



## AFRICA AGRICULTURAL MARKETS PROGRAM (AAMP)



### **PURPOSE AND POTENTIAL FOR COMMODITY EXCHANGES IN AFRICAN ECONOMIES**

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## SUMMARY

This paper reviews the purpose and potential of commodity exchanges in Africa. Drawing from the literature and using indicative empirics, it examines the conditions that enable success, highlights the special challenges in setting up exchanges in Africa; and reviews alternatives to establishing domestic exchanges. It argues that, despite improved affordability of information technology, many critical preconditions for successful establishment of commodity exchanges in Africa remain binding in the short to medium term. In particular, the development of commodity exchanges in the region is impeded by the relatively small size of domestic commodity markets, weak physical and communication infrastructure, a lack of legal and regulatory environments, and the likelihood of policy interventions, particularly in the market for staple cereals. Meanwhile, the demand for a domestic commodity exchange for export crops may be limited due to the availability of well-established exchanges abroad. The paper highlights three points: (a) efforts to launch exchanges in Africa should realistically assess whether basic conditions for success can be met; (b) if the pre-conditions cannot be met, using existing exchanges abroad or developing regional exchanges may be more feasible than establishing national commodity exchanges; and (c) the goals of risk management and reduced transaction costs might be achieved more effectively through investments in transportation, information services, or other financial institutions which could support future establishment of a commodities exchange.

**Keywords:** Commodity exchanges, risk managements, market development, Africa

# **PURPOSE AND POTENTIAL FOR COMMODITY EXCHANGES IN AFRICAN ECONOMIES**

## **1. INTRODUCTION**

Organized commodity exchanges have a long history. Grain traders in Japan began experimenting with the idea in 1730, and the Chicago Board of Trade (CBOT) and the London Metal Exchange successfully launched their operations in 1864 and 1877, respectively. For more than a century, commodity exchanges remained largely confined to industrialized nations. However, with market liberalization and increasingly affordable information technology since 1990, commodity exchanges have mushroomed around the world. By 2005, non-OECD countries accounted for more than 50 percent of the agricultural futures and options traded in the world; and a majority of the world's functional commodity exchanges are located outside of the North America and Europe (UNCTAD, 2007).

Growing interest in commodity exchange from government and donors in Africa is a clear reflection of need for commodity risk management. Because international markets remain volatile and domestic markets are thin and fragmented, risk management is critical for commodity sector development. With the dismantling or weakening of marketing boards and the unsatisfactory performance of international commodity agreements (ICAs), governments and their development partners have increasingly looked to commodity exchanges as an alternative for managing risks in a liberalized market environment.

There have been many donor-supported initiatives to establish commodity exchanges in developing countries, but very few have succeeded. In Africa, five countries launched agricultural commodity exchanges shortly after market liberalization in the 1990s, but only

South Africa succeeded in making its exchange sustainable. Despite initial signs of success, Zambia and Zimbabwe suspended their operations following unusual price hikes and subsequent government intervention. Other exchanges established in the 1990s include the Kenyan Agricultural Commodity Exchange (KACE) which no longer support actual trades but exist with donor support and the Uganda Commodity Exchange (UCE) which does coordinate trades but not been able to attract sufficient trade volumes to be self sustaining.

Since 2004, more and more countries have been launching exchanges—notable ones include Malawi in 2004, Nigeria in 2006, the Ethiopian Commodity Exchange (ECX) in 2008 and the new Zambian exchange, ZAMACE, established in 2007. The role of Malawi Exchange has been limited to providing price information and Abuja Securities and Commodity Exchange (ASCE) started trading in maize and soybeans in 2006 in a very limited scale. The ECX, a government owned exchange, initially focused on trading maize, wheat and beans, but was unable to attract significant volume of these commodities. The ECX turned its focus to export crops with the support of policies discouraging export of coffee through other outlets.

This paper undertakes three tasks: (a) it reviews the purposes of agricultural commodity exchanges in African context, (b) assess the conditions that can make commodity exchange viable, and (c) explores alternatives to commodity exchange for risk management, where modern exchanges are not feasible. The rest of the paper is organized as follows. The next section describes the purpose of commodity exchange, which is followed by an assessment of the preconditions in setting up successful exchange. Section 4 examines the alternatives to domestic exchanges and the paper concludes with a summary and policy implications.

