in a clearinghouse or brokerage role on a commodity exchange, or in a speculator role which provides much needed liquidity.<sup>49</sup> Critically, this indicates that governments and international development actors

<sup>46</sup> USAID-FACET project, *ICT to Enhance Warehouse Receipt Systems and Commodity Exchanges in Africa* (2010)

<sup>47</sup> Dana, J., Gilbert, C. *Managing Agricultural Price Risk in Developing Countries* (2008)

<sup>48</sup> Gravelet-Blondin, R. *Learning from South Africa*. Presentation from: “On the Making of a Market: Global Learning from Commodity Exchange Experiences”, (February 24, 2010, Addis Ababa)

<sup>49</sup> Arlas, D., et al. *Agricultural Commodity Exchanges in Latin America and the Caribbean* (2011)

should not view a commodity exchange as a means to encourage financial participation in a particular commodity market – instead, such participation from financial institutions should be viewed as a prerequisite to the successful introduction of a commodity exchange in any given market.

The US Chicago Board of Trade (CBOT) exemplifies financial sector participation in agricultural commodity markets, intermediary services, and financial speculation. There is significant competition among banks and other non-bank financial institutions in the US to provide clearing, settlement, and brokerage services for exchange market participants that promotes efficient, low risk, and low cost transactions over the exchange. Additionally, financial institutions are heavily engaged in the commodity exchange as speculators through the mutual fund, hedge fund, and portfolio management industry.

### Suggested Indicators or Methods for Measurement

<b>Financial service activity</b>	<p><b>Quantitative:</b> Sector lending (\$) from domestic financial institutions (if available).</p> <p><b>Qualitative:</b> Survey of financial institutions to determine interest/willingness to lend and/or play intermediary role in the targeted commodity sector.</p>
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### *Is there, or is there expected to be, buy-in from existing market actors?<sup>50</sup>*

Certain commodity value chains may be dominated by leading firms, whether they be large-scale producers, traders, exporters, or even government or international relief agencies that control a significant proportion of the volume and/or value of commodity traded in a country. For a commodity exchange to be successful, they require the commitment of these dominant actors in order to increase the volume traded and liquidity of the exchange. Importantly, many of these dominant actors have entrenched interests in the market, and they may see a commodity exchange as a threat to their market position given the transparency of the price discovery function. Without their commitment to participate on the exchange, however, achieving sufficient trade volume to sustain the exchange may not be possible.

In many African grain markets for instance, the WFP is a dominant buyer of grain, and controls a significant portion of the overall trade volume. In Malawi, ACE prioritized WFP’s participation on the exchange to increase trade volumes and this has been cited as one of the factors for ACE’s ability to continue operations.<sup>51</sup> Of course, this participation of WFP on ACE has its downside because it controls the majority of trade volume and limits the exchange’s liquidity. Alternatively, ZAMACE in Zambia was unable to generate a commitment to transparency from dominant traders on the exchange, evidenced by the fact that the majority of trade was done off the exchange, indicating the majority of actors benefited more from the status quo than from a transparent and competitive system. Ultimately this lack of transparency caused the majority of traders to avoid participation on the exchange, contributing to its illiquidity. There was also little enthusiasm and therefore little participation from large market actors in Kenya and Uganda, contributing in part to the failure of these nascent exchanges.

### Suggested Indicators or Methods for Measurement

<b>Existing market participants</b>	<p><b>Qualitative:</b> Comprehensive, customized survey of existing market participants to determine interest/willingness to trade transparently on a formal exchange.</p>
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## Exchange Design Conditions

While the preceding three sub-sections focused on conditions in the external environment within which a commodity exchange must operate, this fourth sub-section focuses on conditions that should be present in the design of the commodity exchange itself. They include the organizational structure, services,

<sup>50</sup> Although it should be noted that good contract design (providing contracts that meet buyers’ needs) could be an important factor in attracting additional international buyers, which occurred in Malaysia (see discussion below).

<sup>51</sup> Dentoni, D., and Dries, L., *Private Sector Investments to Create Market-Supporting Institutions: The Case of Malawian Agricultural Commodity Exchange* (2015)

contracts, and technologies that successful exchanges provide. While these conditions are internal in nature, they are critical to the effective performance of an exchange, and rely to a great extent on the wider external enabling environment. To assess these conditions in a pre-operational exchange (e.g. in the pre-design or design phase), a comprehensive business planning exercise needs to be conducted by, or in collaboration with, the operators of the exchange. For those exchanges that are already operational, the presence or absence of these conditions (as well as any extenuating reasons for their absence) should be determined by the analyst.

**Determine what types of enabling services can and will be provided through the exchange.**

The services available to market participants that enable exchange-based trade will to a large degree dictate the exchange's ability to bring down market transaction costs and attract sufficient volumes to continue operations. Importantly, the higher the fixed operational costs assumed by an exchange, the more trade volume is needed to spread the costs across all participants and transactions, otherwise unit transaction costs will be too high.<sup>52</sup>

The services expected to be provided by or on an exchange include the following:

**Certified Warehouse Management and Insurance Services:** Trade on an exchange requires licensed, bonded, and insured storage operators who are capable of guaranteeing the delivery of the commodity according to contract specifications. These services can be deployed under different operational models. For instance, the Ethiopia ECX operates a network of warehouses<sup>53</sup>, which affords greater control, but also inflates their fixed operational costs. Alternatively, Malawi ACE leverages existing storage infrastructure from private traders, which has allowed ACE to maintain lower fixed operational costs that have been crucial to sustaining their operations given the relatively low overall volume of trade on the exchange.

**Clearing and Settlement Services:** Clearinghouses act as a counterparty to every single trade on an exchange, and assume the “counterparty risk” so the buyers and sellers do not need to worry about default by the other party. Settlement services collect the funds from buyers and disperse the funds sellers following the trade. These services rely heavily on large and capable financial institution participation, without which commodity exchange operations are unlikely to be successful. The US CBOT is a prime example of an exchange that benefits from a vibrant market for clearing and settlement services from financial institutions. Engagement of the financial sector for clearing and settlement services has proven valuable for many other exchanges globally, including Brazil's BM&F which relied on strong participation from Banco do Brasil.

