Session 2

What determines the cost of fertilizer at the farm gate? Cost build-up analysis

- Describe the various stages in the fertilizer supply chain; the role of fertilizer producers/importers/agro-dealers;
- Provide a few different examples; some stages are based on % mark-ups
- Propose a few scenarios such as (a) removal of import tariff or inspection levy; (b) reduced pilferage; (c) better coordination of up-country transport with off-loading to reduce demurrage charges or need for off-port temporary storage and ask participants to revise the cost build-up to work through the cost to the final consumer, i.e., the farmer at particular locations.
- Consider the effects of mandating a maximum retail price for retailers. Using cost build-up scenarios, ask participants to determine where retailers will stock fertilizer and where they will not.
- Conduct sensitivity analysis to estimate how farm-gate fertilizer prices would change with alternative types of public investments and/or regulatory changes.

Fertilizer Supply Chain in Africa

By

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AAMP Fertilizer Policy Training
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Outline of the Presentation

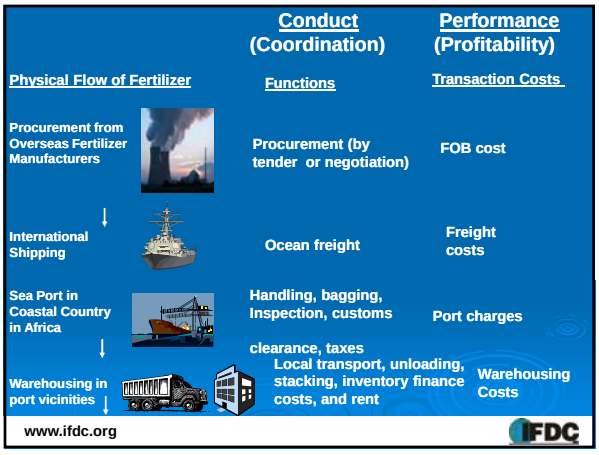
- Key Stakeholders in the Supply Chain
- Key Cost Components
- Product Portfolio
- Sensitivity Analysis
- Areas for Improvement

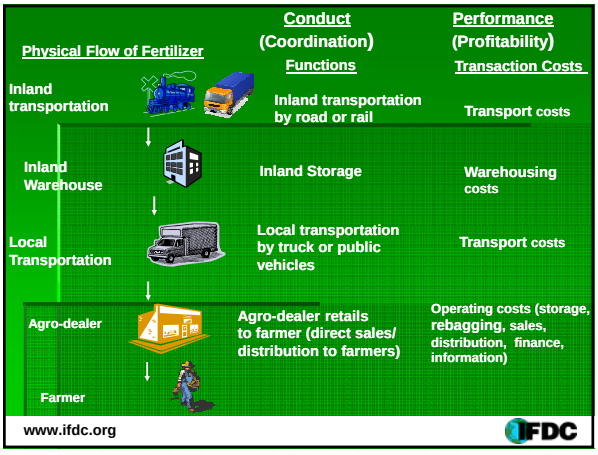
Stakeholders

- Global markets:
  - Manufacturers, Traders, Shipping Companies, Inspection agencies, and Banks
- Domestic Market
  - Importers, manufacturers, transporters, & banks
  - Port authorities, policymakers, regulators
  - Wholesalers
  - Retailers/Stockists
  - Farmers

Functions

- Procurement, shipping, financing, and inspection
- Domestic Production, bagging,
- Local Financing
- Transportation
- Domestic marketing
  - Wholesale
  - Retail
- Farming





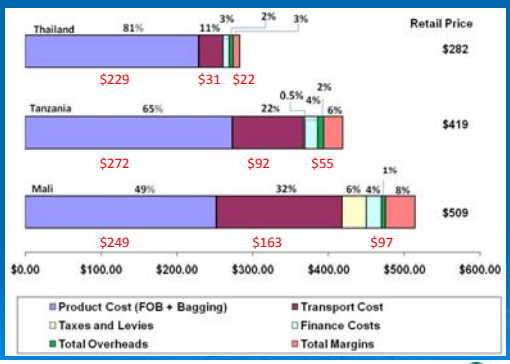
Product Portfolio

- Internationally traded products:
  - Urea, DAP, MOP, NPKs
- Regionally traded products:
  - Compound D, Cotton Formula
- Local/Special Products
  - NPK 12-24-12, 23-21-0-5S

Role of Product in Cost Build-up

- Internationally traded products
- Special products
- Size of shipment
- Location of the country (landlocked/coastal)

Fertilizer Price Formation:
Thailand vs. Sub-Saharan Africa (2006)



Cost Components: Malawi and Angola (US $/ton), 2003

Cost Item	Malawi	Angola	(Ratio of Angola to Malawi Cost)
FOB	145	226	(1.56)
Shipping	25	95	(3.8)
Port Handling	8	98	(12.25)
Duties	2	48	(24)
Inland Transport Cost	60	15	(0.08)
Dealer Cost/ Margin	18	220	(12.22)
(Other Costs)	(63)	(126)	(2.16)
Retail Price	*321*	*828*	*(2.58)*

Constraints to Fertilizer Supply Systems

- Non-conducive policy environment
- Ineffective regulation
- Limited access to finance
- Inadequate Human capital
- Restricted multi-country trade
- Inadequate market transparency & linkages
- Infrastructure-
  - Inefficient Port handling facilities
  - Underdeveloped road and rail systems

Measures Needed to Improve Fertilizer Supply Systems

- Create an enabling policy environment
- Strengthen human capital base
- Improve access to finance
- Create market transparency
- Enforce effective regulatory frameworks
- Strengthen market and business linkages for multi-country markets

Concluding Remarks

- Improvements are needed in both supply system arrangements and cost components
- Improvements in policy, human capital, regulation, access to finance, and market transparency are essential.

Concluding Remarks (contd)

- Economies of scale in procurement and internationally traded products can save costs.
- Improvement in port handling and transportation arrangements are also essential for reducing prices at the farm gate.

Table 1: Fertilizer Supply Cost Components, Malawi

Cost Component	**S0**	**S1**	**S2**	**S3**	**S4**	**S5**
Product/ Date	**Urea 1/06**	**Urea 1/08**	**Urea 1/06**			
Source	**Arab Gulf**	**Arab Gulf**	**Arab Gulf**			
Port of Entry	**Beira**	**Beira**	**Beira**			**Fast train**
Exchange Rate	**ER 140**	**ER 140**	**ER 140**	***ER 200***	**Subsidy**	
Cost Item	**Lilongwe**	**Lilongwe**	**Lilongwe**		**70%**	
FOB Cost Incl. Pre-inspection	$181.80	***$810.00***	181.80			
Ocean Freight	$55.00	$55.00	55			
Insurance	$3.63	$3.63	3.63			
Taxes and Levies	$7.72	$7.72	7.72			
Port Charges	$8.78	$8.78	8.78			
Bags, bagging and storage	$29.42	$29.42	29.42			
Finance costs	$8.70	$8.70	8.7			
Importer overhead	$5.00	$5.00	5			
Importer Margin	$19.11	$19.11	19.11			
Inland Transport Cost	**$86.91**	**$86.91**	**86.91**			***26.11***
Distributor warehouse	$7.38	$7.38	7.38			
Taxes and Levies	$3.87	$3.87	3.87			
Distributor Finance Cost	$7.61	$7.61	7.61			
Distributor Overhead	$2.00	$2.00	2			
Distributor Margin	$44.90	$44.90	44.9			
Retail transport	$3.57	$3.57	3.57			
Retail Finance Cost	$5.39	$5.39	5.39			
Other retailer costs (incl. local tax)	$2.00	$2.00	2			
Retailer Margin	$16.66	$16.66	16.66			
Retail Price	$499.45	$1,127.65	**499.45**			**435.02**
Price per bag	$24.97	$56.38	24.79	24.79		14.50
Price per bag (kwacha)			***3470.6***	***4958***	1487.4	870
Product Cost (FOB + Bagging)	$220.00	$848.20				
Transport Cost	$149.11	$149.11				
Taxes and Levies	$11.59	$11.59				
Finance Costs	$21.70	$21.70				
Total Overheads	$16.38	$16.38				
Total Margins	$80.67	$80.67				
	$499.45	$1,127.65				
Ratio of Retail:FOB	2.75	1.39				
Ratio of Retail:CIF	2.08	1.30				

Fertilizer Supply and Costs in Africa

June 21, 2007
This publication was produced for review by The Bill and Melinda Gates Foundation. It was prepared by Chemonics International Inc. and the International Center for Soil Fertility and Agricultural Development.

Table of Contents

Acronyms

ADB	Agricultural Development Bank
APFOG	Apex Farmers Organization of Ghana
ASEMA	*Association des Semenciers du Mali*
BDI	Baltic Dry Index
BNDA	*Banque Nationale pour le Développement Agricole*
C&F	Cost and Freight
CAN	Calcium Ammonium Nitrate
CHDI	Clinton-Hunter Development Initiative
CILSS	*Comité Permanent Inter-Etats de Lutte contre la Sécheresse dans le Sahel*
CMDT	*Compagnie Malienne pour le Développement des Fibres Textiles*
COMESA	Common Market for Eastern and Southern Africa
DFID	Department for International Development
DTE	Datong Enterprises
ECOWAS	Economic Community of West African States
EPA	Environmental Protection Agency
FAOSTAT	Food and Agriculture Organization Statistical Database
GAIDA	Ghana Agricultural Input Dealers Association
GDCM	*Grand Distributeur Céréalier du Mali*
GSCVM	*Groupement des Syndicats Cotonniers et Vivriers du Mali*
ICS	*Industries Chimiques du Sénégal*
IER	*Institut d'Economie Rurale*
IFDC	International Center for Soil Fertility and Agricultural Development
INSAH	*Institut du Sahel*
LIBOR	London Inter Bank Offer Rate
MISTOWA	Market Information Systems and Traders' Organizations of West Africa
MOFA	Ministry of Food and Agriculture
NGO	Non-Governmental Organization
ORIAM	*Réseau des Opérateurs d'Intrants Agricoles*
SSI	SCPA SIVEX International
TFC	Tanzania Fertilizer Company
USAID	United States Agency for International Development
VAT	Value-Added Tax
VEPEAG	Vegetable Producers and Exporters Association of Ghana

CHAPTER ONE

Introduction

The Bill and Melinda Gates Foundation contracted Chemonics International and the International Center for Soil Fertility and Agricultural Development (IFDC) to perform a six-country survey of fertilizer supply and costs in Africa. A broad survey was preferred to a lengthy undertaking because of the time constraints affixed to the work. The timeframe from contract signing to production of this final report spanned approximately eight weeks. This schedule was driven by the Gates Foundation's need for specific information to inform the decision-making process and strategic reflection on possible interventions. Timely information was of the essence. The research team agreed to provide weekly updates during the life of the work to inform the foundation of its progress, initial reflections, insights, and problems encountered.

Purpose of the Study

The purpose of this study is to provide Gates Foundation staff with current information on the status of fertilizer markets as they craft the foundation's strategy for increasing agricultural productivity in Africa.

Methodology

The research methodology used a combination of quantitative and qualitative data collection. A sample of six African countries was selected as representative of the variety found on the continent. Two countries were chosen from each of three regions: west, east, and southern Africa, with representation from anglophone, francophone, and lusophone countries. In addition, a coastal and a landlocked country were chosen as representative of each region. The countries selected through this process were: Mali and Ghana (West Africa), Uganda and Tanzania (East Africa), and Malawi and Mozambique (southern Africa).

Quantitative data was under the purview of IFDC, which created a data collection instrument to capture supply cost data in the target countries. IFDC engaged field staff in each of the six countries to collect cost information and prepare draft country narratives. The field teams were managed by a two-person research team based in Muscle Shoals, Alabama. One researcher conducted a field visit to collect information on regional transit corridor initiatives in Gaborone, Botswana, as well as Nairobi and Mombasa in Kenya. The data was transmitted to Alabama via e-mail and a preliminary analysis was performed, with follow-up questions to field staff. The quantitative data was prepared and presented in the form of waterfall charts to display the cost components of select fertilizer product supply

chains. Additional qualitative and quantitative information was also collected, analyzed, and presented on a variety of supply chain issues.

The qualitative information collected through field visits to the six sample countries was the responsibility of a two-person research team from Chemonics. To conserve time and reduce travel costs, the team split field data collection into West and East African trips. One researcher with French language skills traveled to Mali and Ghana in the west, while the other team member, with Spanish language skills, covered Kenya, Malawi, Mozambique, and Uganda. In each country, Chemonics hired a local professional to facilitate the field visits, assist with interviews, organize workshops, and provide input and interpretative insights. IFDC and Chemonics field staff were one and the same in the four eastern and southern African countries, but they were different in the West African countries. Qualitative information was collected in two major ways: individual interviews and group workshops with key market actors. In West Africa, the workshops were eschewed due to the onset of the rainy season and the inability of key market actors to attend a day-long event, making it necessary to hold additional interviews.

With roughly eight weeks to visit and collect data from six African countries, time management was crucial to the effort. The two research teams met face-to-face at the beginning of the field trips and again after they were completed six weeks later. These were extremely helpful exchanges that facilitated the task of producing a draft final report in less than one week. Once the teams had returned and the data had been collected, report writing responsibilities were shared among the researchers, with IFDC taking the lead on the cost analyses while Chemonics focused on drafting the country chapters and overall report.

Overview of the African Fertilizer Market

As the research progressed, common themes evolved about the characteristics of African fertilizer markets. All of the countries visited had embarked on liberalization and privatization of their agricultural input markets starting in the late 1980s and into the 1990s. This has led to different levels of government withdrawal from the sector in each country. While liberalization, deregulation, and privatization were introduced, there are instances of vacillation, with some governments intervening in the markets through direct imports or "targeted" subsidies. As a result, there is inconsistency in policy, uncertainty on intentions, and confusion over the state's role in some countries.

Fertilizer is a capital-intensive and logistics-testing industry that mostly moves commoditized products. There are specialty fertilizers for certain crops (e.g., tea, coffee, and flowers), but in general, the bulk fertilizers traded on the world market are indistinguishable from each other, provided they have the same formulation. Because fertilizer is a bulky product that is traded in large quantities, finance and logistics are key elements to performance in the marketplace. Successful firms are those that can access capital at reasonable rates and have the management skills to deal with complex logistical arrangements. In addition, countries that have a large enough market or receive donor-funded technical assistance in the sector are more sophisticated and successful than others.

The cost of money appears to be a significant barrier to entry in the fertilizer market, which is not necessarily unique to Africa. Most local firms with access to finance on local capital markets are at a disadvantage compared to firms with international ties to world financial systems. The latter can generally access capital at international rates and in dollar or euro terms. Local firms cannot compete with the comparative advantage of the larger, globally linked fertilizer firms. Hence, in almost all the markets, a handful of international firms function as importer-wholesalers.

The fertilizer market is also dependent on the logistics management expertise required to move large quantities of a bulky product. Generally, freight represents the second highest portion of total cost after procurement. These costs can reach astronomical levels when the transport infrastructure is inefficient, in disrepair, or non-existent. Many local firms in the African fertilizer trade come from transport backgrounds because they have mastered the business of moving large quantities of bulk materials and have access to trucking fleets and ancillary services. Almost all the true agricultural input firms outsource their transport needs to local specialty transport firms. To survive and thrive in the fertilizer industry, firms must be logistics gurus, if not magicians.

The fertilizer industry has economies of scale in both production and procurement. In other words, a higher scale of production or procurement yields lower production costs given the limits of technology. The drive to lower costs results in larger production units, which in turn require significant capital and skills to manage sophisticated operations. The end result is a small number of market actors. This does not necessarily imply a monopolistic environment as long as there is freedom of entry and exit in the industry, and as long as policy-makers ensure there is no restriction on freedom of entry. Recent examples from Mali and Malawi bear this out. In Mali, the entry of the Chinese firm DTE to the pesticide market reduced prices by roughly 10 percent due to increased competition. In Malawi, the entry of Export Trading Company from neighboring Tanzania had a similar impact on agricultural input prices.

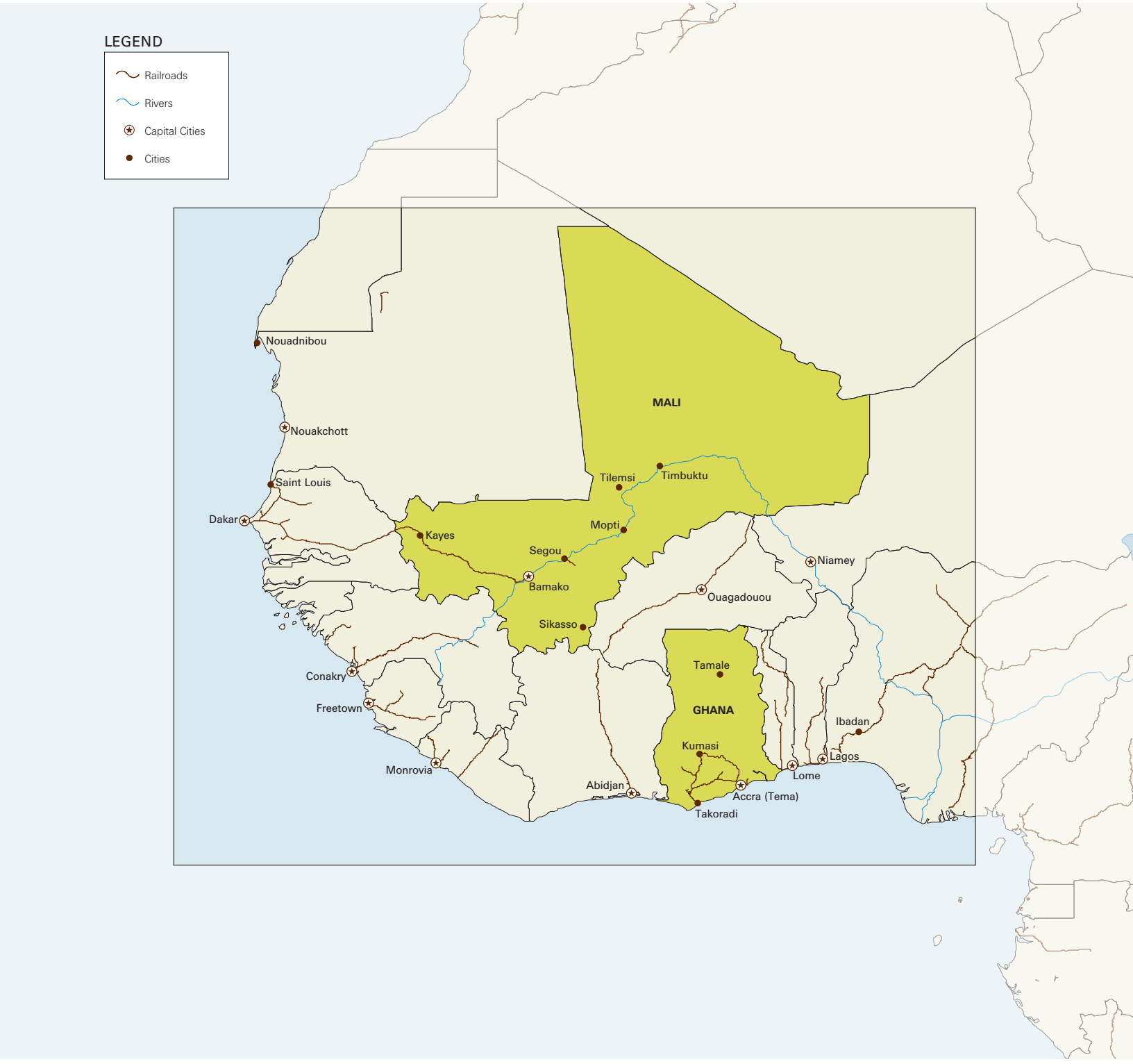
The cost of money, bulky commoditized products, emphasis on logistics, and large financing requirements lend themselves to the emergence of oligopolistic markets, particularly at the wholesaler-importer level. This is less true as one descends the supply chain in-country to distributors and dealers. Oligopolistic markets are characterized by a small number of economic actors who all know of each other and whose respective decisions are influenced by the actions of the other market members. With each actor aware of the other's actions, these markets can be described as "interactive oligopolies."

While oligopolies can engender collusion among actors, there is nothing about the nature of this type of market that forces them to behave as monopolists, even though most laymen misinterpret oligopolies as monopolies. Generally, the African fertilizer markets cannot be described as monopolies. The costs of vertical integration are high and most importer-wholesalers prefer to work with the local fertilizer distribution networks than to create their own. Importers and wholesalers are generally not interested in developing vertically integrated retail networks for multiple reasons. First, the establishment of retail depots and affiliated management systems involves sig-

nificant overhead costs. Second, the demand for fertilizers is seasonal and maintaining a depot adds fixed costs year-round for personnel, rent, and utilities. Third, any unsold stock must be held until the next year, which incurs costs (sunk capital in unsellable stocks) and risks (loss, damage, theft, etc). With their lower cost structures and knowledge of local markets, independent distributors and dealers can help spread these risks among themselves as well as among retailers and stockists all along the supply chain.

Oligopolies can sometimes lead to cartels, as in the case of OPEC, but these usually dissolve or become ineffective as cartel members have incentives to lower their prices to gain market share from their colleagues. Thus, oligopolies do not necessarily lead to monopolistic behavior or a drive to integrate vertically to dominate supply conditions. That said, they are characterized by significant barriers to entry, as in the case of fertilizer due to its demanding financial and logistical requirements. In this type of market, product differentiation becomes extremely important because price is not entirely within the control of economic actors. As a result, firms in oligopolistic industries often use non-price competition to differentiate their products from the competition and to increase market share and revenues. In sum, African fertilizer markets are highly competitive oligopolies at the importer-wholesaler level, with no observed collusion that might lead to cartel-like behavior.

Map of West Africa



CHAPTER TWO

Ghana Country Study

Ghana's fertilizer market has been almost completely liberalized and privatized over the past 20 years, and a nascent private sector has arisen to replace the state monopoly on agricultural input supply and distribution. The country's fertilizer market resembles an oligopoly, with three major importer-wholesalers accounting for roughly 95 percent of imports. In the first quarter of 2007, these three firms were joined by a new entrant at the importer-wholesaler level, which will boost competition. Ghana is also characterized by a relatively well-organized association of agricultural input distributors and dealers, which provides a basis for interaction with the sector. The entry of two major international and regional fertilizer firms in the first half of 2007 is indicative of sector growth.

Background

Mineral fertilizers have been used in Ghana since the early 20th century and were originally organized by the government through the Ministry of Food and Agriculture (MOFA). As it became increasingly clear that the government's role in the agricultural inputs market was impeding the emergence of entrepreneurial activity, the liberalization and privatization process was launched in 1988. A gradual phase-out of the state took place from 1988 to 1992, during which more than 500 entrepreneurs entered the market. The large capital costs, logistical challenges, and commodity nature of fertilizer products led to a concentration of economic actors into the small group of major importer-wholesalers seen today.

Market Organization

Market Structure

The private sector fertilizer supply chain starts with importers, who also serve as wholesalers. These importer-wholesalers also have subnational representation (e.g., Accra, Tema, Takoradi, Tamale, and Kumasi) and some retail sales, but prefer to work through local distributors. The distributors generally retail fertilizers directly to consumers and via dealers in the districts, sub-districts, villages, and

Exhibit II-1. Ghana's Fertilizer Market

International Exporters (Manufacturers and/or Raw Material Suppliers) or Traders		
Importer/Wholesaler		
1. Wienco Yara 2. Dizengoff	3. Chemico 4. Golden Stork Cigogne	95%
Distributor		
35 registered distributors/retailers in the 10 regions		
Retailer		
300 retailers in the 10 regions of Ghana		
Farmer		

communities of Ghana. Through this process, farmers can access dealer retail shops to meet their agricultural input needs.

Private and public estate (plantation) production units in Ghana and other parts of Africa often procure fertilizer directly on the international market. The Ghana Oil Palm Development Cooperation, Unilever Ghana Ltd, Farmapine, Ghana Cotton Company, as well as cocoa, coffee, and sheanut cooperatives have all imported directly in the past. These production units invest a great deal of time and money in direct procurement and are increasingly turning to importer-wholesalers to increase efficiency as the private market continues to professionalize. Apart from private importers, MOFA has sometimes imported fertilizers for the Ghana Cocoa Board, although the tender bid process is the most common approach used today.

Three main importer-wholesalers operate in Ghana's fertilizer market. The market leader is Wienco, followed by Dizengoff Ghana Ltd and Chemico Ghana Ltd. Wienco is run by a Dutchman who has lived in Ghana for more than 30 years. In April 2007, Yara took over Wienco's fertilizer business through a joint-venture arrangement. Wienco will move upstream to focus on production and market development while retaining its agricultural chemical and equipment business. For its part, Yara will assume responsibility for all aspects of fertilizer importation and wholesale operations.

Dizengoff, which is managed by a group of Israeli agriculturalists, is a subsidiary of Balton CP, a leading British supplier of agricultural inputs. Ghana is Balton's largest African market among representation in the Ivory Coast, Rwanda, Tanzania, and Uganda. The company is increasingly moving into the specialty fertilizer market, particularly foliates. Finally, Chemico is a Ghanaian company formerly known as ICI Ghana. Though Chemico has a fertilizer blending capacity, it appears constrained by the financial demands of the industry and the lack of an external partner.

In early 2007, The Golden Stork entered the market at the importer-wholesaler level. The company is part of the Belgian-French firm La Cigogne, which operates in all the neighboring francophone states, and of SCPA SIVEX International (SSI). SSI is a 100 percent-owned subsidiary of SCPA, previously known as Potasse d'Alsace. The latter is a 100 percent-owned subsidiary of Entreprise Minière et Chimique, which is wholly owned by the French government.

The three private operators — Wienco, Dizengoff, and Chemico — account for 95 percent of all imported fertilizer products. The Golden Stork will add to this competition in the upcoming season. The remaining 5 percent enters Ghana as aid-in-kind (mostly urea) through MOFA. With more than 60 percent

Exhibit II-2. Major Distributor Locales throughout Ghana

Regions Covered	City	Major Distributors
Ashanti	Kumasi	Chinese Woman, Obek, Sefa and Jane, K Badu
Northern	Tamale	Iddisal, Wumpini and Evans
Upper West		
Upper East		
Eastern	Nsawaam	Smako
Western	Takoradi	Offie
Central	Cape Coast	Collins
Volta	Ho/Hohoe	Monica, Francis and Sam J
Greater Accra	Accra	Aglow and Agrimat
Brong Ahafo	Techiman Sunyani	Addo and Ajaku

of the market share, Wienco is the largest private importer, followed by Dizengoff with 20 percent and Chemico with 10 percent. The remainder goes to small-scale importers and MOFA.

Approximately three dozen registered distributor-retailers service some 800 agricultural input dealers across Ghana. Of these dealers, 632 (i.e., 79 percent) are registered with the Ghana Agricultural Input Dealers Association (GAIDA) and 300 report retail sales of fertilizer. The dealers are organized at the regional and national levels, which facilitates communications, delivery of training sessions, and service improvements on a wide scale. Major distributors include Aglow Farms — a former parastatal now under private ownership — and Agrimat Limited in the Greater Accra area. Most distributors are locally owned and operated businesses, with the largest firms based in Kumasi and a developing distribution network to northern Ghana. Estimates indicate that up to 75 percent of all fertilizer sales take place in Kumasi due to its central location, which makes it possible to service both the north and the south. The emerging strength of this market structure is the presence of small agricultural dealers who are grouped into regional branches of GAIDA.

GAIDA, CropLife Ghana (an association of agricultural chemical dealers), and the Apex Farmers Organization of Ghana (APFOG) are housed in the same building and share a secretariat. These three associations form the Ghana Agricultural Associations Business and Information Center, a cost-effective arrangement that creates a "one-stop shop" for agricultural information, interventions, and contacts. Mali has a similar Bamako-based grouping known as the *Réseau des Opérateurs des Intrants Agricoles au Mali* (ORIAM), but it is not yet as functional as the one in Accra. All major importer-wholesalers are contributing members, financially and otherwise, of the GAIDA-CropLife-APFOG consortium, which provides a forum for interaction with key private sector economic actors.

GAIDA in the Greater Accra region also serves as the national secretariat. Similar groupings exist elsewhere, with the largest membership in the Ashanti and Brong-Ahafo regions. Composed mostly of distributors and dealers, these groups share concerns similar to those heard further up the supply chain. First and foremost are high transport costs. Fertilizer that lands in Tema harbor can potentially double in price by the time it reaches a farmer in northern Ghana. Finance and storage capacity were also identified as binding constraints. According to dealers, farmers have insufficient storage and access to finance to increase their stocks, which often means they do not have the stocks on hand to meet demand. In addition, dealers are interested in improving their skill sets so they can better run their businesses, disseminate best agronomic practices, and deliver interactive training to farmers and extension agents.

In the liberalized and privatized markets of this era, agricultural input dealers have become *de facto* extension agents. The state's retreat from large public sector extension systems has only reinforced this trend. Illustrating the outreach available through these dealers, a distributor/dealer based in Kaneshie, a suburb of Accra, stated that he receives more than 5,000 clients a month in the busy season. Despite their growing role, these new technology transfer agents, as well as existing extension agents, receive little support or training.

Market Conduct

Ghana's fertilizer market appears to be in a growth phase and has the potential for continued growth well into the future. The behavior of the two major international fertilizer companies in early 2007 — Yara and SSI — attests to the perceived economic opportunities of a growing market. These two firms would not have made certain investment choices if their appreciation of the market was not one of opportunity. It is worth noting the different strategies they each used to enter the market: merger and acquisition for Yara and opening of a subsidiary for SSI (The Golden Stork).

SSI's entry into the Ghanaian fertilizer market will only serve to make an already competitive market more competitive. SSI has already started making arrangements with local distributors to ensure its products reach consumers. As a new entrant in an oligopolistic market, it will rely on product differentiation to compete with other major players. Indeed, The Golden Stork plans to market its fertilizer in attractive, brightly colored bags to distinguish its product line. As international companies, SSI and Yara will also introduce technology and technical ideas into the Ghanaian marketplace, which will spur greater sophistication and professionalization throughout the supply chain.

At the distributor and dealer levels, there is a combination of extreme competition and emerging collaboration through GAIDA. This process is in its early stages, but member interaction is encouraging and warrants support. This is particularly true in the sub-national groupings, not only in Greater Accra. Several dealers are successfully transitioning into a distributor role, especially those that have developed a strategic plan, exhibit an entrepreneurial drive, and have received both technical and business training. The distributor-dealer portion of the supply chain will remain competitive while deepening and broadening its presence at a market-driven rhythm.

Market Supply

For the most part, fertilizers are imported through the ports of Tema and Takoradi, where large storage facilities are available. Sea freight of imported fertilizer to other West African ports (e.g., Abidjan) appears less expensive than in Tema because major Ivorian importers, such as Hydrochem (Yara) and STEPC (La Cigogne), have benefited from economies of scale in bulk transport and in-country blending. As of May 2007, Yara was offloading bulk fertilizer in Tema with shipside bagging by a single agent (Nectar), followed by direct loading onto trucks for transport to any of the company's 10 warehouses in the immediate area. Trucks are then used to transport products to various destinations nationwide. Fertilizer delivery to the north via the Volta River (as Wienco did in the past) is no longer operational due to multiple handling issues and associated costs that increase product prices at the final destination.

Traditionally, fertilizers have entered Ghana in small shiploads due to the limited market size and port constraints. Tema can accommodate 10 meter draft vessels and ships of up to 20,000 metric tons, which have to await high tide before berthing. In some cases, a ship can wait up to two weeks before unloading. Nonetheless, growth in the Ghanaian market has attracted the recent entry of regional fertilizer companies such as Yara (March 2007) and La Cigogne (January 2007). These firms have ac-

cess to international markets, while Chemico and Dizengoff import primarily from Eastern Europe.

There is a general lack of appreciation for the use of lime to address Ghana's acid soils, which hinder vegetable production. Oystershell deposits in the Volta region could serve as a source of lime to balance the ever-increasing soil acidity.

Ghana's main ports — i.e., Tema near Accra and Takoradi in the west — face significant bottlenecks. At Tema, which acts as a container port, bulk fertilizer imports get "bumped" if a container ship is ready to unload. Unloading of bulk fertilizer and bagging on the quay is performed by the British company Nectar. The maximum shipload is 20,000 metric tons and the daily offload rate is 2,000 metric tons. Hence, it can take up to 10 days to unload a fertilizer shipment in Tema.

Takoradi is likely a better port for unloading bulk commodities, but the road infrastructure is not as good, especially for reaching northern regions of Ghana. Yara's warehousing capacity provides an indicator of the relative importance of the two ports. The company has 10 warehouses in Tema and only 3 in Takoradi, but would prefer to bring all fertilizer through Takoradi if infrastructure improvements were made. Most of the fertilizer is brought into Tema port in bulk by the major players. However, smaller importers bring in 25 and 50 kilogram bags, while retailers re-bag fertilizer products for sale in 1, 2, and 5 kilogram bags or sell directly from open 50 kilogram bags.

Fertilizer Cost Chain Analysis

The size of the total 2006 fertilizer market in Ghana is estimated at 60,000 metric tons based on incomplete data from FAOSTAT (through 2002/2003), the International Fertilizer Manufacturer's Association (through 2004-2005), and historical trends (see Exhibit II-3). Almost all of the fertilizer used is concentrated in the northern, upper east, and upper west regions for cotton and rice. Fertilizer use on grains, vegetables, and export crops is higher in the south and growing rapidly. Detailed product consumption in total and by crop is difficult to establish due to the lack of reliable statistics.

Among the nitrogen-based products, urea, ammonium sulfate, and calcium ammonium nitrate (CAN) account for approximately 30,000 metric tons. The remaining 30,000 metric tons include a range of NPK compounds dominated by Triple 15 (15-15-15) for food crops, 0-22-18-7S + 6MgO for cocoa, 11-5-27 +5MgO for pineapple, and 11-

Exhibit II-3. Ghana Fertilizer Nutrient Imports (nutrient metric tons), 1992-2002

Year	Ghana Fertilizer Imports by Type			
	Nitrogen	Phosphate	Potash	Total
1992	7,000	2,400	1,100	10,500
1993	3,096	1,365	2,875	7,336
1994	2,700	2,000	3,000	7,700
1995	3,200	2,500	4,000	9,700
1996	7,200	3,500	6,700	17,400
1997	9,853	5,955	6,655	22,463
1998	7,274	3,654	4,256	15,184
1999	8,002	4,202	3,202	15,406
2000	7,048	2,719	2,119	11,886
2001	14,169	8,590	8,268	31,027
2002	14,170	8,590	8,270	31,030

Exhibit II-4. Ghana Fertilizer Nutrient Consumption (nutrient metric tons), 1992-2002

Year	Ghana Fertilizer Consumption by Type			
	Nitrogen	Phosphate	Potash	Total
1992	7,000	2,000	1,100	10,100
1993	5,203	1,365	1,000	7,568
1994	2,700	2,000	3,000	7,700
1995	3,200	2,500	4,000	9,700
1996	7,200	3,500	6,700	17,400
1997	8,706	5,955	6,655	21,316
1998	7,274	3,654	4,256	15,184
1999	8,002	4,202	3,202	15,406
2000	7,048	2,719	2,119	11,886
2001	14,169	8,590	8,268	31,027
2002	14,170	8,590	8,270	31,030

Exhibit II-5. Contribution of Major Cost Components to Total Price

Cost Component	%
Product Cost (FOB plus bagging costs)	65%
Transportation (includes ocean & inland freight)	18%
All Margins	8%
Finance Costs	5%
Overhead Costs	2%
Official Taxes	2%
Total	100%

0-37 for bananas and plantain. Ammonium sulfate use has declined slightly in recent years in favor of CAN and urea, but still represents a significant portion of nitrogen fertilizers.

Major importers source products from northern Europe (Norway, Lithuania, and Russia) and eastern Europe based on established relationships with affiliated manufacturers and the most cost-effective cost and freight (C&F) terms. In this survey, the urea was sourced from Russia (Black Sea port), the ammonium sulfate from an unknown European country, and the Triple 15 from Norway. The survey followed these three imported products along the supply cost chain from source to retail price in southern (Tema), central (Kumasi), and northern (Tamale) Ghana in 2006. Urea (25,000 metric tons), ammonium sulfate (15,000 metric tons), and Triple 15 (5,000 metric tons) were all imported in bulk and bagged dockside at Tema port. The major cost components and their respective average contribution to total price (as a percentage of the retail price) are presented in Exhibit II-5.

Cost Commentary

Four of the eight firms that import from the international market account for 95 percent of the Ghanaian fertilizer market. Nigerian products are imported overland by truckload (up to 28 metric tons) by some of the 13 small sub-national importers, but without access to reasonable finance. The results of the cost chain build-up are summarized in Exhibit II-6, with greater detail presented in Exhibit II-7.

FOB. In general, ocean freight costs for all three products were consistent with market rates during 2006. In the same vein, FOB prices were consistent with published rates. At roughly $50 per metric ton, ocean freight rates are similar between the Black Sea and Norway to Tema. However, Triple 15 NPK could have been substituted with Triple 16, which is available from Russia and Eastern Europe at prices that are 23 percent lower than the same product from Norway. Significant cost savings were missed given the similar freight costs and no appreciable agronomic difference between Triple 15 and 16 in the Ghanaian context. Quality, farmer preferences, historic formulations, lower financing costs, and better terms were all cited as reasons for this decision. The consideration of product preference in Ghana is important, but this example illustrates significantly higher prices due to the lack of market sophistication and historic ties to a particular product.

Port. Overall port charges in Tema were lower than in most African ports, except for the "free zone" in Dakar, Senegal. Port charges (roughly $10.60 per metric ton) were assessed as both a fixed fee per metric ton and a percent of the C&F value. These percentage charges are regressive with respect to high-analysis fertilizers, which have a higher cost per ton than low-analysis fertilizers and represent a disincentive to bring higher-valued products into the market.

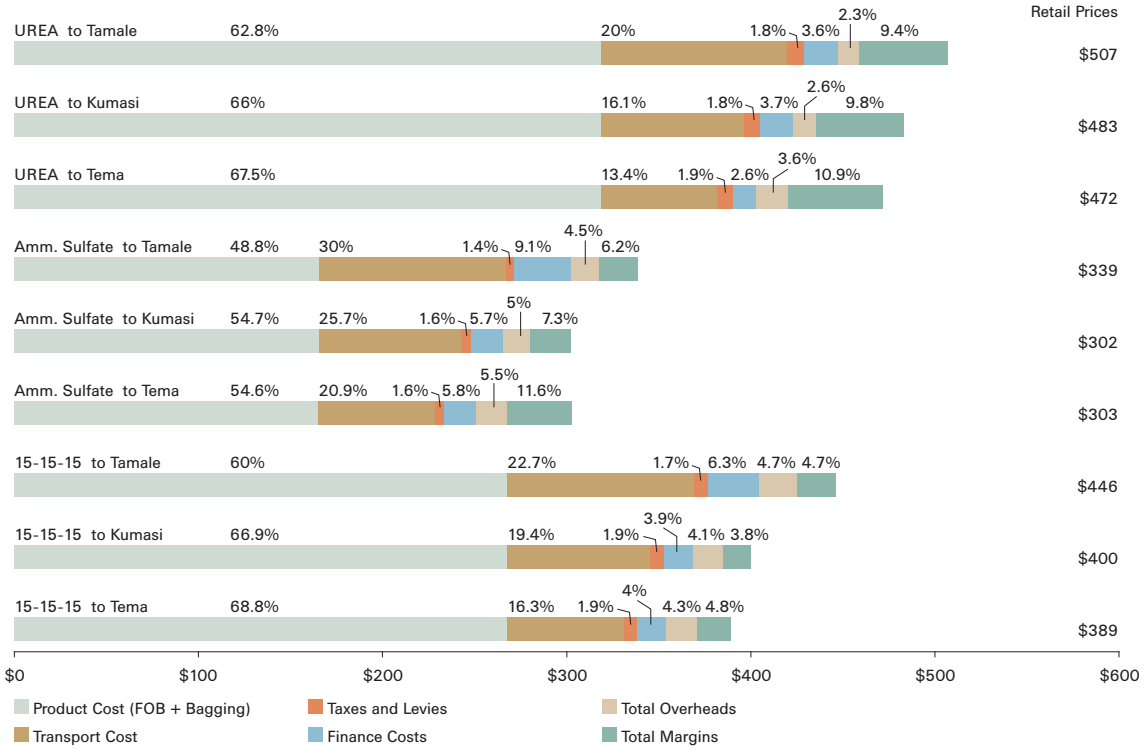
Bagging. The cost of bags and bagging (around $29.60 per metric ton) is comparatively high,

though similar to Beira port in Mozambique. These costs cover bags, bagging labor, transport to the warehouse, and storage, with only one private fertilizer-bagging company (Nectar) at Tema port. There is little incentive for new entrants to compete with Nectar because of the small annual tonnage imported into Tema. The increased costs derive from the bags ($9.80 per metric ton), transport to the warehouse ($6 per metric ton), and warehouse rentals ($3.24 per metric ton per month), which are higher than elsewhere. Bagging labor costs are comparatively low at $3.24 per metric ton.