## **2. THE PURPOSE OF COMMODITY EXCHANGES**

The purposes served by a commodities exchange depend in part on the nature of the specific contracts that are traded. Simply by centralizing trade in a commodity an exchange can facilitate title transfer, market transparency, and price discovery. Transaction costs are reduced because coordination through a centralized exchange can reduce costs associated with identifying market outlets, physically inspecting product quality, and finding buyers or sellers. By reducing transactions costs and enhancing information flows an exchange can improve returns to market agents while reducing short term price variability and spatial price dispersion. Such contracts offer little capacity to address inter annual price uncertainty. More sophisticated contracts allowing exchange in futures can enable further risk management, but such contracts require a well developed exchange and cannot address maintain spot prices in bounds that might be desired.

It is possible to organize an exchange around an auction floor in which physical goods are traded. In Africa, many such auction floors dealing in export commodities have operated for many decades. These auctions floors lower search costs for participants, but may impose costs of transportation and warehousing and offer little or no services for price risk management or finance. Recent efforts in developing commodity exchanges attempt to move beyond auction floors to trade in fungible contracts that can be used as price-hedging devices.

The simplest contract that can be traded is probably a warehouse receipt. Trade in warehouse receipts implies immediate title transfer of a commodity with specific quality, quantity and location as specified on a warehouse receipt. While exchange in warehouse receipts can lower transfer costs in a marketing system, they do little to help agents manage risk based on

price variability that is rooted in the fundamentals of supply and demand. By contrast, by trading contracts for future delivery, commodity exchanges can help strengthen market liquidity, improve price discovery, and facilitate price risk management (Leuthold et al. 1989). An exchange can improve liquidity because a futures contract is a fungible financial instrument which buyers and sellers are willing to hold and exchange. While futures contracts effectively remove price level risk, they do not eliminate risk. Rather they replace price risk with basis risk, where the basis is the difference between the spot market and futures market prices. Unanticipated shifts in the basis can result in gains or losses, and the degree of basis risk can strongly influence the effectiveness of the exchange in risk management.

Providing the services of a commodity exchange is expensive. The costs include physical investments in operational space, warehousing, and communications as well as operational costs involved in screening participants and enforcing contracts. Moreover, an exchange typically must provide clearinghouse services which allow buying and selling the commodities traded at the stated prices with limited fear of default for participants. These services expose the exchange to both working capital costs and risk. For an exchange to succeed its services must be sufficiently valued by users that they are willing to pay fees to cover these costs.

Futures markets historically evolved, through private sector initiatives to address the incompleteness of spot markets. This raises an important question: if moving from spot to futures markets leads to economic improvement, why haven't most countries adopted or replicated futures markets? In some countries it is because of government intervention, but in most countries exchanges fail to emerge because local conditions do not make their activities privately profitable. Market failures, including inadequacies in physical infrastructure, asymmetry in information, and inadequate supporting legal and financial institutions can all

impede the formation of futures exchanges. From an institutional perspective, evolution of the system of trading can also require growth in the volume of activity to spread the fixed costs of a new exchange. From a traders' perspective, insufficient volume means illiquid markets, increased trading risks, and a reduced willingness to trade. In the presence of inadequate market scale or pronounced market failures a commodity futures market is likely to fail. Such failures can impose considerable long-run costs on society, as resources will be drawn away from productive uses and traders will be disillusioned (Leuthold, 1994). In some cases, governments can intervene to create conditions that support the development of a commodity exchange, but some deficiencies may be structural and beyond the influence of government in the short term.

### **3. CONDITIONS ENABLING THE DEVELOPMENT OF A COMMODITY EXCHANGE**

One can identify three broad categories of conditions that enable the development of a commodities exchange. First, the commodities to be traded on the exchange must have certain physical and market features. Absence of such commodities leaves an exchange irrelevant in a country. Second, given appropriate commodities, the contracts traded in the exchange must be suited to the economic conditions. Failure to correctly specify contracts will make an exchange unattractive to potential users. Finally, given appropriate commodity and contract features, an exchange needs to be supported by a facilitating market and market and policy environment.

#### **3.1. COMMODITY SPECIFIC CONDITIONS**

##### ***3.1.1 Continuously produced or storable commodities***

A commodity futures contract can be viable only if both buyers and sellers are reasonably certain about the availability of the specified commodity at a particular date. Early futures markets developed exclusively for storable commodities, such as cereals, coffee, cotton, and metals. With



the advancements in refrigeration, many commodities including orange juice concentrate and pork bellies that had previously been un-storable could be traded in futures exchanges. Perishable goods that are continuously produced may also be traded regardless of their storability. Continuously produced commodities can be traded in a futures market provided sufficient information is available to insure market transparency. (Black, 1986). New production technologies have tended to expand the production seasons for products allowing more scope for futures trade.