**Market Information Services:** As commodity exchanges provide a critical price discovery function, they must be able to widely disseminate the information regarding trading activity including real time bid/ask prices, lot sizes, and settlement prices to ensure market transparency and enable the participation of a broad cross-section of market participants. Successful examples of commodity exchanges broadly disseminating market information via ICT include the India MCX and the Ethiopia ECX, both of which provide rural price tickers, mobile SMS, and web-based market information, particularly in rural areas.

**Dispute Resolution Services:** As previously discussed, contract enforceability is an enabling condition that must be present in the legal/regulatory framework in a country. For exchange transactions, it would be timely and costly for market actors to go through the court system every time there was a contract dispute. Therefore, successful commodity exchanges provide or facilitate third party arbitration services to speed up and reduce the transaction costs associated with dispute resolution<sup>54</sup>. Another factor driving

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<sup>52</sup> Sitko, N., Jayne, T., *Constraints to the Development of Commodity Exchanges in Africa: A Case Study of ZAMACE* (2011)

<sup>53</sup> <http://www.ecx.com.et/Operations.aspx#WH>

<sup>54</sup> IAPRI, *Agricultural Commodity Exchanges and the Development of Grain Markets and Trade in Africa* (2014)

ZAMACE's failure in Zambia was the high cost of contract enforcement through the formal court system leading to distrust and disinterest in the exchange by market actors.

### Suggested Indicators or Methods for Measurement

<b>Certified warehouse management &amp; insurance services</b>	<p><b>Quantitative:</b> Procedures and time to construct a warehouse (# of procedures, and # of days). <i>Source: DoingBusiness.org</i></p> <p><b>Qualitative:</b> Comprehensive survey of existing warehouse operators to determine capacity; licensing requirements/status; and status of warehouse insurance services.</p>
<b>Clearing and settlement services</b>	<p><b>Quantitative:</b> Financial market development indicators: real interest rate lending (%), Net domestic credit (% GDP), Domestic credit provided by banking sector (% of GDP). <i>Source: WDI of the World Bank</i></p> <p><b>Qualitative:</b> Comprehensive survey of existing financial institutions to determine their interest/willingness to participate as a clearing/settlement service provider</p>
<b>Market information services</b>	<p><b>Qualitative:</b> Assessment of business plan for clear articulation of strategy for market information dissemination, technological requirements, and market actor access to sources of information.</p>
<b>Dispute resolution services</b>	<p><b>Qualitative:</b> Assessment of business plan for clear articulation of strategy for reducing time and cost associated with dispute resolution in formal court system. Identify and assess viability of the intended means of arbitration, and enforcement.</p>

### Define an effective structure for exchange ownership, membership, and governance.

There are different models for operating an exchange – China's DaLian Exchange (DCE) is government owned and controlled, Malaysia's Bursa, Thailand's TFEX, and Brazil's BMF are public/private partnership models,<sup>55</sup> the US CBOT and South Africa's SAFEX are private for-profit management models, and Malawi's ACE has two separate business models – a non-profit arm and a for-profit arm.<sup>56</sup> As all of these exchanges are considered successful operations in their own right, it is evident that the ownership model is less consequential by itself in dictating success. What is more important is that governance arrangements are put in place to manage the exchange products/services effectively, and foster the trust necessary to attain the buy-in, involvement, and/or membership from a wide range and critical mass of industry actors including banks, brokers, traders, processors, and producers.<sup>57</sup>

## Market Infrastructure

### What is the condition of physical infrastructure?

There are three primary types of hard market infrastructure on which successful commodity exchanges rely – transportation, ICT, and storage. Transportation infrastructure reduces transaction costs of physical trade, and reduces spatial price variation (different prices for the same grade commodity in different geographic locations). ICT infrastructure also reduces transaction costs by increasing the speed at which individuals can access information and communicate with trade partners. The availability of storage infrastructure allows seasonal supply smoothing and provides venues for securing the underlying commodity on which an exchange contract is created.<sup>58</sup>

While physical market infrastructure has been shown to be a pre-requisite for commodity exchange success in some countries, others suggest that its absence may not be the most significant constraint to commodity exchange performance. For instance, the US CBOT was introduced in 1864 when the physical

<sup>55</sup> Rashid, S., *Commodity Exchanges and Market Development: What Have We Learned?* (2015)

<sup>56</sup> Dentoni, D., and Dries, L., *Private Sector Investments to Create Market-Supporting Institutions: The Case of Malawian Agricultural Commodity Exchange* (2015)

<sup>57</sup> USAID-COMPETE, *10 Preconditions for a Successful Commodity Exchange – a Comparison between ACE and ZAMACE* (2012)

<sup>58</sup> Andersson, C., et al. *The Ethiopian Commodity Exchange and spatial price dispersion* (2015)

infrastructure in the US was arguably no better than that seen in many developing countries today.<sup>59</sup> Additionally, while successful exchanges in Malaysia and South Africa were developed in contexts of relatively strong physical infrastructure, the exchanges in Brazil and India were introduced without these characteristics fully in place and instead may have led to the strengthening of the physical market infrastructure in country.<sup>60</sup>

### Suggested Indicators or Methods for Measurement

<b>Physical Infrastructure</b>	<b>Quantitative:</b> Road Density (km/kmsq land area), Percent of paved roads (%), Ground line & Mobile subscribers per 1,000 people, Internet users per 1,000 people. <i>Source: World Development Indicators</i>
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### Are there effectively administered, industry adopted grades/standards in place?

While infrastructure is often traditionally thought of as the physical infrastructure previously discussed, it also includes the “soft” infrastructure that facilitates trade and reduces transaction costs. Trade on a commodity exchange relies on a mutually accepted system of grades and standards that dictates the quality of the commodity traded. The grade of a particular commodity will influence its price, and therefore must be clearly and widely understood and enforced at all levels of the value chain. A widely accepted and trusted grades and standards system facilitates the evolution in the market system from personal relationship-based trade to anonymous trade because there is no longer a need to personally physically inspect the commodity. Grades and standards account for differences in impurities, moisture content, weights, foreign matter, contaminants, and allow a contract to describe the specific characteristics, attributes, and deficiencies to be expected upon physical delivery.<sup>61</sup> An effective grades and standards system relies on industry accepted written standards, licensed inspectors, and capable certified storage operators to maintain quality.