Finance. The major importer-wholesalers have access to U.S. dollar-denominated credit sources (roughly 7.5 percent per annum), and are considered reasonable on the present market. Some evidence indicates that importers with connections to international fertilizer producers or trading companies can access procurement credit at LIBOR, plus 0.5 to 2 percent. Smaller importers, depending on their credit standing, may only obtain procurement credit in the range of LIBOR, plus 2.5 to 5 percent, resulting in higher financing costs of 7.5 to 10 percent. Independent distributors without access to offshore financing opportunities are faced with high financing costs averaging 28 percent. These rates reduce their capacity to purchase from the major importer-wholesalers and result in extremely thin margins, especially in the highly competitive Kumasi market of central Ghana. Higher prices in the north enable both distributors and retailers to make higher margins.

Margins. Importer margins (7 percent) for urea and ammonium sulfate were greater than

Exhibit II-6. Ghana Fertilizer Cost Chain Analysis Summary, 2006

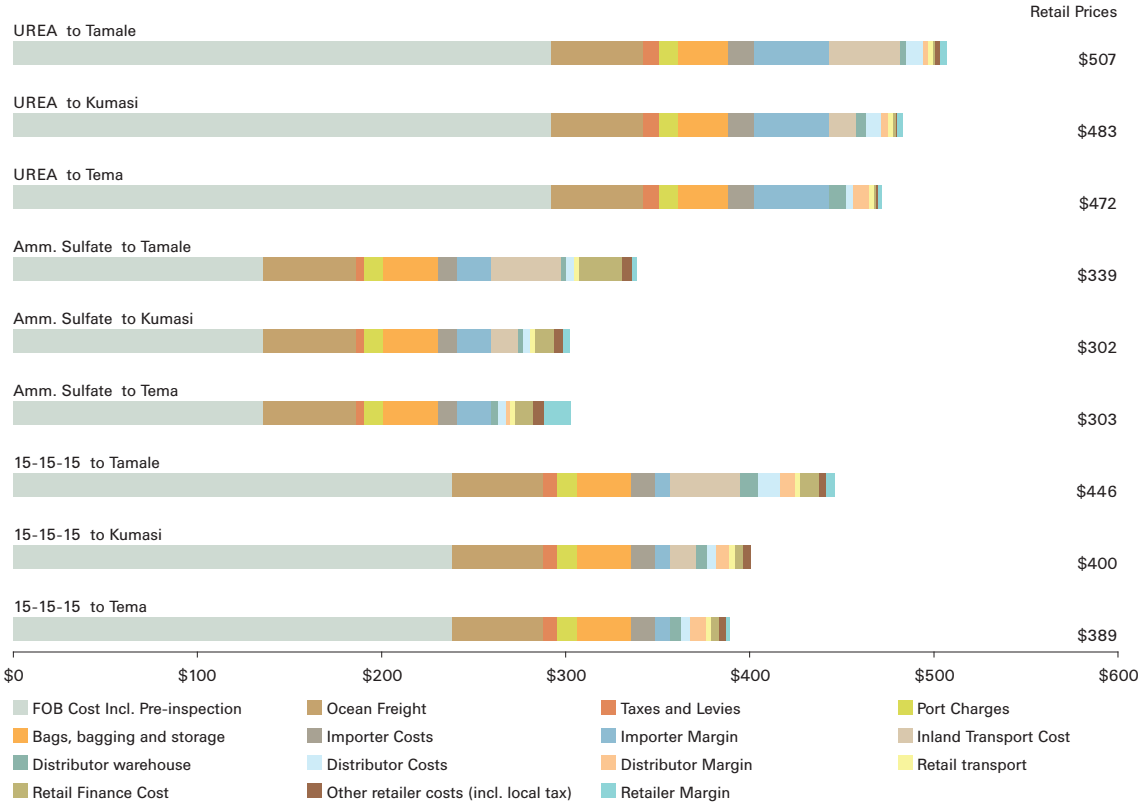


those for Triple 15 (2.2 percent), most likely due to competition from the most cost-effective and price-setting importer and its lower financing costs. At the wholesale level, importers were able to extract another 1 to 2 percent margin. Importer-wholesalers also acting as distributors capture additional margins by selling at retail. In the Tema area, for example, direct sales from the warehouse resulted in an additional margin just under 1 percent for urea and Triple 15, again probably due to price competition from the major importer. Ammonium sulfate experiences less competition and a greater retail margin at roughly 5 percent.

Transport. Inland transport costs are fairly expensive for all products. Road transport costs to the most intensive and competitive market in central Ghana (Kumasi) are $14.50 per metric ton. Road transport to northern Ghana (Tamale) costs $38 per metric ton, principally for rice and cotton fertilizers. Margins in Kumasi are slim compared to southern Ghana at both the wholesale and retail levels, probably due to increased competition. Northern markets are less competitive and exhibit higher margins at the wholesale and retail levels, along with higher prices overall.

Infrastructure. Three major deficiencies are recognized with regard to the physical infrastructure at Tema port and compare unfavorably to other African ports. First, the lack of storage warehouses at Tema and throughout the country leads to relatively high storage costs.

Exhibit II-7. Detailed Ghana Fertilizer Cost Chain Analysis, 2006



There are 25 regional distributors, including 12 regional (sub-national) importers, with 35 warehouses and a combined capacity of about 12,000 metric tons. The warehouse capacity of the 300 retailers is estimated at only 5,000 metric tons. Second, the bagging rate at Tema port varies from 1,000 to 1,200 metric tons per day, with a maximum of 2,000 metric tons per day. Other African ports average 2,000 metric tons per day, regularly achieve 2,500 metric tons per day, and in some instances can reach 3,000 metric tons per day. Slow bagging rates add to port charges and charter party rates for ocean freight. Finally, the restriction on vessel size at Tema is 20,000 metric tons or drafts of 10 meters. In spite of the relatively short sailing times to Tema for most shipments (around 21 days), the average delay from order placement to farmer availability varies from 61 to 97 days. Slow discharge rates at Tema port due to infrastructure constraints account for much of this delay.

Market Demand

Major fertilizer users in Ghana consist of cotton producers based around Tamale and points north, as well as the southern plantations of rubber, cocoa, and oil palm. There are three main cotton-producing companies — the Ghana Cotton Company, Nulux Plantation, and Plantation Development, Ltd — with a total production of only 15,000 metric tons of seed cotton against a ginning capacity of 100,000 metric tons. Rubber and oil palm are handled by industrial interests, though they all have outgrower schemes to work with local smallholder farmers. The largest food crop consumers of fertilizer in Ghana are rice (mostly grown in the north) and maize. A substantial portion of the crop mix for fertilizer is similar to that found in Mali (i.e., cotton, rice, and maize).

Ghana has a number of specialty crops with specific fertilizer needs that distinguish it from Mali. Principal among them is cocoa, but these crops also include pineapples, coffee, oil palm, rubber, coconut and, increasingly, bananas. Most of the people interviewed for this study felt that the main fertilizer import — i.e., Triple 15 (15-15-15 NPK) — was inappropriate for Ghana in the 21st century. There is ample opportunity to work with the public and private sectors to research new fertilizer combinations for different crop and soil types. An organized study and marketing campaign at the national level would likely produce significant improvements in crop yield and fertilizer effectiveness.

An interesting market differentiation in Ghana is that of "white" versus "red" versions of Triple 15. It seems that the "white" version dissolves more slowly and is appreciated in the northern portion of Ghana, while the "red" version dissolves more quickly and is preferred in the south. This preference is most often explained by the different rain regimes in the north and south, as well as crop choices in these regions (cotton versus horticultural crops).

Actors all along the supply chain agree that foliar fertilizers are becoming increasingly important on the Ghanaian market. This is attributed to the crop mix in the southern part of the country and is mainly driven by the horticultural and tree crop industries. Most fertilizers imported into Ghana remain in the country. All importer-wholesalers stated they were mainly focused on the domestic market.

In any given year, 10 to 20,000 metric tons of fertilizers might transit from Ghana to Burkina Faso and Mali. Triple 15 fertilizers are the biggest sellers in the agricultural season, while ammonia and urea are in greater demand by vegetable producers during the dry season.

Market Environment

Policy. Ghana has no direct import duties or sales taxes (VAT) on fertilizers, although the Economic Community of West African States (ECOWAS) imposes a 5 percent external tariff. The procurement and distribution of fertilizers is completely liberalized, with no import restrictions on product type or source. However, importers are required to communicate intended orders to MOFA and the Environmental Protection Agency (EPA) for monitoring purposes. Ghana does not have legislation governing fertilizer products, and the rate of progress with regard to a legislative document has been slow. MOFA has developed a draft regulatory framework, but needs additional assistance to accelerate its passage and implementation.

MOFA has also created a committee tasked with making recommendations to the government on the agricultural input market, including fertilizers. Ghana is not as far along as Uganda in this area, but would benefit from the latter's example. MOFA technicians in Ghana are keen to link their fertilizer strategy to an output market approach to enhance fertilizer consumption. They believe that a sustainable increase in consumption must be based on an attractive market for the increased output; otherwise farmers will change their crop mix or leave farming altogether. There was unanimous agreement on this point among players as diverse as ministry technicians, private sector importers, and NGO staff. They also agreed that they would stay out of Ghana's rice sector because of the large rice imports brought in by the government and donors (principally the United States), which undercut the profitability of local rice producers. Similar complaints were also heard in both Ghana and Mali concerning U.S. cotton subsidies.

Regulation. Fertilizer sold in the Ghanaian market is not guaranteed, particularly in terms of its nutrient content, net product weight, and physical qualities. Anecdotal accounts describe limited evidence of adulterated products at the small-scale importer level. These almost always represent imports by land rather than through the ports. Nevertheless, it is important to recognize quality control and truth-in-labeling as critical to the proper development of any market, particularly when it is becoming more diverse and dynamic, as is the case in Ghana. Quality control assures consumers that the agricultural inputs they purchase are not nutrient-deficient, adulterated, or sold in short weight bags. In addition, crop failures can be traced back to faulty inputs rather than the technological package.

All market actors mentioned the need to reinforce market regulation in Ghana. This also holds true in Mali and is partly a function of the move toward blending fertilizers in-country from bulk primary components. At present, no one systematically checks the quality and formulation of the blends being produced in Africa. Ghana has a list of agricultural inputs that do not require approval for imports. Importers wishing to deviate from the list must seek approval from the EPA. The latter issues import permits, while the Ghana Standards Board occasionally tests for purity and verifies that a new product is brought into

the market as identified by the MOFA and EPA approval requests submitted by private importers. The Ghana Standards Board only tests at the import level. Once the commodity is in-country, little or no testing is performed at the wholesale or retail levels. Hence, a fertilizer that is stated to be 15-15-15 NPK may or may not actually contain these levels of nutrients. While this has not been a problem with internationally reputed importers, some adulteration of regionally traded fertilizers has been noted, particularly in Nigeria. To permit imports, the EPA charges a fee of approximately $10,000 per fertilizer shipload. Since the fee schedule is linear with respect to the amount imported, there is no fee reduction incentive to bring in bulk imports.

Four survey companies currently operate in Ghana — SGS, Cotecna, Gateway Services, and GSBV — so the full burden of testing does not necessarily have to be placed on government institutions. Importers rely on these firms for survey and inspection at the point of loading only. Pesticide and seed inspectors are available, but they are neither equipped nor mandated to inspect or sample fertilizer products. The Ghana Irrigation Development Authority, an independent agency under MOFA, represents the ministry's only chemical analysis capability.

Finance. Finance is consistently mentioned as a major problem confronting all members of the fertilizer supply chain in Ghana. Fertilizers are capital-intensive as they require firms to move large quantities of bulk materials in a specified timeframe. Hence, the quantity and timeliness of financing is crucial to procurement and distribution. Even the largest importer, Wienco, has problems obtaining finance, which largely accounts for the sale of that portion of its business to Yara. Indeed, banking restrictions were becoming too burdensome, inefficient, and expensive for Wienco to continue allocating time and effort to securing bank finance.

Three main forms of financing are used to deal with the credit crunch: auto-financing, supplier financing, and the formal banking system. The effective nominal interest rate on any financing in local currency terms ranges from 20 to 30 percent. Major importer-wholesalers with connections to the international markets, such as Yara, SSI-Cigogne, and Dizengoff, have access to international capital markets, which lend in the 5 to 10 percent range. Many of the major importers can afford to provide reliable distributors with favorable supplier credit because of this financing advantage. Firms that can only access national capital markets are at a disadvantage in this regard (e.g., Chemico). Auto-financing is limited due to the large capital requirements of the fertilizer trade for procurement, transport, and handling. Traditional banking finance is also limited because of the longer repayment periods on agricultural lending (due to the cropping cycle) compared to other forms of commodity trading. Many distributors and dealers have an unfavorable perception of the national Agricultural Development Bank (ADB-Ghana). They refer to ADB-Ghana as "agricultural" in name only, adding that the closest the bank gets to agriculture is to finance food imports.

Research. The major research issue raised in Ghana was the blanket Triple 15 recommendation made to farmers. All those interviewed stated that this was no longer the appropriate blend for Ghana, having been established prior to independence. Private sector groups

have been involved in direct fertilizer trials for specific crops, most notably Wienco with cocoa formulations and Chemico with maize. The last formal trials were conducted in the 1970s with Cornell University.

Any research trials in Ghana or other African countries must begin with a literature review of existing studies to avoid duplication, identify information gaps, and guide new research. A minimum of three cropping cycles will likely be required to determine results. Research findings should be widely disseminated to consumers via news articles, radio, television, rural films, posters, demonstration plots, and seminars.

Market Performance

The small number of firms at the importer-wholesaler level does not represent over-concentration because the nature of fertilizer lends itself to an oligopoly given the financial, administrative, and logistical barriers to market entry. The most efficient economic actors at the importer-wholesaler level are those that are connected to offshore suppliers who can manage the level and timing of required imports. The Dutch leader of Wienco, who has been in business in Ghana for 30 years, stated that he established a joint venture with Yara because he could no longer finance and administer the level of fertilizer imports that his clients required. He held up a small slip of paper and stated that "this is now all we need to order two 20,000 metric ton shiploads of fertilizer to Ghana," adding that internal procedures, bank formalities, customs clearances, transport arrangements, and storage had become too cumbersome for his firm, despite the fact that it is the largest importer-wholesaler in the country.

Fertilizer pricing follows the price leadership model, with smaller importers pegging prices to those established by the market leader. Price competition in the Ghanaian market is robust and will likely increase with the new entrants, represented by the direct participation of Yara and The Golden Stork (SSI-La Cigogne) in the market. Distributor- and dealer-level competition is enhanced by the large number of participants in these sections of the marketplace, and can be increased through efforts to professionalize the sector and lower barriers to market entry. The Ghanaian market is clearly on a growth trajectory and will continue to develop and deepen with time. While the pace of that development may not be at the rhythm preferred by some observers, it will only increase with market-enhancing interventions.

CHAPTER THREE

Mali Country Study

Over the past 20 years, Mali has liberalized and privatized its fertilizer market, giving rise to an embryonic private sector to replace the previous state monopoly of agricultural input supply and distribution. However, the demand for fertilizer continues to be dominated by the annual tender bids launched by the cotton parastatal *Compagnie Malienne pour le Développement des Fibres Textiles* (CMDT) and the smaller government-managed development agencies (e.g., OHVN, *Office du Niger,* and *Office Riz Ségou*). Private sector suppliers of fertilizer can best be described as an oligopoly, with four major importer-wholesaler firms competing for market share. By the end of 2007, the Malian fertilizer market may finally enter the period of extreme change expected from the long-anticipated privatization of CMDT into four smaller cotton-producing entities.

Background

Mali's experience in the post-structural adjustment period of the 1990s and early 2000 mirrored that of other African countries, but with an emphasis on organizing farmer associations through the apex organization *Assemblée Permanente des Chambres d'Agriculture du Mali.* The goal is to empower farmer associations to deal directly with agricultural input and output markets to meet their needs. The successive liberalization of market forces and privatization of former state assets led to the breakup of state-run monopolies. Private sector actors were expected to immediately fill the void, but were often hesitant. In Mali, as elsewhere, the transformation from a command economy to one driven by market signals was erratic, with certain sectors advancing along the path of change more quickly than others. While the agricultural input markets were quickly transformed, the production parastatals were slower to change, specifically CMDT. Some 20 years since this process began, 2007 may finally witness the privatization of this cotton parastatal, which dominates the country's agricultural sector.

Market Organization

Market Structure

As the state withdraws from the vertically integrated approach of the parastatals, a nascent private sector fertilizer market has arisen in Mali. This private sector market is thinly traded and presently dominated by groups with direct access to international fertilizer producers. Most notable is Yara Mali, a branch of the major Norway-based fertilizer group. There are also francophone fertilizer interests represented via a company called La Cigogne

Exhibit III-1. Mali's Fertilizer Market

International Exporters (Manufacturers and/or Raw Material Suppliers) or Traders	
Importer/Wholesaler	
1. Yara Mali 2. Toguna	3. La Cigogne Banikono 4. DTE Chinese
Distributor	
1. GDCM 2. Agri2000 3. SAD/SAT 4. PA	5. Syatel 6. SOMADECO 7. Gnoumani 8. Faso Jigi
Farmer	

(The Golden Stork), which is part of SCPA SIVEX International (SSI). The third member of this group of firms directly linked to fertilizer suppliers is Datong Enterprises (DTE), with Chinese ties. All three of these firms are distinguished by their regional interests in neighboring countries. For example, DTE also has a presence in Burkina Faso and the Ivory Coast. Yara and La Cigogne have much more extensive regional representation.

Somewhat distinct from these three firms is the major Malian fertilizer firm Toguna AgroIndustries, which has established contacts with international fertilizer trading companies. Toguna has become a major player at the CMDT auctions, capturing roughly 20 percent of the total bids for urea and NPK. The firm uses a combination of regional representation (Sikasso, Mopti, Niono) and affiliated traders (Segou, Dire, Timbuctou) to assist with product distribution outside Bamako. Toguna is increasingly seen as a leader in the Malian market for fertilizer, although it was not originally a participant in the tender bid system. It learned about the market through participation in the Malian agricultural input suppliers' business association, ORIAM. The company's growth over the last few years has resulted in the establishment of a blending operation in Bamako.

ORIAM provides a forum for firms involved in the fertilizer sector to collaborate on joint interests. The association regroups CropLife Mali and the *Association des Semenciers du Mali* (ASEMA), which deal with agricultural chemicals and seeds, respectively. ORIAM is located near the Burkina Faso embassy in Bamako, but is not as well structured as its Ghana homologue, GAIDA. For example, it has not had a general assembly in three years and needs to renew its leadership, mandate, and activities.

After these four companies at the top of the market, a second tier comprises around a half-dozen businesses that are more distributors than firms with international contacts. These firms arose from the transport sector (e.g., Agri2000, SAD/SAT) or the cereal trade (e.g., GDCM), or are agricultural input-specific (e.g., Partenaire Agricole, which deals mostly in agricultural chemicals and some fertilizer). Each of these mid-level distributor firms is linked with one or more of the top four mentioned above to source supplies. The major player in the present CMDT tender bid season, and in the last few years, is the cereal transporter *Grand Distributeur Céréalier du Mali* (GDCM), with roughly half the market

Exhibit III-2. Results of the CMDT Urea Auction for the 2007-2008 Season

Region	Firm	Quantity (mt)	USD/mt @ 500 Fcfa/$	Shares	
Kignan	Agri2000	2,000	484	2,000	9%
Bougouni	GDCM	3,500	472	11,300	50%
Koumantou	GDCM	2,500	467		
Fana	GDCM	1,500	477		
Sikasso	GDCM	1,500	462		
Dioila	GDCM	1,200	477		
Oueles OHVN	GDCM	400	472		
Kimparana	GDCM	400	472		
Bamako OHVN	GDCM	300	472		
Sikasso	Partenaire Agricole	1,000	488	1,000	4%
Kita	SFD	2,000	481	2,000	9%
Karangana	Somadeco	1,200	485	1,200	5%
Koutiala	Toguna	5,000	488	5,000	22%
Total		22,500		22,500	100%

for both urea and NPK. GDCM's main business is transportation and trading of foodstuffs such as rice, maize, and sugar. Finally, about half a dozen non-Bamako-based firms handle distribution outside the capital (e.g., SOMADECO-Niono, Gnoumani-Niono, Faso Jigi-Segou).

Market Conduct

The Malian market is a "tender bid" market with increasingly effective demand expressed outside the auction system. Market conduct revolves around submission of proposals against the CMDT tender bid auction, which is further broken down into geographically specific lots (see data from this season's CMDT tender bids in Exhibit III-3). Because the barriers to entry to this auction are minimal, a wide variety of firms, many with no previous experience in agricultural input supply, submit bids. The auction results in a changing procurement mix of supply firms each year. For example, in 2006, all of the urea bids were won by DTE, though it did not win any portion of that market in the 2007-2008 season. This discourages firms from holding in-country stocks and developing relationships and markets. Every year, the auction system attracts submissions from firms as diverse as paint producers, cloth traders, battery producers, bookstores, and general goods dealers.

Many of the major importer-wholesalers have decided to withdraw from the tender bid system and allow local distributors to deal with the annual auctions. For example, Yara Mali has opted to support its preferred domestic distributors (e.g., Gnoumani) with a set price from which they can establish their bids, knowing that Yara will not directly participate in the auction. This assures the distributors of a fixed supply at a given time and price, based on which they can establish their response to the tender. Most fertilizer players avoid the tender bid process because of the high formal and informal costs associated with participation.

Exhibit III-3. Results of the CMDT NPK Auction for the 2007-2008 Season

Region	Firm	Quantity (mt)	USD/mt @ 500 Fcfa/$	Shares	
Kignan	Agri2000	6,000	519	6,000	9%
Koutiala	GDCM	16,000	504	27,300	39%
Kita	GDCM	6,000	517		
Sikasso	GDCM	4,500	499		
Kimparana	GDCM	800	509		
Bougouni	Gnoumani	10,000	510	10,000	14%
Sikasso	Partenaire Agricole	4,000	517	4,000	6%
Karangana	SAD	4,000	520	4,000	6%
Dioila	SFD	4,000	520	4,000	6%
Oueles OHVN	SMIAS	1,500	520	2,700	4%
Bamako OHVN	SMIAS	1,200	520		
Koumantou	Toguna	8,000	520	12,000	17%
Fana	Toguna	4,000	520		
Total		70,000		22,500	100%

It is uncertain how the CMDT privatization will proceed. No observer expected the December 2007 deadlines to be respected, but it appears to be an accepted fact that privatization will finally occur. Once it materializes, privatization will have a major impact on how fertilizers are procured and, hence, on market conduct. With CMDT split into four components based on geographic proximity, each under separate ownership headed by farmer organizations, the rationale for unified fertilizer procurement under a tender bid auction scheme will weaken. A system of direct procurement under direct negotiation with major importer-wholesalers will likely take its place, offering lower prices, greater reliability, and higher quality. In theory, privatization will create the opportunity for a more structured agricultural input market that deals directly

with farmers, without the predatory intermediary that most parastatals represent.

Market Supply

All of Mali's fertilizers are imported, although there are exploitable phosphate deposits around Tilemsi (west of Goundam). Almost all of the imported fertilizer arrives by road from Abidjan or by rail from Dakar. Abidjan was traditionally the source of urea via HydroChem, and Dakar provided phosphates from *Industries Chimiques du Sénégal* (ICS) and its marketing arm SENCHIM, which has representation in Benin, Burkina Faso, Cameroon, Mali, and Togo. Yara bought HydroChem in March 2004, and an Indian company (IFFCO) took a significant interest in ICS via a joint venture to supply phosphoric acid. However, ICS failed to deliver the agreed quantities and operated the plant at less than optimum capacity, resulting in the eventual break-up of the partners. As the road infrastructure in western Mali continues to be upgraded, road transport will begin to challenge rail along this East-West axis to the Atlantic Ocean. With civil war in the Ivory Coast, the Dakar connection has become increasingly important.

Fertilizer consumption is dominated by NPK formulations (including DAP) or urea. In Mali, the phrase "cotton complex" refers to NPK augmented with sulphur and boron to yield NPK-SB in one of two formulations: 14-22-12-7-1 or 14-16-18-6-1. Similarly, the phrase "cereal complex" refers to two possible NPK formulations: Triple 15 or Triple 17. The urea is generally 46 percent nitrogen, and the DAP is 18-48-0. International procurements of urea are generally sourced in Eastern Europe, while phosphates originate in Morocco and Tunisia.

Toguna, the leading importer-wholesaler, has established a blending operation in Bamako and procures inputs via Dakar. The firm blends the ingredients in Mali and sells to other distributors. There are some questions about the quality of Toguna's blends, but the company has made the investment and is presently functional. Yara Mali has stated it plans to have a functional blending plant in Bamako by the end of 2007. It is targeting smaller packages of fertilizer for the local farming community (e.g., 1, 5, 10, 25, and 50 kilogram bags) outside of the tender bid system. A U.S.-based firm, Miller3 International, visited Mali in the past year and has also proposed investing in a blending plant.

The interest shown by three separate groups in establishing blending operations in Mali is indicative of the perception of a growing market. Multiple groups with existing or planned blending capacity should allow for greater competition and lower prices for consumers. The bulk import of raw materials and value added through blending via cost-effective Malian labor should also drive down prices. If part of the resource base could be locally produced, prices should drop even more because of the decreased transport and labor costs, assuming the infrastructure exists to exploit the phosphate deposits at Tilemsi.

Before the 2005-2006 agricultural season, a joint delegation of public and private sector fertilizer actors traveled to Ukraine to make a bulk purchase of urea, but were rebuffed because the combined bulk order was considered too small (100,000 metric tons) to justify direct purchase at the source. Estimates were that a bulk order needed to be between 350,000 and 500,000 metric tons to attract the attention of a source supplier. Moreover,

the Ukrainian suppliers had already forward-sold their supplies for the next three years.

Fertilizer Cost Chain Analysis

The Malian fertilizer market is dominated by consumption on cotton, followed by rice and other cereal grains. Historical averages are presented in Exhibit III-4. According to incomplete data from FAOSTAT and the International Fertilizer Manufacturers Association, the market had reached 60,000 metric tons of product by 2006.

The major products used are urea and NPKs (cotton), as well as urea and DAP (rice and dry cereals). Cotton sector fertilizer procurement is implemented by the CMDT parastatal under a tender bid system characterized as costly, time-consuming, and rife with corruption. It takes at least six months between tender launch and fertilizer delivery, and non-transparent bureaucratic procedures offer ample opportunity for rent-seeking behavior. The large volumes tendered by a few marketing boards in West Africa have had the perverse impact of inducing international suppliers to form coalitions, thereby reducing competition.

The CMDT tender suffers from high ocean transport costs from the Ukraine ($120 per metric ton), high finance costs ($28.8 per metric ton) related to the time exposure, non-use of euro or dollar accounts, and high cumulative margins ($95.49 per metric ton). However, inland transport costs are about $20/metric ton lower due to backhauling of cotton. This saving is offset by the longer finance period because fertilizer is purchased at harvest time and stored until the next planting season. The use of local firms to represent international fertilizer companies in tender bids allows for rent-seeking payments to be made in order to secure tender business, and accounts for the high margins sought by bidders.

The cost chain analysis illustrates costs involved in a 2005 CMDT urea tender, with scenarios representing private sector imports from 2006 and 2007. The ratio of retail price to FOB price was 2.51, indicating cotton farmers paid 2.5 times the international FOB price for urea. Comparison of the cost components is presented for these two cases in Exhibit III-6.

Many groups have become uncomfortable with the centralized tender bid system and disappointed with the prices obtained. The MIR project decided to assist a farmer-based organization in purchasing fertilizer through direct

Exhibit III-4. Mali Fertilizer Nutrient Imports (nutrient metric tons), 1992-2002

Year	Mali Fertilizer Imports by Type			
	Nitrogen	Phosphate	Potash	Total
1992	10,700	13,600	3,000	27,300
1993	12,000	10,000	3,000	25,000
1994	12,000	6,000	7,000	25,000
1995	12,000	8,000	7,000	27,000
1996	12,000	8,700	6,600	27,300
1997	25,600	12,000	10,200	47,800
1998	17,400	15,800	12,700	45,900
1999	18,100	16,100	15,600	49,800
2000	16,369	13,569	13,569	43,507
2001	14,000	14,000	14,000	42,000
2002	14,000	14,000	14,000	42,000

Exhibit III-5. Mali Fertilizer Nutrient Consumption (nutrient metric tons), 1992-2002

Year	Mali Fertilizer Consumption by Type			
	Nitrogen	Phosphate	Potash	Total
1992	10,700	13,600	3,000	27,300
1993	12,000	10,000	3,000	25,000
1994	12,000	6,000	7,000	25,000
1995	12,000	8,000	7,000	27,000
1996	12,000	8,700	6,600	27,300
1997	25,600	12,000	10,200	47,800
1998	17,400	15,800	12,700	45,900
1999	18,100	16,100	15,600	49,800
2000	12,709	13,569	13,569	39,847
2001	14,000	14,000	14,000	42,000
2002	14,000	14,000	14,000	42,000

Exhibit III-6. Comparison of Public Tender and Private Procurement Costs

Cost Component	% of Total Cost	
	CMDT Tender 2005	Private Sector 2006-07
Product Cost (FOB plus bagging costs)	41%	49%
Transportation (includes ocean & inland freight)	34%	30%
All Margins	17%	11%
Finance Costs	5%	2%
Overhead Costs	1%	1%
Official Taxes	2%	7%
Total	100%	100%

Exhibit III-7. Comparison of Prices Obtained by CMDT and Faso Jigi

	Date of Purchase	Quantity	Price
	Mth-Yr	mt	Fcfa/mt
CMDT Tender	Jul-04	18,000	236,000
Faso Jigi	Mar-05	2,000	236,000

negotiation on the international market. The farmers' organization, Faso Jigi, was formed in 1997 in Segou and has about 4,500 members, who mainly grow rice, maize, sorghum, and millet. The organization initially focused on the marketing of rice and maize, but has become involved in fertilizer procurement on behalf of its members over the last three years. The group pools demand, procures in Mali, and distributes fertilizer to its members, with all transactions conducted in cash.

After delivering training on fertilizer procurement, international and regional fertilizer markets, and negotiation techniques, the MIR project signed an agreement with Faso Jigi to provide technical assistance with fertilizer procurement. In February 2005, the first contacts were established between Faso Jigi and international suppliers (e.g., through visits to Bamako and telephone contacts). MIR staff analyzed market prices and trends in collaboration with Faso Jigi staff in March 2005. Offers from various suppliers were compared and negotiations begun with international suppliers and their local representatives in Bamako (e.g., affiliated wholesalers). As an outcome of these efforts, 2,000 metric tons of urea, 600 metric tons of DAP, and 400 metric tons of NPK were ordered in March and delivered to farmers by May, with suppliers paid by the end of June 2007.

The Faso Jigi success story demonstrated the potential of direct, decentralized fertilizer procurement and its competitiveness vis-à-vis the prevailing tender system. In the cost chain analysis, Cases 2 to 6 represent multiple private sector procurements since 2005, as follows:

- Case 2: urea imported from Lome for cotton in September 2006
- Case 3: urea imported from Abidjan for rice in March 2007
- Case 4: NPK (14-18-18-6S-1B) imported from Abidjan for cotton
- Case 5: NPK (14-18-18-6S-1B) imported from Dakar for cotton
- Case 6: DAP imported by Faso Jigi from Dakar for rice

In each case, except Case 2, private sector distributors based in Mali procured fertilizer from an international operator in Abidjan or Dakar. When comparing the choice of import ports, there is no significant difference in total procurement costs once differences in FOB urea price between Cases 2 and 3 are taken into account. However, product bagging and port charges were twice as high at Lome than at Abidjan, and there was only a minor differ-

ence in road transport cost. In the comparison between Dakar and Abidjan, the main differences in procurement costs arises from the cost savings to the international company operating in the free trade zone at Dakar, which has lower port charges compared to Abidjan. These are a minor component of the total costs, however.

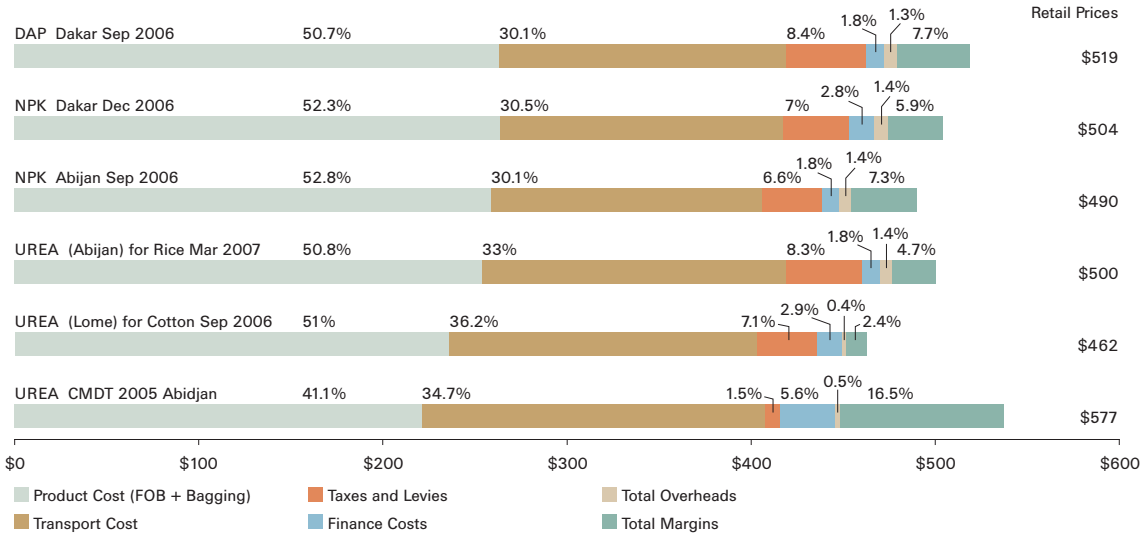
Margins. Margins account for the major difference in the cost structure between the tender system and the emerging private sector procurements. All the private sector cases averaged total margins of 5.6 percent of total retail price, compared to 16.5 percent under the tender example (Case 1). Private sector distributors purchase directly from international operators at the ports in 1,000 metric ton orders, and combine distribution and retail operations to eliminate retail mark-ups beyond wholesale prices. The size and complexity of the Malian private sector distributor-retailers' operations can be expected to increase as they develop their financial resources and skills. They currently pay approximately 17 percent for trade finance, plus letter of credit charges of 2 to 2.5 percent, which restricts their procurement capacity. By comparison, international importers earn margins of around 5 percent while financing with lower euro account interest rates.

High taxation rates and levies further hinder the Malian fertilizer sector. These average more than 7 percent in total, comprised of a national import duty (2.5 percent) and an ECOWAS import tariff (5 percent). In addition, illegal payments forced on transport operators add around 10 percent to the already high transportation costs. The cost savings initiated by private sector non-tender suppliers of fertilizer have reduced the ratio of retail-to-FOB prices for farmers from 2.5 (under the tender system) to 2.0.

Market Demand

The demand for fertilizer in Mali is dominated by the cotton and rice sectors, which account for roughly 90 percent of imports. Cotton commands about 65 percent of all

Exhibit III-8. Mali Fertilizer Cost Chain Analysis Summary, 2005-2007



imports, followed by rice at 25 percent and maize making up the bulk of the remainder. Approximately two-thirds of fertilizer imports consist of NPK, while one-third is urea. Cotton fertilizer demand is expressed through the CMDT tender bid auction. Rice and cereal fertilizer is procured through market channels, direct negotiation, and/or tender bid auctions organized by the *Groupement des Syndicats Cotonniers et Vivriers du Mali* (GSCVM). In 2007, a new farmers organization, the *Union des Sociétés Coopératives de Producteurs de Coton,* will likely take over responsibility for all cotton fertilizer purchases from GSCVM.

Fertilizer demand on the Mali market is dominated by the cotton parastatal CMDT. Input supply markets have been fully liberalized, but CMDT's tender bid auction continues to set the reference for prices and quantities. The annual auction can represent up to 70 percent of total fertilizer demand in Mali (NPK and urea) in any given year. The CMDT privatization expected in 2007 will create four separate, geographically distinct zones, with ownership passed to producers, along with local and international investors. The specific modality of this capital transfer from the state to private interests is not yet clear, nor are its impacts on fertilizer demand.

The cotton zone is concentrated around the four major areas of Sikasso, Fana, Koutiala, and Kita. The 70 percent figure represents the fertilizer needs of CMDT farmers planting cotton and maize. Another 20 percent of national fertilizer demand arises from the rice farmers within the Office du Niger, another former parastatal focused on rice that is based near Niono, north of Segou. The remainder of the fertilizer use is mostly for sugarcane, as well as fruit and vegetable production. Total fertilizer imports of all types are on the order of 250,000 metric tons per year.

Demand in the cotton and rice sectors can be described as a "bottom-up" process. Farmers are encouraged to estimate their input needs

Exhibit III-9. Detailed Mali Fertilizer Cost Chain Analysis, 2005-2007

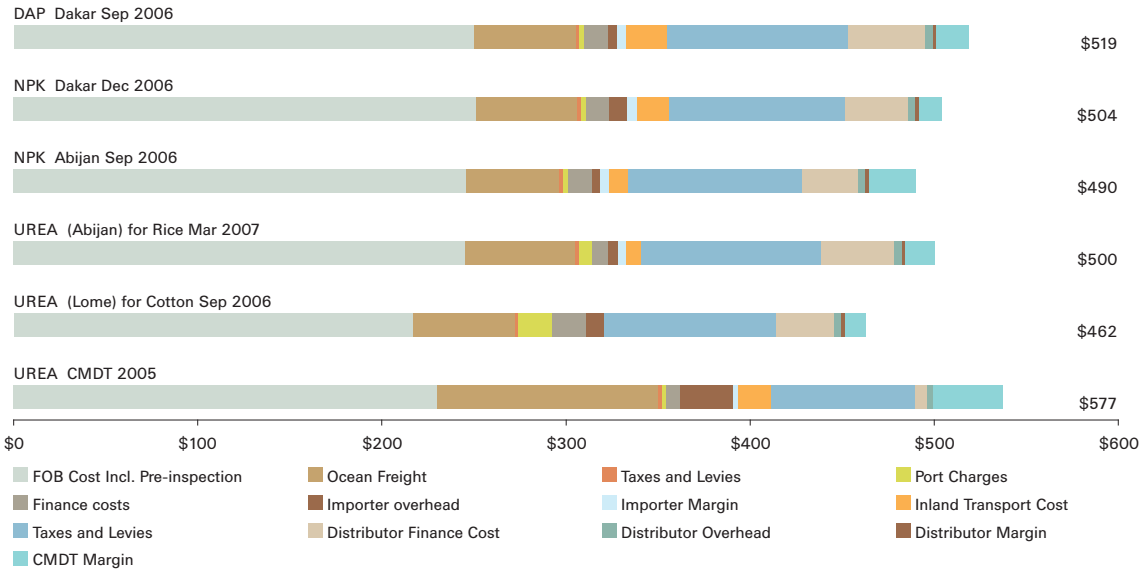


Exhibit III-10. Breakdown of Fertilizer (Urea) Procurement Costs (Prices in $/mt of Urea)
Based on Tender System and Real April 2005 Prices

Cost Component	$ per mt	Subtotals ($/mt)				Scope for more efficiency
		CFR Abidjan	Cost Price Abidjan	Ex Works Abidjan Price	Sale price to cotton company or farmer organization	
FOB Ukraine	230	350	360	441	570	Yes (1)
Sea freight	120					
Unloading, transportation to warehouses, storage, and bagging (incl. 2% losses)	10					
Gross margin supplier (5%)	18					
8 months financial costs (8%)	29					Yes (2)
Official taxes (15% of FOB price)	34					Yes (3)
Transportation to Mali	78					Yes (4)
Non official taxes	7					Yes (5)
Retailer margin (10% of Ex Works Abidjan price)	44					Yes (6)

through farmer organizations. These are then summed at the village, sector, and regional levels to obtain a combined estimate of needs. Traditionally, the production parastatals would use the figures to launch tenders bids on an annual basis. Under the evolving new system, farmer organizations are expected to launch their own tender bids. This "bottom-up" process to determine needs injects additional inefficiency into an already burdensome system due to the efforts expended each year to establish demand. Once this is done for a few years, trends should be discerned and growth rates applied rather than direct estimation. In addition, farmers often over-estimate their needs so as to capture additional supplies to sell on the open market to supplement their incomes.