**Table 1: Procedures and time to construct warehouse and start businesses.**

Countries	Constructing Warehouses		Starting a Business	
	# of Procedures	Time ( # of days)	# of Procedures	Time ( # of days)
Ethiopia	12.0	128.0	6.7	20.2
Ghana	18.0	220.0	10.7	59.3
Kenya	10.0	137.2	12.3	43.8
Malawi	21.0	213.0	10.0	37.7
Nigeria	19.6	370.8	8.8	37.7
Zambia	17.0	254.0	6.0	29.0
India	37.0	195.0	12.0	48.0
OECD	15.0	162.0	6.1	16.0

Source: DoingBusiness.org

\*The numbers are averages of 2005-2010 reports

Since most discussion of exchanges in Africa focuses on cereals, the need for continuous availability means that countries need to assess warehouse capacity. An indicator of the feasibility of establishing an exchange is therefore the costs of improving warehouse capacity to a minimum standard. Information on the time required to establish a warehouse in various countries is presented in table 1. Comparison of these numbers with OECD countries, where it requires 14 procedures and 150 days to complete a warehouse, suggests that establishing warehouses is not particularly difficult in the African context. However, given weak physical

infrastructure, connecting warehouses to each other and to central collection points might prove challenging. Increased warehouse capacity could also be prohibitive even when per unit costs are reasonable because the scale of deficiencies may be large relative to available funds.

### ***3.1.2 Product homogeneity within a system of grades and standards***

Samples of the same commodity can differ by moisture content, impurities, safety standards and other features. For a commodity to be tradable in a futures market, it must be subject to grades and standards that account for relevant attributes. With workable standards, futures contracts can identify specific characteristics and allow for standardized discounts when contract specifications are not met at delivery. Many African countries have grades and standards for major export commodities and functioning auction markets for these commodities. Such systems provide the basis for defining futures contracts or specifying warehouse receipts. For cereals, formal grades and standards are less common, and countries may need to develop or improve their systems of grades and standards before setting up exchanges. In this regard, South Africa sets an example with the most developed system of grades and standards for cereals and by far the most active exchange in sub-Saharan Africa.

### ***3.1.3 Large and active spot market***

A commodity is only likely to be traded effectively on an exchange if there already exists a large spot market, in terms of value and number of market participants. First, a large volume of trade is needed to generate sufficient commissions to cover the costs of running the commodities exchange. Further, more value in the existing market implies more interest by participants which increases the likelihood of successful trade in any kind of contract. A large number of market participants also reduces the probability of collusion and market manipulation,

making market corners and squeezes less likely. An active spot market also provides information which can be used to craft contracts and inform bids in the exchange.

The literature does not identify a minimum volume or scale of economic activity required for a commodity exchange to succeed. However, the low level of agricultural value added in most African countries compared to countries with active exchanges suggests that the scale of trade is likely to be an issue in many countries. In 2005 agricultural value added in India and South Africa, where exchanges are active, was US\$145.8 and US\$7.3 billion, respectively, in 2005. By comparison, for the 45 countries for which data are available, the value of agricultural GDP is less than a billion US dollars in 27 countries (60%), between 1 and 2 billion in eight countries, between 2 and 4 billion in five countries, and over four billion in just the remaining five countries. The value of marketed production is much lower in all cases as a large share of the total production is consumed on farm.

**Table 2: Indicators of agricultural market sizes in selected African countries in 2005\***

Indicators	Ethiopia	Kenya	Malawi	Uganda	Zambia	South Africa
Total Agric Exports (mln US\$)	380	1296	392	359	202	3421
Share of leading export commodities (%)	51	35	66	34	38	16
Value of Leading Export Commodity (mln US\$)	198	454	258	122	76	535
Value of agricultural imports (mln US\$)	422	483	58	281	97.2	2650
Share of leading import commodities (%)	43	17.7	20	26	24	7.6
Value of leading import commodities (mln US\$)	181	87	12	73	23	201

Source: *FAOStat* of the Food and Agricultural Organization (FAO).

Export and import values also indicate the volume of market activity. Table 2 presents data on agricultural trade for African countries that have initiated commodity exchanges. It is clear that South Africa's sector is far larger than that of the other countries. The leading agricultural commodity had an annual value of under US \$300 million in most countries and exceeded US \$500 million in South Africa only. Moreover, South Africa's largest export commodity by value has an export share of only 16%, reflecting the presence of many other commodities of similar scale. In contrast, most other African countries rely on one or two dominant commodities.