Coffee contracts traded on the ECX in Ethiopia are based on industry accepted grades and standards. While this mutually recognized homogeneity of quality is important to enable contract-based trade on the exchange, it may have limitations in highly differentiated commodities such as coffee. The ECX trades only in spot contracts so buyers are interested in accepting physical delivery of the coffee underlying the exchange contracts. Coffee buyers complain that the grades and standards system in operation on the exchange does not allow other differentiating factors such as traceability to be provided under the existing grades/standards system. ECX has indicated they are working on introducing a system that also enables other market-led standards that differentiate the underlying commodity to end buyers such as traceability – and in 2015, the ECX introduced the IBM-enabled national traceability system which tags bags of coffees to geo-referenced washing, hulling, and cleaning stations across Ethiopia’s coffee growing areas.<sup>62</sup>

### Suggested Indicators or Methods for Measurement

<b>Grades and Standards</b>	<b>Qualitative:</b> Comprehensive survey of existing public and/or private grades and standards administration systems – written standards, certification bodies, accreditation bodies, testing facilities.
<b>Organizational structure</b>	<b>Qualitative:</b> Assessment of business plan for clear articulation of the organizational structure to be employed, including ownership (public, private, public/private), membership (diversity of existing actors), and the governance arrangements to operate the exchange (board of directors, advisory bodies, etc.). Assess rationale for the structure compared to the objectives, the prevailing enabling environment, and corporate governance norms in country of operation.

<sup>59</sup> Rashid, S., *Commodity Exchanges and Market Development: What Have We Learned?* (2015)

<sup>60</sup> UNCTAD, *Development Impacts of Commodity Exchanges in Emerging Markets* (2009)

<sup>61</sup> USAID-EAT project, *Building and Enabling Environment for Functioning Commodity Exchanges* (2012)

<sup>62</sup> <https://www.usaid.gov/ethiopia/press-releases/ecx-launches-independent-food-traceability-system>

**Determine the most effective, resilient, and reliable trading platform.**

The technology employed by a commodity exchange should be viewed as a means, rather than an end in itself. While advanced ICT is not a critical factor determining the success of a commodity exchange, it can be an important means to scale up the system.<sup>63</sup> As described in Section I, an exchange platform may be open outcry or electronic transaction based. Where technical capacity and infrastructure is available, an exchange should consider various degrees of sophistication for software applications to enable electronic transactions.<sup>64</sup> Alternatively, an open outcry system can be employed where the foundation for electronic transactions is more limited.

The open outcry system was employed with relative success under the Ethiopia ECX system, although they shifted to an electronic transaction platform in 2015.<sup>65</sup> This experience suggests a phased approach may be beneficial – where nascent commodity exchanges start by introducing a less sophisticated platform for exchange then transition to web-based or mobile transactions once a resilient and reliable system can be put in place.

**Suggested Indicators or Methods for Measurement**

<p><b>Trading platform</b></p>	<p><b>Qualitative:</b> Business plan should clearly articulate the intended trading platform (open outcry, electronic exchange) in relation to the existing technological sophistication and objectives of the exchange. Determine accessibility of existing market actors and likelihood of uptake. If software-based, assess the trouble-shooting systems in place to ensure the reliability and resilience of the system.</p>
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**Evaluate anticipated market demand for exchange traded contracts.**

It is critical to achieve a high volume of trade to sustain exchange operations. Therefore, exchange operators, or those investors supporting the development of a commodity exchange, must understand the market demand for exchange-traded commodity-based contracts and design the products offered on the exchange accordingly.

The existing market supply of exchange contracts will include those products that are offered on existing exchanges that may present competition for a new commodity exchange. For instance, any attempts to establish a commodity-based contract in Mexico must consider the characteristics and attributes of the contracts being offered on the US Chicago Exchange (CBOT), as this is where many agribusinesses operating in Mexico hedge their price risk.<sup>66</sup> For example, a contract on winter wheat would compete with that offered on the Chicago exchange. In this case, a contract will not experience high demand from market actors unless it is differentiated from the contracts already available on the market.<sup>67</sup> However, the Malaysia Bursa was able to introduce a contract on palm oil that had not existed elsewhere and did attract international buyers.

Additionally, the contract should address the concerns of market actors. For instance, if agribusinesses face a six-month window of price risk between planting and harvest, the demand for a six month futures contract may be expected to exhibit higher demand than a three month futures contract. It is also important to design the appropriate size contract based on average farmer production capacity if direct smallholder participation is an objective of the commodity exchange. Producer organizations can serve the important function of aggregating supply to meet minimum contract size requirements. However, member-based producer organizations are likely to face significant challenges managing members’ price

<sup>63</sup> USAID-FACET project, *ICT to Enhance Warehouse Receipt Systems and Commodity Exchanges in Africa* (2010)

<sup>64</sup> Moreno-Alemay, P., Pereira-Villa, C. *Why does Colombia Lack Agricultural Commodity Futures?* (2014)

<sup>65</sup> Rockefeller Foundation. *Market Change: Ethiopia Commodity Exchange* (2013)

<sup>66</sup> Arlas, D., et al. *Agricultural Commodity Exchanges in Latin America and the Caribbean* (2011)

<sup>67</sup> Qehaja, L. *Feasibility Studies on Future Exchange of Agricultural Commodities in Kosovo* (2014)

risk through the futures/options markets, unless a sufficient level of capacity is present in producer organization leadership to successfully interact with qualified providers of these financial products.

