



# FEED THE FUTURE

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

## Feed the Future Enabling Environment for Food Security Project

### Alternatives to Full-Service National-Level Commodity Exchanges: Case Studies on ASERCA and PXAfrica

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# CONTENTS

<b>Acronym List</b> .....	<b>i</b>
<b>Executive Summary</b> .....	<b>1</b>
<b>1. Introduction</b> .....	<b>2</b>
1.1 Rationale for the Study.....	2
1.2 Methodology.....	2
<b>2. ASERCA</b> .....	<b>3</b>
2.1 Background .....	3
2.2 How the Model Works .....	4
2.3 Breadth and Depth of Engagement .....	5
2.4 Benefits of the Model .....	6
2.5 Limitations of the Model.....	7
2.6 Long-Term Outlook and Replicability of the Model.....	8
<b>3. PXAfrica</b> .....	<b>9</b>
3.1 Background .....	9
3.2 How the Model Works .....	9
3.3 Breadth and Depth Engagement .....	10
3.4 Benefits of the Model .....	11
3.5 Limitations of the Model.....	12
3.6 Long-Term Outlook and Replicability of the Model.....	12
<b>4. Key Takeaways</b> .....	<b>13</b>
4.1 Objective: Commodity Price Risk Management .....	13
4.2 Objective: Upgrading Physical Trade .....	13
<b>5. References</b> .....	<b>15</b>

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## ACRONYM LIST

<b>ASERCA</b>	Agencia de Servicios a la Comercialización y Desarrollo de Mercados Agropecuarios
<b>CBOT</b>	Chicago Board of Trade
<b>CEX</b>	commodity exchange
<b>CME</b>	Chicago Mercantile Exchange
<b>CONASUPO</b>	Compañía Nacional de Subsistencias Populares
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FIRA</b>	Mexican Agricultural Financing Agency
<b>FIRM</b>	USAID Kenya Financial Inclusion for Rural Microenterprises
<b>NAFTA</b>	North American Free Trade Agreement
<b>NYBOT</b>	New York Board of Trade
<b>OTC</b>	over-the-counter
<b>PXA</b>	PXAfrica
<b>USAID</b>	United States Agency for International Development

## EXECUTIVE SUMMARY

A commodity exchange is 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. Commodity exchanges rely on a sound agribusiness enabling environment, but where the appropriate conditions are not present, they are more likely to fail than deliver the expected benefits.

High-profile commodity exchange failures across Africa have illustrated that targeted enabling environment reforms, including food market liberalization, are critical. Nonetheless, where certain conditions are not yet present to support a full-service national-level commodity exchange, there may be alternative mechanisms for achieving similar market objectives.

This report profiles two alternative models: the **Agencia de Servicios a la Comercialización y Desarrollo de Mercados Agropecuarios (ASERCA)** program in Mexico, and the **PanXchange** trading platform in East Africa known as **PXAfrica (PXA)**. The objective of the ASERCA program is to provide commodity price risk management for domestic producers, processors, and wholesalers. The objective of the PXA platform is to upgrade physical trade in agricultural commodities within and across Kenya, Tanzania, and Uganda. These models deliver some of the benefits of a commodity exchange yet may not need to meet all pre-conditions for a full-service national-level commodity exchange.

ASERCA was born out of the cross-border food market liberalization required of the Mexican government when they joined NAFTA. Where government agencies previously intervened directly in food markets to control prices, ASERCA — a government agency — was tasked with intervening as an intermediary for domestic value chain actors to buy and sell commodity futures and options contracts on exchanges in New York and Chicago to protect against downside price risk for producers and/or upside price risk for buyers. A rapid analysis of ASERCA suggests the following key takeaways:

- To utilize international exchanges for price risk management, domestic commodity prices must be correlated with international prices, which requires liberalization of cross-border commodity trade.
- Managing price hedging strategies on behalf of domestic stakeholders requires advanced institutional capacity and resources.
- Public sector agencies may stimulate the role of intermediaries to access international exchanges where nascent unmet demand is present. However, long-term sustainability may require transitioning the intermediary role to private actors, including financial institutions and producer organizations.

PXA, a wholly owned subsidiary of PanXchange, is a web-based over-the-counter (OTC) software platform that facilitates trade in physical commodities in Kenya, Uganda, and Tanzania. PXA does not aim to be a full-service regulated commodity exchange. They do not, for example, provide or facilitate clearinghouse services, commodity warehousing services, or dispute resolution services. A rapid analysis of the platform reveals the following features, many of which distinguish its design and objectives from traditional full-service national-level commodity exchanges:

- The platform provides a central location for buyers and sellers of physical commodity to obtain bid prices and offer prices at various geographic locations and then to negotiate trade terms with their counterparts.
- PXA does not manage counterparty risk directly but aims to enable users to manage their own counterparty risk.

- When terms of trade match between buyer and seller, a binding contract is automatically generated. This is considered a significant technical upgrade from the current practice of phone-based negotiation.
- PXA breaks down entry barriers and provides a degree of price transparency across geographies.
- Going forward, the platform seeks to aggregate cross-market data and allow users to automate arbitrage opportunities related to transportation and/or currency spreads.

The report provides several key takeaways from the experiences of ASERCA and PXA for policymakers, development agencies, or private stakeholders seeking to address the objectives of upgrading physical commodity trade and/or facilitating commodity price risk management.