South Africa's exchange (SAFEX) provides an indication of the level of trade in a successful market. SAFEX regularly trades over 100,000 futures contracts in white maize monthly. On a normal day, April 20, 2007, the value of trade for white maize with a May delivery reached US\$8.5 million, and the value of all contracts in white maize were valued at over US\$85.2 million. The value of the contracts in all commodities traded on April 20, 2007 was worth \$125 million.<sup>1</sup>

While a single day of trade activity in South Africa is valued at over US\$100 million, Zambia's exchange, ZAMACE, reported a total of US\$18.3 million in traded value between October 2007 and April 2010. Similarly, from April through December 2008, the Ethiopian exchange (ECX) traded only 935 tons of maize, 90 tons of wheat and 570 tons of beans with a total value of \$794,000. At a commission rate of 0.2% the exchange generated a gross revenue of US\$1,588, amounting to US\$144 per month. Unable to make ECX viable through trade in

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<sup>1</sup> Data from SAFEX statement of daily trading volume statistics at the following website:  
[http://www.safex.co.za/ap/market\\_data\\_volume\\_stats.asp](http://www.safex.co.za/ap/market_data_volume_stats.asp)

these primary cereals, the government of Ethiopia suspended the active coffee auction floor and directed traders to use the new exchange. These developments reflect the difficulties small economies may have in trying to use centralized commodities exchanges to reduce transactions costs.

### ***3.1.4 Variable spot market prices***

Since a purpose of a futures market is to manage price risk, cash market price instability is a basic requirement for a commodity futures exchange. Where prices are regulated or markets are of monopolistic structure, futures contracts are unlikely to attract buyers. Similarly, regulated cash markets made commodities exchanges irrelevant in most African countries for most major commodities during much of the post-colonial period. Price variability in Africa's grains markets has increased following liberalization, but variability that does not emerge from well-functioning competitive markets may not support an exchange. Erratic price behaviors that are inconsistent with transaction costs could undermine a commodity exchange by making basis risk unacceptably high. Prices can also vary significantly across space due to inadequate infrastructure or information asymmetry, both of which are important sources of market failures. The non-competitive situations resulting from market failures can make it difficult to identify how to structure contracts to be traded on an exchange. An effective information system can lead to more predictable price relationships in the cash markets and thus support a commodities exchange.

## **3.2 CONTRACT SPECIFIC CONDITIONS**

An exchange can only operate if it offers contracts that are attractive to the market participants and prevents manipulation or uncertainties associated with thin markets. Even in

developed countries with stable commodity exchanges, most futures contracts fail because they do not attract sufficient market participants. For instance, in the US between 1975 and early 1990s, only about one-third of more than 340 contracts approved by the Commodity Futures Trading Commission succeeded (Garcia and Leuthold, 2004). A well established exchange with a core of widely traded contracts can absorb unsuccessful ones. However, if a nascent exchange fails to offer attractive contracts it is unlikely to continue to operate.

### ***3.2.1 Attracting market participants***

Viable futures contracts must be attractive to brokers, hedgers and speculators in order to draw adequate volume.<sup>2</sup> A large spot market generally means a sufficient number of brokers, hedgers, and speculators, but contract features can discourage or encourage participation. Each of these types of traders are useful in creating sufficient activity to support a commodities exchange. Three contract features are key: (i) a close relationship of contract terms with cash market trade, (ii) small basis risks, and (iii) an appropriate contract size. If a futures contract does not have a clear analogue in the cash market, the basis will be difficult to calculate and a futures contract will lose value for hedging. Therefore, the futures contract should be defined consistently with the spot market.

Moreover, factors that affect the basis and its variability must be considered when specifying the contract. These factors include interest rates, warehousing costs, and transportation costs. If these costs are unpredictable, it may be difficult to specify a contract that will attract both buyers and sellers. The final contract feature identifies that size and quality features of standardized contracts must be appropriate for traders, making it fungible and usable

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<sup>2</sup> Warehouse receipts will be of interest to brokers but not speculators since they are not interested in accepting delivery risk. Markets for warehouse receipts will tend to be less liquid than those for futures contracts.

as collateral in the banking system.