Finally, where the legal/regulatory framework inhibits more sophisticated instruments like futures and options, and demand exists for spot/forward contracts, it may be beneficial for nascent commodity exchanges to employ a phased approach to product development – start with spot contracts before transitioning to futures. Overall, the importance of market demand illustrates the need for a well-designed business plan prior to introducing a new commodity exchange. The Johannesburg Stock Exchange, which owns SAFEX, has recommended that any new exchange initiative start with a robust business plan that sets out the objectives and opportunities for the exchange.<sup>68</sup>

#### Suggested Indicators or Methods for Measurement

<b>Market demand</b>	<b>Qualitative:</b> Business plan should clearly articulate the anticipated demand for the contracts that will be offered on the exchange, with rationale for assumptions. Once the anticipated terms of a particular contract are determined, anticipated demand can be assessed through rapid remote surveys, targeted in-person interviews, or focus groups obtaining the views of a critical mass of existing traders, commercial producers, or market speculators.
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#### **Determine funding and implementation strategy for an outreach and education program.**

Awareness raising and capacity building for market actors including agribusinesses, traders, farmers, media, financial institutions, and government regulators is necessary to increase the volume of trade on an existing exchange.

While there is clearly a role for the public sector to promote the exchange given its broad market development potential, there is also a need for exchange operators to lead educational initiatives to market actors.

In Colombia, 71 percent of market actors surveyed in one study suggested that lack of education related to price risk management is a reason why futures are not traded on agricultural commodities in the country.<sup>69</sup> In India, the success of the MCX has been partially attributed to India’s relatively high levels of rural education,<sup>70</sup> as well as an emphasis on education from the exchange operators.<sup>71</sup>

#### Suggested Indicators or Methods for Measurement

<b>Education and outreach</b>	<b>Qualitative:</b> Business plan should clearly articulate the strategy for market actor sensitization and capacity building, including outreach to a diversity of existing market actors including small and large farmers, traders, and financial institutions. Also determine the ongoing costs of outreach/education and the source of funding for these activities, whether through exchange fees and/or external donor support.
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## V. ALTERNATIVE SOLUTIONS & STRATEGIES

The preceding sections discussed the preconditions for domestic, national-level commodity exchange success, and presented lessons learned from countries around the world. While the introduction of domestic commodity exchanges presents an opportunity for a range of benefits associated with agricultural market development, they are not the only mechanism available to policy makers to achieve similar

<sup>68</sup> Gravelet-Blondin, R. *Learning from South Africa*. From: “On the Making of a Market: Global Learning from Commodity Exchange Experiences” (2010)

<sup>69</sup> Moreno-Alemay, P., Pereira-Villa, C. *Why does Colombia Lack Agricultural Commodity Futures?* (2014)

<sup>70</sup> USAID-FACET project, *ICT to Enhance Warehouse Receipt Systems and Commodity Exchanges in Africa* (2010)

<sup>71</sup> UNCTAD, *Development Impacts of Commodity Exchanges in Emerging Markets* (2009)

objectives. This section presents a few alternatives available when USAID and partners determine the preconditions for success are not yet in place in a target country.

### Utilizing Existing International Exchanges

Rather than introducing a new domestic commodity exchange, linking with existing international exchanges allows domestic actors to manage price risk by buying and selling future contracts through a well-established exchange that may benefit from a more effective enabling environment than their own domestic market system may provide.<sup>72</sup> This strategy is expected to be more appropriate for exportable commodities than for domestically traded cereal crops.<sup>73</sup> However, using international commodity exchanges for price risk management is limited in markets where there is low price transmission, meaning the world prices and local prices are not closely related. Where price transmission is low, this causes what is known as “basis risk,” which will provide a lower level of price risk reduction to developing country actors looking to hedge their positions.<sup>74</sup> Put another way, if the price of the commodity linked contract is not perfectly correlated with the price of the underlying commodity then hedging a physical position will be ineffective.

A primary condition needed for this strategy to be effective is low basis risk.<sup>75</sup> Basis risk occurs if the prices between domestic and global markets are not well correlated, and therefore local market actors cannot use global futures contracts to hedge their physical position.<sup>76</sup> There are several potential reasons that commodity prices may not be correlated between domestic and global markets, including climatic and seasonal differences, trade restrictions such as export/import bans, or currency exchange rate volatility.<sup>77</sup> In Iran, for example, the difference in commodity prices on domestic versus world markets is substantial, therefore basis risk is considered high and contracts on global exchanges do not provide sufficient price risk management for Iranian market actors.<sup>78</sup>

In Mexico, the government provides cotton producers a minimum price guarantee for a fee, and the Support Services for Agricultural Marketing Agency hedges the government’s price risk by using producer fees to buy put options on the New York futures exchange.<sup>79</sup> Similarly in Ghana, the cocoa board provides a minimum farm-gate price to their members then uses member fees to buy options on exchanges in New York and London to hedge their downside price risk.<sup>80</sup> These are innovative, effective ways to address producer price risk by leveraging international exchanges rather than developing costly and potentially less effective domestic exchanges.

### Regional Exchange

Where market size and liquidity is limited, the aggregation of volumes through regional exchanges has emerged as an alternative to establishing standalone domestic exchanges. If domestic exchanges are unable to achieve the trade volumes necessary to cover their operational fixed expenses, engaging in a regional exchange may present opportunities for economies of scale. Regional exchanges however, require regulatory consistency across borders. This may be supported by a common market among countries, including a system of regional regulatory cooperation, including harmonization or mutual recognition of grades and standards, trade policies, exchange rate policies, contract laws, and financial legislation.<sup>81</sup>

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<sup>72</sup> Rashid, S., *Commodity Exchanges and Market Development: What Have We Learned?* (2015)

<sup>73</sup> IFPRI, *Purpose and Potential for Commodity Exchanges in African Economies* (2010)

<sup>74</sup> Dana, J., Gilbert, C. *Managing Agricultural Price Risk in Developing Countries* (2008)

<sup>75</sup> Quattri, M., et al *On the role of the brokerage institution in the development of Ethiopian agricultural markets* (2011)

<sup>76</sup> Dana, J., Gilbert, C. *Managing Agricultural Price Risk in Developing Countries* (2008)

<sup>77</sup> UNCTAD, *Development Impacts of Commodity Exchanges in Emerging Markets* (2009)

<sup>78</sup> Qehaja, L. *Feasibility Studies on Future Exchange of Agricultural Commodities in Kosovo* (2014)

<sup>79</sup> Rashid, Shahidur, *Commodity Exchanges and Market Development: What Have We Learned?* (2015)

<sup>80</sup> *ibid*

<sup>81</sup> IFPRI, *Purpose and Potential for Commodity Exchanges in African Economies* (2010)

Needless to say, it is a politically difficult and timely process to establish a common market regionally that would enable the regulatory consistency that a regionally integrated exchange requires.