## I. INTRODUCTION

These rapid case studies will seek to present the benefits, limitations, long-term outlook, and replicability of ASERCA and PXA as potential alternatives to full-service national-level commodity exchange (CEX) investments for policymakers and development agencies globally. Where investments in national-level CEX have either failed or are considered ill-advised given unaccommodating enabling environment conditions,<sup>1</sup> consideration of alternatives to achieve similar objectives may be necessary. Any solution should be responsive to industry demand and reflect the operating context and capacities. Further review will be necessary to ascertain whether the specific model is relevant and appropriate in a given country's context.

### 1.1 RATIONALE FOR THE STUDY

In 2017, the Feed the Future Enabling Environment for Food Security Project published a study entitled *Assessing the Preconditions for Commodity Exchange Success: A Guidance Document*. This study both identified the requisite enabling environment conditions for commodity exchanges to succeed as well as highlighted alternative solutions to achieve similar objectives where those conditions are not yet in place. Two alternatives to full-service national-level commodity exchanges, among others, identified in the study included the ASERCA commodity price risk management model in Mexico and the PXA regional commodity trading platform in East Africa. These case studies aim to dig deeper to identify the design, attributes, challenges, and lessons learned from these two alternatives.

### 1.2 METHODOLOGY

The case studies presented here are the result of a desk-based review of publicly available literature related to the ASERCA program and PXA conducted from March 19–23, 2018. In addition, the consultant conducted a short, semi-structured remote interview with the CEO of PanXchange to supplement the limited information available publicly. No additional stakeholder interviews were conducted for either PXA or ASERCA.

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<sup>1</sup> Several examples of failed CEX investments, the reasons for these failures, and the prerequisites for success are presented in *Assessing the Preconditions for Commodity Exchange Success: A Guidance Document*. Feed the Future Enabling Environment for Food Security, 2017.

## 2. ASERCA

### 2.1 BACKGROUND

Before the North American Free Trade Agreement (NAFTA) of 1994, the Mexican government regulated agricultural commodity prices directly. The government agency CONASUPO (Compañía Nacional de Subsistencias Populares) subsidized grain production, restricted grain imports, subsidized consumer grain prices, and fixed producer grain prices through direct purchase programs.<sup>2</sup> The high costs of the subsidies and other forms of direct intervention were ultimately unsustainable, and through NAFTA the government committed to liberalize its agricultural sector.

Liberalization, including the reduction and eventual elimination of import tariffs on corn, resulted in falling prices. In 1995, the commodity purchase program managed by CONASUPO was replaced by ASERCA, a decentralized government agency tasked with managing commodity price risks on behalf of domestic value chain actors. The program entitled “Incentivos a la Comercialización de Cosechas” (Harvest Commercialization Incentives) facilitates commodity price risk management for producers and other value chain actors for a fixed fee by purchasing futures and options contracts on U.S.-based exchanges, effectively providing producers a price floor and buyers a price ceiling. The price certainty provided by the program is intended to stabilize markets and stimulate commercial production.

From 2004 onwards, the Mexican government also explored how ASERCA could enable Mexican producers to compete against large international producers and introduced a program called “Agricultura por Contrato” (Contract Farming).<sup>3</sup> The program facilitated contract farming arrangements — essentially forward purchase agreements — by using futures and options to lock in the purchase price agreed to at a future date for both the producer and the buyer.

ASERCA’s price risk management efforts originally targeted the cotton and maize sectors until coffee was added to the commodities supported in 1999.<sup>4</sup> By 2016, the commodities ASERCA supported had expanded to include corn, wheat, rice, sorghum, cotton, oats, coffee, orange juice, sugar cane, cocoa, barley, oil, cattle, lean hogs, and milk.<sup>5</sup>

Upon its introduction, ASERCA contributed 100 percent of the purchase cost of futures and options contracts in New York and Chicago, but by 2007 the subsidy was reported to have been reduced to 50 percent.<sup>6</sup> In the latest notice from ASERCA, the program contributes 75 percent of the contract costs, while participants contribute only 25 percent of the costs.<sup>7</sup> The government budget allocated to subsidize the price hedging costs increased from \$22.5 million in 2002 to \$700 million in 2011.<sup>8</sup>

In 2012, the government began exploring an exit strategy for ASERCA as the primary intermediary between value chain actors and international financial markets. While ASERCA continued to operate, the

<sup>2</sup> Byerlee, Derek, et al. *Managing Food Price Risks and Instability in an Environment of Market Liberalization: Agriculture and Rural Development Department*. The World Bank, 2005.

<sup>3</sup> *Puts and Peso’s The Mexican Experience of Grain Deregulation and the ASERCA Program*. Intl FC Stone, 2016.

<sup>4</sup> Rutten, Lamon, and Frida Youssef. *Market-Based Price Risk Management: An Exploration of Commodity Income Stabilization Options for Coffee Farmers*. IISD, 2007.

<sup>5</sup> *Puts and Peso’s The Mexican Experience of Grain Deregulation and the ASERCA Program*. Intl FC Stone, 2016.

<sup>6</sup> Kang, Myong Goo. *Innovative Agricultural Insurance Products and Schemes*. Food and Agriculture Organization of the United Nations, 2007.