### ***3.2.2 Preventing manipulations and balancing interests***

For a futures contract to be successful, it must not favor some market participants over others. Gray (1966) concluded that the contracts that favored either buyers or the sellers, enabling one side to squeeze the other, either failed or had to be revised to make them successful. Constraints to developing balanced contracts for African markets that are attractive to potential users are not well understood. Empirical studies in the US markets by Black (1986) and Bronsen and Fofano (2001), found that an active cash market is the primary condition for success. An active market facilitates defining contract terms that are balanced and provides clear assessment of basis risk. Product homogeneity, buyer concentration, and cash price volatility also have explanatory power in explaining other indicators of market activity, volume and open interest. Bollman, Garcia and Thompson (2003) provide a rare detailed case study of the collapse of a specific contract. Their analysis of the di-ammonium phosphate (DAP) futures contract in the Chicago Board of Trade indicated that it ultimately failed because the cash and futures markets were not sufficiently well linked, making it a poor hedging tool that offered no additional risk management support. This case study demonstrates the difficulty of providing a functional contract even when the infrastructural, macro-economic and institutional environment is hospitable.

### **3.3 ECONOMIC AND POLICY ENVIRONMENT**

Commodity exchanges have historically developed under private initiative, but they require supportive public policies. The main benefits of an exchange can be achieved only if a

country has adequate infrastructure, efficient flow of information, a sound macroeconomic and financial environment, rule of law and effective contract enforcement. Additionally, public policy supports commodity exchange development by refraining from controlling commodity markets and by allowing producer organizations and other entities to emerge as intermediaries between farmers and exchanges.

### 3.3.1 *Physical infrastructure*

Communications and transportation infrastructure is critical to a functioning exchange. First, trade at a futures exchange requires a communications network that can provide traders with spot market information in order to estimate the basis. A commodity exchange also needs to be supported by a reliable system for transportation and distribution, so that delivery location can be credibly specified in the contract. Moreover, the transactions costs must be stable enough for traders to evaluate the spread between the spot and futures contract prices.

**Table 3: Indicators of communications and transportation infrastructure**

Countries	Road Density (Km/Km sq land area)	% of paved roads	Ground line & Mobile Phone subscribers per 1,000 people	Internet users per 1000 people
Ethiopia	0.03	13	8	2
Ghana	0.21	18	93	17
Kenya	0.11	12	85	45
Malawi	0.3	19	25	3
Nigeria	0.21	31	79	14
Zambia	0.12	22	34	20
Uganda	0.35	13	44	8
South Africa	0.3	20	473	78
India	1.29	63	85	32

Source: Compiled from the WDI of the World Bank. The numbers are for 2006 or later years.

Infrastructure must not only support the exchange, but it must also link various spot markets if the exchange is to function. Ideally, the physical and communications infrastructure will ensure information on product quality, quantity, form, and price in all relevant markets is



available across various spot markets. In the absence of this information, price discovery in the spot markets may be erratic and price risk will not be manageable in a futures exchange. Available data suggest that the lack of physical infrastructure may be a constraining factor in many African countries. Countries with successful exchanges have far more developed communications and/or transportation infrastructure than others (Table 3). Public investment in both transportation and information infrastructure may be needed for the development of a successful commodity exchange in countries where they do not exist.

### ***3.3.2 Legal and regulatory infrastructure***

A commodity exchange must be supported by appropriate legal infrastructure, particularly (i) a system of grades and standards, (ii) a credible system of contract enforcement, and (iii) governance in spot markets. In most African cereals markets such a system of grades and standards is not likely to evolve without government involvement. However, the real challenge in African markets will not be the development of grades but the enforcement of contracts that use them. The legal system must ensure contract enforcement and a regulatory system must ensure that warehouses do not issue multiple receipts for a single lot. For futures contracts, participants must have confidence that contracts will be recognized by the legal system and that contract obligations will be enforced.

Information on enforcing contracts in selected countries is presented in table 4. India and the OECD are included here for comparison to conditions in African countries. These data reveal wide variation in conditions across African countries which can be compared to OECD countries, where contract enforcement requires an average of 22 procedures over 351 days, costing 11.2 percent of the debt to be recovered. In terms of the number of procedures, most of

the African countries in the sample are similar to the OECD. Malawi stands out as high, but not as high as India. South Africa, India, Ethiopia and Ghana stand out for the length of time resolution requires. As for total cost, however, South Africa is quite low, almost at the OECD average. Ghana is also relatively low cost, while costs in Malawi appear to make efforts at contract enforcement futile. The wide dispersion of costs among African countries and the favorable comparison between many of them and India, where exchanges are functioning suggest that some African countries may have enforcement abilities that are sufficient to support an exchange. In this respect the comparison of Ethiopia and South Africa is encouraging for the new exchange in Ethiopia.