Nonetheless, regional models are emerging in Africa. In 2015, US-based company PanXchange launched a software trading platform across the East Africa Community (EAC) called PXAfrica offering contracts on grains and pulses. (This is a **regional** example of Model 2, an electronic exchange, as discussed in the Introduction to Commodity Exchanges section above.) The platform had 12 users in 2015 and had grown to 105 users by the end of 2016. PXAfrica has offices in Nairobi and Kampala with members in Kenya, Uganda, and Tanzania. Further details on types of contracts available and the effectiveness of the PXAfrica platform are limited.

In Rwanda, a different model for regional exchange was envisioned. In 2011, the Government of Rwanda signed an MOU to establish the Rwanda Commodity Exchange as a national platform with links to an EAC regional exchange.<sup>82</sup> Kenya, Uganda, and Rwanda then agreed on a joint commodity exchange based upon harmonized standards and legal framework, requiring each country to establish its own privately operated exchange, which would link together allowing cross-border electronic exchange<sup>83</sup>. Today, the East Africa Exchange (EAX) is based in Kigali, Rwanda with registration in Kenya, Uganda, Tanzania, and Burundi, with private investors in Rwanda, Nigeria, and the US. The EAX currently offers contracts on maize, beans, and soya based on EAC standards and has 215 registered members<sup>84</sup>. There is little public information available on the success of the exchange to date other than information provided by the exchange itself.

### Establish or Upgrade Auction Systems

While contract-based commodity exchanges are relatively complex institutional designs, it may also be feasible to explore more simple institutional designs for physical exchange of commodity in the spot market. For instance, many countries have utilized auction floors for agricultural commodity trade for generations. In fact, the ECX is an example of transforming an existing traditional auction system into a contract-based commodity exchange. But rather than transforming the auction system, the auction system may be a more effective institution in less developed contexts. Nonetheless, while basic auction systems may bring order to physical trade in some contexts, they would not directly contribute to price risk management because trade is typically executed at the spot market price (they do not offer forwards, futures, or options). There is very little available evidence of the contribution that supporting traditional auction systems would have on overall commodity market development, but it is an alternative that has been suggested could merit further research to understand for instance how technology might be utilized to link traditional physical auctions across a country<sup>85</sup>. This is primarily because auction systems are less complex, cumbersome, and costly than a full-service commodity exchange; however, the trade-off for this simplification is a mechanism that does not provide critical services such as price risk management. Where regulatory capacity is limited and other pre-requisites for full service commodity exchanges are not present, the establishment or upgrading of the auction system may prove valuable.

### Other Risk Management Mechanisms

A primary utility of commodity-based futures contracts for agribusinesses is the price risk management function. So where futures trading is not viable, there may be other risk management mechanisms available for market actors. One such examples is index insurance, which utilizes a data trigger to pay out on crop

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<sup>82</sup> <http://www.minicom.gov.rw>

<sup>83</sup> <http://tpsftz.org/region-close-to-having-a-commodities-exchange/>

<sup>84</sup> <http://www.ea-africaexchange.com/pages/about-us/company-profile>

<sup>85</sup> Rashid, *Commodity Exchanges and Market Development: What Have We Learned?* (2015)

losses.<sup>86</sup> While not directly linked to price risk exposure, farmers can enter into these instruments at planting and protect against crop losses, essentially hedging their position in the physical commodity.

### Market System Fundamentals – Enabling Environment Reform

Where the foundation for commodity exchange and price risk management are not yet in place, countries would benefit from investments in market fundamentals that would support an enabling environment for structured trade.<sup>87</sup> This could include the introduction and administration of a grades and standards system, strengthening of contract enforcement legislation, rules and regulations to create incentives for increased investment in and from the financial sector, a national market information system, and physical infrastructure. Additionally, where political tolerance for food price fluctuations is low, it is necessary to support an open public-private dialogue on price support policies to reduce uncertainty and strengthen rules-based decision making.<sup>88</sup>

## VI. CONCLUSION

Commodity exchanges are not panaceas for commodity market development. There are fundamental reasons why existing trading systems are in place, so understanding and working within those market dynamics is critical to the success of any market development interventions. Nonetheless, where the appropriate enabling environment conditions exist and the exchange is appropriately designed, commodity exchanges present several potential benefits, notably price discovery, price risk management, lower transaction cost, market transparency, and access to finance. USAID is in a position to contribute to the viability of commodity exchange investments in any given country through the following avenues:

**Assessment:** Before investments in commodity exchanges move forward, USAID can facilitate a comprehensive analysis of the enabling environment for a commodity exchange to consider if preconditions are in place and determine its likelihood of success. This document provides a roadmap for conducting the assessment and suggested qualitative and quantitative indicators and methods for information gathering. Country-specific analyses can be made available through the Feed the Future Enabling Environment for Food Security program.

**Business Planning:** If and when a commodity exchange is determined to be potentially viable in a given environment, USAID can support the exchange operators to develop a comprehensive business plan to detail the exchange design conditions including a clear articulation of the objectives of an exchange and an analysis of market demand for exchange-traded contracts. Only once objectives of the exchange are clearly presented and the demand for exchange contracts is assumed to be large enough to generate revenues necessary to sustain exchange operations should investment considerations move forward.

**Investments in Market Systems Fundamentals:** Following the comprehensive assessment stage, if it is determined that the enabling environment is not yet conducive to supporting a commodity exchange, then investments in market fundamentals including, enabling environment reform, and financial sector development may prove to be a critical foundation for a successful domestic commodity exchange. Depending on existing conditions, alternative investments may prove more appropriate, including facilitating the utilization of international exchanges, establishing a regional exchange, supporting the development of other risk management mechanisms. Importantly, the results of a commodity exchange feasibility analysis will present limiting factors within each enabling environment condition that deserve closer attention for reform or investments.