<sup>7</sup> “Notice of opening of windows for the purchase of price coverage and recognition of anticipated coverages, in the scheme of agriculture by contract, for the agricultural cycle Autumn-Winter 2017/2018.” Secretaria de Agricultura, Ganadería, Desarrollo Rural Pesca y Alimentación and ASERCA.

<sup>8</sup> Murphy, Anne G, et al. *Risk Management Instruments for Food Price Volatility and Weather Risk in Latin America and the Caribbean: The Use of Risk Management Instruments*. Inter-American Development Bank, 2012.

Mexican Agricultural Financing Agency (FIRA) was provided a \$41 million fund to begin transitioning the futures and options trading function from the government to private intermediaries, including banks and other financial institutions.<sup>9</sup> Where institutional capacity is strong, private intermediaries are expected to be more responsive to value chain actor demand for price risk management.

## 2.2 HOW THE MODEL WORKS

ASERCA is a decentralized agency of the Mexican government. The program positions this government agency as an intermediary for producers and buyers to engage in futures and options contracts on exchanges in New York and Chicago to hedge price risk. Contracts for corn, wheat, soybeans, pigs, and cattle are purchased on the Chicago Mercantile Exchange (CME) and Chicago Board of Trade (CBOT), while options for cotton, coffee, and orange juice are purchased on the New York Board of Trade (NYBOT).<sup>10</sup>

Beneficiaries of the program typically include commodity producers, intermediaries, and processors. The beneficiary pays between 25-50 percent of the cost of the contract, and ASERCA subsidizes the remaining 50-75 percent. Upon maturity of the contract, if there are profits, ASERCA first reimburses the beneficiary their fees, then ASERCA recovers the cost of their subsidy. If there are additional profits, they are delivered to the beneficiary.

The position a beneficiary takes in a future or option contract acts as insurance against price fluctuations between planting and harvest/delivery. For a producer who plants a crop today, there is risk that the market price of that commodity will fall before he/she harvests the crop. By buying a put option, if the market price of the commodity declines, the gain on the option offsets the losses at sale of the harvest. For a processor who needs to buy a commodity in three months, there is risk that the price will increase before then. By buying a call option, if the market price of the commodity increases, the gain on the call option offsets the loss from the increased price they need to pay for the commodity.

The ASERCA price risk management scheme also facilitates a market-based insurance of sorts for forward purchase agreements in contract farming arrangements. Under a contract farming arrangement, a buyer agrees to buy and a producer agrees to sell a certain volume of commodity at an agreed price on a given date (typically at harvest), and the buyer often extends inputs or input credit at planting season. The risks for a producer and processor in this situation are the opposite of the examples provided above.

### How a Put Option Works

A put option gives the contract holder the right to sell at a particular price (“the strike price”) on a particular date (“the expiration date”). If the price falls below the strike price, the cost of the option increases because it is “in the money.” The holder of the put option can then either sell the option for a profit prior to maturity or, at maturity, can sell the underlying asset (a corn contract) at the strike price and buy it at its market price, netting a profit on the margin between the two. In either scenario, a producer’s profit on the put option offsets the losses on their maize harvest.

### How a Call Option Works

A call option gives the contract holder the right to buy at a particular price (“the strike price”) on a particular date (“the expiration date”). If the price rises above the strike price, the cost of the option increases because it is “in the money.” The holder of the call option can then either sell the option for a profit prior to maturity or, at maturity, can buy the underlying asset (a corn contract) at the strike price and sell it at its market price, netting a profit on the margin between the two. In either scenario, a processor’s profit on the call option offsets the increased price of maize they need as raw materials for their business.

<sup>9</sup> “Mexico offers new hedging aid program for farmers.” Reuters, 1 Aug. 2012.

<sup>10</sup> Murphy, Anne G, et al. 2012.

The producer's risk in a contract farming arrangement is that the price of their commodity will rise above the price at which they have agreed to sell. The processor's risk in a contract farming arrangement is that the price of the commodity will fall below the price at which they have agreed to buy. When this happens, contract farming arrangements often break down, as one of the parties will renege on the agreement given their opportunity to buy or sell at a more attractive market price.

But entering into futures or options, contracts can protect both the producer and the buyer of a contract farming arrangement. A buyer who has agreed to a forward purchase agreement now may wish to enter into a put option, enabling them to profit — or simply offset — their opportunity cost if market prices fall before harvest. A producer who has agreed to sell at a set price and future date may now choose to enter into a call option, so they can profit (or offset their opportunity cost) if the market price of maize rises before harvest.

The ASERCA program only provides this service during narrow trading windows, where value chain actors can apply to participate in the program for a given season. The windows typically correspond to growing periods of target commodities within target geographies. The program's geographic focus includes the primary production states for each of the target commodities.

### 2.3 BREADTH AND DEPTH OF ENGAGEMENT

In 2015, the total operational budget of ASERCA was 4.2 billion pesos<sup>11</sup> (approximately \$220 million USD); however, ASERCA implements several different programs to support beneficiaries. The size of the price risk management program specifically, has grown substantially since its inception in both breadth and depth. For instance, ASERCA expenditures on futures/options contracts was reported to have grown from 497 million pesos in 2005 to 1.7 billion pesos in 2017/18<sup>12</sup> (approximately \$89 million USD), an increase of over 240 percent.