Yara Mali has started to develop its market outside of the tender bid system and has somewhat equivalent sales. It recounted $16 million via the tenders and $12 million outside the tenders in its last reporting year. Other groups are beginning to diversify their marketing away from the CMDT tender bids and are developing their perceived markets (e.g., DTE and Toguna). The privatization of CMDT will only serve to encourage this move away from the tender bid system and the development of a more modern and competitive agricultural input supply system.

Market Environment

Policy. The only formal tax on fertilizers in Mali is the same found in other West African member-states of ECOWAS. A 5 percent common external tariff is assessed to provide incentive to use productive assets based in the region, such as HydroChem in Abidjan and SENCHIM in Dakar. There is a national policy of uniform pricing for seed and fertilizer throughout the country, which is highly unrealistic given disparate transport costs across Mali. It is unclear how or if this policy is enforced.

Regulation. There is minimal regulatory control of agricultural input products on the Malian market. The advent of local fertilizer

blending has brought this issue to the forefront in Mali and other African states. Both the primary inputs and the resultant blends should be tested and regulated to assure consumers of the quality of the products available on the market. At present, little or no effort is being made in that regard.

Finance. Large economic actors at the top of the market structure do not mention access to finance as a major constraint, as long as they are associated with an external partner (e.g., Yara and La Cigogne). These firms have access to world capital markets and the prevailing rates to borrow in U.S. dollars. They generally do not need loan funds on the local market. In contrast, those firms across the supply chain that depend on local financing for their capital needs cite access to finance as a significant constraint. The major provider of agricultural credit in Mali is the *Banque Nationale pour le Développement Agricole* (BNDA), which has a much better reputation among in-country market actors than its Ghana counterpart, the Agricultural Development Bank.

Cotton is considered an easier crop to finance because of the monopsony held by CMDT. CMDT's traditional relationship with its farmers can best be described as "interlocking" since they provide inputs and purchase output at predetermined prices. The one buyer for cotton allows farmers' credits to be deducted at the source, with a resultant recovery rate of 98 percent. On the other hand, rice is not a monopsony and farmers can sell to whomever they wish. This complicates the financial closure of credit transactions because there is no possibility to deduct at the source. Hence, rice credit recovery rates are much lower than those of cotton, and many banks, including rural microfinance institutions, will not furnish credit to the rice sector. With cotton farmers able to sell their cotton to multiple buyers (i.e., the four privatized firms), it is feared that, under the privatization, the impressive credit reimbursement rates in the cotton sector will drop.

Under the tender bid system, CMDT generally pays fertilizer providers in 180 days (6 months), although it is beginning to stretch this timeframe to 240 days (8 months). This puts additional financial strain on the suppliers because they must now finance a longer period, which translates into higher final prices. Most fertilizer suppliers on the local market require cash on delivery or 90 day terms at best. The withdrawal of major importer-wholesalers from the tender bid system has passed the burden of carrying the financing for these longer periods to smaller local firms. This has led to the emergence of major transporters in the tender bid system because they can mobilize the financing required given the collateral represented by their trucking fleets.

Research. None of the individuals interviewed for this study expressed concern about the formulation being used in the cotton sector, although they did mention declining yields and the need to systematically ascertain sources. There is uncertainty about whether the decline is due to agricultural input quality, farmer husbandry practices, or other factors (i.e., acidic soils that need liming and organic matter). The major national research unit in Mali is the *Institut d'Economie Rurale* (IER) for the physical and socioeconomic sciences, while the *Institut du Sahel* (INSAH) provides a regional perspective. INSAH is the research arm of the *Comité Permanent Inter-Etats de Lutte contre la Sécheresse dans le Sahel* (CILSS)

and has a Department of Research and Studies on Agricultural Inputs and Regulation. Both institutions are based in Bamako and can provide research assets that help shape policy-making and public opinion.

Private sector interests have engaged in research using their own products. For example, Yara Mali has run crop scenarios for a hectare of land intensively cultivated in cotton versus potatoes. According to Yara's own figures, and using Yara products, cotton yields $8 net profit per hectare, while potatoes offer $2,000 per hectare. While the difference between these two crops are likely exaggerated because of the controlled conditions of most research trials, the general impression from multiple interviews in Mali was that cotton is becoming less attractive to farmers. There are major alternative crop opportunities for farmers in fruit and vegetable production when serviced by newly emerging agricultural input markets.

Market Performance

Market performance in Mali is dual in nature. First and foremost is the slowly disappearing tender bid auction, which is inefficient, ineffective, and riddled with corruption. The second market, which is emerging, represents sales outside the auction process and potentially marks the future of agricultural input marketing in the post-CMDT era. The latter market needs support and stimulus to ensure that farmers have access to the agricultural inputs they need to increase productivity and output.

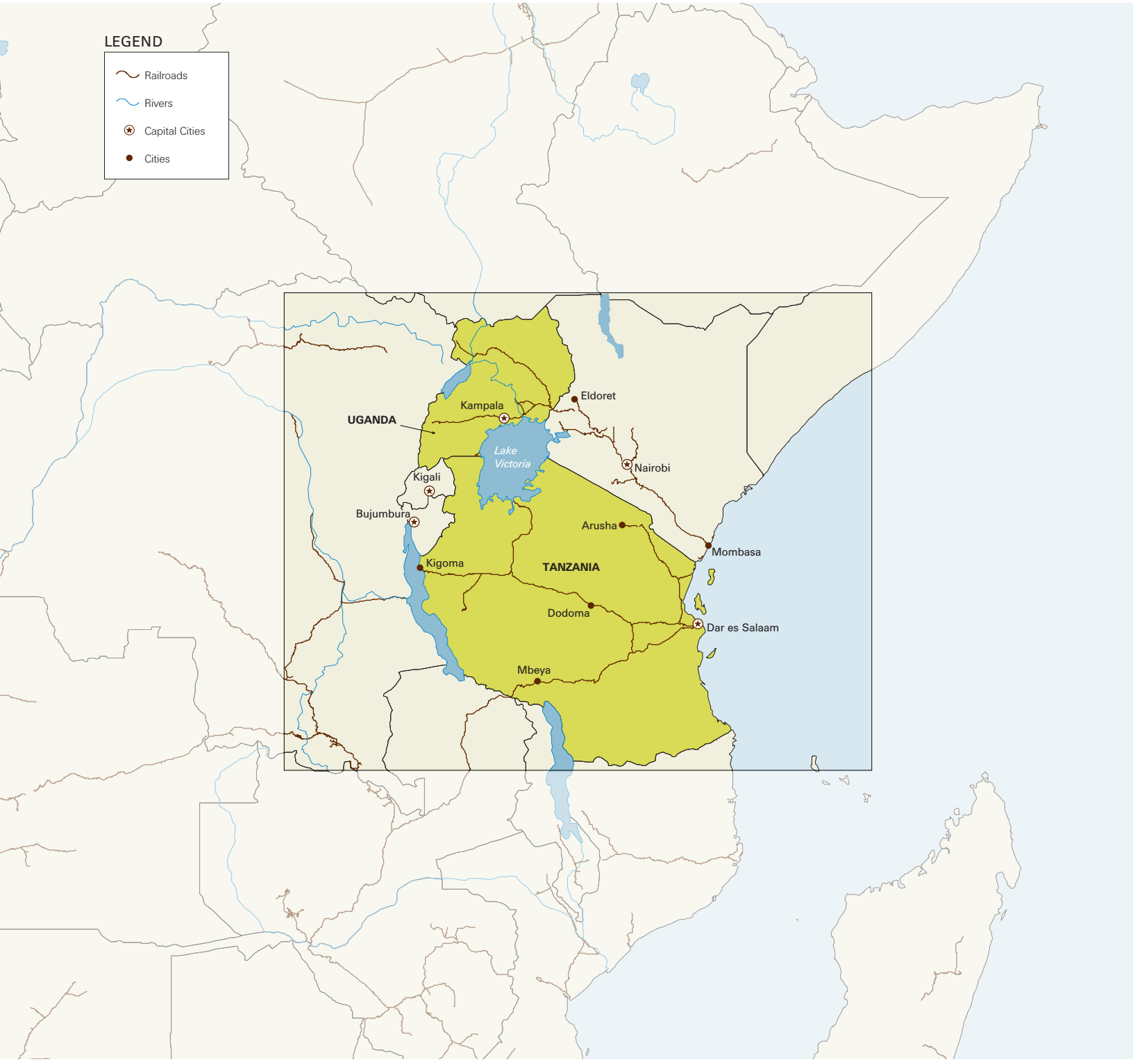
The tender bid auction system has hindered the development of specialized agricultural input supply firms. Perversely, it has also resulted in higher costs and uncertain supply because winning bidders cannot always fulfill their recently won orders. Non-agricultural input firms often offer unrealistic prices, bidding simply to gain market share. Once the tender is won, these firms proceed to seek supplies and price quotes. They then encounter actual market prices, which drive them to seek inferior products at lower costs in order to retain their expected margins. The end result is a low-quality product that is generally not delivered on time. To limit these abuses, the auction increased the price of admission to approximately $3,000 just for the right to bid on one tender. This has not had an appreciable effect other than to further increase bid prices as firms seek to recapture their sunk bidding costs.

Market performance will be enhanced by hastening the dissolution of the tender bid auction. Additional sources of supply could also have a significant impact on market performance, as has been the case for herbicides. The new entrant firm, DTE, was able to reduce herbicide prices by 30 percent by sourcing in China. Unfortunately, fertilizer prices cannot be similarly reduced because of a 25 percent export tax on Chinese fertilizer exports (specifically urea) intended to discourage exports from that country. Another new entrant on the Malian market is the French Roullier Group under the name Timac. It opened subsidiaries in late 2004 in both Mali (Timac Agro Mali) and Senegal (Timac Agro Alizes) to develop agricultural supply activities in the region. The firm has not yet had a significant impact on the fertilizer market, but its investment speaks to the perceived potential of the Malian market.

The IFDC project in Mali helped one of the sub-national distributors — Faso Jigi, based in Niono — to acquire Ukrainian urea through

an international trader and direct negotiation. The distributor obtained the supply some two months before the CMDT auction and at a 15 percent reduction from the average auction price. The actions of this distributor were not appreciated by the organizers of the tender bid, and they were noticeably absent from among the winning bids in the 2007-2008 campaign. This example is indicative of the price premium paid through the tender bid system over a direct negotiation approach.

Map of East Africa



CHAPTER FOUR

Uganda Country Study

At 2 kilograms per hectare, fertilizer usage in Uganda remains one of the lowest in the world. Although steps are being taken by the Ministry of Agriculture, Animal Industry, and Fisheries to improve the general agricultural business environment, there is no distinct fertilizer policy. A knowledge gap exists across the entire fertilizer chain — from farmers, to dealers, to policy-makers. Current fertilizer use recommendations are outdated; application techniques are poor due to lack of soil fertility tests; and there is little or no output market information. Financing is limited throughout the supply chain as commercial sources are too expensive and fertilizer margins are small. Furthermore, infrastructure is weak, transport costs are high, and fertilizer prices have increased dramatically in the last few years due to global market factors. The resultant farm-gate prices are beyond the reach of most farmers. Importers depend on Kenya for supply since direct imports are restricted by the uneconomical low volumes. The 6 percent withholding tax is a burden since it is almost impossible for traders to reclaim. Finally, there is no local production or in-country blending, although some investments have begun in agricultural lime and vermiculite, as well as phosphates.

Background

Uganda is an agriculturally based, landlocked country in East Africa. Agriculture is the most important sector of the economy, employing more than 80 percent of the workforce and representing over 29 percent of the gross domestic product. Though Uganda has fertile lands and abundant water, food production and availability remain major concerns, with more than 35 percent of the 30 million inhabitants living below the poverty line. Strong cultural beliefs continue to affect farmers' decisions to avoid fertilizer use, resulting in low productivity for the average smallholder farmer (estimated at below 30 percent of capacity).

Exhibit IV-1. Uganda's Fertilizer Market

International Exporters (Manufacturers and/or Raw Material Suppliers) or Traders		
Kenya Importer		
Importer/Wholesaler	Agro Business	
1. Uchumi (80%) 2. Balton 3. Green House	1. Tea 2. Sugar 3. Tobacco 4. Rice	70%
Distributor		
Retailer		
Farmer	Own Farming	
	Contract Farming	

Low rural farmer incomes continue to be an important component of the public agenda. Government officials exhort productivity enhancement through increased use of fertilizers, but rising fertilizer prices and stagnant or decreasing output prices continue to deplete farmer income and limit their capacity to purchase production inputs. All stakeholders — both public and private — agree that fertilizer availability must increase, farmers must have access to fertilizers, and their agronomic knowledge must be improved.

Market Organization

Market Structure

The Uganda market procures from Kenya-based importers, who purchase from international exporters (traders and/or producers). The in-country structure involves the Uganda importer servicing distributors, who then service retailers, and finally farmers. The major constraints and potential interventions identified by each group are outlined below.

International traders/producers. Supply is restricted, which increases prices worldwide, as do increased demand, high petroleum prices, and terrorism concerns (restricting output). Uganda market actors feel they have no control over these macro-level determinants of supply and demand.

Ugandan importers. As a bulk commodity, fertilizer is a capital-intensive industry, and access to finance at this scale is limited. Uganda is dependent on Kenyan marketing channels for quality control, and incurs high import costs from Mombasa. Direct import from producers is limited due to volume requirements and low Ugandan demand. The only possible intervention identified was guaranteed trade credits.

Wholesaler-distributors. These market players have low profit margins due to competition and small purchases by retailers. They must immediately pay importers and then auto-finance until their stock is sold (i.e., sales risk is transferred from the importer to the wholesaler-distributor). Import oligopoly, limited supplies, high transport costs, and lack of access to finance increase costs and hence prices. The solutions proposed were to stimulate local fertilizer production, strengthen agricultural input dealer associations, provide credit guarantees, and make package sizes more suitable.

Retailers. Retailers are confronted by inadequate supply, low demand, and limited infrastructure and storage. This results in high prices that are compounded by auto-financing constraints since they must pay distributors in cash. Free fertilizer distributions by donors and NGOs were described as unfair market practices that inhibit sustainable market development. Retailers were not particularly well-informed on agronomic best practices, the timing needs of fertilizer applications, or application rates. Proposed solutions include intensive fertilizer promotion and marketing campaigns for farmers, appropriately sized packaging, credit guarantees, and quality assurances through a stronger regulatory framework.

Farmers. Low demand is a result of high fertilizer prices, lack of agronomic knowledge, inappropriate packaging, and farmer unfamiliarity with input and/or output markets. There is an absence of updated information on best fertilizer formulations by crop, along with timing and application quantities. Proposed solutions include better market information systems on input and output prices, promotion of appropriate packaging, strengthened farmer organizations, increased farm dem-

onstrations with extension messages, and updated fertilizer recommendations.

Market players. The main players in the fertilizer market are agribusinesses involved in contract farming or outgrower schemes. Often referred to as estates or plantations, these businesses work exclusively in crop-specific activities (e.g., tea, sugar, tobacco, rice, and sunflower), provide an assured output market, and represent about 70 percent of the total fertilizer market via direct import. A variety of private sector players import, distribute, and retail fertilizer to farmers. Among them, Uchumi represents approximately 80 percent of the market. Others include Balton, Green House, FICA, East African Seeds, and General & Allied.

Sasakawa Africa Association plays a major role within Uganda's agribusiness associations, with 14 support centers across the country, and plans to reach a total of 20. These centers provide farmer training, organize and manage associations, develop enterprises, assist with planning activities, stimulate market linkages, and develop crop-specific value chains. They currently bag rice and millet, and package them for sale on local markets.

Market Conduct

The fertilizer market in Uganda is best described as an oligopoly. The largest volume of fertilizer (70 percent) is imported by independent agribusiness companies engaged in integrated production of specific crops through outgrower programs. The remainder is imported by a group of private sector enterprises selling fertilizer in an open-market environment. The Midland Group of Companies, known locally as Uchumi Commodities, is the market and price leader in the industry. Uchumi, whose main business is transport, has an 80 percent share of the Ugandan fertilizer market. It achieves this position by using backhaul from tea exports to Mombasa to return to Uganda with fertilizers (similar to the backhaul and pre-positioning of fertilizer found with CMDT in Mali for cotton). Uchumi imports truckloads of 30 to 40 metric tons and sells to the 6 to 15 major fertilizer users. Most fertilizer sales are in cash. Uchumi does not conduct retail sales since the majority of its clients purchase by the truckload.

The majority of importers on the open market do not have sufficient purchasing power. They perceive that attracting large international players would enhance competition and result in increased product availability and reduced costs. Attempts to engage international importers have not been successful to date. For example, FICA approached Yara to conduct direct international purchases, but the volume was considered too small for direct purchase.

Retailers and stockists commonly purchase two 50 kilogram bags, and repackage them locally into 1 and 2 kilogram bags, which are preferred by small farmers as they are more affordable. Retailers who are part of an importer's distribution network import from Kenya. Others source products from a third or fourth local party. Since there is a short supply of fertilizer, prices are never stable and are usually high.

Market Supply

Supply. The major supply problem for Uganda is the requirement for large consignments and increasing prices, which suppresses local demand and reduces supplies even further. Several stakeholders believe that Kenya controls their industry, and bemoan the service ob-

tained from sources there, who largely import for their own market. Uganda is perceived as a secondary market. The poor transport and communications infrastructure, coupled with the scattered nature of smallholder farmers, leads to high distribution costs and contributes to higher retail prices. As a result, fertilizer availability is limited in rural areas.

Training. Critical elements to improving supply include training and capacity development, a market information system, and credit guarantee schemes along the entire chain. The bulk nature of fertilizers, the lack of product differentiation, and the small profit margins are all investment disincentives to most companies. The Ugandan market is too small to attract the attention of major suppliers. Indeed, estimates of the portion of the fertilizer market that is only transiting to neighboring countries (Rwanda, Burundi, and the Democratic Republic of the Congo) are as high as 60 percent, further limiting the attractiveness of the Uganda market.

Transport. Uganda's main port of access is Mombasa, with almost all fertilizer products directly sourced and transported from Kenya. Uganda-destined products are bagged (in 50 kilogram bags) and transported to Kampala, the main in-country distribution point, after bulk arrival overseen by Kenyan importers. Transport from Kenya is expensive ($150 per ton) since all land imports are by truck (30-40 metric tons per truckload), and the majority of importer-wholesalers purchase in small units (100-200 metric tons).

Inland transportation within Uganda is by road. The current rail infrastructure and trains are obsolete and non-functional. In its January 2007 fertilizer strategy, the Government of Uganda highlights upcoming modernization of the rail system between Kampala and Mombasa as an immediate opportunity to reduce transportation costs. However, there is no specific action plan to make this happen in the foreseeable future.

Production. Public and private sector representatives often talk about future production opportunities, particularly the possibility of blending products in Uganda to reduce costs. The idea would be to import granular mineral stock (i.e., primary materials) to blend in-country with filler materials to lower the overall cost. However, no particular group seems to be seriously exploring such an endeavor because the current level of demand does not justify a blending investment. Some investments have begun in agricultural lime and vermiculite, as well as phosphates. These efforts should be supported since such entrepreneurial activities can enhance the availability of fertilizer, reduce costs, and create jobs.

Fertilizer Cost Chain Analysis

The total annual market in Uganda for 2006 was approximately 25,000 metric tons of fertilizer products. Exhibits IV-2 and IV-3 provide basic fertilizer data for Uganda from 1992 to 2002 for imports and consumption. Most fertilizer is procured for direct use by estates and contract farmers in the tea, sugarcane, tobacco, and rice markets. Only about 30 percent is procured by traders for retail sales, and much of this is sold through NGOs and development projects. Nearly all fertilizer is procured from Kenyan importers based in Mombasa or Nairobi, with about 10 percent procured from Tanzanian importers.

The original source of these products has been Russia and the Arab Gulf (urea), Russia

and the United States (DAP), and Ukraine, Russia, and Romania (NPKs). Most Ugandan importer-wholesalers also function as brokers. They import fertilizer only after tendering for and being awarded a contract by commercial estates. Due to market risk and high credit cost, these brokers do not maintain significant inventories for resale. Over the past five years, the number of stockists has increased thanks to technical support from donor projects, which has led to a growth in retail sales.

There are no fertilizer subsidies in Uganda. Retail prices are high, with the ratio of retail-to-FOB price averaging around 2, and all surveyed products retailing at more than $500 per metric ton. High prices are mostly due to high inland transportation costs, small volumes, and large transaction costs. The relationship between Ugandan secondary importers and Kenyan primary importers is important because almost all of Uganda's fertilizer is imported through such connections. Unfortunately, these connections are minimal because Ugandan importers are essentially brokers responding to estate tender calls and do not have distinct marketing or market development strategies. For their part, Kenyan importers take no direct interest in marketing opportunities in Uganda or elsewhere.

Detailed total product consumption by crop is difficult to establish, but some data is available for 2002 as shown in Exhibit IV-4. Estimated values for the total product mix in 2006 are 6,000 metric tons of urea, 1,000 metric tons of DAP, 1,000 metric tons of CAN, and 17,500 metric tons of NPKs, for a total of 25,500 metric tons.

Four product imports were surveyed for this report, following the supply cost chain from the source to the retail price level in Kampala. The products were urea (sourced from Mombasa or purchased with CIF delivery in Kampala), DAP (ex-Mombasa and Eldoret),

Exhibit IV-2. Uganda Fertilizer Imports (nutrient metric tons), 1992-2002

Year	Uganda Fertilizer Imports by Type			
	Nitrogen	Phosphate	Potash	Total
1992	400	100	300	800
1993	1,300	400	500	2,200
1994	1,000	400	500	1,900
1995	800	200	300	1,300
1996	200	200	200	600
1997	200	200	200	600
1998	1,825	939	771	3,535
1999	2,077	1,320	1,082	4,479
2000	3,668	1,794	1,567	7,029
2001	4,500	1,000	1,000	6,500
2002	4,330	2,698	2,278	9,306

Exhibit IV-3. Uganda Fertilizer Consumption (nutrient metric tons), 1992-2002

Year	Uganda Fertilizer Consumption by Type			
	Nitrogen	Phosphate	Potash	Total
1992	400	100	300	800
1993	1,300	400	500	2,200
1994	1,000	400	500	1,900
1995	800	200	300	1,300
1996	200	200	200	600
1997	200	200	200	600
1998	1,825	939	771	3,535
1999	2,077	1,320	1,082	4,479
2000	3,392	1,737	1,510	6,639
2001	3,800	1,000	1,000	5,800
2002	4,330	2,698	2,278	9,306

Exhibit IV-4. Estimated Imported Fertilizers in 2002

Company	10-20-20 +BS	25-5-5	Urea	CAN	TSP	SSP	DAP	MOP	Other	Total
Kakira Sugar			1,500		400					1,900
Balton(U)		800	2,700	100	650	45	350	200		4,845
Uganda Tea Dev.		1,500								1,500
Sugar Corp of Uganda			500	500						1,000
BAT	1,610			300						1,910
Tilda			200		100					300
Other			500						500	1,000
Total	1,610	2,300	5,400	900	1,150	45	350	200	500	12,455

Source: IFDC, "An Action Plan for Developing Agricultural Input Markets in Uganda"

Exhibit IV-5. Relative Cost Components

Cost Component	%
Product Cost (FOB plus bagging costs)	65%
Transportation (includes ocean & inland freight)	18%
All Margins	8%
Finance Costs	5%
Overhead Costs	2%
Official Taxes	2%
Total	100%

and 25-5-5-5s for a tea plantation (sourced from Mombasa). All products were imported into Uganda in bags by road in relatively small tonnages varying between 350 and 2,375 metric tons. The urea was sourced from the Arab Gulf, the 25-5-5 from Finland, and the DAP from Jordan. The FOB prices were consistent with published FOB prices. Ocean freights for all three products were consistent with market rates during 2006. The results of the cost chain build-up are summarized in Exhibit IV-6 and presented in more detail in Exhibit IV-7. The major cost components as a percentage of the average retail price for the four examples are presented in Exhibit IV-5.

Kenyan importers represent a highly competitive oligopoly, with 5 major importers capturing 88 percent of the market share and 3 companies accounting for the 12 percent balance. Yara (32 percent), SKL (18 percent), MEA (14 percent), Supplies and Services (14 percent), and Devji (10 percent) all import through Mombasa. The top three importers have affiliations with international fertilizer companies or traders: Yara with its parent company, SKL with Kemira (the Finnish fertilizer producer), and MEA with ConAgra (Europe), a major agro-trading company and fertilizer producer. All major importers have access to dollar- or euro-denominated credit sources at an annual interest of approximately 7.5 percent. Their finance costs are considered reasonable, while smaller companies are at a disadvantage in this area.

The MEA-ConAgra relationship involves a memorandum of understanding between the companies, which allows MEA to draw down product from ConAgra's inventory in Mombasa. ConAgra imports on its own account, and all port operations and warehousing are undertaken by the forwarding agent, Mitchell-Cotts. This company arranges for dock-side bagging by one of the three independent international bagging companies, namely Nectar, Interglobe, and Multiport. In addition to these three, Yara maintains its own bagging equipment and bags its own product dockside.

Exhibit IV-6. Uganda Fertilizer Cost Chain Summary, 2006

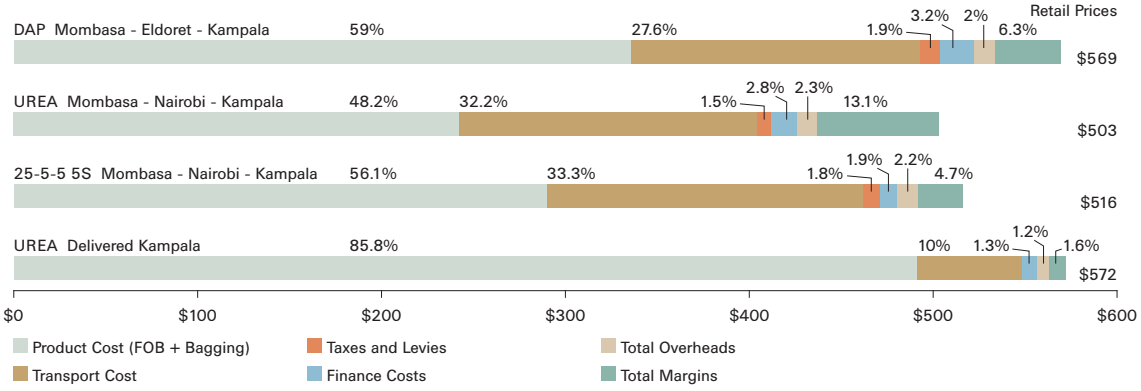
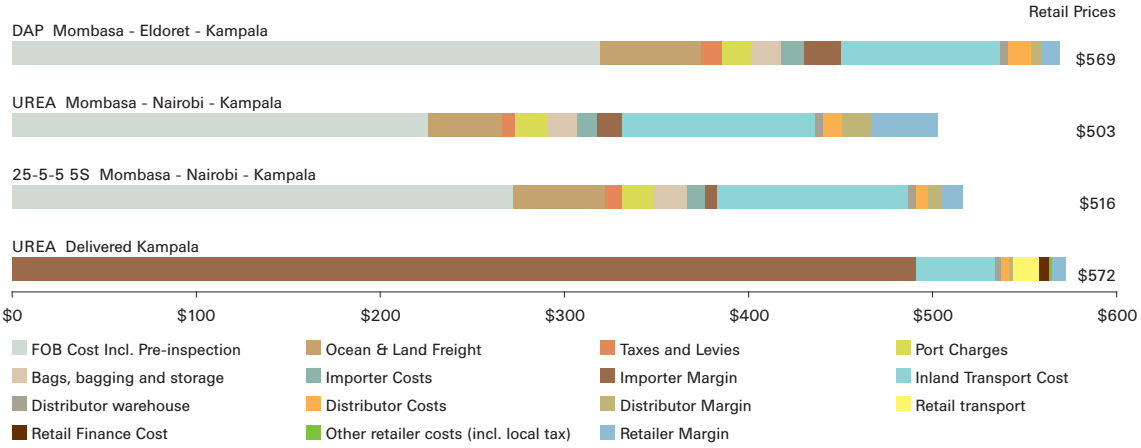


Exhibit IV-7. Detailed Uganda Fertilizer Cost Chain, 2006



SKL also bags its own products, but does so at its warehouse. Yara and SKL bagging costs are slightly lower than for the other companies. Bags and bagging costs average around $16 to $17 per metric ton, including transport to nearby warehouses. Bagging rates average 2,500 metric tons per day, with occasional rates up to 3,000 metric tons per day.

Of all the ports surveyed, Mombasa has the most efficient fertilizer operations. However, port charges are relatively high at roughly $17 per metric ton, and there is no suitable fertilizer storage at the port. Rail loading for bagged product is available, but no fertilizer has been directly loaded to rail cars for years. All products are moved by medium-sized trucks to nearby warehouses. Two companies, MEA and SKL, have additional warehouses at Eldoret. MEA transports product to Eldoret by rail as well as road. Rail is more cost-effective, but slow and unreliable in spite of the recent privatization. Railcars are in short supply and derailments are frequent. The rail company holding the management concession, Rift Valley Railways, is undercapitalized and unable to make the major improvements and investments required to deliver more efficient service.

Moving product inland is expensive. Transport from Mombasa in 28 metric-ton truckloads has to pass through the center of Nairobi. Kenyan roads from Mombasa to Nairobi and from Nairobi to the Ugandan border are in extremely poor condition for long distances. The total cost of road transport from Mombasa to Kampala is around $105/metric ton compared to $86/metric ton via Eldoret using the rail and road combination. The Eldoret route provides cost savings due to lower rail freight charges and avoids Nairobi's congestion, but is unreliable and has insufficient capacity to meet all needs.

Case 4 in the cost chain analysis demonstrates a delivered urea price to Kampala of $491/metric ton. Case 2 for urea delivered to Kampala for another Ugandan importer was only $436/metric ton. The comparison may not be fair due to different international urea FOB prices between the cases as urea prices rose strongly throughout 2006 and there was a considerable difference in the order size (2,375 metric tons versus 350 metric tons). However,

this difference illustrates that some Ugandan importers are not concerned with competitive pricing due to the small size of the market and limited competition.

Market Demand

Demand. The demand for fertilizer in Uganda is driven by the estate sector, which represents 70 percent of consumption. These estates principally produce tea, sugarcane, and tobacco for the export market. Out of the remaining 30 percent of the market, 60 percent is estimated to consist of fertilizer transiting to neighboring countries, further limiting non-estate demand in Uganda. While important, economies of scale achieved by the estates do not appear to be the determining factor in fertilizer usage and application among smallholders. Smallholders involved in contract-farming programs apply fertilizers that result in higher yields and incomes.

Traditional Ugandan smallholders growing maize under subsistence conditions use little or no fertilizer. Farmers cultivating in a high-risk environment due to climatic variability and unreliable output markets under-invest in agriculture. Fertilizers are not readily available in or near (within 10 kilometers) most villages, and the purchasing power of inhabitants is severely limited. Most smallholder farmers are subsistence producers with minimal access to output markets (prices, buyers, and information), training, or technical support. Another major constraint to smallholder fertilizer use is the perception that there is no market for the increased output that justifies the investment in agricultural inputs. Farmers need reliable output markets for their increased production before they invest in improved techniques and technologies.

Other challenges to farmer productivity include knowledge and information gaps, inadequate post-harvest handling, lack of water management systems, and poor produce markets.

Market Environment

Policy. In response to the Abuja Fertilizer Summit, Uganda drafted a fertilizer strategy that identifies a number of challenges facing domestic agricultural production and provides general recommendations to address them. It highlights a list of supply- and demand-driven activities, with more emphasis placed on the former. It also identifies output marketing as critical to "prime the whole system" and points to the "lack of organized output markets" as a disincentive for farmers due to their cyclical nature. It concludes by calling for a holistic approach to ensure returns on investment and for bold interventions in production, processing, and marketing to achieve agricultural productivity and sustainable growth. The document reads like a needs assessment that mostly identifies issues, but fails to provide the required detail to outline and clarify a plan of action.

Although there is no initiative to create a new agricultural policy, the Government of Uganda is seriously considering an input subsidy program. Officials are reviewing Malawi's experience with a voucher program to stimulate production. Ministry of Agriculture officials have also proposed the creation of a "national" credit facility that would work with existing microfinance institutions to improve access to credit.

Regulation. Farmer and agricultural input associations currently implement promotion and regulation of fertilizers. The key issue

for the government is the need to increase productivity to enhance food security, rural incomes, and employment. The current law places fertilizers alongside other imports, but many argue that fertilizer needs a separate legislative document that would include a "truth in labeling" component to provide quality assurance.

Finance. Most fertilizer transactions in Uganda are on a cash basis, and given the bulk nature of fertilizer, the sums are large. Lack of appropriate financing is clearly a constraint on market development. The commercial interest rate of 22 percent paid to local banks is prohibitive, given the term length of any loan in the agricultural sector. Almost all banks prefer to lend to commercial traders of other goods because their turnaround on loans is much quicker. Hence, many firms struggle to mobilize their own funds to finance fertilizer purchases. The absence of internationally linked fertilizer companies in Uganda precludes a local market actor with access to euro- or U.S. dollar-denominated interest rates to finance imports.

Research. There is a lack of recent research on crop-specific fertilizer response for different agro-climatic zones. Any research undertaken in this area must be done with actual farmer trials given the low level of fertilizer use in Uganda. There is clearly room for demonstrative research to convince farmers of the efficiency and effectiveness of using fertilizers on their fields.

Market Performance

As noted earlier, Uchumi makes efficient use of its backhaul capacity from tea exports to dominate the Ugandan fertilizer market. However, it is essentially a transport company, not a dedicated agricultural input supply firm. Thus, Uchumi cannot be expected to lead the industry. Successful production approaches that have stimulated the Ugandan fertilizer market have involved companies engaged in crop-specific commodities (tobacco and rice), specialized crops (high-quality coffee and tea), or processed goods (sugar and sunflower oil). These companies import fertilizers directly and provide their contract farmers with complete technological packages (improved seeds, agrochemicals, fertilizers, and technical assistance), along with direct or implied credit and an assured output market. The farmers exhibit a rapid uptake of new technologies and techniques, including increased fertilizer use.

For example, Mukwano is an oil processor currently working with 30,000 farmers to grow sunflower seeds on 50,000 acres. It purchases all of the farmers' output at a guaranteed price set at the beginning of the season, and provides them with high-quality production inputs. The firm constructed a new processing plant near the production areas to handle an increase in daily output from 300 to 1,000 metric tons per day. Installing the production capacity near the fields has reduced transportation costs and generated additional rural jobs. Mukwano's growth plan testifies to its success as it now seeks to reach 50,000 farmers.

CHAPTER FIVE

Tanzania Country Study

The fertilizer industry in Tanzania is a curious hybrid of open and command markets. The Tanzanian market is less advanced in its liberalization process than Uganda, although reform efforts are underway. The pre-liberalized Tanzanian market has subsidies at all the major levels of the market chain: importer, wholesaler, distributor, and retailer. The farmer, on the other hand, is not directly subsidized, but is specifically directed regarding quantities and retailers from whom to purchase fertilizer. A newly proposed system will provide credit guarantees to retailers via microfinance institutions to sell to farmers, who will in turn be subsidized through a voucher system (similar to the Malawi program).

Background

Tanzania is a coastal country bordering the Indian Ocean in East Africa with a predominantly agricultural economy. The sector employs more than 80 percent of the workforce, represents over 43 percent of the gross domestic product, and accounts for more than 85 percent of exports. Donor assistance and solid macroeconomic policies supported a real gross domestic product growth of nearly 6 percent in 2006. Agriculture plays a critical role in ensuring food security: 96 percent of the food consumed in-country is produced locally, and agriculture provides raw materials for the agro-industrial sector. Agricultural producers include smallholders, medium-scale and a few large-scale farmers. Most farms are characterized by low productivity due to low soil fertility attributed to nutrient mining, soil erosion, and leaching.

Before the liberalization and privatization of the early 1990s, all fertilizer production, import supply, and distribution was handled by the Tanzania Fertilizer Company (TFC), a government parastatal. Distribution to smallholder farmers was largely through cooperative unions, which were also government institutions. This system included government subsidies, credit facilities, and producer

Exhibit V-1. Tanzania's Fertilizer Market

International Exporters (Manufacturers and/or Raw Material Suppliers) or Traders	
Importer/Wholesaler	Agro Business
1. TFC 2. Nutricare 3. Export Trading Co. 4. Premium AgroChem 5. Shival Tank & Co.	Tobacco 16% 2 firms
Wholesaler/Distributor	
	Cooperative Societies
Retailer	
Farmer	Own Farming
Includes: Estates Large Scale Small Scale	Contract Farming

and fertilizer price controls, which resulted in increased fertilizer consumption but at an unsustainable cost.

Market Organization

The private sector has been slow to take over the former state role since government withdrawal from the business. However, fertilizer importation and distribution is largely handled by the private sector. Farmers have not benefited much from the current fertilizer marketing system, mainly because the private sector has been more active in responding to trading opportunities offered by the liberalized output markets rather than input markets.

Market Structure

The structure of the fertilizer market in Tanzania consists of overseas suppliers, importers, wholesalers, retailers, stockists, and farmers (small, medium, and large-scale farms). In 2006, 11 companies imported fertilizer, of which 8 were private companies, 2 were tobacco companies and 1 State Owned Enterprise (SOE). The majority of these companies are based in Dar es Salaam, with distribution channels at regional town centers. As in many other African countries, there is no clear demarcation between importers and wholesalers, and almost all importers have wholesaler and/or retail operations at regional trading centers. There are a few viable cooperative unions that supply inputs to their member farmers, especially in areas that produce traditional export crops like cotton, coffee, and tea. Most fertilizer retailers are located at regional and district town centers and small settlements along the roads, but very few are found in rural areas. This is due to high transaction costs attributed to poor infrastructure. Most retailers and stockists lack capital and knowledge of fertilizer handling and overall business concepts, which result in high bankruptcy rates.

International traders/producers. Issues specific to Tanzania include excessive "caking" of fertilizers originating with manufacturers and especially prevalent in bulk imports. The high costs and low quality arise from port inefficiencies (poor handling, bagging, stitching, etc) in Dar es Salaam. The proposed solution is to invest in mechanized port equipment; the cost would be warranted by the number of countries using the Dar port (Tanzania, Zambia, Uganda, Malawi, Burundi, Rwanda, and the Democratic Republic of the Congo).

Importers. Importers felt the market was subsidy-dependent, which limits market growth due to inadequate allocations to regions. Continuous cost-cutting was underway due to increased world prices (50 percent increase in DAP prices from 2006 to 2007), with limited volumes and high cost of financing further pushing up prices.

All countries using the Dar port could potentially consolidate their orders to achieve better bulk prices on the world market. A consolidation order of this magnitude and complexity would require guarantees on volumes, quality, types, delivery, and credit. Another suggestion was to provide importers with credit guarantees that would reduce financial processing costs and avail the African fertilizer market of world interest rates (4 percent instead of 10 percent on the local market).

Wholesaler-distributors. Most importers also play the distributor role in Tanzania. There is no freedom to target or choose customers since the government appoints retailers and requires them to buy and sell from approved

market agents. The central and western regions of the country are not well served by transportation options (neither road nor rail), resulting in increased transport costs to these regions. Training is needed on both fertilizer applications and best agronomic practices.

Retailers. Financing received through the Agricultural Input Trust Fund is limited due to budget constraints. Packaging sizes of 25 and 50 kilogram bags are inappropriate for the retail market. Retailers have an insufficient knowledge base to assist farmers. There are limited sales growth opportunities because farmer permits from the government are directed to specific retailers. Suggested interventions included rural finance credit and/or guarantees, strengthening the Agricultural Input Trust Fund both technically and financially, and training retailers on agronomic practices.

Farmers. Prices increase annually and are exacerbated by domestic taxes and high transport costs from the farmer to the retailer. Purchasing permits are slow to obtain, insufficient in volume, and provide limited access (low allocations). Insufficient market information and access, combined with limited technical and extension support, result in low fertilizer use and uncertainty about potential input and output prices, buyers and sellers, and product quality. There is no real representative body for farmers. Potential interventions include rural credit financing guarantees, improved market information systems, capacity building for the Tanzanian Bureau of Standards, and technical assistance to cooperative societies at the farmer level.