**Table 4: Indicators of Contract Enforcement Capacity**

Countries	Indicators		
	Number of procedures	Days to process	Cost as a % of debt recovered
Ethiopia	30	690	14.8
Ghana	22	730	12.7
Kenya	25	360	41.3
Malawi	40	337	136.5
Zambia	21	404	28.7
Uganda	19	484	35.2
South Africa	26	600	11.5
India	56	1,420	35.7
OECD countries	<b>22</b>	351	11.20

Source: *Doing Business.org*, accessed April 14, 2008. The numbers are for 2007 or most recent years

### 3.3.3 *Macroeconomic stability*

A commodity exchange, particularly futures trade, cannot be developed and sustained in absence of sound policies for monetary management and foreign trade. In particular, macroeconomic policy needs to maintain stable and reasonably undistorted real interest rates, exchange rates and inflation rates. Clearly, macro policies have broader implications, but they can be

critical for a commodity exchange. For example, even after the government of Ethiopia dismantled the coffee auction floor and required all Ethiopian coffee to be exported through the ECX, preferred to hold the commodity rather than to sell. One explanation for this behavior is that the Ethiopian Birr was highly overvalued and there was a rumor that there would be devaluation of 20-30 percent. Under those circumstances, holding stocks made perfect sense to the exporters, as devaluation would generate larger profits for them. Meanwhile, the general expectation of a devaluation tended to depress exports broadly and exacerbated a balance of payment crisis, when government desperately needed foreign exchange. This exchange crisis may have contributed to the government's decision to confiscate 17,000 tons of coffee from 80 exporters who had been reluctant to sell. In any case, the Ethiopian experience clearly demonstrates the relevance of a sound macroeconomic environment and stable exchange rates in developing and sustaining an exchange. In a similar manner efforts to maintain unsustainable interest rates can affect behavior towards an exchange and volatile inflation rates will depress activities.

#### ***3.3.4 Commercial and financial sectors development.***

A limited financial sector with few commercial agents will have a reduced capacity to support a futures exchange. For an exchange to operate successfully there must be an adequate number of potential hedgers and speculators in the economy. These individuals must understand risk-taking and trading and must have financial capacity. Moreover, an exchange must have access to a clearing house with sufficient capital to serve as a guarantor of all transactions. These requirements imply a generally well functioning financial sector.

Available indicators suggest that financial sectors in most countries in Africa are either shallow or constrained by repressive regulations. Table 5 presents indicators for the same set of countries examined in Table 4. Low or negative real interest rates indicate repressed financial systems in all countries except South Africa and India. Furthermore, South Africa and India had considerably lower spreads between deposit and lending rates, suggesting more efficient and liquid financial markets. The stock of credit in these economies is consistent with the real interest rate data, with low volumes of domestic credit relative to GDP in countries with repressed interest rates. Under these circumstances, it is likely to be difficult to finance the activities of an exchange.

**Table 5: Indicators of financial market development**

Indicators	Ethiopia	Ghana	Kenya	Malawi	Nigeria	Zambia	South Africa	India
Real interest rate deposits (%)	-8.1	- 4.3	-4.74	-3.89	-2.62	-6.03	2.56	
Real interest rate lending (%)	-4.6	--	2.33	15.31	3.91	8.35	6.99	6.24
Real interest rate spread (%)	3.5	--	7.07	19.21	6.53	14.38	4.43	
Financial Information infrastructure index	--	--	3.5	--	1.0	1.5	6.0	5.5
Net Dom Credit (% GDP)	52.9	25.05	38.82	16.78	9.00	22.28	84.31	60.91
Domestic credit provided by banking sector (% of GDP)	57.8	30.49	41.12	22.38	9.01	22.3	84.37	60.91
Domestic credit to private sector (% of GDP)	25.3	13.08	27.03	10.52	14.93	7.56	146.81	41.11
Inflation rate (% change cpi)	11.60	15.12	10.31	15.41	13.51	18.32	3.4	4.25

Note: data come from World Development Indicators; and all indicators are based on 2007 or later years. Real interest rates are calculated using the consumer price index. Financial information infrastructure index is based on 10 factors; of which 6 cover the scope, quality, and availability of credit reporting data (in private and public registries) and the existence of a basic legal framework for credit reporting. The other 4 factors cover the availability of public registry data for collateral (fixed and moveable) and corporate registries and court records. The index is from 0 to 10, with higher values indicating greater financial infrastructure.