In 2015, ASERCA reportedly purchased a total of over 250,000 options on U.S. commodity exchanges, representing 20.7 million tons of grain, which impacted more than 250,000 beneficiaries.<sup>13</sup> While these figures show a seemingly large reach, the 250,000 beneficiaries overall pales in comparison to the estimated 2.8 million farms engaged in maize production in Mexico.<sup>14</sup> The data available does not specify the size/scale of beneficiaries supported through the program; however, critics argue that the geographical target of ASERCA prioritizes areas where large scale commercial actors are more dominant than small-scale actors.

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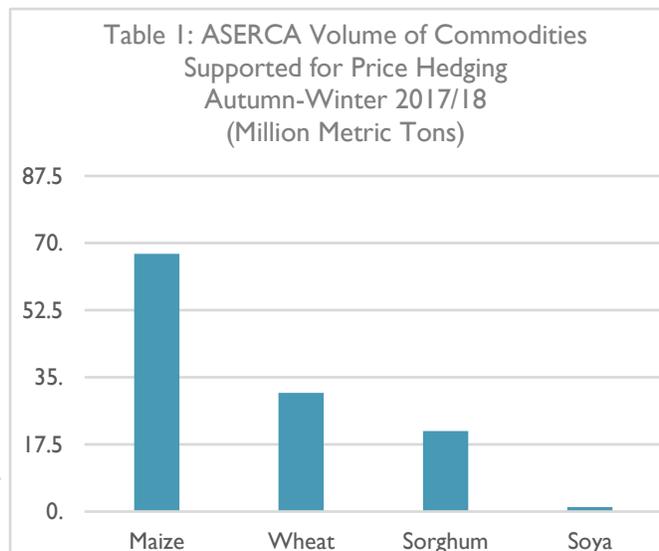
<sup>11</sup> Ibid.

<sup>12</sup> Cuautle-Parra, David, and John Michael Riley. *Effectiveness of United States Corn Futures Contracts as Hedging Instruments for Mexican Corn Producers*. AgEcon Search, 2014.

<sup>13</sup> *Puts and Peso's The Mexican Experience of Grain Deregulation and the ASERCA Program*. Intl FC Stone, 2016.

<sup>14</sup> Cuautle-Parra, David, and John Michael Riley. 2014.

Maize actors are reportedly the most significant priority of the program, receiving the majority of support compared to other grains in Mexico. In the latest open window provided by ASERCA, of the nearly 12 million tons of grain to be supported in the Autumn-Winter window of 2017/18, over 56 percent would be maize, 25.8 percent wheat, 17.5 percent sorghum, and less than 1 percent soya.<sup>15</sup> Table I illustrates the allocation of support to the various commodities in Autumn/Winter 2017/18.



## 2.4 BENEFITS OF THE MODEL

At its core, the program provides a form of subsidized insurance against price volatility, and it does so without direct intervention in the physical market. While the program is most well-known for its ability to provide a price floor for producers, evidence also suggests it has staved off price inflation of one of the nation’s staple foods, tortillas. Even when maize prices spiked in 2011 due to crop losses, the inflation of tortilla prices was minimized because it was estimated that 60-70 percent of the country’s tortilla processors were engaged in grain option contracts through ASERCA.<sup>16</sup>

By utilizing international exchanges, the ASERCA program circumvents Mexican actors’ need for a full-service national-level commodity futures exchange to manage price risks. But to capitalize on this opportunity, it is necessary for domestic commodity prices to be highly correlated with global commodity prices. Futures/options in Chicago and NY are priced-based on physical grain prices in the U.S. which is often considered the global price. If physical grain prices in Mexico are correlated with U.S. prices, then a derivative contract (future or option) can provide the holder of the physical commodity a “hedge” against downside price risk of the physical commodity.

For instance, if Farmer A expects to harvest maize in 90 days, then they are at risk of prices falling before they are able to sell their harvest. But if they buy a put option, the price of that contract will rise if the price of the physical commodity falls – and they can offset their loss in the physical market with a gain on their put option position. Alternatively, if Trader X needs to buy maize in 90 days, then they are at risk of the prices rising before they are able to buy. But if they buy a call option, the price of the option will rise if the price of the physical commodity rises – and they can offset their increased costs with a gain on their call option position. In both cases, the actor has “hedged” their price risk. But if domestic physical commodity prices are not correlated with global physical commodity prices – and by extension, the global derivative contract price – then when physical prices move against an actor’s objective, they may not profit on the derivative contract to offset the losses.

There are various reasons why domestic physical commodity prices may not be correlated with global commodity prices. One of the main reasons for weak correlation across border (also referred to as low price transmission) is because trade barriers (either tariff or non-tariff) may be in place, which makes

<sup>15</sup> “Notice of opening of windows for the purchase of price coverage and recognition of anticipated coverages, in the scheme of agriculture by contract, for the agricultural cycle Autumn-Winter 2017/2018.” Secretaria de Agricultura, Ganadería, Desarrollo Rural Pesca y Alimentación and ASERCA.

<sup>16</sup> Murphy, Anne G, et al. 2012.

domestic prices higher or lower than global prices and more responsive to domestic factors than global ones.

One study shows that approximately 83 percent of the price of maize in Mexico can be explained by prices at the CME, so price risk management with derivative contracts traded on the CME is expected to be effective.<sup>17</sup>

As an intermediary for transactions, ASERCA reduces the entry requirements for value chain actors in terms of sufficient volumes, financial resources, and price risk management capacity. Nonetheless, trading on international futures and options exchanges also requires significant technical know-how and resources, neither of which many value chain actors possess. ASERCA has demonstrated a necessary understanding of how international futures/options exchanges operate and how to execute price risk management trades on behalf of value chain actors.