Market players. About 16 percent of the fertilizer market is represented by two tobacco companies (Alliance One) that service their farmers and work under contract-farming schemes. The Tanzania Fertilizer Company (TFC), Export Trading Company, Shival Tank & Co, Nutricare, Premium Agro Chem, and about 12 other companies import fertilizers directly. TFC is a government-owned company operating as an independent entity and competes directly with other private sector importers and the government, which can import fertilizer directly. Market share among these players changes annually due to arbitrary government allocations and not necessarily because of market needs or firm capabilities. Recent fertilizer import levels are shown in Exhibit V-2.

The Fertilizer Society of Tanzania is a prominent and influential organization whose main officers are also managing directors of the main importing companies (TFC and Premium Agro Chem). They identified the lack of market options for food crops as a major hindrance to small-scale farmers' incomes and subsequent ability to purchase fertilizers. They were also concerned about the timing of fertilizer arrivals and mentioned that government decisions regarding the volume and allocations of subsidized inputs were often late, delaying companies' procurement arrangements and supply to farmers.

Market Conduct

The fertilizer market in Tanzania can be characterized as a hybrid oligopoly due to the strong influence of the state on quantity and allocation decisions. The agricultural sector, including the input industry, falls under the scope of the Ministry of Agriculture, Food Security, and Cooperatives. The government has been directly involved in the fertilizer market for decades, and became fully engaged

in a subsidy program during 2003-2004. The government establishes the total amount of fertilizer to be subsidized and provides allocations to importers, distributor-wholesalers, and retailer-stockists. Farmers are given permits that instruct them on the exact amount and type of fertilizer to purchase under the subsidy program, and further specify the particular stockist from whom to purchase. The government engaged an international manufacturer (Yara) to provide the necessary fertilizer supplies funded through donor assistance. By 2005-2006, the government had 241,000 metric tons in-country, with demand around 120,000 metric tons. Although the government has requested additional support to form an international partnership to create a buffer stock for fertilizers, the excess stock has essentially dissolved the partnership. The government increased the subsidy for the coming season to $16 million from the $6 million expended in 2006-2007.

Private sector market players claim the fertilizer market is bound by the subsidy amount and government allocation decisions, although the government allows a total volume estimate of needs greater than the subsidized portion. The government directly imported fertilizer during the 2006-2007 agricultural season, and distributed and delivered supplies throughout the country. The previous season created a strong precedent for the government's role in influencing the market. Although multiple stakeholders have provided suggestions about sustainability and impact on market actors to improve the current program, they also acknowledge that the subsidy program has provided an important supply push to make fertilizers available at a reduced cost. The volume of subsidized product available for the program is based on the government's budget, which has retarded the development of a fertilizer market outside the subsidy program.

The subsidy program has influenced private sector behavior away from market signals to the command economy. Wholesalers and retailers make a plan based on their previous season allocations as a best first estimate of fertilizer demand for the season. They pay particular attention to rumors among the main importers (TFC) regarding the annual subsidized volume. They also visit government district authorities and ask about their fertilizer plans and access their figures. Based on the preliminary figures and information received, these market actors then lobby to increase the volume of fertilizers imported and their respective allocations.

Savings and credit cooperative societies are another important player on the fertilizer market. These financial institutions have taken

Exhibit V-2. Tanzania Fertilizer Imports (nutrient metric tons), 2004-2006

Product	2004	2005	2006
UREA	73,145	98,524	45,405
DAP	10,850	35,287	15,000
CAN	26,749	8,117	21,889
SA	4,000	475	7,660
TSP	4,500	700	2,475
20:10:10	7,138	2,759	7,000
25:05:05	3,000	3,000	14,000
10:18:24	31,079	16,150	10,970
17:17:17			10,000
MOP/SOP	2,000	1,350	3,000
Others		1,200	800
Total	162,461	167,562	138,199

Exhibit V-3. Tanzania Fertilizer Consumption (nutrient metric tons), 2003-2006

Product	2003/04	2004/05	2005/06
UREA	36,150	54,674	46,570
DAP	13,897	10,551	26,588
CAN	21,494	12,680	15,460
SA	4,099	2,593	1,554
TSP	2313	2,479	2,065
20:10:10	5,611	168	3,704
25:05:05	1,134	7,236	2,570
10:18:24	16,199	18,624	17,477
MOP/SOP	941	2,007	1,283
Others	820	41	2,020
Total	102,658	111,053	119,291

interest in distributor-wholesaler-retailer roles for their members at the rural level, and also service rural-based retailers. In addition, the government directly purchases some output food commodities (e.g., maize) at an established floor price guaranteed to farmers. Farmers benefit from this system because free market traders must match or exceed the government set price in order to acquire grain. Once the government purchase program ends, prices return to an equilibrium level that balances supply and demand.

Market Supply

The estimated annual volume of fertilizer imports is approximately 140,000 metric tons, with Tanzanian importers sourcing their product from international manufacturers while constantly comparing prices, availability, and transport costs. Europe, the Middle East, and Russia are among the main sources of sea-transported fertilizer to Tanzania.

Retailers and stockists experience the packaging problem more acutely than the larger distributors and wholesalers. Generally, 50 kilogram bags are not affordable to small-scale farmers. The common practice to open larger bags, scoop fertilizer out, and weigh it in stores creates spills while inaccurate scales result in higher costs to farmers. Bagging fertilizer in smaller packages (even 25 kilogram sacks) would enable buyers to purchase fertilizer and invest in productivity enhancement for nearly half the original investment. Another problem identified at this level was the practice of storing product on the floor, which results in caking. This problem arises during the high-demand periods and is transferred throughout the supply chain. The suggestion is for importers to stock their bagged fertilizers on pallets.

Logistics. All fertilizer is imported through Dar es Salaam seaport and discharged at two berths (numbers 7 and 8). The draft on both berths is roughly 10 meters, which is the minimum needed for vessels of around 20,000 metric ton. By contrast, berths 4, 5, and 6 have drafts of only 7 meters, which are only appropriate for coaster vessels. Fertilizer usually arrives in bulk, with bagging performed by the port authority and not contracted out, as is the case in most other African ports. The port authority recently procured three new bagging units to replace old ones, but cannot yet provide figures on bag weights and discharge performance. Should there be a problem, the port authority does not accept any responsibility; all risks lie with the port user, which contrasts with private contractors under contractual obligations and under which port users have some recourse in case of non-performance.

Port inefficiencies in Dar es Salaam include handling (losses estimated at over $20 million per year due to slow unloading), bagging (inaccurate weight bags in a range of 48 to 55 kilograms per bag rather than the standard 50 kilograms), and poor stitching (inadequate materials). Trailers and tug masters (to pull the trailers) are limited and cannot cope with the current level of demand. If the bagging speed were to increase, the cargo could not be taken away from the quayside any faster.

Most in-country transport is conducted by road in trucks. Rail is used to service the central and western regions since it is the only economically viable option. However, this rail line was built in the 1950s, has deficient up-

keep, and operates at reduced capacity. Sending fertilizers to those areas is difficult, slow, and expensive. In addition, securing transport to those regions is nearly impossible due to the limited availability of trucks.

Storage. There is a lack of storage space for fertilizer in the port, and fertilizer is typically stored outside under verandas. The previous shade alongside berth number 8 is being converted to container space, further limiting available storage space. Removing fertilizer from the port is slow due to joint entry and exit from Gate 5. Other gates can be used under special circumstances, but this requires a waiver of port responsibility for any cargo losses. Grain supplies take precedence over fertilizer unloading. Fertilizer will not be taken out from the same gates as grain if a shipment of the latter is unloading at the same time as fertilizer.

Domestic production. A government-owned fertilizer manufacturer previously operated for local production in Tanga, where NPK and DAP were produced. The manufacturer ceased operations in 1991 due to inadequate maintenance and lack of reinvestment in the facility infrastructure. A rock-phosphate company (Mingingo) based in Arusha is currently producing a powdered product with plans to granulate in the future, although no specific timeline has been set. According to Ministry of Agriculture officials, phosphorus is the main missing ingredient in Tanzanian soils. There are potential phosphate deposits (Minjingu in Manyara Region) and natural gas in southern Tanzania (Songosongo, Mnazi Bay, Mkuranga) that could justify investments in national production capacity to service the local and regional markets.

Fertilizer Cost Chain Analysis

Historic Tanzanian import and consumption values for the major fertilizer products are presented in Exhibit V-4. The Tanzanian fertilizer market was estimated at a total of 119,000 metric tons in 2006. Exhibit V-5 provides detailed product import and consumption data for 2004-2006.

The overall downward trend in total fertilizer imports and consumption in Tanzania over the last decade has been reversed in the last few years due to the government's subsidy program. The detailed product breakdown demonstrates that di-ammonium phosphate (DAP) use has increased as the phosphate source compared to triple superphosphate (TSP). Urea consumption for nitrogenous nutrients has increased at the expense of CAN and ammonium sulfate in the past two years as market actors have become more aware of

Exhibit V-4. Tanzania Fertilizer Nutrient Imports (nutrient metric tons), 1992-2002

Year	Tanzania Fertilizer Imports by Type			
	Nitrogen	Phosphate	Potash	Total
1992	31,254	4,200	4,700	40,154
1993	31,700	6,800	3,200	41,700
1994	20,000	6,900	3,600	30,500
1995	15,000	7,000	5,000	27,000
1996	24,300	7,000	4,039	35,339
1997	24,943	8,242	5,878	39,063
1998	19,324	5,917	5,615	30,856
1999	12,535	6,234	2,211	20,980
2000	14,135	5,974	2,295	22,404
2001	9,357	1,838	596	11,791
2002	7,371	1,415	586	9,372

Exhibit V-5. Tanzania Fertilizer Nutrient Consumption, (nutrient metric tons), 1992-2002

Year	Tanzania Fertilizer Consumption by Type			
	Nitrogen	Phosphate	Potash	Total
1992	33,147	10,000	4,776	47,923
1993	26,300	6,800	3,200	36,300
1994	25,400	6,900	3,600	35,900
1995	15,000	7,000	5,000	27,000
1996	20,175	7,000	4,039	31,214
1997	24,943	8,300	6,737	39,980
1998	19,324	5,917	5,615	30,856
1999	12,535	6,234	2,211	20,980
2000	14,135	5,974	2,295	22,404
2001	6,660	884	330	7,874
2002	6,206	442	500	7,148

Exhibit V-6. Relative Cost Components

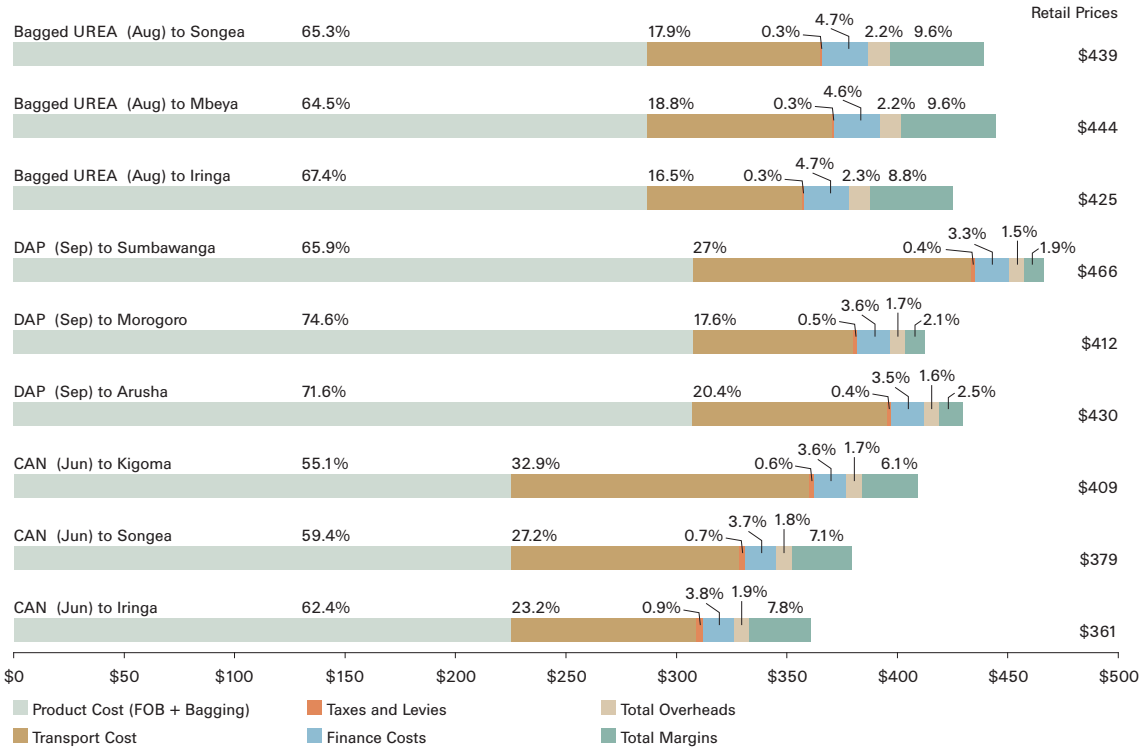
Cost Component	%
Product Cost (FOB plus bagging costs)	65%
Transportation (includes ocean & inland freight)	22%
All Margins	6%
Finance Costs	4%
Overhead Costs	2%
Official Taxes	1%
Total	100%

nutrient unit costs in selecting fertilizers. Note that the import figures include values destined for other countries in the sub-region.

Cost chains were established for three products (CAN, DAP, and bagged urea), and each followed through to three different distribution points in the country. In Case 1, the cost chain for CAN imported from Finland revealed an FOB cost of just under $200/metric ton, which doubled by the time it reached the retail market in Kigoma. The reported inland transport cost of around $62/metric ton was no higher per ton mile than for other countries. However, the distances inland are extremely long and the road infrastructure poor. The average cost components as a percentage of total cost for these products in 2006 are presented in Exhibit V-6.

The cost chain comparisons demonstrate port charges at Dar es Salaam similar to those in Mombasa. The Mombasa port charges are currently under review as they have not been increased for 12 years. Port charges are high given the quality of facilities available at Dar es Salaam. Bagging costs and storage are extremeley high given the low daily rates, monopoly position of the Port Authority, and limited availability of warehouse space around

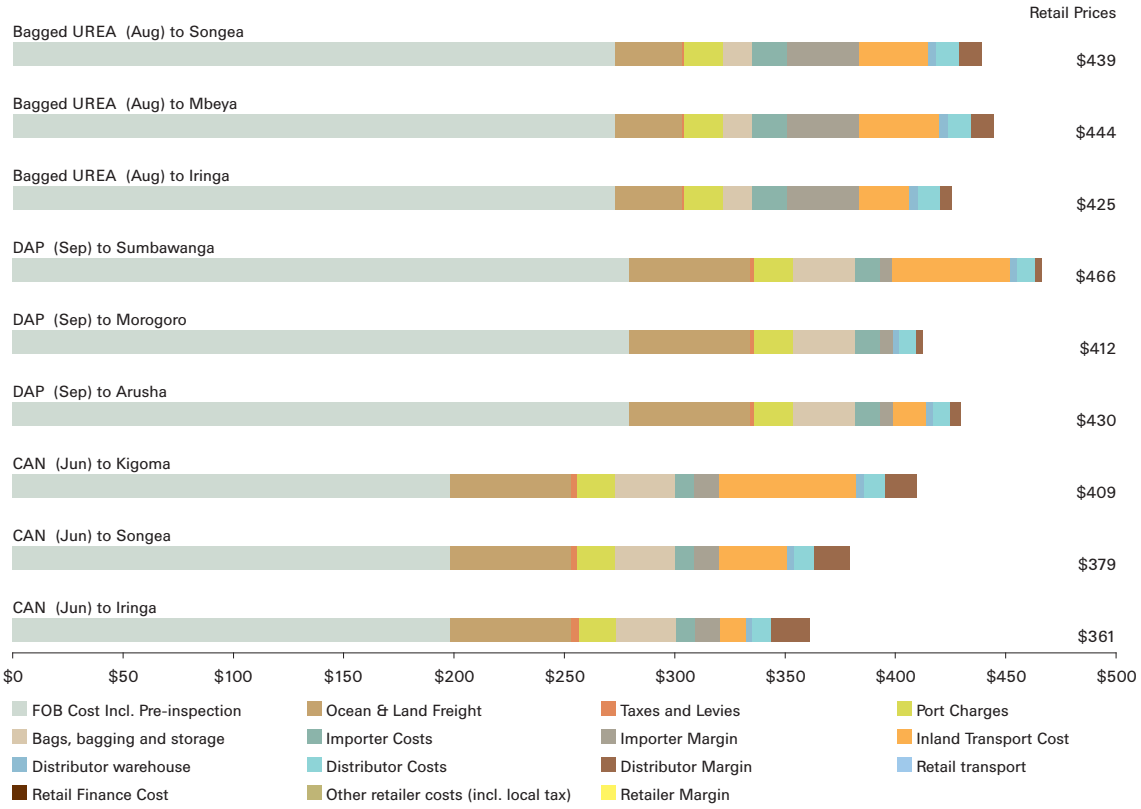
Exhibit V-7. Tanzania Fertilizer Cost Chain Summary, 2006



the port (estimated around 20,000 metric tons). Overall bagging and storage costs are approximately $15/metric ton higher for products bagged at Dar es Salaam compared to the bagging and storage costs for the importation of bagged urea in Cases 7 to 9. The price differential between bagged and bulk urea from the Arab Gulf is $10/metric ton so it appears that the Port Authority's monopoly position erodes any cost advantage normally found in dockside bagging of bulk material.

Overall margins are low (6.1 percent), partly due to the fact that the cost chain only includes the combined wholesale/retail margin, with no allowance for further margins to the stockist level in rural areas. Importer margins for bagged urea were excessively high (9 percent) in Cases 7 to 9, which may indicate price gouging when international urea prices were rapidly rising. African fertilizer importers often state that volatile international prices create severe risk for importers and thereby justify higher margins. For example, an importer with a negotiated price can find that a competitor has imported at a lower cost due to falling FOB values over the course of one month. The first importer is then forced to sell at a reduced price or even a loss. However, the converse is also true. A rising market, as in 2006, offers windfall profits to some importers who time their imports correctly or luckily. It remains to be seen if this advantage is retained when demand is expressed against the higher price levels.

Exhibit V-8. Tanzania Detailed Fertilizer Cost Chain, 2006



Market Demand

Retail fertilizer is commonly sold in 50 kilogram bags, although in some areas the smaller 25 kilogram bag can be found. In vegetable-growing areas, fertilizer retails in small lots of 1, 2, 5, and 10 kilograms to service the smaller fields. Tobacco, coffee, and tea estates demand specific fertilizer formulations. Their crop specificity and differentiated (assured) markets allow companies to afford fertilizer, particularly since they are export-driven. These companies also have partial access to the subsidized fertilizers that can translate into reduced costs to the farmer.

Independent farmers who establish their own production and supply contracts with large clients (including staple commodities like maize or millet) have the ability to better forecast their earnings and afford their fertilizers. Others involved in vegetable production, where crop value is much greater than staple commodities, can afford fertilizers and other production inputs. Smallholders have access to subsidized fertilizer since the retail price was previously negotiated between the stockists and the government. Most smallholders are subsistence farmers who grow staple crops (e.g., maize) and face low output prices. Their ability to purchase fertilizers is limited by their incomes.

Market Environment

Policy. The main fertilizer policy in Tanzania is the government's subsidy program. As it is based on the government's budget and establishes the marketable volume of fertilizers, every trader's participation in the market is constrained by the government's finances. The dynamics of the subsidy allocation include the registration of transport costs with the government at every market level (importer, distributor-wholesaler, and retailer-stockist), with the exception of the retailer-stockist to farmer level. At the regional level, stockists present their costs to the government officials and prices are "worked out." Margins are agreed upon, including handling costs, and prices are determined at the village or ward level. The government instructs stockists to pick up fertilizer from the importers' warehouses. All prices are previously contracted at the importer, wholesaler, and retailer levels. The retailer's price to the farmer is fixed in order to support the smallholder.

The total allocation is arbitrarily divided among the various players and a portion of an importer's volume (e.g., 10 metric tons) may be allocated to a specific geographic region (such as Iringa). Regional governments may allocate to 10 different stockists, but at different volume levels for each. Wholesalers might receive an inappropriate amount (2 metric tons) given the scale of their operations, resource base, level of demand, and business and marketing abilities. In the same vein, the allocation of farmer permits is arbitrary since it directs farmers to purchase a specific amount of fertilizer from a particular retailer-stockist. Farmer allocations often do not match the volume allocated to the specified trader. The end result is reduced economic activity and business opportunities for all actors along the fertilizer supply chain, leaving unsatisfied demand, insufficient stocks, or excessive inventories.

Both traders and farmers recommend allowing farmers to purchase freely from any retailer-stockist. Traders suggest that the government should continue enforcing fixed prices under the subsidy program, but that it

should change the subsidy allocation program by eliminating sales permits. A free market-friendly approach would allow all players to compete and service the market according to business abilities, while not being restricted to pre-established volumes.

The government is already contemplating the next version of its subsidy program that would include a voucher system. In Tanzania, such a program is perceived as consistent with AGRA and the Rockefeller Foundation, and is based on the Malawi approach of direct subsidization at the farmer level. The government seeks to provide affordable prices for the majority of farmers, where the price would be triggered by the user. Empowering the farmer is crucial, and the present subsidy program actually enfeebles farmers by usurping their decision-making power. The Ministry of Agriculture would like to establish an immediate national approach that eliminates the current permit system. Partners such as IFDC and CNFA are prepared to provide assistance in this regard, as they have done in Malawi and Kenya. The government plans to implement a pilot program in the southern and northern districts during the upcoming season.

Regulation. The Fertilizer and Animal Foodstuffs Ordinance (Cap 467) of 1962 is the founding regulatory document for the fertilizer industry. The ordinance was meant to regulate importation, manufacture, and sale of fertilizer and animal foodstuffs, but enforcement was difficult due to the disparate nature of these two product lines. For example, the custodian of this law is the director of veterinary services within the Ministry of Livestock Development, while fertilizer is housed within the Ministry of Agriculture. The government has begun the process of repealing the Fertilizer and Animal Foodstuffs Act to facilitate the development of a regulatory framework for fertilizer.

The functional law impacting fertilizer is the 1975 Standards Act, which established the Tanzania Bureau of Standards. The bureau is mandated to standardize imported and locally produced commodity specifications, including mineral fertilizer. It is not an overall fertilizer regulatory body, and it rarely acts beyond setting and controlling the standards at the port of entry. This lack of quality control and regulatory mechanisms has allowed sales of low-quality fertilizer products on the market.

Finance. Exim Bank's involvement in the fertilizer business within the agricultural sector focuses on procurement and importation. Its main business is to finance the export crop sector through export guarantee programs with the central bank. The Agricultural Inputs Trust Fund is a government entity providing financing for fertilizer distribution at the stockist level, although their financial capacity is limited and dependent on funds received from the government's annual budget.

Although stockists have access to finance through AGITF, it does not seem to meet their needs, and credit remains a problem. Application fees are high relative to the required loan amounts, and the time spent dealing with financial institutions could be better used elsewhere. Businesses lack access to affordable financing and most auto-finance their operations, which impedes growth and does not achieve economies of scale. In a limited resource environment, they are forced to divide purchases into small increments. Fertilizers are seasonal, capital-intensive products, and each business is a permanently established

operation that also markets other merchandise to farmers and the general public (e.g., seeds, agricultural equipment and tools, flour, sugar, cooking oil, soap, household goods). All buyers purchase at the same time (after the rainy season begins) and merchants' limited inventories cannot meet the level of demand.

Research. The Ministry of Agriculture's Department of Agricultural Inputs stated that the government has invested significant resources to support farmers and analyze their needs. A study of 14 districts demonstrated that many farmers do not know about fertilizers; there are minimal linkages among banks, agro-dealers, and farmers; and output and input market information and communication is non-existent. The ministry's efforts now focus on training farmers in agronomic solutions that include providing adequate rates of production inputs, organizing them into stronger associations, and seeking financial solutions to support production. These supply-driven efforts are perceived as important, but weak output markets, incomplete information, and limited income possibilities were cited as the main constraints.

Market Performance

Fertilizer providers know where to sell their products. Their preferred clients are commercial farmers due to their higher-volume purchases and economic strength. However, a number of retailers do not have the necessary information on input and output markets to determine their clients' fertilizer needs. Previously, the cooperative societies announced output prices in advance, and farmers would evaluate future crop prices to decide what to grow for the next season. This notional command economy futures market allowed farmers to determine prices and volumes so they could forecast earnings, assess expenses, and make investments.

There is no institution that provides futures information on prices and quantities for farmers. Information is also lacking on potential markets, buyers, and alternative production opportunities. For example, in the northern area around Lake Victoria, cotton was previously the most important crop, but is now being overtaken by rice as a better income-earning opportunity. Similarly, coffee production waned around Kilimanjaro, but the tomato market gained importance and now presents real economic opportunity to those farmers who have information on market trends.

Contract-farming schemes in the production of tobacco, coffee, and tea provide a steady income for farmers. Under the contract-farming approach, companies provide inputs, financing (cost and terms), and finally buy the crop from the farmer (discounting previous costs). This works for crops that have assured output markets. Coffee and cashew nut producers are organized into successful producer groups controlled by crop boards, and their high-value commodities obtain premium prices based on their high quality and marketing. However, it appears that smallholder tobacco farmers limit their income opportunities by being involved in the contract-farming arrangement with the marketing companies, since there are no success stories about smallholders graduating to become commercial tobacco farmers.

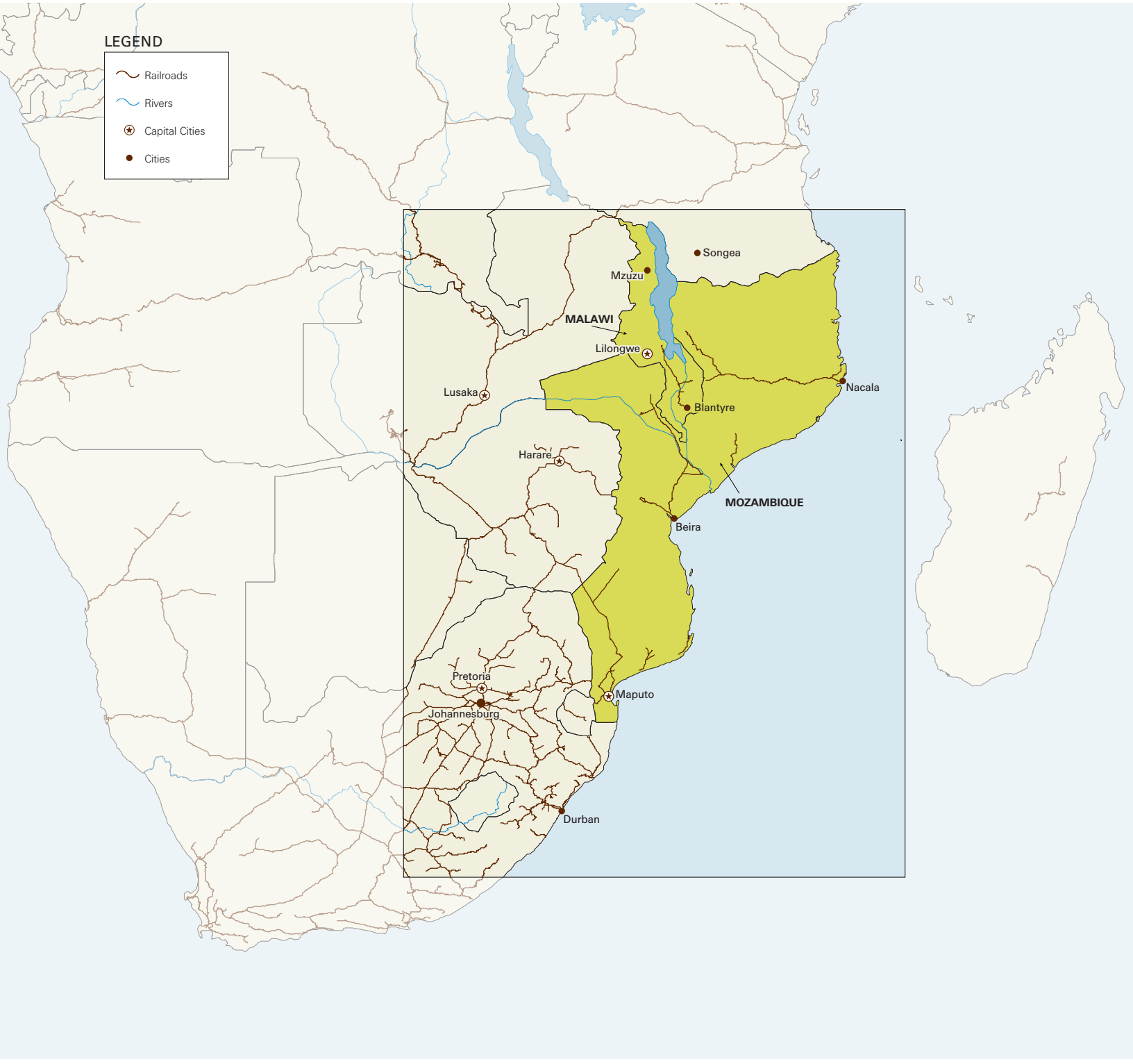
Some argue that contract farming does not allow farmers to make their own decisions and that it is only through freedom of choice that farmer entrepreneurs will arise and evolve. In this ideal situation, farmers would purchase their fertilizer, obtain loans directly from

financial institutions, and sell output to tobacco companies. In order to reach this ideal, farmers need to be trained in agronomic best practices, business planning, financial systems, and organizational management. Investment must be placed directly at the farmer level to build the human capacity that is the only sustainable means of achieving economic independence.

Farmers have found additional means of linking to established output markets other than the contract farming approach. Tomato farmers in Ngorogoro are well-connected with their output market through the use of mobile phones that allow them to monitor prices, spot demand niches, and identify buyers. This type of market information allows them to harvest, pack, and ship their tomatoes in time to obtain premium prices for their crops. Another example involves a farmer in Iringa, who has established supply contracts with schools to assure his output market. He can now make investment decisions based on an income stream, and has purchased a grain-milling machine to add value to his crop and expand to other markets.

The ubiquitous small-scale maize producer does not have the advantage of a guaranteed market unless the government actively purchases staple food crops through a floor price. Unfortunately, government purchases and price guarantees are not sustainable given the limited resources of most African states. The continued lack of input and output market information further limits options for these farmers.

Map of Southern Africa



CHAPTER SIX

Malawi Country Study

An agriculture-based, landlocked country in East Africa, Malawi is one of the least-developed countries in the world. Agriculture employs more than 90 percent of the workforce, represents over one-third of the gross domestic product, and accounts for 80 percent of export revenues. Tobacco exports represent over one-half of the country's exports. Food production and availability remain a major concern, with 53 percent of Malawi's 13.6 million inhabitants living below the poverty line. Approximately 85 percent of the population lives in rural areas, per capita gross domestic product is $600, and the country's economy heavily depends on donor assistance.

Background

Among the countries studied, Malawi presents one of the most important and interesting hybrid markets for fertilizer. In terms of value, fertilizers make up one of the four largest markets in the country. Agricultural inputs, including fertilizer, seed, and CPPs, represent the only sector among the top four that primarily comprises private actors. The role of the state in the fertilizer market is still evolving in Malawi, which is in the forefront in the use of voucher systems, with logistical support from DFID. One could say that the Tanzanian market is moving toward what Malawi is today. However, there is some tension regarding the appropriate role of the state in the marketplace, and how government actions can inadvertently create the wrong incentives for the private sector. Malawi is also interesting because of the importance of producer associations that organize by output crop (e.g., tobacco, cotton, coffee, tea) and input products such as fertilizer.

Stakeholders from the public, private, and donor communities share the belief that a

Exhibit VI-1. Malawi's Fertilizer Market

International Exporters (Manufacturers and/or Raw Material Suppliers) or Traders		
Private	Co-Op	GOM
1. EFC 2. Yara 3. FW-Agora 4. MFC 5. Others	NASFAM	1. SFFRFM (ADMARC)
Wholesaler/ Distributor		GOM Distributor
1. EFC 2. Yara 3. FW-Agora 4. MFC 5. Others		2. SFFRFM (ADMARC)
Retailer/AgroDealer NGOs	Co-Op	GOM Retailer
ETC – 25 FW-Agora 81 Nylambo 66 Yara 7	43 Co-Ops	SFFRFM 56 (ADMARC)
400 formal private and public outlets 226 informal agrodealers		
Farmer		

number of interacting poverty and productivity traps continue to constrain agricultural, rural, and national economic development. Such traps confine input and maize market development, investments in maize intensification, diversification from maize into other agricultural and non-agricultural activities, the ability of rural inhabitants to protect themselves from shocks (particularly the poor), and wider local and national economic development. Unless they can break out of these traps, most Malawian farmers appear to be locked into a cycle of increasing soil degradation, declining agricultural productivity, and growing livelihood vulnerability.

Market Organization

Market Structure

With it subsidy programs, the structure of the Malawian market resembles that of Tanzania. However, the Malawian market is more advanced in its liberalization and reform process than Tanzania. In Malawi, market subsidies are applied directly at the farmer level, and private sector importers compete via public tender to supply fertilizers through the subsidy program. While the tender bidding process is open to any participating entity, it is not an integrated approach. Locally established companies with the ability to service the market have no advantage in their bids. This situation opens opportunities for additional businesses to bid on the fertilizer procurement process and to create gaps in supply when new players fail to deliver the contracted goods.

Importers and producers (blending facilities). These players are also distributors and retailers. They expressed concern over high interest rates, and need credit guarantee support to be more cost-effective and to procure higher volumes on international markets. The subsidy program presents multiple challenges in terms of timing, volume allocation, definition of currency in tender, validity of quoted prices, and payment delays when vouchers are redeemed. Inefficiencies in transport costs from the port affect pricing. The state's open tender system, coupled with direct market competition with government actors, places private importers at a disadvantage. These importers are fully dependent on access ports from Tanzania, Mozambique, and South Africa. They recommend supporting and promoting the use of local deposits and resources, such as phosphate rock, limestone, and organic materials.

Distributor-wholesalers. Most importers perform this function, incurring major transportation costs to retail outlets due to the high price of fuel, spare parts, and repairs, as well as diminished load capacity since full loads can cause vehicle damage. Compounding these problems, cargo fleets lack vehicles that are in good working order, inadequate road and bridge infrastructure delays delivery times, and affordable financing is currently unavailable.

Retailers. The government and importers also play the role of retailers. Timing on fertilizer arrival is crucial for private retailers. The voucher program indicates a specific location to redeem (cash-in) that makes it difficult for retailers to receive payment. In addition, the original and the copy of the vouchers are very similar, leaving room for error. This underscores the need to improve the quality of the voucher and the voucher system as a whole, especially through targeting methods (areas for specific fertilizer use), timely payment to retailers, and the synchronization of fertilizers and vouchers on the market. It is important

to promote greater private sector involvement rather than having the government compete directly. Furthermore, retailers need to receive market information about farmers' needs (e.g., Compound D or 23-21).

Farmers. Beneficiaries must be identified before a voucher becomes available so they can adequately plan their financial needs. Ideally, notification should happen when farmers sell their crops, and fertilizers must be available on time. Financing through the Malawi Rural Financial Company is costly. Vouchers are limited to two bags of fertilizer for maize and two bags for tobacco. The market price for outputs is low, and farmers need access to market information, marketing options, and buyers. By the same token, there is a need for stronger farmer organizations and for agribusiness training to teach farmers how to apply business concepts. Though farmer incomes are affected by high production costs and low yields, productivity can be increased through improved inputs and better crop management. Extension workers also require training in agronomic and business concepts.

Malawi liberalized its agricultural input markets more than 10 years ago, but the public sector continues to participate in the fertilizer market. Government participation at the procurement and distribution levels varies from year to year, depending on subsidy program decisions. The strength of the government network is its ownership of 58 SFFRFM depots and more than 600 ADMARC market units. The latter have not been active for the past eight years, apart from distributing subsidized fertilizer in 2005-2006 and 2006-2007, which significantly undermined the private stockists (small retailers) emerging under the AISAM and CNFA networks. In parallel with these two agricultural campaigns, about a dozen firms were involved in fertilizer procurement — primarily imports, with some processing. These importers supply a formal network of more than 400 retail outlets in Malawi (public and private sector combined), in addition to an informal network of independent agro-dealers with an estimated 226 active dealers. Many of these smaller dealers were driven out of business in the two agricultural campaigns by the government's subsidy program.

There are a number of active agriculture-linked business associations, including the Fertilizer Association of Malawi (comprised mainly of large importers) and the agro-input dealers' networks organized under the tutelage of CNFA and AISAM. FAM is composed of 14 members, including 2 blending companies, 2 state entities, and a national farmer's cooperative. Only eight members are involved in government tenders while the rest participate in both tenders (wholesale) and retail trading. The NASFAM network of farmer cooperatives is another important player that distributes fertilizer through its cooperative shops. The tea and coffee estates also procure fertilizers through farmer cooperatives for their own use.

Market Conduct

The Malawian fertilizer market is an oligopoly, with the government playing an active role — from importation to final delivery — through a public tender to receive private sector bids to procure subsidized fertilizers. Players include international companies with country offices (Yara Malawi, Export Trading Co), importer-producers (Optichem, Farmers World, Agora), and independent traders (Sealand Investment, Agricultural Trading Company, Simama General Dealers Company).

Many importers are vertically integrated, which contrasts with fertilizer markets in the other countries studied. While importers in the other countries are often wholesalers, few are also distributors and retailers, as is the case in Malawi. Another difference in Malawi is that the government can still play a role anywhere along the market chain, from importer all the way to the level of retailer. The uncertainty surrounding government intentions from year to year causes this marketplace to be riskier for private sector investment and market development. Experience in the last three years has influenced the government's thinking on its proper role, as have donor nations, which fund the subsidy (voucher) program. Subsidy policy uncertainties include annual timing, volume allocations, tender currency choice, validity of quoted prices, and payment delays.

Market Supply

Malawi is a net importer of fertilizer (high nutrient nitrogen, phosphate, and potassium as raw materials), with some local production (blending) of these basic nutrients. The two Malawi-based fertilizer manufacturers are Optichem, with a steam granulation plant, and the Malawi Fertilizer Company, which operates a bulk blending plant that produces compound fertilizers. Taiwanese investors are completing a third plant, scheduled to begin operations in June 2007 with a capacity of 50,000 metric tons per year. These three manufacturers have the capacity to produce substantial quantities of compound fertilizers, such as the traditional 23: 21: 0 +4s for maize and D compound for tobacco.

Fertilizer costs and timely availability are greatly influenced by the choice of port of entry to landlocked Malawi, namely Tanzania, Mozambique, or South Africa. The ports in each of these countries have different inefficiencies and in-transit costs, as well as time management delays. Fertilizers in 50 kilogram bags were previously imported from South African manufacturers via the land route, but this involved high costs due to the 3,500 kilometer journey across three countries (South Africa, Zimbabwe, and Mozambique). Suppliers currently source fertilizers through one of three ports: Beira in Mozambique (807 kilometers); Nacala, also in Mozambique (649 kilometers); or Dar es Salaam in Tanzania (1,979 kilometers). While these routes appear to offer lower transportation costs, fertilizers remain costly due to insufficient linkages to international markets, increased delays, port congestion, high risks, and limited competition. Some producer groups, particularly the export-producing estates, have turned to the higher-cost South Africa port of Durban to lower uncertainties regarding timely deliveries.

High transportation costs to reach retail outlets remain a major component of the overall cost structure. This is mainly due to high fuel prices and poor road infrastructure that negatively impacts vehicle life spans. The high price of repairs and spare parts increases costs as transport companies have few vehicles in good working condition at any one time. Other supply constraints include the uncertain government policy environment, limited and costly access to finance, the perception of a "small" fertilizer market (although it is among the largest and best structured within the sampled countries), and poor physical infrastructure (e.g., roads and rails) — all of which contribute to high fertilizer costs at the farm-gate level.

Fertilizer Cost Chain Analysis

The Malawi market in 2006-2007 is estimated to be almost 260,000 metric tons of fertilizer product, representing a 16 percent increase over the previous year. This is mainly due to a subsidized fertilizer program initiated by the government, amounting to 170,000 metric tons. The annual market over the past 10 years has fluctuated between 167,000 and 224,000 metric tons due to shifting government policies and periodic drought conditions. Inconsistent government policies have frustrated the vibrant private sector procurement and marketing of fertilizer.