A final measure of the strength and development of the financial sector is the financial information infrastructure index which reflects the scope, quality and availability of credit

reporting, the legal framework for reporting, and the availability of relevant court records and registries. All of this information is useful for supporting a commodity exchange. This index is scaled from 1 to 10, with 10 indicating the maximum availability of financial information. The table reveals that countries with functioning exchanges have far greater financial information infrastructure than those with failed exchanges. On this measure, conditions in Ethiopia appear inhospitable to its new exchange.

### ***3.3.5 Political tolerance to cereal price movements***

Because they dominate agricultural production in most African countries, cereal crops are the likely target for commodity exchanges. At the same time, food crops are inevitably politically sensitive in low income countries and are susceptible to unpredictable policy intervention. The likelihood of intervention adds another layer of risk which can limit the success of an exchange and its contracts.

Most African countries have intervened in cereal markets to stabilize prices, especially when sudden price spikes threaten consumer welfare. A few examples can highlight the importance of food policies and politics to the development of a commodity exchange. Both Zambia and Zimbabwe successfully launched commodity exchanges in the mid 1990s following agricultural market liberalization, but they have foundered due to government interventions in their core maize markets (UNCTAD 2007). Zambia and Zimbabwe argued that they could not tolerate sharp increases in food prices that occurred in the late 1990s. In other developing countries, including India and Indonesia, important cereals are excluded from commodity exchanges.

Commodity exchanges cannot guarantee that prices will remain within the range that is acceptable to the governments. Analyses of historical data suggest that futures prices are slightly less variable than spot prices (Tomek and Gray, 1970). Extending this idea further, Gilbert (1996) argues that although commodity futures can help market participants and the producing governments to manage risks associated with variability over an annual time horizon, it should not be equated with price stabilization. If prices spike, government will tend to intervene and if the intervention is large, it can create uncertainties, shatter confidence in the system, and reduce the likelihood of a successful exchange.

### ***3.3.6 Farm size and production organizations***

In most African countries agriculture is dominated by smallholders. It is well recognized that smallholders do not access commodity futures markets directly. They may lack know how, have insufficient collateral for margins, and may have difficulty monitoring prices (Larson, et al., 1998). Producers in the US rarely use futures contracts directly. Surveys commonly indicate that only between 5 to 10 percent of producers use futures contracts. Nonetheless, US producers benefit from futures trading because they sell to local elevator operators who offer pricing contracts that are based on futures contracts and their prices. In turn, the purchasers take positions in futures to manage their operations.

In most African countries, additional institutional mechanisms are needed to link smallholders to centralized exchanges. For instance, producers' organizations could be used to complete product assembly and conduct transactions. In the absence of such institutional innovations, a centralized agricultural commodity exchange is not likely to develop in a smallholder dominated country.

#### **4. ALTERNATIVES TO DOMESTIC COMMODITY EXCHANGES**

Many African markets may lack sufficient size and enabling policy and infrastructural environments for domestic commodity exchanges in the near future. Meanwhile, the costs of establishing an exchange may exceed the benefits. Given feasibility and cost, African countries may seek to rely on existing exchanges in other countries or to coordinate with neighbors to establish regional exchanges.

##### **4.1. USE OF OFFSHORE COMMODITY EXCHANGES**

If establishing a domestic commodity exchange is questionable, offshore exchanges can provide some of the same benefits. A well-established off-shore exchange may provide hedging opportunities, high liquidity, and better integration with world markets. Use of an offshore commodity exchange implies risks of exchange rate movements which can alter local currency prices aside from movement in commodity prices. This risk can be mitigated by trading and hedging in foreign currency.

The second risk associated with use of an offshore exchange is added basis risk. Offshore traders face a potentially large basis when there is a long distance to the delivery location in the contract. The basis may be volatile when the offshore product is graded along different specifications from those used in the exchange. In this case, deliveries are likely to be subject to unanticipated discounts due to quality characteristics. Basis risk will also be large if the local spot markets are subject to price fluctuations that are not transmitted to or from the offshore exchange. For cereal crops in Africa, the basis risks associated with use of an offshore exchange are likely to be prohibitive because local prices vary widely with local conditions and

because local varieties and grading systems differ from those used abroad.<sup>3</sup>

Aside from basis risk and exchange rate risk, use of off-shore exchanges could be limited by contract specifications in terms of size or other features that are not appropriate for the local context. If, for example, minimum contract sizes were beyond the capacity of local institutions, an offshore exchange would not serve most potential participants. Similarly, offshore exchanges may not be accessible because brokers in those exchanges may be reluctant to work with new (risky) clients from developing countries (Morgan, 2001). A solution to these problems, suggested by Mohan (2007), could involve established exchanges integrating backwards to producer countries by establishing branch exchanges trading in commodities also traded at the central exchange.