Additionally, strengthening contract farming arrangements has the potential to significantly expand the commercialization of small- to medium-sized production systems. While there is little empirical evidence to verify the degree of impact attributed to ASERCA, the model should be expected to strengthen and/or expand contract farming arrangements, given that both producers and buyers pre-commit to sharing the cost to insure the agreement and to protect against price differentials on both sides.

## 2.5 LIMITATIONS OF THE MODEL

Despite the relative success and overall benefits that the program provides, the available literature suggests several shortcomings that also deserve examination. Regarding the ability of ASERCA to facilitate insurance for contract farming arrangements, another study suggests that a more critical variable is the exchange rate of the peso. The study claims that when the government devalues the peso, agribusinesses either do not participate or do not honor the contract farming arrangements.<sup>18</sup> This points to the significance of stable macroeconomic policy.

Additionally, the same study suggests that, despite ASERCA, contract farming arrangements are still breached by producers when market prices are higher than the contract price.<sup>19</sup> Further examination would be necessary to understand ASERCA's attributable effect on contract farming arrangements, but this finding points to the importance of contract enforcement as a critical variable for contract farming success.

ASERCA's low number of beneficiaries relative to the overall number of producers in Mexico remains a limitation of the program. Although 436,329 farmers are reported to have received subsidies in 2011, this represented only 11 percent of Mexican grain producers.<sup>20</sup>

Additionally, the same study argues that the majority of resources from ASERCA are directed to the northern states, where only large and medium producers operate, therefore effectively leaving small-scale producers out of the program. Similarly, another author points out that coffee producers' participation in ASERCA had been relatively limited primarily because coffee producers tend to be smaller, poorly organized, and their overall levels of education are low.<sup>21</sup> There was no evidence in the available literature of efforts ASERCA may or may not be taking to address these constraints specifically.

<sup>17</sup> Cuautle-Parra, David, and John Michael Riley. 2014.

<sup>18</sup> Echánove Huacuja, Flavia. *Government Subsidies for Price Risks: The Case of Maize Producers in Mexico*. *Geography Papers*, 2015.

<sup>19</sup> Ibid.

<sup>20</sup> Ibid.

<sup>21</sup> Rutten, Lamon, and Frida Youssef. IISD, 2007.

The Mexican government appears to be aiming to eventually scale down the government subsidies of ASERCA and would like to see more private intermediaries, including producer organizations and financial institutions, operating price risk management through global futures markets on their own. This is evidenced through the 2012 introduction of the FIRA program, which aims to increase the role of private intermediaries in Mexico. The program's launch was likely in response to both the ballooning ASERCA budget as well as the need for more demand-driven responsive price risk management services, such as less restrictive trading windows.

## 2.6 LONG-TERM OUTLOOK AND REPLICABILITY OF THE MODEL

ASERCA has demonstrated that to achieve commodity price risk management, it is not always necessary for individual value chain actors to trade directly on an established exchange. Intermediaries can bundle the risk management needs of producers and other value chain actors to reduce transaction costs and facilitate access to commodities futures/options contracts for price risk management.

Governments who may be considering replicating the ASERCA model must consider whether they have the budgetary resources and technical capacity (e.g., understanding of price risk management strategies and execution) before they determine if they can play a role as an intermediary in the global futures market. Various other national or sub-national private institutions could also take on the role of an intermediary, including producer associations and cooperatives, banks, or other financial institutions.

It is critically important to recognize that intermediaries will take root and succeed only where: 1) there is demand for price risk management services, and 2) price transmission between global markets and local markets is evident. Price transmission requires the free flow of agricultural inputs and outputs across borders. Where government impedes cross-border trade of agricultural commodities, price transmission will be lower, and utilization of global exchanges for price risk management is less feasible.

The model needs to transition to the private sector to sustain success over the long term. One example of transitioning the intermediary role to private institutions is the Maseual Xicaualis ("Indigenous Power") cooperative in Nahuatl. The coffee farmer cooperative was reported in 2011 to be engaging in buying derivatives (futures and options) for their members.<sup>22</sup> They are executing transactions directly through a Mexican brokerage firm GAMAA on a fee basis for their members. Maseual Xicaualis members felt as if ASERCA moved too slowly for their price risk management needs, since ASERCA only trades during tight windows, and they only pay at the end of the season regardless of price movement.

Needless to say, a private intermediary model will only expand in areas where there is a robust, committed financial services industry and where significant capacity building efforts are extended to intermediaries and value chain actors.

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<sup>22</sup> "[Mexico coffee farmers shelter from risk behind hedges.](#)" Reuters, 25 Aug. 2011.

## 3. PXAFRICA

### 3.1 BACKGROUND

PanXchange is a web-based over-the-counter (OTC) software platform that facilitates trade in physical commodities. The company was founded in 2011 by a former commodity trader named Julie Lerner.<sup>23</sup> In 2012, PanXchange piloted trade in global sugar contracts, and in 2014 it piloted trade in grain contracts in East Africa,<sup>24</sup> which is now formally known as PXAfrica (PXA).