Since the market was liberalized more than 10 years ago, fertilizer prices have been determined by market forces, and traders have been free to enter or exit the market. The number and diversity of economic actors in the sector is high. This is even true at the import level, where economies of size and scale often result in African input sectors characterized by a few large firms and little competition. During 2006, a dozen firms were involved in fertilizer procurement, primarily imports, with some blending. These importers supply a formal network of more than 400 retail outlets in the public and private sectors, as well as an informal network of 226 active, independent agro-dealers under AISAM and CNFA.

Rab Processors and Farmers World-Agora each have company-owned or controlled retail outlets focused on estate crop and peri-urban markets. The Export Trading Company entered the market in 2004, quickly captured market share, and was instrumental in reducing previously high margins.

Market information systems for fertilizer in Malawi are more developed than in other African countries, and IFDC records illustrate the change in product mix over the past 10 years (see Exhibit VI-4). The market has traditionally been dominated by NPK compound products. Inconsistent policies and traditional practices have frustrated the development of lower-cost straight products and DAP. DAP consumption in 1996-1997 was greatly reduced following complete subsidy removal. The low DAP and urea consumption during this period was further exacerbated by increased demand for both products as raw material for a blending plant (Interfert) established by Interep Africa and Press Agriculture. The disappearance of DAP from the market incited increased consumption of D compound, Super D, and 23:21:0 +4S. The blending plant is now the Malawi Fertilizer Company.

As it is difficult to separate figures for granulated and blended fertilizers, Exhibit VI-4

Exhibit VI-2. Malawi Fertilizer Nutrient Imports (nutrient metric tons), 1992-2002

Year	Malawi Fertilizer Imports by Type			
	Nitrogen	Phosphate	Potash	Total
1992	51,800	8,400	8,000	68,200
1993	48,000	21,000	5,000	74,000
1994	9,060	7,223	5,000	21,283
1995	28,202	10,317	5,000	43,519
1996	37,900	14,300	6,000	58,200
1997	41,200	12,600	3,000	56,800
1998	34,800	11,900	3,500	50,200
1999	30,000	16,600	3,500	50,100
2000	34,588	11,416	3,787	49,791
2001	16,781	5,396	5,305	27,482
2002	130,253	28,979	33,776	193,008

Exhibit VI-3. Malawi Fertilizer Nutrient Consumption (nutrient metric tons), 1992-2002

Year	Malawi Fertilizer Consumption by Type			
	Nitrogen	Phosphate	Potash	Total
1992	51,800	14,000	8,000	73,800
1993	48,000	21,000	5,000	74,000
1994	9,060	7,223	5,000	21,283
1995	28,202	10,317	5,000	43,519
1996	37,900	14,300	6,000	58,200
1997	41,200	12,600	3,000	56,800
1998	34,800	11,900	3,500	50,200
1999	30,000	16,600	3,500	50,100
2000	34,588	11,416	3,787	49,791
2001	16,781	5,396	5,305	27,482
2002	130,253	28,979	33,776	193,008

combines consumption figures for both products. The subsidy program — Targeted Input Supply (TIP) — has stimulated demand, as reflected in the increase in consumption from 208,000 to 259,000 metric tons between 2004 and 2007. The overall consumption trend in the past two decades has been a shift from CAN to urea as farmers have become more knowledgeable about the nutrient content of fertilizer products and have come to adopt more economic use. Tobacco farmers are also increasingly using D Compound and Super D instead of 23:21:0+4s.

The Fertilizer, Farm Feeds, and Remedies Act regulates the availability of fertilizer in Malawi, but is somewhat restrictive regarding the types of fertilizers that can be traded. This leaves little room for innovation and development of new formulations that emerge from new technologies. For example, NPK 23:21:0+4s is intensively used for maize production and has also spilled over into tobacco. This product was developed in the 1980s, when the overriding priority was to get high nutrient fertilizers into Malawi at the lowest logistical cost possible. This formulation was appropriate as a compound maize fertilizer when potassium (K) levels were high in Malawian soils. These soils have undergone mineral depletion over three decades, which includes potassium and trace elements such as sulfur, zinc, and magnesium. The act has been reviewed, and the government needs to expedite the process of updating it to reflect current fertilizer recommendations and needs. A draft national fertilizer strategy has been developed that seeks to promote increased fertilizer use.

The Malawi Bureau of Standards is responsible for performing sample testing at the border and handling pre-inspection arrangements to ensure quality control. This latter function is mandated in spite of pre-import analyses performed by importing companies. Little or no post-import sampling and analysis is carried out in Malawi.

The high use of specialized compounds not available on international markets drives procurement from South African-based producers, namely Sasol, Omnia, and Yara. The FOB costs for these specialty compounds are comparatively high by market norms due to the lack of world-scale production economies despite greater competition among South African producers.

The 2006 cost analysis data was collected for CAN and three compounds sourced from South Africa by road transport to Lilongwe, and for urea sourced from the Arab Gulf through Beira port and by road to Blantyre and Lilongwe. These cost chains are sum-

Exhibit VI-4. Fertilizer Consumption by Product, 1997-2007

Year	Metric Tons (mt)					Compounds					Total
	23:21:0+4s	DAP	CAN	UREA	S/A	D	B	SD	C	Other	
1997-98	35,689	3,166	42,680	38,438	6,855	11,669		9,434		38,995	186,926
1998-99	39,530	2,115	46,125	39,450	7,510	10,114		8,459		29,473	182,776
1999-00	41,139	2,195	48,350	42,116	9,950	14,150		8,150		25,602	191,652
2000-01	36,120	2,119	39,225	37,495	8,120	14,251		6,288		23,360	166,978
2001-02	41,713	2,670	40,051	42,795	6,675	13,350		6,008		21,694	174,956
2002-03	38,467	2,798	41,964	55,131	6,994	14,698		6,295		35,451	201,798
2003-04	50,565	4,834	40,211	48,914	12,491	24,397		8,602		18,169	208,183
2004-05	51,563	104	31,489	70,537	11,462	19,210		8,872		15,236	208,473
2005-06	67,450	1,500	38,790	64,680	8,500	25,678	100	7,518	300	9,456	223,972
2006-07	78,806	800	39,209	85,600	9,000	26,555		8,340	250	10,560	259,120

Source: IFDC/AIMS

Exhibit VI-5. Relative Cost Components

Cost Component	%
Product Cost (FOB plus bagging costs)	65%
Transportation (includes ocean & inland freight)	18%
All Margins	8%
Finance Costs	5%
Overhead Costs	2%
Official Taxes	2%
Total	100%

marized in Exhibit VI-6. Importers acted as both importer-distributors and retailers in the case of CAN and specialty compounds. The reported margins are combined for importer-distributors and separate at the retail level. The lack of wholesale prices to independent retailers constrains efforts to establish small stockists in areas outside the main markets. The major overall cost components for the eight cost chains are summarized in Exhibit VI-6.

Fertilizer procurement in Malawi is arranged through several channels, namely:

- Procurement from the international market through Beira and Nacala ports
- Procurement from South Africa via road transport through Zimbabwe
- Procurement from South Africa by sea from Durban to Beira or Nacala
- Road transport from Beira and Nacala ports to Malawi
- Rail transport from Nacala to Malawi

For a landlocked country, the transport component is reasonable. Road transport cost from South Africa via Zimbabwe is around $88/metric ton, increasing by an additional $10/metric ton during peak periods. A combination of Beira port and road transport to Lilongwe is an alternative route used during peak periods. The alternative shipping costs are around $50/metric ton and the Beira-to-Lilongwe road transport adds an additional $87/metric ton, making this a less attractive proposition. All products shipped from South Africa are in bags.

Importing bulk urea from the international market through Beira port is illustrated in Cases 7 and 8. Port costs at Beira are reasonable at $9 per metric ton, but bagging costs are high at $30 per metric ton. The entrance channel to Beira port requires constant dredging. For the past few years, the depth has limited cargos to a maximum of 10,000 metric tons, thereby increasing shipping costs by 3 to 5 percent compared to 25,000 metric ton shipments. A current NORAD-funded project is dredging the port and improving other port facilities.

Nacala port is generally only used by Farmers World, and products are shipped to Lilongwe by rail. In theory, transportation by rail should cost less than road transport, but this has recently not been the case due to inefficiencies. Slow and unreliable service has restricted the use of the Nacala rail corridor. Privatization of the rail company and Malawian representation in the ownership is expected to improve the situation. However, the greatest impact on the use of rail would be an extension of the rail line by 20 miles to the Zambian border.

Major importers have access to trade finance at internationally competitive rates. The terms offered by South African firms are also favorable. However, the apparently favorable financial situation masks the trade finance difficulties faced by smaller retailers and distributors. Locally denominated interest rates are 20

to 30 percent, and collateral requirements for local currency loans (100-140 percent) add to the cost of expanding these businesses.

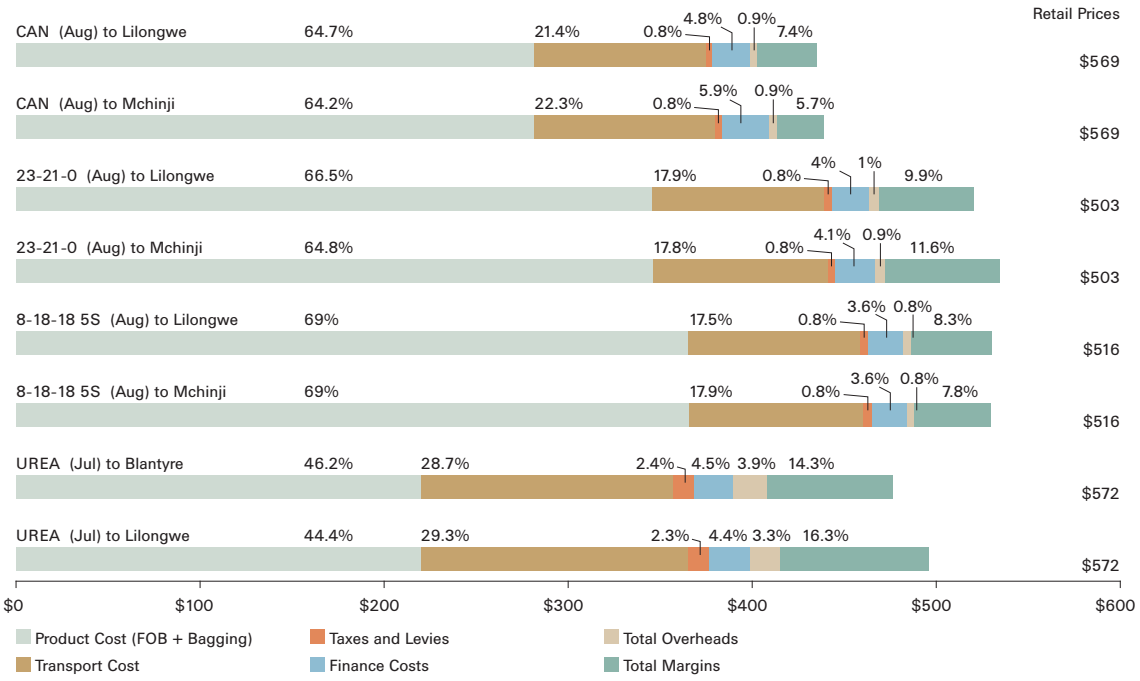
Major importer margins average around 8 percent. However, it is disturbing to note that the combined importer, wholesale, and retail margins on urea imported in 2006 was between $68 and $80 per metric ton (17-19 percent), which is excessive by any standard and resulted in retail prices of $480 to $496 per metric ton.

Given that Malawi represents the largest landlocked fertilizer market in Africa, except for Ethiopia, the cost chain is not as efficient as it could be. Major factors include uncertain government policies and actions, subsidy schemes that are detrimental to the development of small private sector stockists, constraints on fertilizer accessibility, expensive traditional compound fertilizer procurement from South Africa, lack of an efficient rail system from Nacala port, and high local currency costs for smaller market actors.

Market Demand

Fertilizer consumption in Malawi has increased significantly over the years, from approximately 73,000 metric tons in 1984-1985 to some 200,000 metric tons in 2004. The 2005-2006 figure is slightly below 200,000 metric tons. An estimated one-third of the country's farming population uses some sort of fertilizer, resulting in one of the highest per hectare rates of use on the continent (43 kilograms per hectare). The major export crops — tobacco, tea, sugar, and coffee — consume around 40 percent of total fertilizer imports. Tobacco and coffee are a combination of small and estate farmers while sugar and tea are almost all estate, though there is a growing trend toward outgrower schemes in both

Exhibit VI-6. Malawi Fertilizer Cost Chain Summary, 2006

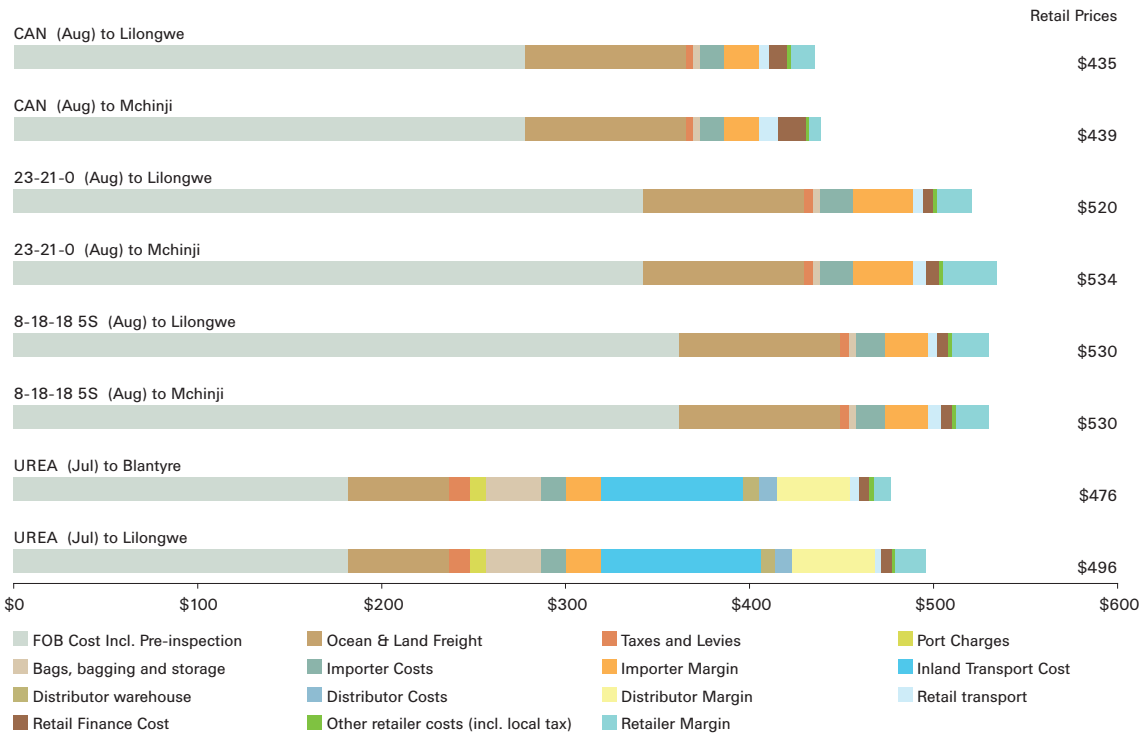


sectors. The largest share of fertilizers used by smallholder farmers in 2004 (42.5 percent) was sourced through the formal markets, while 10 percent was from the government-subsidized targeted input program (TIP), and the remainder from the informal market.

The average Malawian farmer still applies less than half the recommended quantity of fertilizer on crops. Smallholder fertilizer consumption is 34 kilograms per hectare on average. Although this is significantly higher than the Sub-Saharan average of 9 kilograms per hectare, it is well below levels in other regions of the world. In spite of a history of subsidy programs, insufficient mineral and organic fertilizers have been applied to reverse the widespread declines in soil fertility and crop yields, as shown by persistent phosphorous and potassium deficiencies in soils, coupled with the failure to import or apply fertilizers containing these critical nutrients.

Fertilizer use is influenced by the high variability of crop yields due to erratic rainfall and high fertilizer prices relative to output crop prices. Both of these factors yield low net returns to fertilizer use and reduced demand. These demand-depressing effects are further aggravated by farmers' lack of market information, financial constraints on fertilizer purchases, ignorance of best fertilizer agronomic practices, and weak market power due to ineffective or non-existent farmer organizations. In addition, fertilizer use has varied over time, largely based on consumption in the estate sector and the response to fertilizer subsidies. Between 1992 and 2005, fertilizer use fluctuated between 140,000 and 200,000 metric tons. In spite of unfavorable market condi-

Exhibit VI-7. Detailed Malawi Fertilizer Cost Chain, 2006



tions, increasing competition reduced fertilizer prices between 1998 and 2003 through lower handling costs and margins, although the cost of fertilizer on the world market increased in that same period.

Based on recommended application rates, potential fertilizer use has been estimated at 547,000 metric tons. The main fertilizer types used in Malawi include urea, 23:21:0+4S, CAN, and D compound. Urea and 23:21:0+4S are principally for maize, while CAN and D compound target tobacco applications. Unfortunately, crop productivity trends suggest that expansion in the cropped land was not accompanied by a proportionate increase in the appropriate type and quantity of nutrients.

In tobacco, the area devoted to burley increased from 142,000 to 204,000 hectares (44 percent) from 1995 to 2000. However, Ministry of Agriculture estimates indicate reduced average yield per hectare, from 2 metric tons per hectare to less than 1 metric ton per hectare between 1986-1987 and 2002-2003. For maize, the area under cultivation increased from 1.2 to 1.6 million hectares. However, its share of the total cropped land declined from 74 to 44 percent over the same period. Total maize production from 1982-1983 to the 2002-2003 season grew at 12 percent per year (1.4 to 2 million metric tons), but the yield has remained unchanged at around 1 metric ton per hectare. Although maize is the dominant crop, production of cassava, sweet potatoes, potatoes, groundnuts, and a variety of other crops has been increasing rapidly in recent years. TIP evaluation surveys from 2002 and 2003 show that half of all maize farmers growing other crops were food-secure, compared to only 30 percent of farmers growing maize alone. The involvement of farmers in crop diversification continues to increase due to donor-supported and government programs.

Market Environment

Policy. The most important fertilizer policy in Malawi is the subsidy program. Fertilizer is widely recognized as a vital part of an agricultural growth strategy and has been a subject of considerable debate in the donor community. However, some form of incentive structure to foster broader use of fertilizer in the country is now widely accepted. DFID in particular has long been associated with an effort to generate wider use by smallholders (e.g., TIP, Starter Pack), while USAID's involvement in the sector has largely focused on marketing (e.g., AIMS). At the same time, the government remains firmly committed to the fertilizer subsidy and, with some justification, believes it to be highly successful.

In the 2005-2006 season, the subsidy program bypassed private suppliers, a blow to the viability of input marketing dealers and infrastructure. The donor community influenced the government to modify the subsidy program so that private dealers could participate in the voucher program during the 2006-2007 season. The parastatal ADMARC also continued to participate. Farmers were entitled to two 50 kilogram bags of fertilizer at a 75 percent subsidy, requiring them to pay approximately $7 per bag. Although the program was scaled to reach 2 million beneficiaries, the actual number of farmers using the fertilizer is estimated to be lower. Some were not able to afford the purchase and instead sold their vouchers on a secondary market. The current effort for this year is to target the subsidy more specifically to individual farmers so as to limit secondary sales.

The government's plan for the 2006-2007 season is to use tenders to import 150,000 tons of fertilizer at a total cost of $60 million, including shipment to distribution points. The second year of the subsidy features major changes, thanks in substantial part to USAID and other donor efforts to ensure that the subsidy program includes, rather than undercuts, emerging private sector stockists. This season, subsidized fertilizer will be available through ADMARC (with an emphasis on underserved areas, according to the government) and a range of private sector suppliers, such as Farmers' World and many others, large and small. DFID will provide some $8 million to maximize the impact of the subsidy, assist with program logistics, and develop systems that favor more transparent allocation of vouchers at the village level. It will also provide roughly $3.5 million in seed subsidy funds, augmented by another $1.5 million from other donors. The third area of intervention is in effect a trade subsidy, providing the government with an opportunity to temporarily sell its unsold fertilizer to banks, and then buy it back in time for the next season. This has the effect of substantially increasing the government's cash flow.

The Clinton-Hunter Development Initiative (CHDI) has committed $100 million over 10 years to develop a self-sustaining, integrated, and systemic approach to poverty alleviation. Malawi and Rwanda were selected as launching pads for the initiative. CHDI will be a government-led effort in which the Clinton Foundation plays a catalytic role. CHDI intends to address the continuum of problems facing African agriculture by applying new technologies and techniques to achieve greater food productivity and sustainable agriculture, changing the economics of agricultural inputs, and creating a sustainable market mechanism for surplus agricultural production.

The Clinton Foundation has a country office in Malawi through CHDI and recently prepared a fertilizer proposal for the government. Similar to its Rwanda intervention, CHDI plans to facilitate the purchase of low-cost fertilizers for the government — via negotiation support for lower prices — and will likely provide financial assistance. Since the government is heavily involved in direct procurement, distribution, and retailing of subsidized fertilizers, CHDI views its strategic support as beneficial to the country and to smallholder farmers. Ministry of Agriculture officials, however, perceive CHDI as an organization that will procure fertilizer in bulk to assist the country. This perception is shared by the newly formed Fertilizer Association of Malawi, which expressed concern about the gloomy outlook for private sector players under such a scenario. CHDI's focus is on Malawi, Rwanda, Mozambique, and Tanzania.

Regulation. Malawi's regulatory framework is geared to enhance food availability and to protect subsidized fertilizers. A ban on fertilizer exports was implemented to forbid reexportation and ensure product availability to local farmers. During the 2006-2007 season, the government also banned maize exports to secure domestic food stocks. However, high rainfall levels, satisfactory climatic conditions, timely availability of fertilizers, and good agronomic practices led to a bumper harvest. The glut in the domestic market led to a sharp decrease in maize prices over the previous year, with prices dropping by 45 percent in April 2007 compared to April 2006. The end result was a significant blow to farmers' income.

Finance. Present financing through the Malawi Rural Financial Company results in a final product that is too expensive. In other words, the market price plus the interest charges yield a retail price that is above typical retail prices.

Research. More scientific research on, and better estimates of, farmers' needs by crop (e.g., specific amounts of Compound D, 23-21, etc) and additional market research on estimated demand by region would help retailers better plan for adequate inventories and stocks. Through its extension and technical services, the Ministry of Agriculture provides direct technical assistance to farmers. However, its limited budget and finite human resources constrain its ability to provide countrywide support to smallholder farmers.

Market Performance

While liberalization and privatization of the agricultural input markets brought efficiency to the fertilizer supply chain in a short period of time, fertilizer products continue to be expensive and unaffordable for many farmers. Initially, the high cost of privatized fertilizer was addressed through government subsidy programs such as Starter Pack, APIP and, most recently, TIP. The latter was last implemented in the 2004-2005 agricultural season. In 2005-2006 and 2006-2007, the government introduced fertilizer subsidies for smallholder farmers, which have been widely welcomed. The present voucher system is limited to two 50 kilogram bags each for maize and tobacco per farmer (i.e., 100 kilograms total per farmer). However, the subsidy program is skewing the market.

Agora blends fertilizers and has a wide network of retail outlets where inputs are sold to farmers. It has included banking facilities in its stores to provide financial services to smallholder tobacco farmers. Through ATM machines at Agora's rural stores, farmers can access their earnings as posted in the tobacco auction and take out their money at the village level.

Optichem produces fertilizers in Malawi. While it is mainly blending, the company also incorporates local organic materials into the blend and uses previously discarded (waste) products. Optichem purchases and collects poultry manure from large producers and tobacco stems from farmers to include in the fertilizer mix. It combines 75 percent of imported mineral fertilizers with 25 percent of local organic nutrients. Its production includes the local purchase of packaging materials such as sacks and ties. The company's goal is to make low-cost fertilizers available to farmers, even outside the subsidy program. While it currently offers competitive prices to face subsidized prices, its future plans include enhancing its production capability to service more farmers.

In addition to its role in the fertilizer market (importer, distributor, and retailer), Rab Processors Ltd is an agricultural-based entity engaged in maximizing and adding value to outputs. It processes and exports tea, and works directly with smallholder farmers under a contract-farming model. Farmers have an assured market as they grow the tea and sell their harvest to the company.

Using their purchasing power and in anticipation of servicing the fertilizer markets of Malawi and Mozambique, blending companies such as Farmers World are co-investing in operations in Mozambique directly in-route

from Beira port to Lilongwe. Their new position in this neighboring country will allow them to reap benefits in the new market and to have stock available to service government tender bids as needed.

Previously, the government was directly involved in purchasing crops and announced output prices in advance, allowing farmers to plan their finances. While this practice has stopped, the government has resumed its activities in cotton, for which the going price is 40 MK per kilogram. Although the current effort aims to assist farmers, it fails to provide them with sustainable information and/or market options.

CHAPTER SEVEN

Mozambique Country Study

Mozambique is a coastal country with an agriculturally based economy that borders the Mozambique Channel and Indian Ocean in southern Africa. The agricultural sector employs 81 percent of the workforce and represents 21 percent of the gross domestic product. More than 70 percent of Mozambicans live below the poverty line and the country's economy is dependent on foreign assistance. Agriculture is critical to addressing food security since large food imports continue to play an important role in the national economy. Agricultural producers include smallholders, medium-scale and a few large-scale farmers. Most farms experience low productivity due to low soil fertility, which is attributed to nutrient mining, soil erosion, and leaching.

Exhibit VII-1. Mozambique's Fertilizer Market

International Exporters (Manufacturers and/or Raw Material Suppliers) or Traders	
Importer/Wholesaler	Agro Business
1. Agrifocus	1. Sugar 35% 2. Tobacco 45%
Wholesaler/Distributor	
1. Agrifocus 2. Agroquimicos 3. Hygrotech 4. Tecap 5. Savon 6. Biomed	
Retailer	
60 shops selling seed, fertilizer & ag chemicals	
Farmer	Own Farming
Includes: GOM NGOs Farm Demos	Contract Farming

Background

Mozambique's market is characterized by low volumes of domestically consumed fertilizers (30,000 metric tons per year) despite the large quantities of imports that transit through the ports of Beira and Nacala. The domestic market is dominated by one major importer-wholesaler and is the closest to a monopoly among the countries studied. Mozambican ports are used to service the demand for fertilizer among neighboring landlocked countries, namely Malawi, Zambia, and Zimbabwe. There is a potential for Mozambique to decrease the costs of domestic fertilizer by "piggy-backing" small domestic orders to those of the larger landlocked countries. Similarly, warehouse storage for the landlocked countries could be positioned in Mozambique for subsequent sale and delivery throughout the region, and could include release of sufficient stocks to meet local demand.

Market Organization

Market Structure

In the past, all agricultural functions were controlled by the government, and state-owned companies were in charge of all production

decisions and agricultural extension through a physical presence in each province. Despite a later start than most African countries, Mozambique has fully liberalized and privatized all agricultural input markets. The transition to a private sector-led economy has left many unattended villages and farm areas due to the absence of a retail network for agricultural inputs. Distrust remains between the previous public sector monopolists and emerging private sector actors in the agricultural input supply system.

Importers. These players are also distributor-wholesalers and retailers. Most importers face cash-flow limitations, and available financing is currently unaffordable. Their low-volume purchases are subject to high transportation costs and reflect high fertilizer prices. At present, there are no local manufacturing and/or blending facilities. Since Mozambique is the receiving port for neighboring countries, it should take advantage of its geographic location and promote in-country fertilizer blending for domestic and foreign markets.

Distributor-wholesalers. Most importers also fulfill this role and face high transportation costs to retail outlets due to poor road infrastructure. They have low storage and warehousing capacity, and their financing costs are high.

Retailers. Importers and some wholesalers play this role. Timing on fertilizer arrival is crucial for private retailers, and adequate planning plays an important part in deliveries. As retailers often act as agronomic advisors to farmers/clients, they need training in production practices, fertilizer handling, and adequate use. There is also a lack of information about soil fertility needs since soil analyses are not conducted. Retail businesses are financially weak due to limited access to finance. As a result, they keep inventories low, are unable to take advantage of market opportunities, and provide mediocre services to farmers. In addition, the retail network is extremely weak and insufficient to service the market.

Farmers. Since retailers keep low inventories and provide inadequate service, farmers have limited access to fertilizers. Overall, fertilizers are untimely, costly, and unavailable in rural areas. This results in low fertilizer usage, which causes low production yields. Compounding the problem, market linkages are few and far between, and knowledge of output markets (prices, options, and buyers) is insufficient. Most smallholder farmers lack the needed field support and extension to apply learn-by-doing techniques and improve their productivity. Such services are only available to 15 percent of farmers. Farm-level storage capacity for crop outputs is extremely low, which curtails food supplies and market opportunities to sell when prices are better. In addition, farmers' access to credit is practically null.

Players. The fertilizer market is dominated by one major importer, AgriFocus, that services the open market. As in most African countries, the export crop estate sector often imports directly. Estates are unwilling to depend on the local agricultural input supply system due to the high costs incurred if the fertilizers are not delivered on time, in the appropriate amounts, and with the correct formulations. Despite its cost in terms of time, labor, and money, auto-procurement is more attractive and less risky to the estates. In Mozambique, the sugar and tobacco estates auto-procure their fertilizer needs, which represent 80 percent of the country's total fertilizer imports.

AgriFocus wholesales products to other importer-wholesalers, retails directly to farmers (down to 1 kilogram bags), and is an active player in government programs, including a program funded by USAID. The company is vertically integrated, with a distribution network to the retail level. While it has the potential to exercise monopoly pricing power, it does not appear to be doing so because it offers the most competitive prices on the Mozambican market. For example, a 1 kilogram bag sells for 630-650 Meticais, while competitors sell the same product for 1,000 Meticais.

There are many smaller players at the wholesale-distributor level (e.g., Hygrotech) that import based on specific purchase orders from clients and/or to replenish stock. These purchases are characterized by their small quantities (e.g., 28 metric tons), their common source (South Africa), and transportation by land. Transit costs from Johannesburg to Maputo are on the order of $60 per metric ton for the 300-mile trip.

Fertilizer importers in Mozambique mirror those in Malawi since they are also distributors and retailers. The main difference is the open-market scenario in Mozambique versus government intervention in Malawi. The open-market approach has opened doors for the private sector to service the market, but opportunities have not yet ripened since customers (smallholder farmers) are usually cash-constrained. Indeed, they lack market opportunities for their crops, and their investable income for fertilizer is limited.

Market Conduct

Aside from the plantation companies (sugar and tobacco), which import approximately 80 percent of the total fertilizer volume to service their own farmers, the open market presents itself as oligopolistic due to approximately six active importers. As noted earlier, the open market volume is mainly serviced by one importer, Agrifocus. The latter began operations with plantation producers (cotton, sugar, and tobacco) in the late 1990s. It has since gained access to higher-volume procurement, established international creditworthiness, and obtained lower-priced fertilizers from international manufacturers. Agrifocus' import volumes decreased when large sugar and tobacco companies started importing their own fertilizers, but its access to more affordable fertilizers remains intact.

In addition to road imports from South Africa, the main importation of fertilizers into the country is conducted through the Maputo, Nacala, and Beira ports. As additional imports have taken place through Maputo, fertilizer availability and use has increased, as reflected in increasing sales by importer-retailers in the Maputo region.

Market Supply

Mozambique is strategically located in terms of transport and storage logistics to serve the major interior markets for fertilizer in southern Africa. The road system links Mozambique to six countries, and two bridges are being built. The first, to be completed in 2008, will improve connections with the Tanzanian border area, while the second will be built over the next three years. There was in-country blending of fertilizers some 20 years ago.

Fertilizer Cost Chain Analysis

The total 2006 market in Mozambique was approximately 28,800 metric tons of fertilizer products. Exhibit VII-2 provides data on fer-

tilizer imports from 1992 to 2002, as reported by the United Nations Food and Agriculture Organization. The figures include imports that are not used in Mozambique, but destined for use in Malawi, Zambia, and elsewhere, thus overstating market consumption. Exhibit VII-3 provides approximate consumption data for the same period, although these figures are also inflated by transshipments to neighboring countries.

Private companies (e.g., Agrifocus, Agroquimicos, Savon, Biomed, Tecap, Hygrotech) import fertilizers and other agricultural inputs from many sources, mostly South Africa. All of these companies have their own limited in-country distribution channels, including wholesale and retail concentrated in tobacco- and sugarcane-producing areas. Agrifocus is by far the market leader, with an estimated 70 percent market share of all fertilizer handled by the private sector. Agrifocus also serves as a wholesaler to other companies and distributors, such as Agroquimicos, Tecap, and Hygrotech, and supplies fertilizer products directly to estate sector firms. The sugarcane and tobacco companies also directly import fertilizers for their farming needs, with a portion forwarded to contract farmers who produce and sell sugarcane and tobacco to these companies.

Among the three groups that import fertilizers to Mozambique, the largest share is held by tobacco (66 percent), followed by sugar (30 percent) and a small private sector (5 percent) outside the estate sector. Other sources have estimated these shares in 2006 as 40 percent, 35 percent, and 25 percent, respectively. The importance of the estate sector in fertilizer import and consumption is clear in both scenarios. The market is dominated by specialized NPK compounds traditionally used on tobacco and sugarcane, plus urea (sugar) and CAN (tobacco). Small quantities of the straight nitrogen products used in the tobacco and sugarcane sectors leak into the food grain and vegetable sectors, but these markets are severely under-serviced by the market system.

All the major groups procure fertilizer from South Africa, usually in bulk and shipped to the Beira and Nacala ports for bagging and re-distribution, with smaller quantities going through Nacala. Apart from direct deliveries to the estate crop firms, virtually no fertilizer is distributed to rural areas, with minimal stocks kept at the coastal ports to meet orders from development project clients. The cost of distributing to rural areas and the undeveloped demand outside sugar and tobacco have precluded any major development of retail networks by private sector firms.

Exhibit VII-2. Mozambique Fertilizer Nutrient Imports (nutrient metric tons), 1992-2002

Year	Mozambique Fertilizer Imports by Type			
	Nitrogen	Phosphate	Potash	Total
1992	3,000	1,200	700	4,900
1993	2,000	200	1,000	3,200
1994	5,000	300	1,000	6,300
1995	5,000	300	3,500	8,800
1996	7,000	300	800	8,100
1997	1,500	2,600	2,400	6,500
1998	3,800	1,600	2,600	8,000
1999	8,000	0	0	8,000
2000	10,900	3,400	1,200	15,500
2001	17,700	2,000	6,900	26,600
2002	17,700	2,000	6,900	26,600

Exhibit VII-3. Mozambique Fertilizer Nutrient Consumption, (nutrient metric tons), 1992-2002

Year	Mozambique Fertilizer Consumption by Type			
	Nitrogen	Phosphate	Potash	Total
1992	3,000	1,200	700	4,900
1993	2,000	200	1,000	3,200
1994	5,000	300	1,000	6,300
1995	5,000	300	2,500	7,800
1996	7,000	300	800	8,100
1997	1,500	2,600	2,400	6,500
1998	3,800	1,600	2,600	8,000
1999	8,000	0	0	8,000
2000	9,700	3,400	1,200	14,300
2001	16,000	2,000	6,900	24,900
2002	16,000	2,000	6,900	24,900

Exhibit VII-4. Fertilizer Product Consumption by Sector, 2006

Product (mt)	Market Sector			Total
	Private	Sugar	Tobacco	
NPK (12:24:12)	400			400
NPK (10-24-20)			7,000	7,000
UREA (46%)	700	7,000	5,000	12,700
CAN	100		7,000	7,100
Superphosphate	50	1,000		1,050
MAP		500		500
KCl	50			50
Total	1,300	8,500	19,000	28,800
% of Total	5%	30%	66%	100%

Source: Agrifocus and MLT

Exhibit VII-5. Relative Cost Components

Cost Component	%
Product Cost (FOB plus bagging costs)	65%
Transportation (includes ocean & inland freight)	18%
All Margins	8%
Finance Costs	5%
Overhead Costs	2%
Official Taxes	2%
Total	100%

Cost chains were established for two products — urea and NPK (12-24-12) — through the three main distribution points in the country. Exhibit VII-5 presents the average cost components for these products in 2006. Despite market concentration among a small number of importers and major customers, the margins achieved by the estate companies and private sector firms are high at 8 percent. This is a relatively high return when measured against low market risks given the major guaranteed markets serviced in Mozambique.

As shown in Exhibit VII-6, Case 1 reports the cost chain for urea imported from South Africa and distributed to three points. From an FOB cost of $218 per metric ton, the cost increased by 2.5 times to retail at almost $600 per metric ton in the northern Sofala region. This is the highest cost increase recorded in the survey. The reasons for this are straightforward. South Africa has no competitive advantage in urea production even though the ammonia feedstock recently changed from coal to natural gas imported from Mozambique. The cost of shipping bulk urea from South Africa to Beira is almost as expensive as shipping from the Arab Gulf to Beira. Bagging costs at Beira are at $32 per metric ton, the highest unit cost reported and three times the bag cost differential from the Arab Gulf. After bagging the product in Beira, the cost of transportation is astronomical to the main use regions of Maputo ($115 per metric ton) and Sofala ($165 per metric ton). High transportation costs reflect the extremely poor state of the main roads and the absence of backhauling opportunities once the fertilizer is delivered.

Exhibit VII-6. Mozambique Fertilizer Cost Chain Summary, 2006

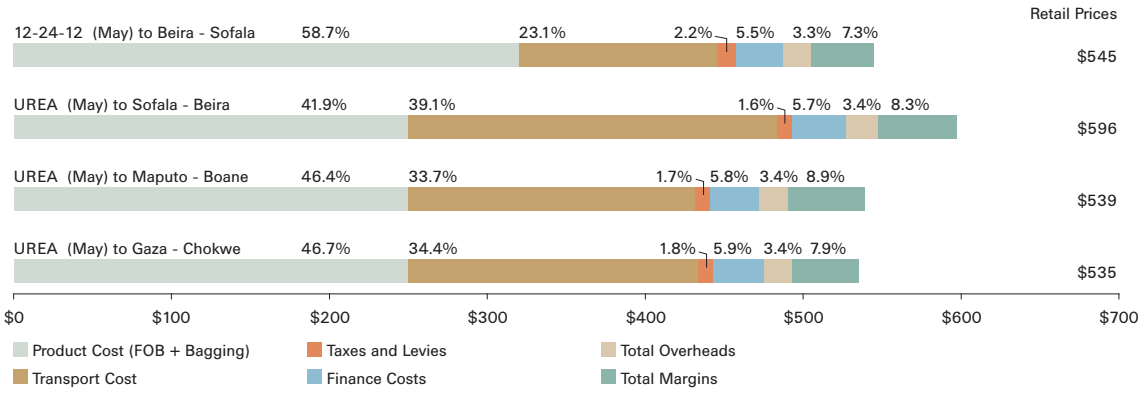
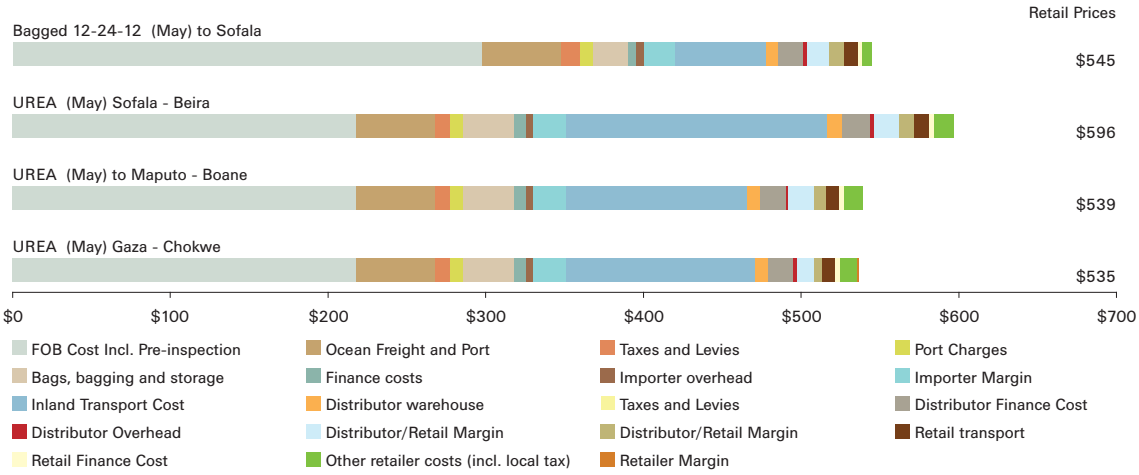


Exhibit VII-7. Detailed Mozambique Fertilizer Cost Chain, 2006



All importers reported that bulk urea imports are increasingly subject to setting-up in ships' holds, which adds to discharge costs, and that greater attention is being paid to the potential cost savings from bagged product delivery to Beira. However, Case 4 (bagged NPK 12-24-12 from South Africa) does not support this view. Transport to warehouses and warehousing costs were still only $22 per metric ton even though the product was delivered to Beira in bags. This signals major inefficiencies in procurement and product handling at Beira.