<sup>86</sup> Larson, D., et al *Policies on Managing Risk in Agricultural Markets* (2004)

<sup>87</sup> IAPRI, *Agricultural Commodity Exchanges and the Development of Grain Markets and Trade in Africa* (2014)

<sup>88</sup> Sitko, N., and Jayne, T. *Why are African Commodity Exchanges Languishing? A Case Study of the ZAMACE* (2012)

## ANNEX 1: CASE EXAMPLES FROM OECD, EMERGING, & DEVELOPING COUNTRIES

Examining specific cases from countries around the world suggests that commodity exchanges may succeed in a range of development contexts; however, there are clear commonalities across these experiences that by and large align with the enabling environment conditions for success presented in Section IV. Below key institutional characteristics and factors for successes and failures are presented for exchanges in OECD countries (US, Japan), emerging countries (Brazil, Colombia, Argentina, China, India, Malaysia, South Africa), and developing countries (Zimbabwe, Zambia, Malawi, Kenya, Nigeria, Ethiopia).

### Experiences from OECD Countries

**US Chicago Board of Trade:** The CBOT is the largest commodity exchange in the world, and it trades contracts on soybeans, maize, wheat, oats, and rice. It was established in 1848 and, at the time, its location along Lake Michigan made it a suitable location for storage, trading and distribution of grain and there was demand for price risk management from traders given seasonal grain availability and therefore price variability.<sup>89</sup> CBOT's success today is owed to a vast number of domestic and international investors, significant financial institution participation at clearing and brokerage houses, and while the US government does provide large producer subsidies, they do not intervene in market prices directly.<sup>90</sup>

**Japan Tokyo Commodity Exchange:** The TCO is one of the most liquid commodity markets in the world, and it executes electronic transactions on futures contracts for agricultural products including rubber, soybeans, corn, and azuki. Japan's regulatory system for commodity exchanges has evolved since its inception and now operates under a unique framework. Following a case of fraud and customer losses in 2005, Japan amended its Commodities Exchange Law, increased minimum capital requirements for financial institutions, created new brokerage rules to limit conflicts of interest, and established a central clearinghouse jointly controlled by all exchanges in the country.<sup>91</sup> One lesson from the Japan experience is that the rules and regulations that govern exchanges must constantly adapt to market conditions, and this requires a solid regulatory framework, and trusted, capable regulators.

### Experiences from Emerging Countries

**Colombia:** While Brazil's BM&F Bovespa and Argentina's Rosario Futures Exchange (ROFEX) have succeeded in establishing a domestic agriculture futures exchange, no other Latin American country has been able to do so. The experiences in Colombia present an interesting case study as to why this may be. There are several factors that suggest Colombia would be a successful case: first, the domestic prices of corn, soybean oil, palm oil, coffee, cocoa, and cotton exhibit at least an 85 percent correlation with world prices;<sup>92</sup> second, market actors have expressed significant interest in hedging their price risk. However, a survey of market participants indicates that that lack of education and capacity of market actors, illiquidity of the market, government intervention in market prices, and an inadequate legal framework are all factors inhibiting futures trading.<sup>93</sup>

<sup>89</sup> Musiyarira, C. *Assessing the ICT-Enabled Agricultural Commodity Exchange Market and Its Impact on Small-Scale Farmers in South Africa* (2013)

<sup>90</sup> Arlas, D., et al. *Agricultural Commodity Exchanges in Latin America and the Caribbean* (2011)

<sup>91</sup> UNCTAD (2), *Overview of the world's commodity exchanges – 2007* (2009)

<sup>92</sup> Price transmission (correlation of domestic prices with world prices) is important for commodity exchanges that deal in export oriented commodities. Price transmission tends to be lower where trade barriers are higher, often due to government intervention. If price transmission is low, then price risk management for global buyers will be less effective - it will not be possible to effectively hedge a physical position.

<sup>93</sup> Moreno-Alemay, P., Pereira-Villa, C. *Why does Colombia Lack Agricultural Commodity Futures?* (2014)

**Malaysia Bursa:** While many exchanges trade a number of commodity-linked contracts, Malaysia's Bursa is focused almost entirely on futures for palm oil. In fact, the world reference price for palm oil is established on Malaysia's Bursa, which is considered one of the only non-OECD countries that is both the leading producer of a commodity and operates the exchange that sets the reference price.<sup>94</sup> Importantly, there were no other available contracts when Bursa first offered the palm oil contract, so they were able to effectively differentiate their contract and meet market demand. The palm oil market in Malaysia experiences high volume of regulated physical trade with diverse market actors. Malaysia's success is also owed to the government's commitment to not intervene in supporting market prices. Nonetheless, Malaysia's Bursa has been unsuccessful in introducing other commodity-linked futures contracts.<sup>95</sup>

**India MCX:** The experiences trading commodity-linked spot and futures contracts on the MCX have been widely regarded as a success. Importantly, India's domestic agriculture markets are of significant size<sup>96</sup> and other success factors noted include high levels of rural education and a cultural disposition toward speculation.<sup>97</sup> Despite relatively inadequate physical transportation infrastructure, India's success is due to an emphasis on education and capacity building for exchange participants, and an efficient utilization of ICT for rural market information dissemination including rural tickers, information kiosks, mobile SMS, and web-based MIS.

**South Africa SAFEX:** SAFEX is the largest and most successful commodity exchange in sub-Saharan Africa. While physical infrastructure is notably stronger in South Africa than in other sub-Saharan African countries, SAFEX's success is due to enabling legislation, commitment from the financial sector for intermediary support, clear trading rules, surveillance to maintain integrity and trust, contracts developed in collaboration with industry actors, and an emphasis on promotion and education.<sup>98</sup> Despite their success in achieving sufficient volumes/liquidity to provide price discovery and price risk management for larger market actors, SAFEX is seen as not directly involving smallholder farmers in the trading mechanism.