The 2014 grain trading pilot in East Africa was made possible through a grant from the USAID Kenya Financial Inclusion for Rural Microenterprises (FIRM) project.<sup>25</sup> The USAID FIRM project was implemented from 2011–2016.

In August 2015, PXA launched live as a wholly owned subsidiary of its parent company PanXchange.<sup>26</sup> The initial focus of PXA was maize and wheat in Kenya, and it has now expanded its focus to 30 different grains and pulses in Kenya, Tanzania, and Uganda.<sup>27</sup>

In addition to PXA in East Africa, the parent company PanXchange launched trade of U.S. feed grains in 2016<sup>28</sup> and proppant sand for oil and gas fracking in 2017.<sup>29</sup> They currently have offices in Denver, Houston, Nairobi, and Kampala. The software platform is the intellectual property of the parent company PanXchange, with protection from two issued patents and additional U.S. patent applications pending.

#### What is Over-the-Counter?

**Over-the-counter (OTC)** refers to a market where trade occurs through a network of dealers rather than with the oversight of a regulated exchange. Trade is carried out directly between dealers rather than through financial intermediaries on an exchange. The value and volume of contracts settled on the exchange are often not publicized.

### 3.2 HOW THE MODEL WORKS

In the most basic sense, PXA is a software platform that connects grain sellers and grain buyers at any physical location. While commodity traders in East Africa traditionally connect and negotiate by phone, the PXA platform allows online negotiation of the terms of trade, including price, delivery date, and delivery location. A buyer or seller can establish their desired terms of trade, and when those terms match counterparty terms, the trade is then automatically executed, converting into a binding contract.

PXA is not a regulated exchange; it is an OTC platform for buyers and sellers to anonymously negotiate the trade of physical commodities in the spot and forward markets through fixed-price contracts. One of the primary objectives and benefits of PXA is to upgrade physical commodity trade by centralizing live bid and ask prices across various geographies. While there are no futures or options contracts traded on PXA, price risk management through derivative contracts is not an objective of the platform.

<sup>23</sup> *PanXchange About*. WordPress.

<sup>24</sup> “PanXchange, Inc. Concludes Successful Pilot Launch for Web-Based Grain.” *PRWeb*, 16 Oct. 2014.

<sup>25</sup> Keatts, Adam. “Remote Interview with Julie Lerner.” 19 Mar. 2018.

<sup>26</sup> “East African Grain Market Embraces PanXchange’s Live Launch of PXAfrica.” *PRWeb*, 2 Sept. 2015.

<sup>27</sup> Keatts, Adam. “Remote Interview with Julie Lerner.” 19 Mar. 2018.

<sup>28</sup> “PanXchange, Inc.” PanXchange, Inc., *MarketsWiki*.

<sup>29</sup> “PanXchange Q4: Live Launch U.S. Proppant Market, Matt Jansen Joins Board.” *PRNewswire*, 6 Oct. 2017.

PXA also is not a full-service exchange, nor does it aim to be. It does not provide clearinghouse services, and it is not connected to any designated grain warehouses.<sup>30</sup> Where third-party clearinghouse services eliminate the risk of default from an anonymous counterparty, PXA relies on counterparties to manage this risk themselves on the platform. Where exchanges are linked with designated warehouses, either directly managed by the exchange, or by third parties, grain can be graded, and the quality can be assured by the exchange. However, there is a high cost to managing these services. PXA points to its ability to facilitate trade without burdensome transaction fees.<sup>31</sup>

PXA enables regional trade (for example, within Kenya, Tanzania, Uganda), but it does not get involved in any currency or legal issues related to cross-border trading. The exchange simply is the vehicle for a buyer or seller in one country to connect with a buyer or seller in a neighboring country. All legal, regulatory, currency exchange, and transportation logistics matters are left for counterparts to manage between each other.<sup>32</sup>

PXA aims to expand the functionality of the platform to facilitate cross-market arbitrage opportunities for traders, as evidenced by a patent pending.<sup>33</sup> For instance, the patent pending discusses a technical functionality that would facilitate transportation arbitrage opportunities in real time. This includes identifying and capitalizing on disparities in price across geographic areas. The CEO of PXA's parent company PanXchange indicated that while the platform currently "facilitates the [transportation] spread in the sense that [a user] can buy and sell at any origin or delivered to any destination (including negotiating the transportation embedded in the delivered contract), we do not yet offer the ability to negotiate the commodity as well as the cost of freight on the same trading platform."<sup>34</sup> Going forward, this additional functionality has the potential to significantly upgrade physical grain trade via web-based technology.

### What are Spot and Forward Contracts?

**Spot Contract:** an agreement negotiated privately based on the current market price as determined by bid and ask prices on the exchange for immediate delivery of physical commodity from seller at a defined location and payment from buyer.

**Forward Contract:** an agreement negotiated privately between buyer and seller for delivery at a specified future date. For instance, to buy XX tons of commodity at \$YY on a specific date at a defined location.

### 3.3 BREADTH AND DEPTH ENGAGEMENT

Information released by parent company PanXchange regarding PXA users across Kenya, Tanzania, and Uganda indicate rapid growth of the PXA platform. However, publicly available data on volumes traded on the platform remains limited. In 2015, PXA reported 20 registered users, who represented 35 percent of Kenyan grain trade, and market orders increased 30 percent over the first 10 weeks of operation.<sup>35</sup> By 2016, PXA reported over 50 registered users in East Africa,<sup>36</sup> and by March 2018 this figure had grown

<sup>30</sup> "PXAfrica Grows 85% in Two Months, Establishes a Liquid Market Less Than 90 Days From Launch." *MarketWired*, 5 Nov. 2015.