The fertilizer market in Mozambique is extremely under-developed and little effort is being made by the primary importer-distributors to improve efficiency. Faced with enormous inland road transportation costs, importers continue to import products from South African companies above international market prices and with expensive coastal shipping freights. The case for combining procurement with the major Malawian importers is overwhelming. The only constraint is access to similar terms of sale offered by the South African suppliers in the established trade relationship. Access to affordable trade finance and adequate warehousing in Mozambique would overcome these constraints.

Market Demand

Fertilizer demand is among the lowest of the countries studied and classifies Mozambique as a low user, along with Uganda. Lower consumption is attributed to farmers' limited knowledge of appropriate crop husbandry practices, including the benefits of fertilizer application on major food crops such as maize, cassava, and vegetables. There is no systematic soil analysis and only blanket recommendations are provided to farmers. This is a common theme throughout all the countries studied. Indeed, they either have no soil analysis information or recommendations are based on data that predates national independence.

Sugar and tobacco companies are the largest users of urea and MAP fertilizers. While large plantations use about 6,000 metric tons of urea, the open market consumes some 1,000 metric tons. Agricultural input firms provide agrochemicals to these companies.

Market Environment

Policy. Due to food security concerns, some observers have suggested that the government should directly purchase domestically produced maize and establish a legal supporting mechanism through a price-floor policy. This would allow smallholder farmers to forecast their earnings, establish a more competitive price for maize (to be matched or improved by private buyers), and create an incentive for enhanced food production.

Regulation. The stakeholders consulted for this study have identified a number of priorities for improving the enabling environment. These include addressing the lack of storage for food reserves, reducing import tariffs on fertilizer (and agricultural production inputs), and promoting the use of fertilizers to 50 kilograms per hectare, in accordance with the Abuja Declaration, through the approval and implementation of fertilizer regulations. The Ministry of Agriculture is currently developing regulations to strengthen the domestic environment. As part of these efforts, the National Directorate for Agrarian Services is drafting a regulation, to be completed in 2007, for the input market and the marketing chain.

The Joaquim Chissano Foundation has determined that approximately 30 percent of production gets lost due to bad storage. One of the foundation's main goals is to enhance storage capacity in rural areas so as to augment food availability. Such organizations could play an important role in supporting an initiative to build storage capacity at the village level.

Finance. The current commercial interest rates available to the fertilizer industry are between 20 and 25 percent. There are few investments with sufficient returns to justify borrowing at these levels. The end result is a lack of potential growth opportunities. The Center for Agricultural Promotion within the Ministry of Agriculture runs an initiative that provides farmers with lower-cost financing at 5 to 10 percent interest rates through local financial institutions. Such programs need to be expanded to facilitate growth in the fertilizer industry and to allow smallholder producers to access credit to cover their operational expenses.

Research. Applied crop-specific research is necessary to determine the appropriate formulations and amounts for various soil types throughout the country under existing farmer conditions. The Agricultural Research Institute of Mozambique could provide support in this area, as could other national research systems in all the sample countries. The Ministry of Agriculture plans to equip its laboratories to conduct soil testing as well as determine soil fertility levels and nutrient deficiencies.

The ministry conducts research and sector analyses to support production practices and training. This is done through a number of agencies, including the Agricultural Research Institute, the National Directorate of Agrarian Extension, the Center for Promotion of Agriculture, and the Directorate of Economics. As their resources are limited, these agencies rely on private sector players to complement their efforts. The ministry not only perceives a direct interaction for supply-led support, but also recognizes that output market assistance and facilitation should take priority.

The combined assessment from public and private stakeholders is that extension services are weak and should be reinforced.

Entrepreneurial drive is required to activate the fertilizer market through private sector distribution, delivery, and service. Crop buyers (traders, processors, exporters, distributors, food retailers, etc) are needed to provide demand-driven forces that will create economic incentives for farmers and other players along the market chain. The formation of public-private partnerships that combine resources from the government, donors, and individual companies would help address these problems in a sustainable manner. While such alliances are critical, they require trust-building between the public and private sectors.

Market Performance

The Center for Agricultural Promotion within the Ministry of Agriculture has initiated a crop-specific program to increase agricultural productivity based on the contract or outgrower farming model used by private sector estates. This has the potential to enhance the demand for agricultural inputs, including fertilizers, on specific crops. The program initially targeted rice in Chokwe (located in the Gaza region of southern Mozambique, some 200 kilometers from Maputo), with a focus on areas with existing irrigation infrastructure. Initial efforts began with 3,000 hectares and required approximately $1.5 million in financing. Fertilizer costs were directly negotiated with suppliers in larger quantities (600 metric tons), which resulted in cost savings of 20 percent from spot market prices. Fertilizer imports were "piggy-backed" with another commercial order issued by the private sector agricultural input supplier (OMNIA in this instance).

For this program, financing is provided through a local commercial bank under a loan-guarantee scheme whereby the government covers 65 percent of the risk. Farmers are required to provide 50 percent collateral, and the subsidy is disguised in the interest rate (10 percent versus 25 percent on the open market). The program is being expanded to 5,000 hectares of rice, which will require 1,000 metric tons of fertilizer and $5.5 million in financing. Mozambique imports around $70 million of rice each year, and the major rice importer, Delta Trading, was approached to participate in the production program. Delta Trading is cultivating 200 hectares under this scheme to enhance domestic production and compensate for lost import markets. The program is unique in that it outsources oversight through a project management unit that is selected via an open bidding process. The unit monitors finances, tracks results, and provides agronomic technical assistance to farmers.

Cashew nut production, initiated by a German investor, built a high-value, crop-specific industry. Farmers were market-linked and their incomes expanded many-fold. Importers of other food commodities (maize and sweet sorghum) are beginning to work with public and private sector players to organize farmers and establish a production scheme to procure their goods from domestic producers.

Chiquita Brands has been scoping production opportunities for fresh fruit in Mozambique to service European and Middle Eastern markets. The Beira and Nacala ports are being evaluated as potential shipping ports out of the country. The investment potential from this venture, coupled with local production and weekly outbound export shipments, could position Mozambique as the new fresh fruit producer in southern Africa, as is the case with Chile in South America.

CHAPTER EIGHT

Thailand Country Study

Background

The Thai fertilizer market in 2006 is estimated to be almost 6 million metric tons and has been growing steadily at about 1.3 percent per year since 2000. All fertilizer materials are imported as finished products for direct use, as ingredients for blended fertilizer, or as raw materials for granulation plants. Although potash reserves are available in Thailand, they have yet to be exploited. In recent years, blending operations have competed in the NPK market with the established granulated compound products manufactured by Thai Central Chemical Corporation and National Chemical Fertilizer Company, which have a combined capacity of 2.8 million metric tons.

Exhibit VIII-1. Thailand's Fertilizer Market

<table>
<tr><td colspan="6">International Exporters (Manufacturers and/or Raw Material Suppliers) or Traders</td></tr>
<tr><td colspan="6">4 Production Companies and 100 Small Blenders</td></tr>
<tr><td colspan="6">Importers</td></tr>
<tr><td colspan="6">4 Production Companies and 10 Importer/Distributors</td></tr>
<tr><td colspan="6">Wholesaler/Distributor</td></tr>
<tr><td colspan="3">4 Production Companies
10 Regional Distributors
Cooperatives
Ministry of Finance</td><td colspan="3">Bank for Agriculture & Agricultural Cooperatives (BAAC)
Office of Ruber Replanting Aid Fund (ORRAF)</td></tr>
<tr><td>Manufacturers 62%</td><td>Blenders 10%</td><td>BAAC 20%</td><td>ORRAF 4%</td><td>Co-Ops 2%</td><td>MOF 2%</td></tr>
<tr><td colspan="2">Retailers 5,500</td><td>BAAC Branch</td><td></td><td colspan="2">Cooperatives</td></tr>
<tr><td colspan="6">Farmers 5.7 million</td></tr>
</table>

Major blenders include Cargil Siam Company Ltd, Rajaraskkikiji Fertilizer Company Ltd, and Mosaic (Thailand) Ltd. In addition, there are about 100 small blending plants, many of which produce blended fertilizers with some organic content.

Exhibits VIII-2 and VIII-3 report statistics from the United Nations Food and Agriculture Organization for historic fertilizer nutrient imports and apparent consumption in metric tons.

Market Organization

Market Structure

Fertilizer materials are procured on the international market by the two main fertilizer manufacturers and by 10 importer-distributor firms. In addition to the mainstream products imported in large quantities, numerous NPK products (solid and liquid) are imported in quantities of 20 to 100 metric tons. Thailand is well-placed in relation to sources of supply for urea from Malaysia and Bangladesh and the Arab Gulf. It is also well-placed to source phosphates and N-P fertilizers from China, Korea, and the Philippines. Although less well-positioned in relation to sources of potash and DAP, the size of the import requirements and the ability to handle handymax shipments

Exhibit VIII-2. Thailand Fertilizer Nutrient Imports, (nutrient metric tons), 1992-2002

Year	Thailand Fertilizer Imports by Type			
	Nitrogen	Phosphate	Potash	Total
1992	596,208	338,300	184,000	1,118,508
1993	769,000	430,000	256,000	1,455,000
1994	740,000	374,000	246,000	1,360,000
1995	728,000	453,000	325,998	1,506,998
1996	810,752	436,000	273,000	1,519,752
1997	728,000	380,000	274,000	1,382,000
1998	826,000	370,000	277,000	1,473,000
1999	999,628	345,000	278,000	1,622,628
2000	841,000	293,800	253,086	1,387,886
2001	889,654	347,132	284,804	1,521,590
2002	924,849	348,150	273,832	1,546,831

Exhibit VIII-3. Thailand Fertilizer Nutrient Consumption, (nutrient metric tons), 1992-2002

Year	Thailand Fertilizer Consumption by Type			
	Nitrogen	Phosphate	Potash	Total
1992	600,200	325,700	191,900	1,117,800
1993	769,000	430,000	256,000	1,455,000
1994	740,000	374,000	246,000	1,360,000
1995	728,000	453,000	326,000	1,507,000
1996	810,752	436,000	273,000	1,519,752
1997	784,000	423,000	274,000	1,481,000
1998	905,000	455,000	277,000	1,637,000
1999	1,070,028	415,000	278,000	1,763,028
2000	924,000	383,800	253,086	1,560,886
2001	977,136	422,132	284,804	1,684,072
2002	1,018,625	408,150	273,832	1,700,607

Exhibit VIII-4. Thailand Fertilizer Nutrient Production, (nutrient metric tons), 1992-2002

Year	Thailand Fertilizer Production by Type			
	Nitrogen	Phosphate	Potash	Total
1992	0	0	0	0
1993	0	0	0	0
1994	0	0	0	0
1995	0	0	0	0
1996	0	0	0	0
1997	56,000	43,000	0	99,000
1998	79,000	85,000	0	164,000
1999	70,400	70,000	0	140,400
2000	83,000	75,000	0	158,000
2001	93,000	80,000	0	173,000
2002	108,000	80,000	0	188,000

Exhibit VIII-5. Thailand Fertilizer Nutrient Exports, (nutrient metric tons), 1992-2002

Year	Thailand Fertilizer Exports by Type			
	Nitrogen	Phosphate	Potash	Total
1992	0	0	0	0
1993	0	0	0	0
1994	0	0	0	0
1995	0	0	0	0
1996	0	0	0	0
1997	0	0	0	0
1998	0	0	0	0
1999	0	0	0	0
2000	2,000	2,000	2,000	6,000
2001	5,000	5,000	0	10,000
2002	14,000	20,000	0	34,000

(35,000 to 65,000 metric tons) allows the country to import all products at competitive FOB prices, with low ocean freight costs. The latter are also influenced by the ample availability of return freights for commodities such as rice and rubber.

Market Conduct

About 72 percent of the fertilizer imports in 2006 went to the private sector, including fertilizer manufacturers, blenders and wholesale distributors. Approximately 4 percent of imports are distributed through farmer cooperatives, 20 percent through the Bank for Agriculture and Agricultural Cooperatives, and the remaining 4 percent is distributed through the Office of Rubber Replanting Aid Fund to smallholder rubber farmers in the south. Half of the farmer cooperatives are financed through the Ministry of Finance.

In addition, the Bank for Agriculture and Agricultural Cooperatives provides cooperative members and farmer associations with access to crop production finance.

Market Supply

An analysis of major fertilizer procurement in 2006 reveals that urea accounted for almost 48 percent of total imports, followed by DAP at 11.8 percent, muriate of potash at 11.5 percent, and Triple 15 at 9.5 percent, as shown in Exhibit VIII-6. Peak imports occur between May and September, and July is usually the busiest month. In 2006, almost 340,000 metric tons of urea were imported among total fertilizer imports of nearly 600,000 metric tons. Roughly three-quarters (77 percent) of urea imports are sourced from the Arab Gulf (Saudi Arabia, the United Arab Emirates, etc), with an additional 17 percent obtained from

Exhibit VIII-6. Thailand Fertilizer Procurement by Type, 2006

2006	Urea	Ammonium Sulfate	DAP	MAP	TSP	APS	MOP	15-15-15	16-16-16	Total
Jan	83,928	16,462	16,800	0	2,017	25,940	21,556	15,920	8,930	191,553
Feb	73,129	23,929	63,717	0	493	21,999	2,431	65,555	15,527	266,780
Mar	55,328	3,770	53,574	6,611	563	0	29,423	0	0	149,269
Apr	125,343	0	0	5,720	0	24,400	34,081	500	12,246	202,290
May	142,817	39,041	58,285	0	2,173	0	71,163	47,207	5,097	365,783
Jun	69,618	44,252	6,120	13,481	1,518	22,750	22,478	3,524	3,024	186,765
Jul	339,232	10,310	44,187	25,143	0	60,800	96,841	10,033	8,497	595,043
Aug	148,966	7,350	44,754	17,048	0	5,500	19,124	70,096	21,500	334,338
Sep	145,334	23,450	61,728	7,200	0	6,094	36,290	0	0	280,096
Oct	82,304	10,375	836	7,000	0	47,350	2,107	9,034	0	159,006
Nov	88,002	2,446	418	3,400	0	0	1,755	60,072	9,300	165,393
Dec	63,288	0	0	0	0	0	4,997	0	0	68,285
Total	1,417,289	181,385	350,419	85,603	6,764	214,833	342,246	281,941	84,121	2,964,601
Total %	47.8%	6.1%	11.8%	2.9%	0.2%	7.2%	11.5%	9.5%	2.8%	100%

Exhibit VIII-7. Relative Cost Components

Cost Component	%
Product Cost (FOB plus bagging costs)	81%
Transportation (includes ocean & inland freight)	11%
All Margins	0.1%
Finance Costs	1.9%
Overhead Costs	2.1%
Official Taxes	3.9%
Total	100%

Malaysia and the balance from Egypt, China, and Bangladesh. Most of the urea is granulated and suitable for blending.

Fertilizer Cost Chain Analysis

The cost chain analysis was completed for four products: urea from Saudi Arabia, urea from Malaysia, ammonium phosphate sulfate (16-20-0) from South Korea, and Triple 15 from Russia. The import quantities involved were 25,000 metric tons for urea and 16-20-0; 44,000 metric tons for Triple 15; and 6,029 metric tons for urea from Malaysia. Major cost components for the four cost chains are shown in Exhibit VIII-7.

The average CIF price for urea in 2006 for Thai procurements was $266 per metric ton, which is significantly lower than CIF values for the African countries studied. This lower cost pattern is repeated throughout the cost chain analysis for Thailand, with one exception — the cost of bags. Ocean freight rates per ton were half those applicable to Africa in spite of the greater distance to Bangkok port from the Arab Gulf region compared to the ports of the East African coast. Larger cargos, faster discharge rates, regularity of cargos, bulk-only cargos with no empty bags, and the availability of return cargos are all factors involved in achieving these lower freight rates.

Transport costs are significantly lower due to the lower ocean freight rates negotiated and the reduced costs of inland road transport due to superior road infrastructure and shorter distances. The highest inland freight cost was $13 per metric ton to northern Thailand. Local transport to retailers is frequently undertaken by fish-tail boat, an effective and low-cost means of transportation. The cost of bagging was lower for labor costs (under $4 per metric ton), but bag costs, based on domestically produced bags, were as high as in all the surveyed African countries.

Taxes on fertilizer in Thailand are virtually nil and low port costs were included in the ocean freight rates. Finance costs at all levels of the supply chain are considerably lower than in Africa, even for importers. For example, letter of credit opening fees are 0.25 percent, one-

Exhibit VIII-8. Thailand Fertilizer Cost Chain Summary, 2006

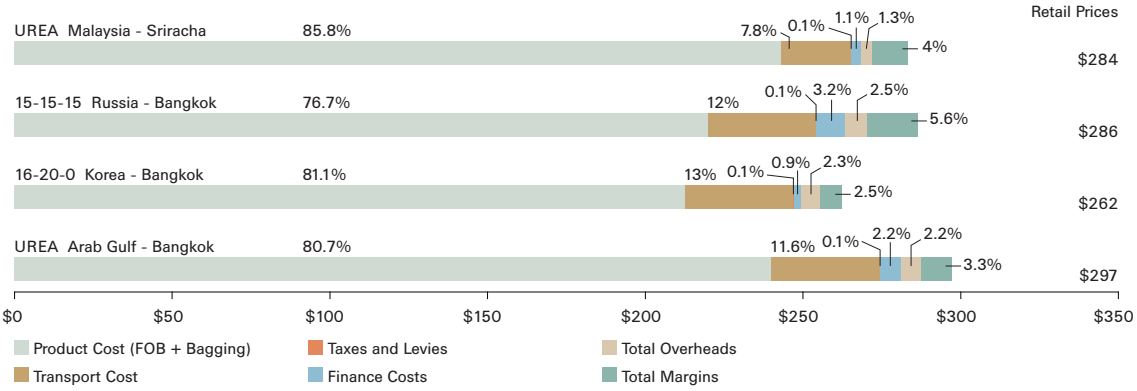
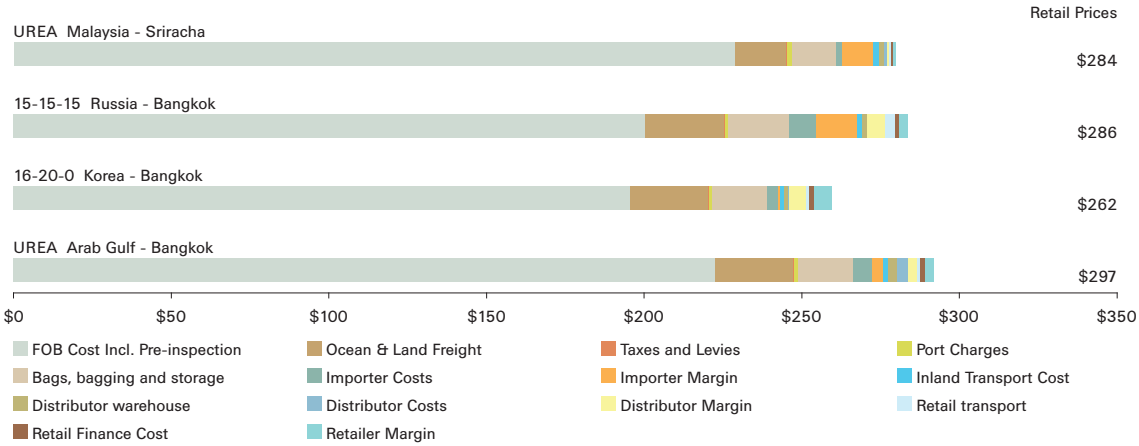


Exhibit VIII-9. Detailed Thailand Fertilizer Cost Chain, 2006



tenth the rates charged in Africa, and interest rates quoted by importers were 5 percent per annum in 2006. Even wholesalers and retailers have access to credit at around 7 percent per annum. Overhead costs and margins are low due to the volume of business conducted and the fierce competition at all levels of the market. These low costs result in low ratios of the retail-to-FOB price (1.3) and the retail-to-CIF price (1.2), implying in-country costs increase the cost of fertilizer to the farmer by 20 percent, compared to 60-100 percent in the African countries studied.

Market Demand

The domestic market is dominated by urea for rice, and NP and NPK fertilizers for all crops. The marketing structure for fertilizers is essentially privatized. All importation is completed by the two private fertilizer manufacturing companies and 10 private import/export companies. In addition to the cooperatives servicing 5.7 million farmers, there are approximately 5,500 fertilizer retailers, for an average of one retailer per 1,000 farmers. Almost all of these retailers are independent of the fertilizer manufacturers and blenders.

Market Environment

The fertilizer sector is regulated by the Ministry of Agriculture and Extension. There are virtually no barriers to entry, and fertilizer products need only be registered with the ministry. However, all fertilizer products are subject to test analysis for declared nutrient content. The ministry is very conscious of the need for this as the number of blending plants has increased in recent years.

Market Performance

The Thai fertilizer sector illustrates how a fertilizer marketing system greatly benefits from economies of scale and intense competition. Importers profit at margins under $1 per metric ton due to the large volumes transacted. Local manufacturers with world-scale granulation capacity compete with imported compounds using imported raw materials from close market sources. This holds true even when large volumes of Triple 15 are imported at competitive prices from Russia. Blending fertilizers in Thailand provides opportunities for niche market nutrient ratios for horticultural and other high-value crops, as well as with mainstream NP and NPK products.

Adequate transport infrastructure and service industries, particularly in finance, provide the opportunity for low transaction costs which, in turn, are kept low by competition and skilled operations management.

CHAPTER NINE

Component Costs of the African Fertilizer Chain

The fertilizer supply survey and cost chain analysis undertaken in May-June 2007 provided detailed cost information for major fertilizer products in six Sub-Saharan African countries — three coastal and three landlocked. Further supply chain cost information was obtained for the more developed Thai fertilizer market for comparative purposes.

Most Sub-Saharan African countries rely on imported fertilizers for their fertilizer supply. The supply cost chain, therefore, consists of six major components: (1) international procurement, (2) shipping transportation, (3) port operations, (4) bagging and warehousing, (5) inland transportation, and (6) wholesale and retail operations. Cross-cutting issues affecting all components include the supply and cost of trade finance to meet supply chain operational requirements, taxation on fertilizer trade, sector structure and linkages, and government regulation and policies governing the sector.

The countries selected included markets ranging in size from 25,000 to 250,000 metric tons of fertilizer products per annum. Standardized data collection forms were prepared for coastal and landlocked countries. These forms recorded the importer prices, wholesale prices, and retail prices at specific locations as a starting point for the selected products.

Detailed cost recording for each cost chain operation were then captured, and the profit margins at the three major points (import, wholesale, and retail) were calculated. Collaborators in each country interviewed various actors in their supply chains to compile the data.

There are significant differences between coastal and landlocked countries. In coastal countries, importing firms, with or without ties to international fertilizer companies, are responsible for most procurement from the international market. In landlocked countries, with the exception of Malawi, national importers either depend on importers located in coastal countries for access to supply or procure products from distributors in neighboring countries. In several countries, government agencies and agro-business firms engaged in estate crop production procure fertilizer for their own needs and those of their contracted farmers. However, both government agencies and agro-business firms increasingly rely on private sector firms for international procurement.

Cost Components

In almost all countries, there is little or no vertical integration between import, wholesale, and retail operations. Notable exceptions are

Malawi and Ghana, where Agora and Wienco are importers with wholesale and retail networks, respectively. The survey documents a 1.5 to 2.5 increase in fertilizer costs from the FOB international price level to the farmer retail level. This contrasts with a value of approximately 1.3 in Thailand.

International procurement. Where traders in coastal countries have linkages to international fertilizer companies:

- Procurement prices are consistent with prevailing international prices.
- Procurement financing is achieved through dollar accounts at affordable interest rates based on LIBOR plus 2 to 2.5 percent.
- Procurement is made from the least-cost source of supplies for major fertilizer commodities such as urea, DAP, and muriate of potash.
- The least-cost supply points reflect the combined costs of FOB prices and shipping costs.
- Procurement of NPK fertilizers is less likely to be from the least-cost sources due to the vested interests of the international fertilizer companies, the small volumes involved, or the often unnecessarily specialized analyses demanded.
- Procurement through government or parastatal agency tenders are the least cost-effective, and evidence from West Africa indicates they are the most likely to suffer from corruption that can add up to 20 percent to the farm-gate price of fertilizer.
- There is no evidence of price collusion among major importers. In fact, extreme competition in the larger ports and high risk associated with volatile international prices, exchange rates, and variable demand lead to low importer profit margins. Even so, importer margins of 4-5 percent are high by international standards and could be reduced by 1 or 2 percentage points to around 3 percent through economies of scale in procurement and competitive market pressures. Vast increases in the volumes of fertilizer products demanded will be required to drop margins to the 1 to 2 percent range.
- There is evidence that normally non-traded specialized NPK ratios demanded in some markets (tobacco, tea, and sugar) have higher costs than needed, and that importer margins are as high as 6-8 percent when products are highly differentiated for captive markets.
- The leading importers are procurement price-takers on the international market, but national and regional price-makers.
- Where coastal country traders have no association with international fertilizer companies or have small markets with limited access to affordable procurement finance:
    - Regional procurement of major commodities prevails at higher prices than international norms.
    - Procurement of NPKs is not cost-effective due to the inability to procure in high volumes or to access affordable finance.

- The cost of fertilizer FOB represents 50 to 70 percent of the farmer cost.

International shipping. Fertilizer shipping costs to African ports are generally higher than other destinations on a cost-per-day basis due to smaller cargo sizes. As discussed later in this section, international shipping costs have increased significantly in recent months and years. African fertilizer traders and importers are price-takers in the shipping market. Shipping costs represent 10 to 15 percent of the retail price, or approximately $50 to $75 per metric ton.

The cost of shipping for handy-sized vessels (15-35,000 metric ton) has followed the cost trends for larger vessels, which have more than tripled since 2003. The Baltic Exchange Dry Index, which charts rates on 26 of the world's key trade routes, traded in a range of 500 to 2,500 points from 1985 to 2003. The index peaked at 6,208 points in December 2004 and hit an all-time high of 6,688 on May 15, 2007, during the course of this study. Fertilizer ocean freight rates to Sub-Saharan Africa have to a large extent reflected these increases.

Several options are available for shipping fertilizer, including variations in form (e.g., bulk, bagged, bulk with bags), in shipping contract (e.g., charter party, liner terms, and container shipment), and in vessel size (handy-size from 15,000 to 35,000 metric ton or panamax up to 74,000 metric ton), although the latter is rarely used for fertilizer. The most common form of international trade in fertilizer is bulk shipment of 25,000 to 50,000 metric tons for urea, DAP, and potash to the major import markets of India and China. However, panamax are frequently used by Cargill and other phosphate suppliers for shipments of DAP from Tampa to China and India. With the exception of Ethiopia and South Africa, most trade to Sub-Saharan Africa is in smaller bulk quantities of 5,000 to 25,000 metric tons for these major products, and in smaller shipment sizes of 5,000 to 10,000 metric tons for bagged NPK products. Container shipments of less than 500 metric tons are frequently used for bagged products when markets are small or when the financial capacity of importers is restricted. When fertilizers are imported in containers, import and wholesale prices can be two to three times higher than bulk prices.

Vessel size for all the country ports studied is limited to 30-35,000 metric tons dead weight (mtdw), with two exceptions: Mombasa, which can handle up to 50,000 mtdw, and Beira, which can only accept vessels of up to 10,000 mtdw. However, the current dredging program in Beira will allow this port to soon accept vessels of up to 20,000 mtdw. Port congestion fees are most often applied in West African ports and incorporated into charter party quotations.

Freight rates quoted for fertilizer shipments to several African ports are $4 to $7 per metric ton higher than the equivalent rates for similar distances to other ports because of the difficulty of finding return cargo. As a measure of the cost disadvantage for African fertilizer shipments, consider an actual shipment of 44,000 metric tons of fertilizer from Russia to Thailand in June 2006 at $25 per metric ton, about half the rate from the Black Sea to East African ports. Thailand achieved this advantage through economies of scale and return cargo from Asia.

Port costs and facilities. Experienced fertilizer traders charter bulk or bulk break ships with reliable unloading gear capable of discharging up to 3,000 metric tons per 24-hour shift. The survey revealed that no ports have berths solely dedicated to fertilizer, but all have one or two berths allocated to fertilizer cargos. Major survey findings are as follows:

- Port costs are higher when the port authority determines that port equipment must be used or when port warehouses are used.
- The cost of discharging bulk cargo is approximately 50 percent less than for bagged cargo due to the lower discharge rate for bagged cargo.
- Dockside bagging rates of up to 3,000 metric tons per 24 hours are possible using portable bagging equipment, but rates are often constrained by the availability of trucks to remove bagged products from the dock.
- When there is competition between specialized cargo bagging companies (e.g., Mombasa), physical bagging and discharge rates are high. In Dar es Salaam, the single port authority bagging unit exhibits not only higher costs and slower rates, but also provides no guarantee of bagging quality.
- The availability of trucks is confounded by the simultaneous arrival of food aid or other grain, which always takes priority over fertilizer for berthing ships and trucks, and increases congestion around port facilities.
- Container handling in virtually all ports is subject to clearance delays. This is not a major problem because most containerized fertilizer imports are small tonnages for specialized fertilizer products.
- Although port costs account for a small portion of total retail costs (1 to 3 percent), Thai port costs are extremely low ($1 to $1.25 per metric ton) compared to many African ports ($8 to $10 per metric ton).
- In some ports (e.g., Mombasa), government-imposed inspection fees apply at a higher cost, although inspections are not actually carried out.
- Dakar is an exception to the above conditions since it has a free port zone that allows importers to operate at substantially lower costs.

Warehousing costs. Warehousing costs in port vicinities include local transport costs, truck unloading, stacking, outloading, warehouse rents, and inventory finance costs. The survey found that warehouse costs in African ports and inland are significantly higher than in Thailand. Other major findings are as follows:

- Immediate product clearance from ports reduces port costs, but constrains importers from loading long-distance trucks for delivery to hinterland market areas or landlocked countries.
- The cost of near-port warehousing varies from $2 to $6 per metric ton for transport, plus $1.50 to $2.50 per metric ton for unloading, stacking, and loading, plus rental charges of $1.50 to $2.50 per metric ton per month.

- Average storage times are about two months, so the total direct warehouse costs vary between $6.50 and $13.50 per metric ton, excluding finance charges. These represent 1 to 1.5 percent of the retail cost of fertilizer.

Taxation. Although it is recognized that developing countries require sources of taxation, such levies on agricultural inputs are detrimental to agricultural development. In Thailand, the total taxation on fertilizer imports is less than $0.20 per metric ton. Some taxation on fertilizer still exists in several countries in Sub-Saharan Africa, including a 0.5 percent tax on external imports into ECOWAS and COMESA countries. In addition, the survey found that:

- With the exception of Mali and Mozambique, where VAT is imposed at 7 percent and 4 percent, respectively, no permanent VAT is imposed on fertilizer and no import duties are imposed in any of the countries.

- In Kenya, VAT is levied at 12 percent on all fertilizers, but repaid at a later stage. It was reported that the recovery time averages 12 months, but can be shortened by an unofficial payment. Interest on outstanding VAT can add $1 to $1.50 per metric ton to importer costs.

- Except for West Africa, the level of unofficial payments required to expedite fertilizer operations was negligible.

Transport costs. Inland transportation costs account for 20 to 40 percent of the total retail cost of fertilizer and represent the second-largest cost element after the FOB cost. Virtually all inland transport of fertilizer in Sub-Saharan Africa is by 28 metric ton trucks. The rail systems of Kenya, Mozambique, Ghana, and Tanzania, which could be used to transport fertilizer at a lower cost than road transport, are inefficient, unreliable, under-capitalized, and virtually unused.

The cost of road transport varies by road condition and has increased considerably in the past two years due to rising fuel costs. Paved road rates vary between 8 and 12 cents/metric ton/kilometer, and those of unpaved roads are up to 16 cents/metric ton/kilometer. The total cost of inland transport in the sample countries ranges from $10 to $60/metric ton for coastal countries and from $80 to $120 for landlocked countries. Transport costs often include illegal payments to facilitate clearance through border posts or local administrative areas, but these amount to a small proportion of total transport costs or of the final retail price of fertilizer. In Mali, however, such payments can add up to 10 percent to the road transport cost.

Rail transport is roughly 30 percent lower cost than truck transport in some countries, but is rarely used by importers or distributors because it is unreliable and reportedly requires inducement payments to make rail cars available. For example, rail transport from Nacala in Mozambique to Lilongwe is more expensive than road transport due to inefficiencies in the system. Public rail monopolies in Tanzania and Kenya have been privatized, but the new operating companies are under-capitalized and unable to make the massive infrastructure investments required to modernize the systems. Solutions to improve the rail systems in these countries, which could offer considerable cost savings in fertilizer transport, will be capital-intensive and do not offer any immediate opportunities to reduce costs.

Finance. Fertilizer trading and marketing is a capital-intensive business. An import of 25,000 metric tons with a CIF value of $300/metric ton requires access to $7.5 million in working capital. Underdeveloped financial services in Sub-Saharan Africa result in high finance costs. In the survey, finance requirements at all levels were standardized at 70 percent of total working capital requirements. Standardization on 70 percent credit funding identified many instances that resulted in negative margins and adjustments to financing costs to achieve some profitability at prevailing wholesale and retail prices. Variations in the cost and length of credit loans between importers, wholesalers, and retailers were applied as appropriate.

The survey found that, on average, finance costs added about 5 percent to the retail price of fertilizers. There are cost disadvantages for major importers, even those with access to LIBOR-plus-interest rates. For example, bank fees for opening letters of credit average 2 to 2.5 percent. This compares unfavorably with fees in more developed economies, where letters of credit cost 0.5 to 1 percent. At the wholesale and retail levels, the use of local currency financing is prohibitively expensive at 15 to 28 percent, and requires collateral deposits of 100 to 140 percent.

Vertical integration. Although major importers in coastal countries have reasonably close relations with national distributors in their countries of operation, they make no effort to promote the use of fertilizer in their national markets and generally only respond to orders from distributors in landlocked or adjoining countries without researching market requirements. Two exceptions to this general state of affairs are strategic fertilizer stocks in Mombasa, held by Conagra Europe for one local distributor (MEA Ltd) and Yara's attempt to provide a strategic stock of fertilizer at Dar es Salaam for Tanzanian distributors.

In all the countries studied, the supply system comprises multiple channels involving independent private sector distributors and retailer-stockists, with independent private estates that procure fertilizer for their own needs or for outgrower farmer members. In some countries, parastatal or government agencies are still involved in fertilizer distribution through public sector channels. Only Malawi and Ghana have large importers with a wholesale-to-retail network for fertilizer marketing.

The major reason for the lack of integration and promotion by major cost chain participants is the lack of incentives provided by perceived low total profit margins at the import, distributor, and retail levels. For example:

- Importer profit margins are less than 5 percent for most products on small volumes, even with access to affordable dollar-account credit terms.
- Distributor margins are even smaller at 3 to 5 percent, or negative, especially when using locally available credit. Repacking and reselling in small bags provide a means to improve wholesale margins.
- Retail margins tend to be higher at 5 to 8 percent on much smaller volumes per business.

- In many instances, examples were identified of breakeven or even negative margins when all costs were accounted.

Cross-Country Comparisons

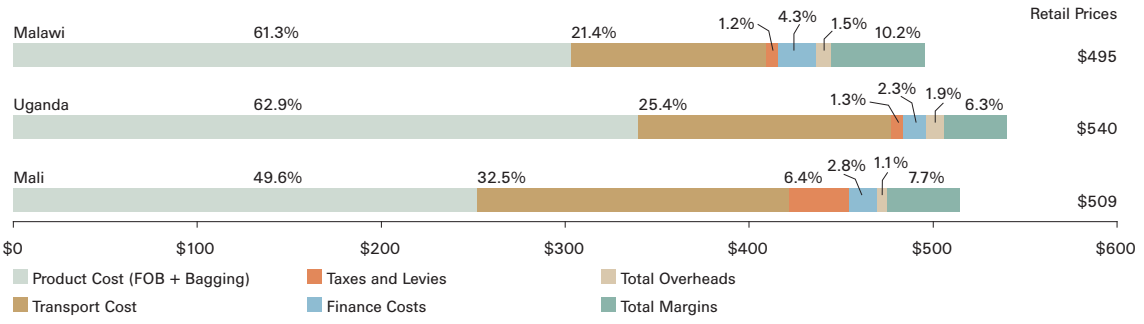
Each cost chain analyzed presents a case for a specific product in a particular country. However, the cost elements are essentially the same except when different supply routes are used, such as Bamako's multiple choices among Lome, Abidjan, or Dakar as a port of entry. In spite of these differences, comparisons are made below between the average summarized cost components among the country case studies. Comparisons are presented for landlocked countries, coastal countries, and between countries with more and less developed retail market networks. Finally, comparisons between coastal countries and Thailand illustrate the benefits derived from economies of scale and market development all along the supply chain (import, wholesale, and retail).

Landlocked Countries

The three landlocked countries — Mali, Uganda, and Malawi — are compared in Exhibit IX-1. The average retail price in all three countries is around $500 per metric ton and above, with Uganda at the highest price of $540 per metric ton. The major component causing high retail prices is transport costs, which contribute 21 to 32 percent of the final retail price. The product cost component for Uganda is higher than the other two because this value contains the transport cost from Mombasa to Nairobi, since two products surveyed in Uganda were sourced from the latter. Most of the Malawi products were sourced from South Africa and transported by road to Malawi, resulting in lower total transportation costs compared to the others. The product cost component in Mali benefits from Dakar sourcing and its lower port and bagging costs in the free port area. This gain is offset by the high inland freight component,

Exhibit IX-1. Comparison of Land-Locked Countries

Comparison of Land-Locked Countries	US $ per mt and Percent of Retail Price					
	Malawi		Uganda		Mali	
	Average	%	Average	%	Average	%
Product Cost (FOB plus bagging)	$303	61.3%	$340	62.9%	$252	49.6%
Transport Cost	$106	21.4%	$137	25.4%	$165	32.5%
Taxes and Levies	$6	1.2%	$7	1.3%	$32	6.4%
Finance Costs	$21	4.3%	$12	2.3%	$14	2.8%
Total Overheads	$8	1.5%	$10	1.9%	$5	1.1%
Total Margins	$51	10.2%	$34	6.3%	$39	7.7%
Grand Total	$495	100%	$540	100%	$509	100%



which includes an estimated 10 percent in illegal charges. The product cost component in all countries is higher than necessary because small volumes of specific NPK compounds are procured. Standardization of formulations among countries for the major fertilizer-using crops (e.g., cotton, tobacco, and sugar) would result in larger orders and lower procurement costs.

This data reflects the lack of coordination between inland distributors and coastal importers in Uganda and Mali. The importer-distributors in Malawi are responsible for arranging their own imports either from South Africa, or from overseas sources through Beira port, which improves the degree of coordinated procurement and lowers the overall cost structure. Lack of logistics coordination leads to higher transportation and other transactions costs. For example, direct delivery from Mombasa to Kampala is about $10 per metric ton lower than when Ugandan importers buy from distributors in Nairobi. Disruptions in transportation, combined with multiple storing and handling of the same product, result in additional costs.

All three countries exhibit high total average margins of 7.5 to 10 percent, for which explanations are specific to each country. However, these higher margins generally reflect the risk undertaken to move products farther inland. In Malawi, the differentiated NPK compounds from South Africa allow importer-distributors and, to a lesser extent, retailers to reclaim higher profit margins than those obtained from bulk commodity products. One would have expected lower margins in Malawi due to the increased level of competition. There is evidence that margins in 2006 are higher than those that prevailed in 2004 after the entry of a major competitor into the market. Speculation centers on the government's tender system for subsidized fertilizer in 2005 and 2006, and the uncertainty this action has instilled in the private sector, resulting in higher tender quotes from the latter. As noted elsewhere in this report, the Mali tender system is beset by corruption, leading to higher margins to compensate for the illegal payments made to secure tenders and the higher cost of doing business.