## Experiences from Developing Countries

**Zimbabwe ZIMACE:** Established in 1994, Zimbabwe's ZIMACE provided contracts for maize, wheat, oilseeds, beans, and cotton with relative success until 2001. The exchange generated \$500M in trade value which generated sufficient fees to finance the operating of the exchange.<sup>99</sup> Despite the success, the government of Zimbabwe intervened to close the exchange so they could more closely control commodity prices.<sup>100</sup> The ZIMACE experience reinforces the lesson that limited government intervention is absolutely critical for the successful functioning of an exchange.

**Malawi ACE:** The ACE model is generally considered a relative success as it continues to operate, although its successes are moderate compared to emerging and OECD country experiences. Success factors for ACE include a supportive and less interventionist government policy environment, buy-in from a wide range of industry actors, an innovative governance structure catering to both smallholder and commercial interests, commitment from dominant market players, a network of third party operated warehouses, and a clear set of operational regulations including a dispute resolution mechanism.<sup>101</sup> While ACE generates enough volume (50,000 tons) to sustain its operations, the share of market volume traded on the exchange remains relatively low – 5 percent of maize traded, and 11 percent of soybeans traded,

<sup>94</sup> UNCTAD, *Development Impacts of Commodity Exchanges in Emerging Markets* (2009)

<sup>95</sup> UNCTAD (2), *Overview of the world's commodity exchanges – 2007* (2009)

<sup>96</sup> Dana, J., Gilbert, C. *Managing Agricultural Price Risk in Developing Countries* (2008)

<sup>97</sup> USAID-FACET project, *ICT to Enhance Warehouse Receipt Systems and Commodity Exchanges in Africa* (2010)

<sup>98</sup> Gravelet-Blondin, R. *Learning from South Africa*. From: "On the Making of a Market: Global Learning from Commodity Exchange Experiences", (2010)

<sup>99</sup> Rashid, S., *Commodity Exchanges and Market Development: What Have We Learned?* (2015)

<sup>100</sup> African Development Bank, *Guidebook on African Commodity and Derivatives Exchanges* (2013)

<sup>101</sup> USAID-COMPETE, *10 Preconditions for a Successful Commodity Exchange – a Comparison between ACE and ZAMACE* (2012)

which minimizes any potential price discovery benefits<sup>102</sup> as ACE utilizes a network of existing storage operators, it does not guarantee quality and volume, therefore actors must still rely on trust.<sup>103</sup> And finally, while ACE owes much of its success to its Bid Volume Only (BVO) system that enables WFP to trade on the exchange<sup>104</sup>, ACE has also arguably become over-reliant on WFP, as they accounted for an estimated 60 percent of trade on the exchange in 2012,<sup>105</sup> suggesting a degree of illiquidity enabling one dominant actor to influence price.

**Zambia ZAMACE:** From its opening in 2007 until its closing in 2011, ZAMACE traded a total value of \$78 million in contracts; by comparison, South Africa's SAFEX trades \$100 million per day.<sup>106</sup> Low trade volumes are a proximate cause for ZAMACE's failure, but there are several underlying factors that have been cited that constrained volumes: the high cost of contract non-compliance caused by Zambia's weak contract laws, timely/costly contract enforcement procedures, and poor dispute resolution mechanisms; the Zambian government's frequent and unpredictable interventions in food markets including trade bans and stock releases; the limited commitment of the commercial banking sector as intermediaries on the exchange; and the lack of commitment from dominant market actors. This lack of commitment is reflected in the fact that 68 percent of ZAMACE trade value takes place through "over-the-counter", or "off-exchange" transactions which do not publicize terms of the transaction (even though the buyer and seller interact through the exchange, and set terms over the counter). This effectively inhibits price transparency of the exchange.<sup>107</sup> The low volumes traded resulted in market manipulation by a small number of actors, and inability of the exchange to generate enough revenue to sustain its operations.

**Table 2: Summary of Factors for Success/Failure in Commodity Exchanges Globally**

Country	Factors for success/failure	Status
USA (CBOT)	Very large and liquid market, highly liquid futures market, participation from wide range of domestic and international investors and agribusinesses, self-regulated exchange with high standards, significant commitment from financial sector for clearing, settlement, and brokerage services	Operational
Brazil (BM&F)	Close engagement with banking sector, futures and spot contracts available, emphasized education of market actors to increase participation	Operational
Argentina (ROFEX)	Large and liquid physical market, little competition from other exchanges, agribusiness commitment, regulatory framework meets international standards	Operational
India (MCX)	Liquid markets, strong trading culture in India, broad portfolio of domestically traded products, strong rural ICT infrastructure, emphasized education	Operational
Malaysia (Bursa)	Contract differentiation, well-established, regulated, highly liquid and growing physical market, government commitment not to intervene in market pricing	Operational
China (DCE)	Strong demand and rapid growth of demand for new contracts, government leveraged commercial interests and expertise	Operational
South Africa (SAFEX)	Constructive government role, acceptable infrastructure, emphasized market actor sensitization/education, no other competition for trading contracts	Operational
Ethiopia (ECX)	Banned coffee trade outside ECX, Reliable clearing system, broad rural market information dissemination	Operational
Malawi (ACE)	WFP buys on the exchange, efficient cost structure, small contracts available to trade, inclusive governance structure (smallholder and commercial interests)	Operational

<sup>102</sup> Dentoni, D., and Dries, L., *Private Sector Investments to Create Market-Supporting Institutions: The Case of Malawian Agricultural Commodity Exchange* (2015)

<sup>103</sup> USAID-FACET project, *ICT to Enhance Warehouse Receipt Systems and Commodity Exchanges in Africa* (2010)

<sup>104</sup> The BVO system works like a reverse auction. A buyer (e.g. WFP) places a bid to buy XX (a certain quantity) MT of grain, and suppliers offer to sell some or all of the necessary volume at their offer price. The buyer then accepts offers (or not) by awarding contracts with the lowest price until the required volume is met. See: <http://www.bidvolumeonly.org/activities/intern-stories/bid-volume-only-by-kmkandawire.aspx>