<sup>31</sup> "PanXchange and Bulkloads Announce Strategic Alliance." *BulkLoads*, 20 Oct. 2016.

<sup>32</sup> Keatts, Adam. "Remote Interview with Julie Lerner." 19 Mar. 2018.

<sup>33</sup> Lerner, Julie. *Commodities Trading Platform*. U.S. Patent Application, US 2016/0350855A1, December 1, 2016.

<sup>34</sup> Keatts, Adam. "Remote Interview with Julie Lerner." 19 Mar. 2018.

<sup>35</sup> "PXAfrica Grows 85% in Two Months, Establishes a Liquid Market Less Than 90 Days From Launch." *MarketWired*, 5 Nov. 2015.

<sup>36</sup> "PXAfrica Launches Into World Wheat Market, Grows 150% Since Launch." *Yahoo Finance*, 9 March 2016.

to 125 registered users.<sup>37</sup> Clearly, the platform has experienced rapid and strong growth in registered users across the region.

Figures citing user share of the grain market do not necessarily indicate the share of Kenyan grain trade being conducted on PXA. The CEO of parent company PanXchange has indicated they do not publicly release trade volumes on the exchange but did cite Q1 2018 data indicating a weekly cumulative value of live bids and offers on PXA of \$615,000.<sup>38</sup> This figure also does not represent closed transaction value on the exchange; it represents value under negotiation on a weekly basis. Without access to trade volume data, it is not possible to determine the breadth and depth of full engagement, including closed transactions, on PXA. Field research, including interviews with PXA users and other grain traders across the region, would be needed to draw further conclusions related to uptake of PXA relative to other modalities available for grain trade, including phone and/or other trading platforms.

### 3.4 BENEFITS OF THE MODEL

The clearest and most evident benefit that PXA provides is the functionality to upgrade physical trade through web-based price discovery and negotiation. While commodity futures exchanges provide price discovery and price risk management, they are not designed for offloading or taking possession of physical commodity. PXA not only allows buyers and sellers to negotiate terms of physical cargoes — including delivery location, quality, and price — it also automatically converts matched terms between counterparts into a binding contract.

Across East Africa, the primary modality for connecting traders remains mobile phones, including texting or instant messaging. This relationship-based modality creates a barrier for new entrants to access real-time information regarding who is buying and who is selling at what price and where. PXA describes the status quo challenge as follows:

*There is no centrally-located source online or offline for viewing and analyzing supply, demand, and prices, including real-time price of spot and forward prices. To attempt to determine such information, one must speak with several brokers, view several emails and daily market reports, and examine price sheets from buyers and sellers. Even when a trader has gathered the relevant information, the trader cannot conclusively confirm that the bids and offers for the product remain valid. Because the trades are not executed in real time, the broker then needs to go back to the original bidder/offer to negotiate and/or accept.<sup>39</sup>*

PXA addresses this challenge by providing real-time pricing through offers from producers and wholesalers ready to sell physical product as well as through bids from wholesalers and processors ready to buy physical product. Buyers and sellers on PXA are anonymous, but users may view the type of counterpart with whom they are negotiating (e.g., processor, wholesaler, producer, et al.) and their location. In the future, the PXA platform may also have the functionality to connect markets on

#### What is Arbitrage?

**Arbitrage** is the simultaneous buying and selling of assets across markets to capitalize on discrepancies in price. A simplified example of transportation spread arbitrage would be if a commodity is available at Location A for \$100 and Location B for \$80, but the transportation cost between Location A and Location B is only \$10. Simultaneously buying at Location B and selling at Location A is expected to net a profit of \$10.

<sup>37</sup> Keatts, Adam. “Remote Interview with Julie Lerner.” 20 Mar. 2018.

<sup>38</sup> Ibid. Notably, OTC platforms have less transparency than full services exchanges, where volumes are known at all times.

<sup>39</sup> Lerner, Julie. *Commodities Trading Platform*. U.S. Patent Application, US 2016/0350855A1, December 1, 2016.

the platform, including transportation and currency spreads, which will facilitate automated arbitrage opportunities for users.

### 3.5 LIMITATIONS OF THE MODEL

PXA does not seek to achieve a full-service commodity exchange in East Africa. Therefore, by design, it does not provide price risk management through futures/options, it does not verify commodity quality through licensed warehouses, and it does not manage counterparty risk through clearinghouse services or formal dispute resolution.

Regarding the issue of counterparty risk, although PXA does not provide third-party clearing, it does provide functionality for users to manage counterparty risk themselves. For instance, in its user agreement, PXA provides the right to publicly shame traders that default. Additionally, PXA is staffed by knowledgeable commodity experts who are available to make introductions and transfer information to users, so they may make their own informed decisions about trading partners. Importantly, the CEO of parent company PanXchange has resisted the introduction of a counterparty rating system on the PXA platform because “traders can hold grudges and act irrationally.”<sup>40</sup> On the issue of quality assurance, PXA does not work with any network of licensed grain warehouses, so the exchange itself cannot ensure quality. This potential area for concern is left to counterparties to work out through negotiation amongst themselves. Based on the information available at the time of the case study, it is unclear if PXA provides any formal dispute resolution mechanism in the event of contract default. Thus, local dispute resolution systems, whether through courts or alternative dispute resolution processes, may be required to address disputes that may arise through this system.