The problems associated with basis risk are less likely to emerge for an African country's export commodities than for cereals. Since domestic consumption of export commodities like cocoa and coffee is low, the domestic conditions reflect international markets. Moreover, systems of grades and standards used in international exchanges for these tropical commodities reflect the varieties and qualities produced in Africa. While basis risk may prohibit use of offshore exchanges for cereals, it is not likely to be a constraint. For export crops, Mohan (2007) provides estimates of the low costs to using offshore exchanges for coffee. Indeed, for tropical commodities that are already traded on existing exchanges, domestic exchanges may be unable to draw participants.

#### 4.2. DEVELOPMENT OF REGIONAL COMMODITY EXCHANGES

Offshore exchanges may be useful for Africa's export commodities, but they are unlikely

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<sup>3</sup> Local price fluctuations can be large in African countries with liberalized trade regimes because high transportation costs imply a very wide band between import and export prices.



to serve cereal crops. Meanwhile the development of domestic exchanges for these commodities will often be inhibited by the size of the markets in terms of both volumes and number of traders and by unsupportive policies and regulatory environments. Deficiencies in physical infrastructure are also substantial, but can be corrected with public investments that are justified on multiple other grounds. An alternative would be the creation of common markets among countries which would increase market size while imposing regulatory consistency, and thus make commodity exchanges more likely to succeed. Within a common market, a commodity exchange would also enjoy increased access to cereals grown in a wider climatic range, spreading the harvest period and smoothing prices. For this to occur, countries would have to harmonize trade and exchange rate policies, set up agreeable rules for grades and standards and for contract enforcement, and promote macroeconomic stability. In the absence of such enabling policies and enforceable rules, a sustainable regional commodity exchange is not likely to develop.

## **5. SUMMARY AND IMPLICATIONS**

Following market liberalization, establishment of commodity exchanges has been considered as a potential market-based mechanism for commodity price risk management. While such initiatives have been successful in some emerging countries, they have frequently failed or had limited success in Africa. This paper reviewed the purpose, conditions for, and challenges of setting up successful commodity exchanges in Africa. It is clear that the success of commodity exchanges depends on conditions which are absent in many African contexts. For African economies, the binding constraints to success appear to be small market size compounded by weak infrastructure and underdeveloped financial sectors, and lack of supportive legal and regulatory frameworks.

Evidence in the literature clearly indicates that the risks of failure are very high if an exchange is launched in a thin market. While a critical minimum is not clearly defined, market sizes in most African countries appear to be very small compared to the countries that have active commodity exchanges. Under-developed financial markets may also make it difficult for hedgers and speculators to actively participate in these exchanges. Within African countries, cereal crops have the largest markets, but cereal prices remain politically sensitive and likely targets for government control or other interventions, especially during periods of rapid food price inflation. Commodities that are likely to draw a sufficient scale of trade to insure needed liquidity in a commodity exchange are likely to be the very goods that are subject to political interference or can be traded effectively on existing exchanges abroad. Even when a government is committed to allowing an exchange to function without price controls or interference, a track record of policy reversals and scape-goating private traders for market abnormalities could still inhibit an exchange.

The development of regional exchanges could offer price risk management tools for cereal crops but will require a long-term commitment and depends on successful regional integration. A common market could provide necessary ingredients for a successful exchange (increased volume, more market participants, higher liquidity, uniform grades and standards, and lower basis risks), but Africa's record in regional integration is mixed. Recent successes in COMESA offer some hope.

A basic condition for a commodity exchange is a smoothly functioning cash market that can be used to estimate the basis when making trades and can also be used to set specifics of contracts. Development of cash markets where they are weak thus serves commodity exchanges.

The enabling conditions for development of commodity exchanges are also fundamental to market development. Good physical infrastructure reduces transaction costs and promotes trade; a successful market information system can address information asymmetry; establishing warehouse receipts can mitigate liquidity constraints of the farmers and traders; and well-designed farmers organizations can facilitate product aggregation and smallholders' linkage to the market added investment. These investments are now increasingly feasible and could generate large social benefits, irrespective of whether they are part of establishing commodity exchanges.

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