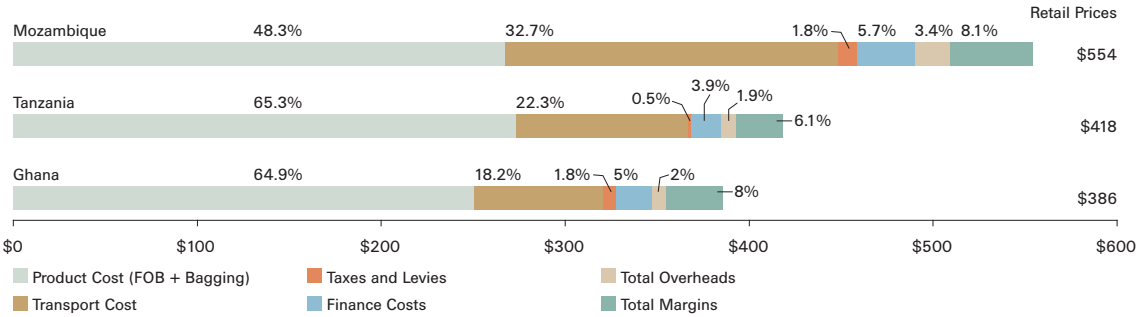
Other notable insights from this cross-country comparison include the higher official taxes in Mali at 6.3 percent, by far the highest among the countries studied. Finance costs are not particularly onerous and amount to 2-5 percent of the total retail price. Such costs are reducible through improved sales forecasting, inventory control and, most importantly, access to affordable finance for wholesalers and retailers.

Coastal Countries

Exhibit IX-2 compares three coastal countries — Ghana, Tanzania, and Mozambique. For the products surveyed, Ghana and Tanzania retail prices are approximately $80 to $120 per metric ton below those in the landlocked countries. Mozambique is notable for an average retail price that exceeds those of the landlocked countries. The major reason for this is the extremely high transportation costs for products, sourced mainly in small volumes from South Africa, and shipped to Mozambique. The resulting shipping cost is almost equal to that from the Arab Gulf to Beira port and is exacerbated by the high inland distribution costs over inadequate roads. Transportation costs that range between 18 and 22 percent of the retail price for the other two coastal countries are within the range of those

Exhibit IX-2. Comparison of Coastal Countries

Comparison of Coastal Countries	US $ per mt and Percent of Retail Price					
	Mozambique		Tanzania		Ghana	
	Average	%	Average	%	Average	%
Product Cost (FOB plus bagging)	$267	48.3%	$273	65.3%	$251	64.9%
Transport Cost	$181	32.7%	$93	22.3%	$70	18.2%
Taxes and Levies	$10	1.8%	$2	0.5%	$7	1.8%
Finance Costs	$32	5.7%	$16	3.9%	$19	5%
Total Overheads	$19	3.4%	$8	1.9%	$8	2%
Total Margins	$45	8.1%	$26	6.1%	$31	8%
Grand Total	$554	100%	$419	100%	$386	100%



in the landlocked countries of Malawi and Uganda.

The small market size in Mozambique leads to extremely high overhead costs within the supply system, as well as other high transaction costs. There is an over-reliance on sourcing specialized NPK compound fertilizers from South Africa, which have both high ex-factory prices due to small volumes and high transportation costs via coastal shipping, compounded by distribution across a debilitated road transport network. Port costs and operations at Beira are also more expensive and inefficient when compared to Mombasa. Greater cooperation between importers in Mozambique and Malawi could allow Mozambican importers to "piggy-back" their orders with Malawian importers that source products. There may also be an opportunity to establish a regional blending plant in the Beira vicinity based on imported intermediate products that could produce NPK blends for both Mozambique and Malawi. However, the traditional use of compounds and the interests of the South African manufacturers would need to be overcome.

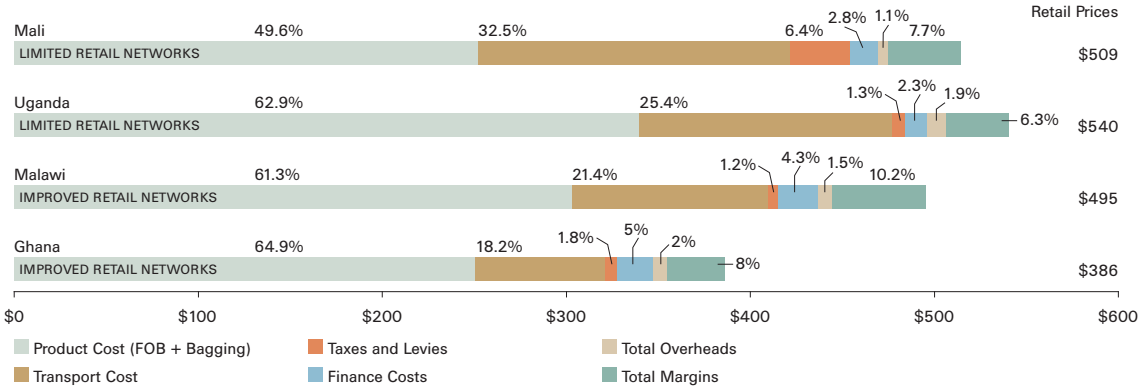
Comparison Based on Retail Development

Ghana and Malawi have the most developed retail networks in terms of quantity and quality as a result of project-based training of retail dealers. Exhibit IX-3 compares these two countries with those that have the least-developed retail networks, namely Uganda and Mali.

Ghana and Malawi have the lowest average retail prices among the coastal and landlocked countries, respectively. Uganda and Mali, with the least number of retailers relative to

Exhibit IX-3. Comparison of Countries with Improved and Limited Retail Networks

Comparison of Countries with Improved and Limited Retail Networks	US $ per mt and Percent of Retail Price							
	Limited				Improved			
	Mali		Uganda		Malawi		Ghana	
	Average	%	Average	%	Average	%	Average	%
Product Cost (FOB plus bagging)	$252	49.6%	$340	62.9%	$303	61.3%	$251	64.9%
Transport Cost	$165	32.5%	$137	25.4%	$106	21.4%	$70	18.2%
Taxes and Levies	$32	6.4%	$7	1.3%	$6	1.2%	$7	1.8%
Finance Costs	$14	2.8%	$12	2.3%	$21	4.3%	$19	5%
Total Overheads	$5	1.1%	$10	1.9%	$8	1.5%	$8	2%
Total Margins	$39	7.7%	$34	6.3%	$51	10.2%	$31	8%
Grand Total	$509	100%	$540	100%	$495	100%	$386	100%



the number of farmers, have higher costs and smaller, less-developed markets. Mali benefits from low-cost operations in Dakar port, offset by the highest taxation level recorded. Where the supply network is most developed, small farmers have lower prices for and improved access to fertilizer. The situations in Ghana and Malawi can be further improved, particularly in Malawi where inconsistent policies are a major disruption to private sector development.

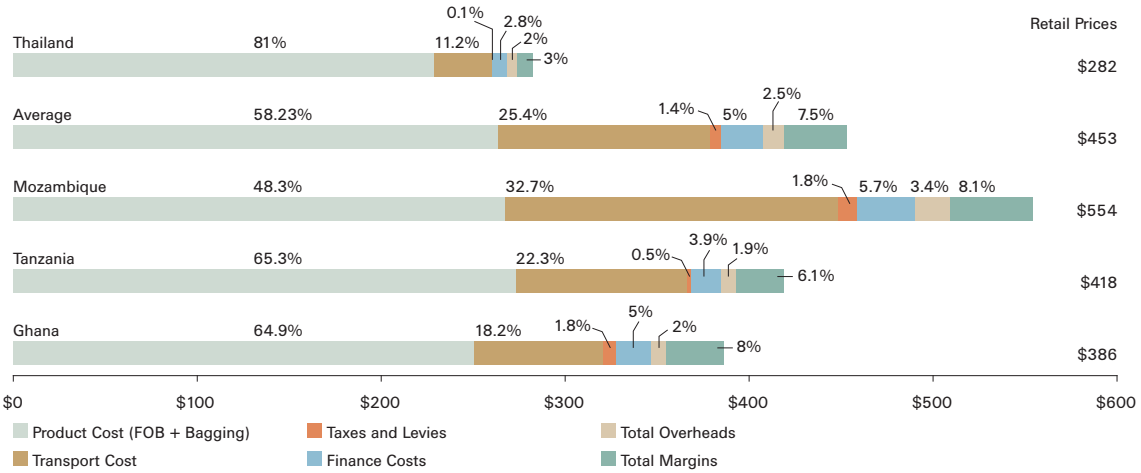
Comparison with Thailand

As shown in Exhibit IX-4, the extent to which transaction costs can be improved is illustrated when comparing the African coastal countries to the more developed market in Thailand.

Retail prices in Thailand are 25 to 50 percent lower than those prevailing in the three African coastal countries. Discounting the inefficient Mozambique situation as an outlier, the Thai retail price levels are still 25 to 30 percent lower. Most of this difference results from lower transportation costs for Thailand, which include both sea and land transportation. However, all cost components are significantly lower due to economies of scale and intense competition. Sub-Saharan African countries cannot immediately aspire to the low transaction costs exhibited in Thailand due to that country's location relative to supply sources, economies of scale in procurement and market, level of development of service industries and infrastructure and, most importantly, human capacity.

Exhibit IX-4. Comparison of African Coastal Countries and Thailand

Comparison of African Coastal Countries and Thailand	US $ per mt and Percent of Retail Price									
	Thailand		Coastal Average		Mozambique		Tanzania		Ghana	
	Average	%	Average	%	Average	%	Average	%	Average	%
Product Cost (FOB plus bagging)	$229	81%	$264	58.2%	$267	48.3%	$273	65.3%	$251	64.9%
Transport Cost	$31	11.2%	$115	25.4%	$181	32.7%	$93	22.3%	$70	18.2%
Taxes and Levies	$0	0.1%	$6	1.4%	$10	1.8%	$2	0.5%	$7	1.8%
Finance Costs	$8	2.8%	$22	5.0%	$32	5.7%	$16	3.9%	$19	5%
Total Overheads	$6	2%	$11	2.5%	$19	3.4%	$8	1.9%	$8	2%
Total Margins	$8	3%	$34	7.5%	$45	8.1%	$26	6.1%	$31	8%
Grand Total	$282	100%	$453	100%	$554	100%	$419	100%	$386	100%



The cost levels in Thailand indicate the path forward for African countries. With roughly one fertilizer retailer per 1,000 farmers, Thailand achieves an annual distribution of more than 5 million metric tons of fertilizer to 5.7 million farmers. Government support essentially consists of small farmer finance schemes that are administered through the Bank for Agriculture and Agricultural Cooperatives, as well as negligible taxation of agricultural inputs. Apart from this support, the private sector is responsible for the entire operation of the sector. The volume of transactions allows the private sector to operate at margins that are one-third to one-fifth those that apply in Sub-Saharan Africa.

Cost Chain Conclusions

Product sourcing and ocean transportation costs are highly dependent on the volumes shipped, but the cost savings on larger shipments are relatively small. Ocean freight transportation costs are not likely to decline in the near and medium terms. Fertilizer import costs to Africa will remain high due to the region's small volumes of imports, high international ocean freight costs due to world economic conditions, and lack of return cargos from African ports.

The costs of and margins on specialized NPKs are significantly higher than on bulk commodity fertilizer products. Localized blending

facilities can provide products at lower prices, assuming bulk nutrients can be imported and transported to the blending facility. Blending is most likely cost-effective at coastal ports, unless bulk inland transportation systems (e.g., rail) are improved and reliable. For effective marketing and distribution, blends require more developed market networks because of their soil specificity and tendency to cake and/or segregate.

Brief Survey of International Shipping Costs and Fertilizer Shipping Costs

Since fertilizer requirements in Sub-Saharan Africa are small, import sizes are often uneconomically low, generally 1,000 to 3,000 metric tons and up to 10,000 metric tons, with 20,000-25,000 metric ton shipments being exceptions. Most of the fertilizer shipped in the world is in parcel sizes of 25,000 metric tons via handy-sized or larger vessels. This results in higher ocean freight rates for the infrequent shipments of low fertilizer volumes to Sub-Saharan Africa than to other locations. The low volumes lead to a double "penalty" — a higher FOB from the supply source and higher ocean freight charges, resulting in a high delivered cost of fertilizer to ports in Sub-Saharan Africa.

Dry bulk cargo shipments. Whether in raw or finished form, most of the fertilizer in the world is shipped as dry bulk cargo or in bulk with bags. Some of it is shipped in 50 kilogram woven polypropylene bags. Several commodities compete for the available vessels in the dry bulk cargo market, estimated at more than 2.7 billion metric tons annually (see Exhibit IX-5). This cargo gets carried in vessels of different sizes, from the small 500 to 10,000 metric ton vessels, which ply riverine routes and coastal waterways, to the larger handy-sized and other vessels (see Exhibit IX-6).

Dry bulk fleet. Most of the global fertilizer trade uses handysize, handymax, and panamax vessels. Handysize and handymax are the workhorses in the business since they have better flexibility in terms of draft and turning radius. The existing number of handysize vessels is higher than that of other capacity carriers. However, as can be seen from the number of vessels on order, the trend is now toward larger carrying capacity, and shipyards usually accept orders only for the larger vessels. Between 35 to 45 percent of the handy-sized vessels are 25 to 27 years old, and have either reached or crossed the stage when they are eligible to be scrapped. If the old vessels are scrapped, per accepted practice, the fleet is expected to decrease in the future since proportionally less handy-sized vessels are on order. Due to low volumes, fertilizer shipments to ports in Sub-Saharan Africa must generally rely on the small and handy-sized vessels.

Exhibit IX-5. Dry Bulk Cargo Shipments

Dry Bulk Commodity Seaborne Trade (in million tons)	Year		
	2004	2005	2006
Coal	665	690	715
Iron Ore	590	650	690
Grains	235	242	255
Fertilizers	150	156	160
Other	870	890	920
World Total	2,510	2,628	2,740

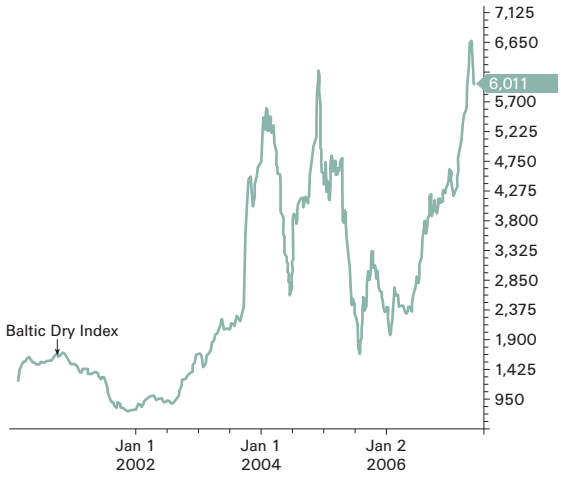
Source: Hammer, 2006

Exhibit IX-6. Dry Bulk Fleet

Nomenclature	Capacity Range (mt)	Existing Numbers	On Order Numbers
VL Capesize	300,000	548	171
Large Capesize	?	144	0
Small Capesize	80,000	80	47
Panamax	›65,000	1313	226
Handymax	35,000 - 65,000	1974	369
Handysize	10,000 - 35,000	2351	268
Small Coasters	500 - 10,000	?	?

Dry bulk cargo freight rates. The ocean freight market is at an all-time high. The Maritime Research Index (1972 = 100) reached 478 at the end of April 2007 from 190 in January 1999. The Baltic Dry Index (BDI), another largely accepted indicator and a composite index of cape, panamax, supramax, and handymax freight rates, rose from 985 in May 1985 to more than 6,600 in May 2007. The BDI has moved rapidly since mid-2003 and continues to demonstrate an upward trend. The recent high of the BDI was 6,688 on May 15, 2007.

Exhibit IX-7. Baltic Dry Index of Freight Rates



Several factors have contributed to the current state of the overheated maritime freight market, including the overall growth of 4.5 to 5 percent in world gross domestic product. The single most important factor is Chinese steel production, which has grown from 280 million to 500 million metric tons from 2004 to 2007. Chinese iron ore imports of 326 million metric tons in 2006 are expected to increase by another 50 million to 375 million metric tons in 2007. China, which had been exporting coal, is now a net importer. Cement has also been another important factor in Chinese influence on the freight market since China is now a major cement producer and exporter.

The situation is described as "precarious" by one industry source, and although the freight market is expected to continue at these high levels, some correction to the dizzying increases is foreseen. However, a number of factors indicate that freight rates are likely to remain high in the foreseeable future:

- Shipping is a capital-intensive industry with high barriers to market entry. While the freight market is high, it will be difficult to mobilize the massive investments required in new floating capacity.
- If scrapping of vintage vessels continues, it is likely the handy fleet will be reduced since most reputable shipyards only accept orders for the larger vessels.
- Demand for iron ore and coal from developing countries in Asia will continue to grow in the short term.
- The China factor and its influence on the freight market is expected to continue to grow.
- There is an acute shortage of professional staff, officers, and crew to run vessels.

Since the freight market is expected to stay firm for now, it follows that the freight rates quoted for Sub-Saharan Africa will remain high in the short term, and possibly in the medium term as well.

Freight rate estimates for Sub-Saharan Africa. Since there is a relatively small fertilizer market in Sub-Saharan Africa, and shipments are few and far between, there are no published freight rates for this market. Unless there

Exhibit IX-8. Present Shipping Freight Estimates Company 1

From	To	US$ per mt
PG/AG	East Africa	45
PG/AG	Dakar	75
Red Sea	East Africa	50
Red Sea	Dakar	65
Black Sea or Tunisia	East Africa	75
Western Europe	East Africa	95
Western Europe	Dakar	55
Tampa	East Africa	95
Tampa	Dakar	55

Basis 15,000 mt dry bulk cargo with a discharging rate of 1500 mt per day full load on a 16,000 mt geared vessel

Exhibit IX-9. Present Shipping Freight Estimates Company 2

From	To	US$ per mt
AG	Beira	46-49
AG	Mombasa or Dar es Salaam	37-40
Egypt or Jordan	Beira	50-53
Egypt or Jordan	Mombasa or Dar es Salaam	46-49
Black Sea Port (Turkey) or Tunisia	Beira	73-76
Black Sea Port (Turkey) or Tunisia	Mombasa or Dar es Salaam	67-70
Western Europe Port (Hamburg)	Dakar	47-50
Tampa	Dakar	66-69

Basis 10,000 mt bulk stand alone cargo

is a serious inquiry from a potential buyer, fertilizer suppliers are not ready to canvass the freight market to obtain rates for ports in Sub-Saharan Africa. Exhibits IX-8 and IX-9 show reliable estimates on the basis of a 15,000 metric ton bulk shipment of fertilizer to the region from different sources aboard a 16,000 metric ton (small handysize) vessel. There is a variance in the two estimates since the basis for freight calculations adopted by the two shipping companies is different. These rates are $4 to$7 per ton higher than the equivalent freight rates for shipments from the same supply sources to the larger and more regular purchasers placed in locations with similar sailing times.

Brief Note on Corruption in West African Fertilizer Markets

Illegal tax payments and corruption averaging 20 percent of total cost represent a significant additional price to pay and inhibits increased fertilizer use by farmers in West Africa. Reduced access to and affordability of fertilizer due to these "taxes" deprive farmers of yield increases and lowers soil fertility. Public denunciation, lobbying at the state and sub-regional levels, and a change in procurement methods should make it possible to discourage such practices.

Although fertilizer consumption in West Africa is relatively low compared to the rest of the world, the quantities used each year are important enough to entice political and private interests. This is particularly relevant to West Africa because some input procurement remains the responsibility of state-controlled companies or parastatals in cotton, cocoa, and coffee. The West Africa fertilizer market is estimated at around 1.2 million metric tons per year and has a sales price value of approximately $600 million. The fertilizer market represents $125 million for both Mali and Burkina Faso, and is the most important procurement made by parastatal institutions, thereby exposing this activity to a high risk of corruption.

Sources of corruption in the fertilizer supply chain. There are several sources of corruption along the fertilizer supply chain in West Africa. Some have a direct economic impact, often resulting in price increases for end-users. Others have an indirect economic impact, which is more difficult to quantify because it

involves delivery delays that can put planting and harvest at risk. Corruption can also cause payment delays, which discourage suppliers to make offers in a specific geographical area. Exhibit IX-10 identifies various sources of corruption along the fertilizer supply chain.

Five points of entry for corruption are identified along the fertilizer supply chain in West Africa; 3 in the logistic chain (port customs and clearance, inland transportation and customs clearance at point of destination) and 2 in the trade chain (tenders and payments for quantities delivered).

Logistics Chain

Customs clearance at the port of entry. Harbor authorities are the principal instigators of corruption at this point of the procurement chain, charging fees for holding discharge space at the port. These authorities are fully informed of the daily expenses (demurrage) incurred for spending one day offshore while awaiting a berth within the port to discharge cargo. They often request a lower sum as an unofficial payment to quickly avail berthing authorization.

There is also corruption at the customs level. Customs agents use their monopoly position to charge extra fees, which the importer is forced to pay to avoid demurrage costs that are levied on goods until they leave the port. Corruption at this level represents 0.5 to 2 percent of the value of the goods (12,500 or 25,000 metric ton cargos). If not paid, sea freight and/or storage overcharges can be incurred at the port, making up as much as 5 percent of the fertilizers' value.

Inland transportation. Corruption at this level refers to all non-official barriers established throughout the truck routes. These generate a level of corruption of about 2 percent of the value of the transported inputs. They cause longer truck rotations, resulting in 10 percent increases in the cost of transportation, or an approximate 2 percent increase in the price of fertilizer.

Customs clearance in the country of destination. Corruption is most significant at this stage, whereby refusal to pay unauthorized charges amounting to 2-5 percent of the declared value of goods may result in trucks being blocked at customs for several weeks. The associated costs can amount to 5-10 percent of the value of the transported inputs.

Commercial Chain

Invitation to tender. Commercial corruption to win tenders is the most important corruption point in the chain of agro-input procurement. It is through this process that political par-

Exhibit IX-10. Nature and Level of Corruption at Different Levels of the Fertilizer Supply Chain

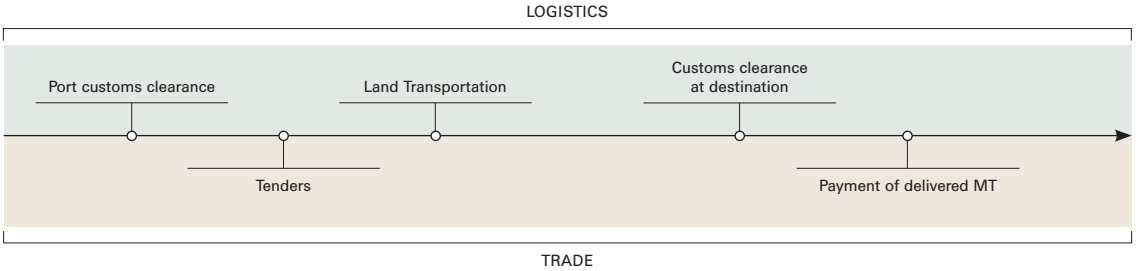


Exhibit IX-11. Sources of Corruption and Consequences of Refusal to Pay

Source	Range (%)		Consequences (in case of refusal)
	Lower	Upper	
Port	0.5%	2%	5%
Inland transportation	4%	4%	Impossible to make delivery
Customs clearance at destination	2%	5%	5 to 10%
Call for Tender	5%	15%	No possible sale without payment
Invoice	1%	2%	Delay in payment
Total	12.5%	25%	Impossible to remain in business

ties finance their activities, close relations of leaders enrich themselves, close relations are "rewarded" for services rendered, or political enemies are "bought" to assure their neutrality.

Multinational fertilizer companies have begun to pass responsibility for tendering to national distributor partners because of severe anti-corruption legislation in the former's home countries. These national distributors are then tasked with redistributing the "margins" that their suppliers grant them. For the last decade, a majority of the placed orders only require offers from national distributors. The amounts required to "win" vary, but are estimated at 5 to 15 percent of the amount of the tender.

Suppliers' payment. Although a supplier may have delivered the requested quantity and quality on time, the invoice payment still constitutes an opportunity for corruption. Requests at this point could be 1 to 2 percent of the invoice amount.

Corruption's Repercussions on Prices, Deadlines, and Input Supply in West Africa

Direct repercussions on prices. The effects of corruption on the fertilizer procurement chain in West Africa can have a direct impact of a 12 to 28 percent increase in the price of fertilizer.

Repercussions on deadlines translated in terms of cost. The additional time for conveying fertilizers due to extra administrative annoyances can reach 30 days and result in indirect expenses of 5 to 10 percent of the value of the transported fertilizer.

Effects on the global fertilizer supply. All the constraints mentioned above constitute barriers to entry for potential suppliers in the fertilizer market, thereby reducing competition and leading to high prices throughout the region.

CHAPTER TEN

Conclusion

The multiple country studies and related quantitative and qualitative analyses have revealed a number of trends and commonalities. Consultations between the research team and Gates Foundation staff have refined our understanding of how African fertilizer markets function and what can be done to improve their performance. Ideas from the research team, interviewees, and the analyses coalesced around six thematic areas:

- Policy and regulatory environment
- Human capacity development
- Supply side issues
- Demand side issues
- Research and technology transfer
- Transport and logistics

Through a combination of actions in each of these areas, it is possible to reduce current fertilizer prices by as much as 20 percent in the medium term. However, prices will only reach those of major fertilizer markets like Thailand when a number of conditions are met. First, economies of scale for imports must be warranted. Second, the region must produce backhaul export outputs. And third, port infrastructure must be upgraded to handle larger vessels.

The single largest gain in price reduction — up to 12 percent — would come from improvements in the internal transportation system. A second tier of price reduction possibilities arise in the areas of finance (4 percent) and larger procurement volumes (3 percent). Country- and region-specific price reductions are also possible through policy reforms on taxes, tariffs, and corruption, particularly in West Africa.

Policy and Regulatory Environment

Policy. Most economic actors were comfortable with the progress made to date on liberalization and privatization, although they did lament the perception that the private sector did not need assistance to play its role and would spontaneously fill the gap left by withdrawal of the state. Notable exceptions to this view were in Malawi and Tanzania, where the state has still not relinquished its tendency to aspire to dictated outcomes. Mali is making headway in relinquishing the grip that the tender bid process has on market outcomes and prices, but more work needs to be done.

Policy concerns at the national level tend to revolve around the appropriate role of the

state in East Africa, particularly in Tanzania and Malawi; cheap food imports; and misguided donor assistance, resulting in disincentives to investment in the agricultural sector throughout Africa. U.S. cotton subsidy programs are of particular concern to cotton-producing countries, which are likely the largest consumers of fertilizer on the continent. This issue is best addressed through the existing Doha Round of international trade discussions.

All the countries visited lacked formal legislation and regulation to provide an overall framework for economic actors involved in the fertilizer industry. While legislation is common for pesticides, it is practically nonexistent for fertilizers. The Abuja Fertilizer Summit called for national fertilizer strategies — a necessary first step toward codifying legislation and regulation that warrants support. Eventual legislation would provide guidelines to stimulate investment by existing agents while elucidating the regulatory regime for potential new entrants.

Regulation. The major need in the regulatory arena is to support testing of blended fertilizer formulations. This could be done through outsourcing to private firms — an approach promoted by the U.S. Food and Drug Administration — or directly via national standards boards. In either case, technical equipment and training will be necessary. Any regulatory activity should engage the ministries of environment, industry, and agriculture, along with national associations of agricultural input suppliers, to ensure public and private sector actors understand and support the regulatory framework. A process of consultation between public and private sector players would yield better results and promote compliance.

Domestic regulatory bodies in each country need support to develop in-house expertise to test fertilizers. While regulatory enforcement and public information are traditional state roles, the U.S. Food and Drug Administration has opted to provide guidance while leaving routine testing to private laboratories. The potential may exist in some countries, such as Ghana, to outsource testing to the private sector as the state focuses its energy and resources on enforcement. Due diligence on local private laboratory testing capacity is required before pursuing such an approach.

The growing importance of fertilizer blending in Africa highlights the need for a robust regulatory regime. Regulatory control is crucial because no one is currently checking whether fertilizer products (blended or not) have their advertised composition after importation — an issue that will become more acute when primary nutrients are locally blended. Public information campaigns about testing will become increasingly important as more countries move into blending. Any blend testing should be conducted in concert with the evolving agricultural input dealer associations as part of their membership requirements and responsibilities.

Standards and measures need to be uniform and enforced to the retail level to ensure quality control and "truth in labeling." Government regulatory agencies will require equipment and training to fulfill this role. National policy, legal, legislative, and regulatory authorities will also have to be updated to support this initiative. Policies could be designed to allow sanctions if advertised compositions are not respected, provide incentives for investment in agricultural production equipment, and promote the introduction of local primary ingredients.

Regulatory emphasis on quality control is required to protect honest fertilizer dealers and provide access to useful consumer information on different product lines and sources. Draft legislation and regulations, along with the requisite investment in equipment, training, and organizations, would help address these problems once the documents are enacted into law.

Human Capital Development

Farmers. The African farming population faces a rather bleak landscape for information and education. With the demise of the state-run extension services in the 1990s, farmers have turned to the emerging agricultural input dealers for extension information. Agricultural input dealers have essentially become new technology transfer agents and often work in association with and complement the services offered by traditional extension agents. However, most of these firms are not well-placed to provide good technical information and need training themselves.

Some extension services remain available, but they are limited in scope and geographic locale and also need to update their information set. Recognizing that an informed and successful farmer is their best type of customer, many private sector companies (input and output) have filled the void by adding training components to their service lines. Like other people, farmers get information from their neighbors through discussions in bars, on market days, at festivals, and the like. Radio has the potential to reach many geographically dispersed farmers. In addition, cellular phones are becoming more common in village settings and offer an opportunity to communicate basic information on prices and quantities. There is definite scope for the Gates Foundation to bring uniformity of message and broad dissemination of best agronomic practices to farmers.

Farmer training and education in modern agricultural technology is one of the most important factors in almost all Sub-Saharan African countries, where extension services are extremely limited. The result is under-use and/or misuse of fertilizers, with a number of myths affecting farmer behavior. For example, most farmers in Uganda remain convinced that their lands are fertile and do not need nutrient replenishment. A second example is Malawi, where farmers demand several different types of "compounds" for each crop when only marginal differences in nutrient content are present in most cases.

Importer-wholesalers. At the apex of the domestic marketing channel, importer-wholesalers seek reliable distribution partners to help them move their product. The major problem is the limited number of qualified and reliable distribution partners. Greater professionalization of distributor and dealer networks would go a long way toward improving these links. The major exception to this generalized market structure is Malawi, where some importer-wholesalers have developed their own distribution networks to a certain extent. However, even in Malawi, two separate networks of independent agricultural input supply dealers have arisen (with donor support through CNFA and IFDC, respectively). Training of importers, wholesalers, and retailers in all countries is critical to get markets performing at a higher level. Ministries of agriculture can provide training to extension workers, together with the new technology transfer agents, which the agri-dealers have become. The ministries can then reorient their resources to

improving the skill levels of the subject-matter specialists who deliver the training.

Importers and wholesalers are not interested in promoting fertilizer products because these firms exercise little direct influence on the price of most straight fertilizer products, which are homogenous, indistinguishable commodities. Importer-wholesalers cannot create any form of "exclusive rights" for their product, and subsequently raise prices because their competitors sell the exact same product. Firms faced with indistinguishable product make little individual effort to develop markets because any growth may be captured by the competition. In this type of situation, there is a need for public investments in developing retail networks in rural areas to create well-functioning fertilizer markets.

Distributor-dealers. The example of Faso Jigi in Mali is insightful with regard to the impact on price that a combination of training, technical assistance, market linkage development, and finance can create. The facilitated procurement process strengthened the competencies of Faso Jigi to purchase fertilizers on international markets, compare and negotiate prices with suppliers, and manage financing. The organization was also able to avoid procurement from non-professional local retailers, eliminate corruption, and establish direct contact with professional suppliers. Faso Jigi negotiated urea prices similar to those paid by CMDT in the previous year, even though world market prices had increased by roughly 30 percent between July 2004 and March 2005. In addition, the organization successfully distributed its auto-procured fertilizers to farmers at least one month earlier than the rice parastatal (Office du Niger) and its tender system.

The growing number of private agricultural input dealers provides a new focal point for agricultural information and dissemination that can be more fully exploited, in concert with traditional extension agents. Agro-input dealers have a vested interest in improving farmer productivity and income as this would result in increased sales of their product line. Attempts should be made to merge the altruistic motivations of the extension agent with those of the self-interested dealer to better serve the needs of increasingly informed consumers of agricultural inputs. Well-informed public service consumers should be promoted as a good in-and-of-itself rather than viewing them as passive consumers of services with no scope for action on their own initiative.

Improving linkages. Increased contact and improved understanding between and among the public and private sector economic actors involved in the fertilizer trade is needed in all the countries visited. The recommended approach would be to address needs through both a top-down (importer-wholesalers to distributors and dealers) and bottom-up approach. Because the level of sophistication of these economic actors is different, their respective training needs vary widely.

Training programs should be organized at the bottom level rather than at the top, with the latter interventions focused on networking and potential partner identification. Linkages must also be developed among key players at the national, regional, and international levels. Seminars, meetings, trade tours, and so on can be used to link local distributors with area retailers, importers with wholesalers and distributors, and importers with international suppliers.

A financial facility would likely accelerate these relationships and could be made contingent upon the distributor-dealer completing a specified training course and demonstrating a minimum level of business acumen over the course of several seasons. This type of program should be run through national agricultural input dealers associations to ensure broad participation and to strengthen the associations by enabling them to provide relevant services to their members.

Supply Side Issues

Pooled imports. Combined ordering for bulk purchasing appears to be a non-starter on practical rather than theoretical grounds. The concept of attempting to capture economies of scale through pooled orders is sound, but the problem lies in actual implementation for a variety of reasons. There remains significant mistrust among market participants, both within national and among international market actors. It is possible that pooled orders would be sufficiently large that they would overwhelm existing port logistics and capacity if larger shipments were brought in at the same time. The idea of pooled orders needs to prove itself at the national level before cross-border procurements are pursued.

Piggy-backing. For smaller markets like Mozambique and Uganda, piggy-backing orders on the larger procurements of neighboring countries is a better place to start, and would require improved interaction among sector actors within the region. Donor projects have been successful in creating regional contacts along theses lines in output markets (e.g., the RATES project in Nairobi), and this should be possible with input markets as well.

Blending. Local blending of fertilizers is a trend identified in multiple countries and represents the next logical step in the development of most of the markets studied, with the exceptions of Uganda and Mozambique. Existing market actors have already noticed this opportunity, and blending operations exist in more than half of the countries visited, albeit at different levels of sophistication. IFDC's estimate that a market needs to reach a total size of 100,000 metric tons per year in fertilizer products to justify a blending operation is confirmed by this study. According to IFDC, the next step would be granulation, which requires a market of 1 million metric tons. Locally based and sophisticated blending capacity would provide the opportunity to service the higher-margin specialty fertilizer market and drive down costs to farmers. These specialty fertilizers are more common in the crop mix of outgrower schemes (e.g., coffee, tea, tobacco, flowers) and could be combined with a demand stimulus package to farmers.

Local bulk blending of fertilizers can ensure balance in the use of different crop nutrients. Crop-specific blends are useful in environments where farmers have limited knowledge of best agronomic husbandry techniques. However, unless there are strong regulatory bodies to constantly monitor the efficacy of locally blended products, unscrupulous traders could engage in adulteration with low-cost local materials (e.g., limestone and gypsum). A local blending strategy should promote research to identify the blends required, training to increase the technical capacity of the blenders, a solid regulatory mechanism, and access to finance.

Research is required to identify appropriate blends for each major crop under existing

farmer conditions, using on-farm trials in concert with national, regional, and international research institutions. Trials will likely require three years to yield statistically significant results. Technical capacity building is necessary to ensure existing blenders are using best practices in blending techniques and technologies. Regional training and site visits by acknowledged blending experts, hosted through local and regional agricultural input dealers associations, would provide all members with access to the same information, ensuring no one individual firm receives preferential support. The associations would benefit from the publicity and service provision to their members.

Financing of primary ingredient procurement is needed because firms are reluctant to tie up scarce capital in primary ingredient stocks and are interested in moving blended outputs as quickly as possible. An appropriate financing package could be developed to accelerate the move toward local blending by providing preferential import credits for the importation of primary ingredients over finished products. Equipment upgrades could also be financed to provide for improved output and adjustable packaging sizes. Finally, appropriate warehousing capacity is needed for the primary ingredients and blended output.

Smaller packaging. Smaller packages are particularly important to low-income and horticultural crop producers. Because their plots are small, horticultural producers do not need large amounts of fertilizer in 25 or 50 kilogram bags. For their part, low-income farmers have limited capital and do not want to tie up their scarce financial resources by holding a 25 or 50 kilogram bag. Many importers and wholesalers are already implementing smaller bag sizes. A good regulatory mechanism to ensure farmers get what they pay for is required to make smaller packaging acceptable to consumers. Initial efforts should focus on reputable importer-wholesalers and large distributors for bagging in smaller packages. An overly liberal practice that extends to retailers could provide the opportunity for unscrupulous elements to adulterate or provide short weight bags, with a resultant increase in effective price.

The trend toward smaller packaging among reputable actors can be reinforced through national agricultural input dealers associations by identifying best practices in marketing smaller quantities and promoting them to dealers. Technical information on application information and dissemination for smaller-lot fertilizers needs to be presented in a way that is accessible to illiterate farmers. Additional marketing and technical information targeting farmers through producer organizations should highlight the efficiency, effectiveness, and technical application of agricultural inputs.

Finance. The major concern in procurement finance is access to credit at reasonable rates, specifically for those firms without access to international financial markets denominated in dollar or euro terms. Most of the large internationally linked firms have access to dollar and euro capital at prevailing world rates. Local importers are at a distinct disadvantage in this regard. Local wholesalers, distributors, dealers, and retailers are often restricted to the local capital markets, with interest rates between 15 and 25 percent. A fertilizer-specific guarantee fund could be established for local market actors so they can increase the volume of orders placed with importer-wholesalers.

Farmers will also need access to finance to purchase inputs, but this is probably best managed through a subsidy scheme for agricultural inputs. An input supply subsidy approach would offer multiple benefits. It would avoid the problem of limited credit collection rates caused by multiple buyers of a particular output because the output sale would no longer be the financial point of transaction. It would allow annual adjustment of the subsidy level to regulate output supply by increasing or decreasing the level of input subsidization. It would strengthen the emerging private agricultural input dealer network if implemented solely through the private sector, thereby establishing market linkages between dealers and farmers. Finally, it would provide a point of transaction for passing on additional services to farmers while stimulating the expansion of existing agricultural dealer networks.

Demand Side Issues

Output demand. The major obstacle to reaching large numbers of geographically dispersed farmers in the countryside is that they do not have access to reliable output markets to justify a change in current agronomic practices. Without an improved output market for the major crop produced by these farmers, almost all input supply enhancement schemes will be short-term in nature — often "one-shot" deals. The key factor for sustainable input supply use is a farmer with an assured output market at economically attractive prices. In the medium and long terms, the root problem limiting sustained adoption of modern farming techniques is the lack of reasonably stable output markets for the increased production. Farmers will make the necessary investments in time and capital if they are reasonably assured of a return on that investment. Any successful agricultural intervention must identify the reliable output market for the increased production. Farmers will respond if the output price is right.

There are several ways of improving output demand. The most common involves outgrower programs that provide more stable output markets because they are run by existing agribusinesses in mostly export-cropping systems. These larger agribusiness operations can handle the logistics and procurement of input supplies for outgrower farmers, as well as marketing of their output. They also provide extension and training services, often referred to as "embedded extension." The problem with these schemes is that they are limited in scale because the agribusinesses involved do not have sufficient time and money to expand operations beyond their immediate vicinity. Within their vicinities, however, they are having a major impact that could be scaled if steps were taken to implement such a program. The private firms encountered essentially stated they were committed to this approach and would achieve scale using their own resources over the course of 25 years. They would welcome partners to help them expand their existing systems, which would allow them to achieve scale in five years.

Peri-urban agriculture around major urban centers is increasingly moving toward more sophisticated agricultural practices. In these areas, reasonably stable output markets that justify farmer investment are provided by urban African consumers. Farmers service this output market with all sorts of fresh produce, animal products, and major cereals by moving from extensive to intensive agricultural techniques, which necessitate increased agricul-

tural inputs and modern husbandry methods. Niche markets, which include schools, hospitals, military installations, brewers, and animal feedstocks, offer targets of opportunity for specific crops and farmers. Finally, new export crops can be introduced to farmers through embedded private sector extension networks, which also assure farmers of an economically attractive price.