<sup>105</sup> Rashid, S., *Commodity Exchanges and Market Development: What Have We Learned?* (2015)

<sup>106</sup> Sitko, N., and Jayne, T. *Why are African Commodity Exchanges Languishing? A Case Study of the ZAMACE* (2012)

<sup>107</sup> Sitko, N., Jayne, T., *Constraints to the Development of Commodity Exchanges in Africa: A Case Study of ZAMACE* (2011)

**Table 2: Summary of Factors for Success/Failure in Commodity Exchanges Globally**

Country	Factors for success/failure	Status
Nigeria (ASCE)	Low trade volume, poor transparency, insufficient linkages with financial institutions	Failed
Kenya (KACE)	Unstructured nature of trade with small-scale farmers, weak infrastructure, periodic unpredictable government interventions in maize market pricing	Failed
Uganda (UCE)	Low demand for contracts resulted in low trade volume	Failed
Zimbabwe (ZIMACE)	Government intervention, macroeconomic instability, limited market actor participation, weak policy design	Failed
Zambia (ZAMACE)	Policies restricted exchange trading, government price support policies disincentivized trade, dominant market actors not committed to transparency	Failed
Ghana (GCX)	TBD: Public-Private Partnership structure - Government of Ghana, Ecobank Ghana Limited, Ghana Commercial Bank Limited, 8 Miles Fund, and the IFC <sup>108</sup>	2017, trade to start
East Africa Exchange (EAX)	Regional exchange based in Kigali, offers contracts on strategic food crops for EAC countries including primarily maize and beans. Offers warehouse services, commodity trading, warehouse receipts finance, clearing and settlement.	Operational

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<sup>108</sup> <http://www.wtcacca.com/media-centre/news/commodity-exchange/>

## ANNEX 2: DEFINITIONS

**Basis Risk:** the risk that the price of a contract is imperfectly correlated with the underlying commodity. Without perfectly inverse correlation, a hedging strategy employed with commodity linked futures contracts will be ineffective.

**Bid Price:** the price a buyer is willing to pay for a commodity-linked contract.

**Brokerage:** an agent that buys or sells contracts for their customers for a fee.

**Call Option:** a financial derivative that provides the holder a right to buy a security at a given price.

**Clearinghouse:** a financial intermediary between buyer and seller, guaranteeing delivery and payment to eliminate counterparty default risk.

**Collateral-based Credit:** loans that are secured with commodity as collateral, typically through an electronic receipt backed by a certified and insured warehouse operator.

**Counterparty Risk:** the risk to each party of a contract that the other party will not live up to its contractual obligations. Counterparty risk is a risk to both parties and should be considered when evaluating a contract. In most financial contracts, counterparty risk is also known as default risk.

**Dispute Resolution:** a service to resolve disagreements between buyer and seller on contract terms at delivery. This service can be provided by or through exchanges using arbitration rather than the formal court system.

**Electronic Transaction:** a contract purchase or sale executed via computer network rather than in-person.

**Forward Contract:** a private agreement between buyer and seller for delivery at a specified date/price. Clearinghouses do not intermediate these transactions, and settlement occurs at the end of the contract.

**Futures Contract:** a standard contract traded over the exchange specifying delivery at a specified date/price. Clearinghouses do intermediate these transactions, and daily price changes are settled daily.

**Grades/Standards:** the formal sorting of a commodity into categories that share common quality traits. Grades/standards systems can be designed and/or administered privately or publicly.

**Liquidity:** the volume of activity in a market affecting the ease with which a contract can be bought or sold without creating price distortions/instability.

**Offer (Ask) Price:** the price a seller is willing to accept for a commodity-linked contract.

**Open Outcry:** a method of trading on an exchange whereby buyers and sellers verbalize or use hand signals between each other to convey their bid/ask prices and volumes.

**Position:** a binding agreement to buy or sell a certain quantity of commodities at an agreed-upon price. Positions are either “long” or “short.” Under a long position, a trader purchases and owns the commodity, holding onto the commodity and earning money if the market price increases. In a short position, a trader borrows a commodity for immediate sale, and buys the same quantity of the commodity back at a future date, profiting if the market price for the commodity falls.

**Price Discovery:** the process used by markets to determine commodity prices based on supply and demand. When underlying supply exceeds demand, selling will outpace buying and prices will fall, and vice versa.

**Price Risk Management:** the use of futures and options to hedge the risk of price volatility of a physical commodity position. This can also be done through forward contracts, although the risk of default is higher. The risk of default with forward contracts is considered higher because 1) without a clearinghouse, each party must assume the risk that the counterparty will not deliver, and 2) without daily contract pricing the holder is unaware of their financial position.

**Put Option:** a financial derivative that provides the holder a right to sell a security at a given price.

**Security:** A security is any financial asset that can be traded. The asset can either be a debt instrument (e.g., a bond) or an equity (e.g., company stock ownership)

**Settlement:** the contract/commodity is delivered to the buyer and payment is delivered to the seller.

**Settlement Price:** the average price at which a contract trades, calculated at market open and close.

**Spatial Price Volatility:** commodity price fluctuations across geographic locations.

**Spot Contract:** a contract for immediate delivery from seller and payment from buyer (e.g. according to spot price/date).

**Temporal Price Volatility:** commodity price fluctuations across time periods.

**Transaction Costs:** the expenses related to engaging in the purchase or sale of a commodity or contract.

**Warehouse Receipt:** proof of ownership of a stated quantity/quality of a commodity at a given location. They can be transferrable or non-transferrable, affecting their ability to be traded and/or used as collateral.

The **Feed the Future Enabling Environment for Food Security** project is a global support mechanism for Feed the Future focused and aligned Missions and Washington-based USAID offices to address policies, as well as legal, institutional, and regulatory factors that function as market constraints affecting food security.

Launched in September 2015, the project enables the rapid procurement of technical analysis, advisory services, and strategic knowledge management. For more information, contact Gloria Kessler (COR) at [gkessler@usaid.gov](mailto:gkessler@usaid.gov) or Nate Kline (Project Director) at [nkline@fintrac.com](mailto:nkline@fintrac.com).