Additionally, while PXA users may transact across borders, PXA does not get involved with any currency or regulatory matters (e.g., sanitary and phytosanitary standards) related to cross-border trade. So while cross-border trade between Kenya, Tanzania, and Uganda is both possible and regularly executed on the exchange, the platform leaves the specific cross-border matters to the counterparts to work out among themselves.

### 3.6 LONG-TERM OUTLOOK AND REPLICABILITY OF THE MODEL

Upgrading physical trade is a critical step in commodity market development and one of several preconditions for more complicated futures and options exchanges to be introduced successfully. The premise of PXA offers significant potential for upgrading physical commodity trade in East Africa. The ability to identify real-time bids and offers at various locations and to negotiate the terms of physical delivery online is a clear technical upgrade over the status quo. Nonetheless, behavior change among traders should not be expected to take place overnight.<sup>41</sup> PXA has experienced strong growth in both registered users and target commodities since its 2014 launch, but it remains unclear based on the available data how significant the trade volume and value is relative to overall physical trade. Further research would be necessary to garner user feedback. If PXA operationalizes the functionality described in a pending patent application to enable real-time, automated arbitrage across markets, this feature would undoubtedly provide a further upgrade and value-add proposition over existing trading arrangements.

Importantly, the PXA platform cannot be replicated by other U.S. firms.<sup>42</sup> The Intellectual Property rights of parent company PanXchange are clear, as the software currently in use is protected by U.S. Patents Nos. 8,180,698 and 8,543,490. Other commodity trading platforms exist in East Africa, but their

<sup>40</sup> Keatts, Adam. “Remote Interview with Julie Lerner.” 20 Mar. 2018.

<sup>41</sup> “Julie Lerner: Meet The Woman Changing Trading.” *Female Entrepreneurs*, 18 Feb. 2017.

<sup>42</sup> Patents have virtually no extraterritorial application. No reciprocity agreement exists offering mutual recognition of patents between the U.S. and any country in East Africa. Patent protections may be required on a jurisdiction by jurisdiction basis to provide sufficient protection against replication of this model.

functionality compared to PXA is uncertain without examining them directly and/or interviewing users of each. For those interested in supporting the expansion of PXA in East Africa or elsewhere, it is recommended that they contact parent company PanXchange directly.

## 4. KEY TAKEAWAYS

While ASERCA and PXA are different in their respective objectives and design, they both present alternative strategies where the pre-conditions for full-service national-level commodity exchanges are not present. ASERCA uses a public sector intermediary to hedge price risks on international futures and options exchanges on behalf of domestic value chain actors. PXA is an OTC platform connecting buyers and sellers of physical commodities, providing them a centralized online location for accessing market prices across geographic areas and facilitating online negotiation between counterparties. ASERCA's primary objective is price risk management. PXA's primary objective is upgrading physical trade. These case studies provide several key takeaways or considerations for policymakers and development agencies interested in supporting the commodity market development objectives addressed by ASERCA and PXA respectively:

### 4.1 OBJECTIVE: COMMODITY PRICE RISK MANAGEMENT

- A high degree of commodity price transmission between domestic commodity prices and global commodity prices is necessary to leverage global commodity exchanges for domestic market actors.
- High price transmission requires liberalized cross-border commodity.
- Government intervention, including ad hoc trade restrictions, negatively impacts the correlation of domestic prices with global prices.
- Macroeconomic policy, including fiscal and monetary policies that support a stable domestic currency, enables domestic actors to utilize global futures contracts to protect against commodity price volatility.
- The use of commodity futures and options can protect against price movements for both buyers and sellers of forward purchase agreements and may facilitate contract farming arrangements where they had previously failed due to parties reneging when prices move.
- Where demand for commodity price risk management services is clear, intermediaries may be able to facilitate value chain actor access to futures or options positions.
- Institutional capacity should dictate whether a public intermediary (e.g., government agency), or a private intermediary (e.g., financial institution or producer organization) is capable of and/or appropriate for carrying out these tasks.

### 4.2 OBJECTIVE: UPGRADING PHYSICAL TRADE

- Upgrading physical trade, including centralizing access to prices across geographic locations is a necessary first step before full-service exchanges — particularly more complex futures or options exchanges — should even be considered.
- Socializing the utilization of a new commodity trading technology, such as an online anonymous negotiation platform, is likely to be a longer-term process of behavior change and will ultimately rest on the specific value proposition of the new technology over the status quo modality.

- Where market actors have traditionally relied on established relationships for commodity exchange, unregulated anonymous trading platforms without clearing services, warehousing services, or dispute resolution mechanisms must provide users other functional means to manage their counterparty risk.
- Commodity trading platforms require design, management, and oversight from knowledgeable staff with a background in commodity trading to effectively deliver the services and functionality that market actors demand.

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 Lourdes Martinez Romero (COR) at [lmartinezromero@usaid.gov](mailto:lmartinezromero@usaid.gov) or Nate Kline (Project Director) at [nkline@fintrac.com](mailto:nkline@fintrac.com).

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