Market information system. All markets exchange information about the perceived value of goods and services through each individual transaction. Sharing information on a multitude of individual transactions improves the quality and reliability of information embodied in the transaction. The role of a market information system is to capture ever-greater numbers of transactions, share them with ever-greater numbers of market participants, and increase the probability that the message communicated in the transaction is accurate.

The Network of Regional Market Information Systems and Traders' Organizations of West Africa project, known as MISTOWA, has made great progress toward creating an effective information system. The project's cell phone-accessible information system, TradeNet, only includes one agricultural input among the nine commodities listed, but can potentially be expanded. MISTOWA's impact is just beginning to be felt, with rollout of TradeNet planned throughout 2007 (Ghana in January, Burkina Faso in April, the Ivory Coast in June, Mali and Nigeria in July). However, the program is scheduled to end in September 2007 at a time when it is expected to hit its stride. This effort deserves to be supported and expanded to include multiple agricultural inputs.

The MISTOWA project in Accra was impressive in its understanding of the role a market information system can play and how to establish a potentially sustainable system on a regional scale. The MISTOWA experience with the TradeNet market information system provides a number of lessons that could be leveraged to build on achievements to date. Donor funding of MISTOWA and TradeNet expires at the end of September 2007 and staff who embody this knowledge will soon seek new employment, which calls for rapid action to continue and replicate the project's successes.

MISTOWA correctly identified the enumerator as the largest cost component of a market information system, severely limiting its ability to be sustainable once donor funds are withdrawn. In the TradeNet system, market participants are the "enumerators" and cell phones are the data-entry instruments, significantly reducing data collection and entry costs. TradeNet used the penetration of cell phones in the late 1990s and early 2000s to further its objectives. The project is now working with cell phone companies to use advertising revenues as another source of financial sustainability for the system. Commodities and countries should be expanded from the present eight output products and one input, and the program should be implemented in other regions of Africa based on lessons learned in West Africa. The accumulated knowledge should shorten the time and effort required to establish similar systems in other regions.

MISTOWA rightly focuses on human capital, not only information technology, to implement the TradeNet information system. TradeNet could be expanded in terms of product

line and nations covered. While the program is mandated to provide price information in 15 West African countries, similar systems could be established in Eastern and Southern Africa. These would not necessarily have to be based in major hubs such as Nairobi and Johannesburg since the program depends on cell phone and Internet connections. By using actual market participants to register price information, TradeNet creates an impressive database of potential trading partners and transactions. Since January 2005, 88 self-reported transactions worth $43 million have been documented through this embryonic system. In addition, banking institutions have expressed interest in the database of potential borrowers. The emphasis should increasingly be placed on providing market intelligence, in addition to raw price data, as the clientele becomes more sophisticated and demand for the TradeNet system increases.

Subsidies. At this stage of market liberalization in most of Sub-Saharan Africa, reverting to traditional subsidy approaches would send the wrong signals to the fragile private sector because these regimes require fixed retail prices, subsidy payment to the primary importer, and a mechanism to ensure the product sells at the "fixed" price. For administrative ease, most governments would restart the parastatals, as already witnessed in Malawi, and task them with importing and distributing to wholesalers and retailers. In the worst-case scenario, as again seen in Malawi, the revived parastatal would perform market actions to the retail level, with negative impacts on emerging private distribution and retail networks. In the medium and long terms, training and access to finance are better means of ensuring sustainable results by educating farmers on the economics of fertilizer use through an extension network and providing them with seasonal credit to purchase inputs through supply orders or vouchers.

If implemented as market-reinforcing mechanisms, subsidies can provide an opportunity to "prime" the demand pump. A subsidy system that reinforces market solutions, rather than replaces them, would have a number of attributes. Market-enhancement subsidies are preferred to those that impede the market allocation mechanism because the subsidy cannot last forever and will eventually be dismantled. Hence, they should do no harm to existing markets, or should at least minimize the negative impact of the subsidy. Ideally, subsidies should accelerate market development for the day they are dismantled. Recognizing that human behavior changes in response to whatever is subsidized, it is important to identify subsidies that provide for the widest individual choice, as in the marketplace. Input markets are preferred to output markets as the target of subsidization to allow farmers full discretion in responding to market signals on what to produce. The existing voucher systems in eastern and southern Africa have been too restrictive on farmer behavior and overly broad in their application.

Research and Technology Transfer

Crop-specific research. There is ample scope for research on crop-specific fertilizer formulations and applications under farmer conditions in all the countries studied. Researchers, ministry of agriculture officials, private sector economic actors, and farmers all stated that yields could be improved by applying the most appropriate fertilizer in the right quantity at the right time. The public and private sectors would need to support such research to ensure wide dissemination of the results. Sim-

plified soil fertility tests that are color-coded for illiterate and semi-literate farmers would empower rural producers to better understand and address their crop performance and soil fertility needs.

The need for crop-specific research on fertilizer formulations and application was heard from multiple actors in every country visited. Economic actors in most countries, though less so in the francophone states, cited the use of inappropriate fertilizer mixes. For example, Ghana uses Triple 15 NPK (15-15-15) on everything, a formulation that seems to date from the colonial period and has not been updated since.

Subsidy impacts. Cross-country socioeconomic research on the impacts of recent experiments with voucher-based subsidies in Africa are needed. The information from such a study would inform governments, policy-makers, donors, the private sector, and the general public on the strengths and weaknesses of voucher-based subsidy schemes.

Farm service centers. Farm service centers should be considered as a means to provide a complete service to farmers on all local crop options and techniques — from land preparation to harvesting, including agricultural inputs and husbandry practices. This would require mobile laboratories to test the soils, water, and fertilizers; agronomic units to establish demonstrations plots; and extension units using multimedia to convey proper messages to farmers in local languages. These extension centers could move around the country after two or three cropping seasons and work closely with the research centers to disseminate results.

Generation gap. There is a generation gap in human capacity among agricultural research scientists in Africa. A large contingent of agricultural scientists is reaching retirement age, and younger staff are not there to replace them. All existing scientists need not be replaced because there must be economies of scope across countries. For example, every country does not necessarily have to host a top-notch maize or cotton breeder. Rather than a personnel problem, it appears what is missing are funds to perform meaningful in-country research. This is not an argument to not fund training of the next generation of scientists, but rather to focus on providing in-country research opportunities for existing and upcoming scientists.

Transport and Logistics

Transport. Transport costs are the second largest component of fertilizer cost in African markets. The scope to reduce international ocean freight rates is minimal in light of the reduced volume of cargo vessels of the appropriate size for African ports. The reduced supply of vessels is compounded by increased demand for shipping vessels from Asia, specifically China. Any efforts to tackle transportation bottlenecks will, therefore, have to focus on land travel. Unfortunately, solutions to improve the road and rail systems, which could yield considerable cost savings in fertilizer transport, are capital-intensive and do not offer immediate opportunities to reduce costs.

Since actors along the supply chain outsource most transport services, little can be done in the short term to reduce fertilizer transportation costs. Rising fuel costs, deteriorating physical infrastructure, and heightened pressure on existing rolling stock all conspire to

maintain high transport prices. Construction financing or repair of infrastructure bottlenecks at ports, rails, and roads would require additional research and due diligence before specific actionable recommendations can be offered. However, some of the greatest gains in price reductions can be made by targeted physical infrastructure investments. For example, recommendations for potential port improvements require more in-depth study of the advantages and disadvantages presented by Tema and Takoradi, along with other key West African port facilities, such as Abidjan and Dakar.

Regional warehousing. Creating holding warehouses at Dar and Beira ports could help many countries source fertilizers at international prices in their backyard, if done in a similar fashion to the Mea-ConAgra relationship in Mombasa. Incentives could be provided for multinationals (e.g., Cargill, Conagra, Yara, Transammonia, Keytrade) to establish bonded warehouses as joint ventures at selected ports on the West Coast (Dakar, Abidjan, and Tema or Takoradi) and the East Coast (Dar es Salaam, Beira, and Nacala). They could store products in bulk, blend if necessary, and bag and sell to importers in surrounding countries against letters of credit. They would own the product until it is sold and freely sell if they found a better market elsewhere. To a certain extent, Conagra and Yara are already doing this in Kenya and Tanzania, providing an example that bears further examination. If such a program were initiated, it should be open to all multinationals, with no prequalification or selection except the willingness to work and commit to stay for a specific period of time (e.g., five years).

Logistics. Related to the warehousing and storage issue is the need to improve the TAZARA railway's transport capacity by adding covered wagons. These are required to protect fertilizer products from the elements and from theft. Covered wagons are also necessary to transport primary nutrients for any blending plant based in an inland area, such as Mbeya in southwestern Tanzania.

Country-Specific Conclusions

Ghana

Policy and Regulatory Environment

Policy. Formal legislation and regulation would provide an overall framework for the economic actors involved in the fertilizer industry of Ghana, which already has legislation governing pesticides. This would also stimulate investment by existing agents and clarify the regulatory regime for potential new entrants. Regulatory emphasis on quality control would protect honest fertilizer dealers and provide access to useful consumer information on different product lines and sources. Draft legislation and regulations, along with the requisite investment in equipment, training, and organizations, would help address policy-related problems once the documents are enacted into law.

A major constraint on food crop production is the liberal importation regime, which results in cheaper food imports than locally produced goods. The government is reluctant to change this policy as migration to cities continues to increase. By 2008, more people worldwide are expected to live in cities than in rural areas for the first time in human history, and Ghana is no exception to this trend.

Human Capital Development

Farmer skills. Even before new research results are disseminated, there is a body of information on best husbandry practices that can be codified and shared with farmers. The absence of state extension services over the last two decades has limited learning opportunities for farming communities. Soils have changed since the Triple 15 recommendations were first promulgated, and farmers need to be retrained on the current characteristics of their soils.

GAIDA. The GAIDA Executive Secretariat in Accra has considerable knowledge and organizational skills, as do many of the regions' distributors and dealers. Training, financing, and organizational support would go a long way to strengthening this association. GAIDA and its Executive Secretariat also provide the most appropriate vehicle through which agricultural input supply information can be captured, analyzed, and disseminated at the national level.

Supply Side Support

Supply. Local agricultural input dealers are clearly competitors, but are also beginning to recognize their shared interests in developing the overall market. There is an opportunity to organize bulk orders at the sub-national and national scales through a business association like GAIDA, if warehousing facilities were also constructed to address member needs. Bulk fertilizer arriving in Tema could be bagged at the port, loaded onto trucks, and delivered to strategically placed warehouses, thereby reducing hauling, loading, and handling costs. Members would then be responsible for sourcing their needs at the warehouses. A warehouse would not be needed in every region of Ghana at the onset of such a scheme. Rather, warehouses in key zones could cover multiple regions, with initial efforts focused on four locales, namely Accra, Takoradi, Kumasi, and Tamale.

Finance. A loan guarantee fund implemented through private banking interests in concert with GAIDA would serve multiple purposes. First, GAIDA would be strengthened because its members would perceive its secretariat as acting in their interests, thereby stimulating adherence to the association and attracting new members. Second, the banking sector would benefit from the pooled guarantee that GAIDA could offer and from the latter's knowledge of its members' willingness and ability to repay. Such a system would also lend itself to initial efforts to merge orders and buy in bulk. Several financial programs for agricultural inputs, including equipment, involve some combination of farmer participation (e.g., 10 percent), grants (30 percent), and bank financing (60 percent). The grant level is adjustable and is the implied subsidy that is hidden from the farmer to minimize market distortions. Examples with variations on this theme include TechnoServe, the International Fund for Agricultural Development, and the Wienco outgrower and extension program to cocoa farmers (Kookoo Abrabo-pa).

Demand Side Support

Wienco (Yara). Wienco has taken a special interest in the cocoa, coconut, and mango sectors, and runs an assistance program for farmers in concert with the Cocoa Marketing Board, the Ministry of Agriculture, and national producer associations. Wienco provides interest-free loans to approximately 20,000 mango farmers. In the cocoa sector, the company assists 7,000 farmers and hopes to expand the number of beneficiaries to 50,000 in the coming years. According to the head

of Wienco, additional assistance and innovative partnerships could enable the outgrower system to reach 100,000 out of an estimated 600,000 cocoa farmers within 5 years rather than the 25 years it would take to achieve this level independently. Similar programs could be supported in other high-demand food crops. The key here is for output demand to drive investments in time, money, and effort. As a reference point, the Millennium Challenge Corporation hopes to address the needs of 60,000 farmers through its Ghana Compact.

VEPEAG. The Vegetable Producers and Exporters Association of Ghana (VEPEAG) represents 750 farmers, of which 30 have irrigation infrastructure, 220 use boreholes, and 500 rely on rainfed production. VEPEAG uses an outgrower model to focus its work with the top 30 farmers, who in turn service the information and input needs of neighboring farmers. The association is mostly active in the Central, Volta, and Greater Accra regions. Although small, with 75 metric tons of fertilizer consumed and $50,000 in exports per year, it is representative of a category of commodity-specific farmer organizations that can drive change.

Research and Technology Transfer

The cost of fertilizer bags should be investigated — another activity that could be implemented through GAIDA as a service to its members. Bag costs in Ghana are around $9.60 per metric ton compared to $7 to $8 per metric ton elsewhere.

Transport and Logistics

All importers would prefer to use Takoradi port because of the lack of facilities at Tema for fertilizer discharge and the priority of the port for container cargo. However, Takoradi port suffers from poor infrastructure and access roads to the interior. While not an immediate role for the Gates Foundation, encouragement should be given to the African Development Bank and the World Bank to consider studying the requirements and possible financing arrangements to improve the infrastructure at Takoradi port and surrounding areas.

The lack of up-country warehouse space needs to be overcome so fertilizers can move directly from Tema port to regional centers. This will reduce overall storage costs and allow smaller distributors to access products more easily. Technical and financial assistance to GAIDA could make it possible for the association to implement such a warehouse as a commercial service to its members.

Mali

There are ample opportunities to further decrease fertilizer prices in Mali, with potential savings on FOB prices, financing costs, taxes, transportation costs, and retailer margins. FOB prices fluctuate significantly and prices for urea and DAP have traditionally been lowest in June and July, thereby offering a buying opportunity. Increasingly decentralized fertilizer procurement would enhance competition between fertilizer buyers (e.g., farmer organizations, retailers, input dealers) and encourage buyers to closely monitor markets and negotiate prices when the latter are relatively favorable. Decentralized fertilizer procurement is also less time-consuming, which adds flexibility in the timing of fertilizer purchases.

Financing costs will decrease as the time required to order, deliver, and pay suppliers decreases. Payment in euros will also lower fi-

nancial costs. Taxes can and should be reduced to stimulate fertilizer consumption. This requires lobbying at the national and regional policy-making levels (e.g., ECOWAS). Transportation costs are relatively high, as a large part of the trucks return empty. For example, 70 percent of trucks delivering cotton fertilizers in Mali return empty. This situation, partly due to the CMDT monopoly on cotton transport, can be improved.

Retailer margins in the tender system are artificially high, particularly since most of the work is carried out by international suppliers. Strengthening competition among retailers, local input dealers, and farmer-based organizations capable of purchasing fertilizers by themselves will improve efficiency in the fertilizer supply chain, as well as reduce unnecessary transaction costs and artificially set margins. It is estimated that increases in efficiency and reduction of taxes could bring savings ranging between 20 to 30 percent of the total price paid by farmers.

Policy and Regulatory Environment

Policy. Mali lacks any explicit policy document for fertilizer, other than the limited and broad sections contained in the Agricultural Policy Orientation Law promulgated in the fall of 2006. Chapter 8 of the law contains general policy outlines on agricultural inputs and equipment. Any policy formulation efforts should draw on this enabling law. Working with and through ORIAM, more explicit direction for fertilizer policy can be delineated within the context of this new law.

Regulation. As in all the African countries visited, there is a need to assist the regulatory authorities in monitoring fertilizer products on the Malian market. This need is becoming more acute as firms move into local blending. The resultant fertilizer formulations require testing to assure consumers of what they are buying. Laboratory testing equipment and training must be improved at the IER laboratory responsible for soil, water, and plant protection. In addition, ORIAM should be engaged in promoting the use of an upgraded laboratory to its members.

Corruption. Mali was the exception to the general observation that corruption was not a major contributor to price levels in the countries surveyed. Overall, corruption was not viewed as a major influence on prices anywhere but in Mali. The high levels of corruption in Mali are largely attributed to the choice of procurement technique based on tender bids. The most immediate remedy is to abolish the tender system, but other supporting actions can serve to stigmatize corrupt behavior. Public denunciation, lobbying at the state and subregional levels, and a change in procurement methods should make it possible to discourage such practices. Only public denunciation and intense lobbying of concerned states and subregional institutions, such as the ECOWAS and the West African Economic and Monetary Union, will reduce corruption from harbor authorities and the various operations involved in customs clearance. Alternative procurement methods to tender bid systems should be promoted to limit opportunities for corruption. For example, restricted open consultations and direct negotiations with suppliers based on objective and professional criteria established a priori could avoid convenient quotations by "businessmen" close to power in the importing country.

Human Capital Development

Farmer skills. There is enormous scope for improving farmer husbandry skills in new and existing crop lines. The farmers' world is changing, and they must constantly adapt to new markets, techniques, and technologies. New productive farming techniques could be promoted through ORIAM and its membership. New products on the market also need to be included in training, whether they are nationally produced blends or internationally procured products.

The combination of farmer groups and input supplier associations begun in Ghana has resonance in the Malian context. ORIAM leadership and key members should be provided the opportunity of an exchange visit to see how the Ghana system works. This type of exchange could stimulate ideas and break through perceived barriers to progress.

Farmer organizations in Mali tend to see themselves playing multiple roles: social structures, labor unions, political entities, and technical support systems. As a result, none of these roles are fulfilled to their full extent. Any intervention should target farmer organizations that focus on the farming needs of their members, with a view to improving agricultural productivity through increased use of fertilizers and training in best husbandry practices. Support should only be provided to cooperatives that are committed to member support and demonstrate a willingness to professionalize technically.

ORIAM. A nascent private sector market with increasing competition from new entrants is arising in Mali. Given the privatization of state structures, the market's direction needs to be supported if it is to fulfill its growing role. Greater efficiencies can be achieved throughout the supply chain through support to all actors within this sector via ORIAM. However, greater efforts will need to be made to strengthen ORIAM than those expended to its sister institution in Ghana (GAIDA) because the former has leadership problems and needs redirection and focus. In the near future, the demand for fertilizer will likely remain similar to the present mix of cotton, rice, and maize. However, a growing demand for horticultural fertilizer products is underway in Mali, as in Ghana. Fertilizer leakage across crops will persist, particularly from cotton to maize, which will continue to complicate the analysis of fertilizer impact on these two sectors.

Supply Side Support

Supply. The economic and financial analysis of the Tilemsi phosphate deposits should be updated to determine the feasibility of rehabilitating or re-establishing a domestic production facility. An updated study is warranted even if its result is to only put the question to rest and allow sector actors and policy-makers to focus their energies elsewhere. The major change in supply opportunities on the Malian market will be the move toward local blending. Assistance efforts here should focus on technical training and support of the regulatory authorities so they can integrate this new production capacity into the class of goods produced in Mali.

Finance. Access to financial resources is required by all but the largest market actors due to the nature of the fertilizer industry, which necessitates the movement of large quantities of a bulky product. A fertilizer financial facility via a loan guarantee program could address this problem if it were open to wholesalers, distributors, and dealers. Working through

ORIAM would allow finance efforts to be targeted, promote the business association to its members, and introduce peer pressure into the reimbursement decision. Although ORIAM is not at the level of organizational sophistication to act as the financial intermediary, its participation in the process would bring multiple benefits to the overall agenda to strengthen the agricultural input market. A local banking institution would have to be involved in management and oversight of the facility, but ORIAM could help identify partners, vet applications, and follow up on the financial assistance provided to its members.

The use of regional private sector banks as lead banks to manage any fertilizer financial facility is the most viable option to improve access to finance along the supply chain. Because no one bank has Africa-wide coverage, regional banks would have to be the targets for the lead bank role. These lead banks would then on-lend and manage the portfolio in their respective regions. For example, there are three regional banks in West Africa that could be considered: Bank of Africa, Ecobank, and Banque Atlantique. In Southern and East Africa, Stanbic, and possibly others, could play this role. Stanbic is now also present in western Ghana, which indicates it may be expanding elsewhere in the coming years. Regional banks could on-lend to national-level banks that have much closer connections to farming sector actors, such as BNDA, the national agricultural development bank in Mali.

Demand Side Support

Market information. MISTOWA is the network of regional Market Information Systems and Traders' Organizations of West Africa and is based in Accra. MISTOWA runs TradeNet, a cell phone and Internet-based information system. Mali anticipates national rollout of the TradeNet system in July 2007. The major difference between the market information systems established in the 1990s and the MISTOWA TradeNet initiative is that the latter opted to use actual market actors to collect and enter regional price information.

Previous systems had chosen to hire field enumerators and data-entry clerks with a structure that resembled a government institution. Once the donor funding waned, the system could no longer be supported at its original scale. MISTOWA identified this structural flaw as a major hindrance to the sustainability of market information systems and deliberately chose a different path. The MISTOWA methodology has proven more useful to actual market actors, and its commercial approach has a better chance of financial sustainability.

The MISTOWA system also facilitates trade by identifying market transaction opportunities. Market participants who enter data are able to access information from other locales, which serves as an incentive to participate in the network. As transactions proceed and are documented, reliable business actors are identified, which further reduces market uncertainty and increases trade. Indeed, banking institutions have expressed interest in accessing this information to identify potential clients. Any efforts aimed at supporting information systems for market actors should focus on the MISTOWA system rather than national-level systems.

Research and Technology Transfer

Research. The major research topic in Mali is the mystery of declining cotton yields, which has a negative impact on farmer incomes, export revenues, and the demand for agricul-

tural inputs. A commissioned study to explore this question through a national (e.g., IER) and regional (e.g., INSAH) research consortium, in concert with an international research institution, would inform policy and private sector actors in the cotton sector throughout the region.

Transport and Logistics

Transport. As elsewhere in Africa, most transport services are outsourced to specialized firms. One distinction in Mali is that tender bid auctions attract transport firms into the fertilizer procurement industry. However, most of them wish to remain transport-oriented and few, if any, have made efforts to directly procure fertilizer on world markets. There is not much that can be done in the short term to lower transport costs due to the price of internationally traded fuel and vehicles. Continued rehabilitation of the road and rail network to Senegal is the most likely method of reducing transport costs into Mali by increasing competition between road and rail, reducing transport time, improving vehicle longevity, and minimizing repairs. Construction financing or repair of infrastructure bottlenecks at ports, rails, and roads would require additional research and due diligence before actionable recommendations can be offered.

Logistics. As a landlocked country, Mali depends on ports in neighboring countries to service its trading needs. Mali has bonded warehouses in major ports along the West African coast — a system that needs to be studied to ascertain its usefulness, cost-effectiveness, and potential influence on fertilizer markets. None of the market actors mentioned this system as a market constraint, but it is worth examining as part of a larger review of West African ports.

Uganda

The fertilizer market in Uganda is embryonic and will require substantial assistance to grow to the level of neighboring countries such as Kenya and Tanzania. All stakeholders interviewed emphasized the importance of supporting private sector-led growth and felt they had the broad support of the government in this regard. Most argued that stronger trader and producer associations were necessary to implement changes throughout the supply chain.

Importer margins of less than 5 percent are indicative of the highly competitive market for imports at Mombasa port. However, there is a disconnect between the Nairobi and Kampala importers due to an information breakdown between these two groups, which constrains supply coordination and market development in Uganda. High-cost problems arise for the Ugandan market in all costs associated with inland transportation. Another source is high transaction costs, especially the high cost of finance for the small Ugandan importers facing local currency interest rates of around 20 percent per annum and excessive collateral requirements (100 to 140 percent). Nairobi-based importers are essentially interested in the large Kenyan market, and all other inland markets, including Uganda, are treated as useful but inconsequential due to their small size.

The first steps to ameliorate this situation are concurrent development of demand among Ugandan smallholders, with support to an agricultural input supplier network to the retail and stockist levels. Lower transaction

costs will require providing affordable finance to Ugandan importers, improving demand forecasting, and developing closer ties between Ugandan distributor-retailers and Kenyan importers. Regional cooperation can be fostered by medium- to long-term technical assistance projects. There is little scope to reduce the initial fertilizer import costs to Mombasa. Unnecessary annoyances, such as importers paying 16 percent VAT on all fertilizer imports and awaiting 12 months to recover funds, add only about a $1.50 per metric ton to transaction costs.

Policy and Regulatory Environment

Policy. The fertilizer strategy developed in response to the Abuja Summit needs to be examined more fully for policy recommendations that are feasible in the short and medium terms.

Regulation. There does not appear to be a functional regulatory body for fertilizers in Uganda. Any program to enhance regulatory capacity through equipment and training of national laboratories and watchdog agencies must include Uganda.

Human Capital Development

Skills. Second to a financial facility, supply chain participants mentioned skills as a high-priority area. Several retailers recounted having to provide farm demonstrations as extension support to convince farmers to adopt agricultural inputs, including fertilizers. Marketing of agricultural input information and impacts was a recurrent theme all along the supply chain. Strengthening farmer and input dealer associations were the most likely vehicles for implementing this type of intervention.

Supply Side Support

Supply. In the near term, reliance on Kenya as the source of supply is unavoidable. Improvements in the transport infrastructure and increased demand for fertilizer to allow for bulk imports are the most likely means of increasing supply in Uganda. Direct support at the farmer level to stimulate demand for fertilizer through outgrower systems was mentioned as a likely source of demand pull to increase supply.

Finance. Financial solutions were the most common suggestions shared by all participants along the supply chain. All stakeholders (importers-wholesalers, distributors, dealers, retailers, and stockists) stated the need for a financial facility to deal with the large capital requirements and time constraints of fertilizer sales.

Demand Side Support

Market information. There is a dearth of market information in Uganda on both input and output product prices. Given the small size of the Ugandan market, any investment in an information system would be most logical at the regional scale to share cost burdens with the more developed markets in neighboring countries.

Research and Technology Transfer

Research. Crop-specific fertilizer response studies need to be undertaken in Uganda and the results widely publicized and discussed. These should result in an updated set of fertilizer recommendations across the cropping spectrum. Results should be made available in local language in media that are accessible to illiterate and semi-literate farmers.

The Malawi subsidy program needs to be formally analyzed for its strengths and weak-

nesses because many East and Southern African countries are drawing on incomplete information about the program to formulate their own subsidy schemes. Malawi did substantially increase production, but at a cost, and partly due to improved rainfall in the subsidy year. The Malawi experience needs to be objectively studied for its costs and benefits, intended and unintended impacts, maize export ban, and resultant 45 percent decrease in maize prices between April 2006 and 2007.

Transport and Logistics

Transport. Road and rail improvements were consistently mentioned as necessary to reduce fertilizer costs and improve demand conditions. The rail network to Mombasa needs refurbishing, as does the road system connecting Kampala to this port city. The internal road network within Uganda is also in need of repair and expansion.

Logistics. Ugandan importers are overly dependent on their Kenyan counterparts for most logistical arrangements at the port. Improved port facilities in Kenya would have a major impact in Uganda. In addition, there is room to improve relationships between Kenyan and Uganda fertilizer actors and to promote greater understanding of their respective constraints. This could be addressed through regional forums and exchange visits.

Tanzania

The following observations arose from the interviews and workshop sessions with market participants and stakeholders in Tanzania.

Policy and Regulatory Environment

Policy. The major policy issue in Tanzania is the appropriate role the state should play in a liberalized economy. This issue has come to the fore given the subsidy program promoted by the government. This process could be informed by an objective and independent analysis of subsidy programs in Malawi and elsewhere in Africa.

Regulation. The Tanzanian Bureau of Standards needs to be strengthened through training and equipment to test fertilizer formulations and products.

Human Capital Development

Skills. There is no prominent representative body for farmers, who need training in agronomic best practices. The most effective means of providing relevant information is through farmer associations. Other market actors such as distributors, dealers, retailers, and stockists also require training on agronomic techniques and best business practices. This is a similar theme in all the sample countries. A curriculum should be developed that is transferable and accessible across multiple countries to capture economies of scope, standardize best practices, avoid duplication of effort, and lower the unit costs of producing training materials.

Supply Side Support

Supply. There is a potential for all the countries that use Dar port to consolidate their orders so as to benefit from lower bulk prices. A consolidation order of this magnitude and complexity would require guarantees on volumes, quality, types, delivery, and credit.

Finance. Potential interventions include rural credit financing and loan guarantees all along the supply chain. One way to do this would be to strengthen AGITF, both technically and financially. Another suggestion is to provide

importers with credit guarantees that would reduce financial costs and avail the African fertilizer market of world interest rates (i.e., 4 percent instead of 10 percent on the local market).

Demand Side Support

Market information. An improved market information system with regional scope would be extremely useful to market participants in Tanzania. Given the number of landlocked countries in eastern Africa that avail themselves of the Dar port, a regional agricultural input and output information system would be especially germane. The MISTOWA TradeNet model in West Africa is likely replicable in the east, given that some farmers in Tanzania are already using cell phones to access market information and intelligence.

Research and Technology Transfer

Research. Research is needed on crop-specific fertilizer formulations and application rates in the context of actual farmers. Tanzania would also greatly benefit from a formal analysis of the Malawi voucher system subsidy program to inform the design of its own system.

Transport and Logistics

Transport. The rural feeder roads connecting the main roads and highways with villages require regular maintenance to avoid impassable roadways during the rainy season. The rail infrastructure needs investment to address disrepair, and is only competitive with truck traffic when decent roads are not available.

Logistics. A proposed solution to reduce port inefficiencies is to invest in mechanized port equipment since the cost could be justified by the number of countries using the Dar port (Tanzania, Zambia, Uganda, Malawi, Burundi, Rwanda, and the Democratic Republic of the Congo). The port has limited capacity for cargo storage. Warehouse space could be provided to store products prior to shipment up-country. This would also alleviate additional port charges ($1/ton/day) if all vessel cargo is not discharged within seven days.

Potential Partners

The ongoing Tanzania Fertilizer Partnership, which encompasses Yara International, Norfund, Rabobank, NORAD, and the Government of Tanzania, is an innovative consortium of private and public sector actors. This group recently presented a proposal to the Rockefeller Foundation to implement "locally identified priority actions to improve the operation of the fertilizer value chain in Tanzania" and to expand its work from five districts to the national level by 2010. The document places top priority on the need for improved information and communication throughout the fertilizer value chain.

The group cites major hindrances to agricultural productivity as follows: deficient knowledge about input and output prices, lack of understanding of the rules governing the subsidy program, misinformation about the likelihood of developing farmer organizations and SACCOs, and the inaccessibility of reliable technical advice and credit. Building on ongoing USAID and other donor support to the agricultural input distribution and retail infrastructure, the proposal concentrates on supply-driven activities to promote agronomic knowledge, input distribution, and promotion. However, it does not devote sufficient time to demand concerns about farmers' disposable income and crop-driven profitability, which will drive sustainable fertilizer procurement and use in the medium and long terms.

The Tanzania Agrodealer Strengthening Program is a concept note presented to AGRA by CNFA to "transform the country's fragmented input distribution system into an efficient, commercially viable input supply infrastructure." Their "voucher-based approach" mirrors Malawi's current subsidy program and is entirely supply-driven. It is based on government as well as donor support and subsidies to revamp the country's agriculture. The document makes a strong argument for technically driven activities designed to enhance agronomic knowledge at the stockist and farmer levels. It also identifies business management training as an important issue that should be addressed by teaching agro-dealers to become successful businesspeople. The proposal calls for enhancing fertilizer demand through a series of activities, implemented jointly with the government, geared to instruct farmers about the adequate use and benefits of fertilizers. As with the Tanzania Fertilizer Partnership, the proposed program does not address the demand side issues of increasing farmers' incomes and how farmers will begin paying market prices for fertilizer and other production inputs.

Malawi

The overall conclusion for Malawi is to continue to promote private sector involvement as the most sustainable medium- and long-term solution, while addressing affordability through subsidy systems implemented in concert with the private sector.

Policy and Regulatory Environment

Policy. The depth of the government's role in the distribution system is interpreted as unfair competition by agricultural input companies. The government should seek ways to reinforce private market development through its subsidy interventions rather than hinder this process, as is presently the case. The Gates Foundation could be seen as an honest broker that funds research into how to best structure the voucher system to reinforce rather than hurt market development.

Human Capital Development

Farmer skills. There is a need for agribusiness training that applies business concepts to farming, in addition to best agronomic practices. Farmer organizations should be strengthened to provide better services to their members and to improve crop management.

Agro-dealer training. The USAID-funded AIMS project, which ended ahead of schedule due to budget cuts, had made great strides toward developing a network of agro-input dealers linked to importer-wholesalers and creating a national agro-input suppliers association (AISAM). More than 1,500 agro-dealers had been trained prior to the early budget cuts that terminated the project. The government's subsequent decision to implement a subsidy program using its own distribution network undermined the embryonic agro-dealer network the project had strived to establish.

Supply Side Support

Finance. Financing must be made available to actors at all levels of the supply chain who do not have preferential access to international financial markets (importers, wholesalers, distributors, retailers, dealers, stockists). Exchange rate volatility adds an additional layer of uncertainty that can only be addressed through greater stability in foreign exchange earnings from exports, donor inflows, and responsible macroeconomic management.

Demand Side Support

Market information. Farmers need market information so they can make informed choices on which crops to produce and the inputs they need to procure. This information should include intelligence on who is buying what product, when, and where.

Affordability. The voucher system needs to be strengthened through targeting methods (areas for specific fertilizer use on specific crops), financing that reinforces the timely payment of vouchers, synchronization of the fertilizer supply and voucher distribution in the marketplace, and informing farmers at the end of a season about the voucher program for the upcoming season. In addition, the printed quality of the voucher must be improved to reduce fraud (e.g., the original and copy are too similar).

The SPLIFA project, which used a targeted voucher approach, was the predecessor or pilot subsidy program to the one currently implemented by the Government of Malawi. Targeted beneficiaries, dealers, and government officials received training from the project about the voucher system before it was implemented. To qualify for the voucher program, farmers were expected to provide an in-kind contribution during the off-season in the form of feeder road repair. The Ministry of Agriculture, the village council, and a local administrating NGO reached out to the beneficiaries and signed the vouchers. Farmers redeemed their vouchers at local dealer shops for one bag of urea and 10 kilograms of maize seed, with both the dealer and beneficiary countersigning the voucher. The dealers, in turn, redeemed their vouchers at the designated bank and received a small commission for participating in the voucher scheme. The project linked the dealers with wholesalers to ensure fertilizer products were available in local stores.

Research and Technology Transfer

A formal review of the subsidy program would help national, regional, and international interests better understand the impact of the Malawi program.

Transport and Logistics

Transport. The development of all-weather roads would contribute to cost reduction and the timely availability of fertilizers for farmers. For example, Chitipa is a remote location with no access during the entire rainfall season (four to six months) due to the collapse of roads and bridges.

Logistics. Holding warehouses should be developed in importing ports (Dar es Salaam) because the timing of orders and fertilizer arrival is an extremely important and sensitive issue in Malawi.

Mozambique

Policy and Regulatory Environment

Policy. The enabling environment in Mozambique needs to address the lack of storage for food reserves, reduce import tariffs on fertilizer (and agricultural production inputs), and promote the use of fertilizers to reach the 50 kilograms per hectare recommended by the Abuja Declaration.

Regulation. Strengthening the capacity for soil and fertilizer quality assurance analysis is critical to provide accurate recommendations and quality products to consumers. A related need is to approve and implement fertilizer regulations.

Human Capital Development

Farmer skills. Extension efforts to farmers on agronomic best practices need to be expanded and complemented with agribusiness training. Stronger farmer associations can better provide services to their members, modeled on production networks in export commodity crops such as sugar, tobacco, and cotton.

Supply Side Support

Supply. The level of supply to the Mozambican market is a function of the low demand for fertilizer products. In that regard, retail networks need to be developed.

Finance. Access to finance is a major problem all along the supply chain. It is important for all market players to have access to credit and/or credit guarantees through a guarantee fund for domestic fertilizer production, commercialization, and crop production.

Demand Side Support

Output product markets are a crucial element in farmer decisions to employ fertilizers. Indeed, relative input-to-output prices help determine the use of agricultural inputs. The availability of reliable output markets at stable price levels allows farmers to plan input resource use. A winning combination is higher output prices and lower input prices.

Market information. Information about output markets is deficient and often creates a high uncertainty level among traders (buyers and farmers), who do not know market prices and often trade at disadvantaged prices. Adequate output market information is needed to improve trading conditions and allow farmers to maximize their prices.

Affordability. The low volume of fertilizers is a limiting factor with regard to obtaining economies of scale and reducing costs.

Research and Technology Transfer

Research. The blanket recommendations made to farmers must be replaced with applied research by crop type under typical farmer conditions.

Transport and Logistics

Transport. High transportation costs to rural markets, due to poor infrastructure, should be addressed.

Logistics. Mozambique is strategically located to serve as a major importing, storing, and blending entrepot for regional fertilizer supply. However, it lacks local production and blending capacity. Such capacity must take into consideration what is installed and functional in the landlocked countries of southern Africa. Low storage and warehousing capacity could be addressed by strategic placements in the three major zones of the country.

Potential Partner(s)

The Government of Mozambique supports private sector growth and is eager to explore innovative partnerships. The Center for Agricultural Promotion can be an active participant and should be considered a potential implementing partner in agronomic projects. Its approach and work is currently monitored and directly managed by an independent project management unit and its pilot level activities (i.e., 5,000 hectares of rice production) are scalable.

Key Concepts

The following are key concepts that arose in all countries and across all six potential areas of intervention:

- Reinforce existing systems in the public and private sectors before creating new institutions:
    - The problems are so large that no single entity can address them on its own.
    - Public-private partnerships can leverage resources, avoid jealousies between sector actors, and break down mistrust that hinders problem-solving.
    - Donors tend to lack knowledge of existing markets, businesses, and economic actors, and/or distrust them.
    - The key is to reinforce and strengthen markets if the goal is sustainability, employment, and growth.
    - Inappropriate donor actions can perturb markets and discourage investors.
    - Donors addressing charitable and humanitarian concerns should focus on enclave areas.
    - Trends such as cell phone penetration, telecenters, etc, should be leveraged.
    - The market development process should be strengthened by empowering existing stakeholders.
- Work through non-profit associations of economic actors, such as farmers, input dealers, and commodity groups. These actors:
    - Know their members, who works, and who does not
    - Can interface with banks and donors
    - Enforce standards (e.g., must be farmer, pay dues, etc)
    - Provide IDs to members to begin system of traceability
    - Facilitate marketing for all members
    - Control payments to members at source so credit owed can be deducted
    - Can evolve into a lobbying group
    - Provide training and information
- Commit to the long term:
    - Liberalization and privatization has taken 20 years to reach its present stage of development with limited to no assistance.
    - The fertilizer market will grow at its own pace without assistance. With appropriate assistance, the development cycle could be reduced from 25-30 years to 5-10 years.
    - The problems plaguing the fertilizer industry will not be solved in a short period of time and require a long-term commitment.

CHAPTER ELEVEN

Recommendations

This report recommends actions in six priority areas that have the greatest potential to boost fertilizer demand in Africa through cost reductions and increased supply. It argues for a holistic approach that tackles elements within each of the priority areas, which proved successful in previous efforts to effect change in fertilizer demand. A piecemeal approach that only addresses one or a few of the priority areas will fragment resources and efforts, with less impact on prices, volumes, and ultimately on demand for fertilizer.

General Recommendations

The Gates Foundation should focus on strengthening the market development process by empowering stakeholders and creating an enabling environment for them to respond to market signals. The overriding idea is to strengthen the process, not the product, which will result in more sustainable impact by creating a self-reinforcing system of people, organizations, policies, and markets resilient enough to address their own needs.

Policy and Regulatory Environment

Policy:

- Create a policy dialogue forum bringing together policy-makers, donors, NGOs, foundations, private sector actors, and farmers to build consensus on an enabling policy environment at the national and regional levels while lobbying to:
    - Reduce or eliminate VAT on agricultural inputs and the policy of VAT pre-pay followed by reimbursement
    - Reduce or drop the external tariff on agricultural inputs
    - Standardize formulation recommendations among countries for the major fertilizer-using crops (e.g., cotton, tobacco, sugar)
    - Change procurement methods to direct negotiation rather than tender bid processes
    - Publicly denounce corruption and its impact on prices
    - Pressure for anti-corruption legislation

Regulation:

- Strengthen regulatory authorities in each country so they are able to:
    - Test imported products

- Test locally blended products
- Widely disseminate the results
- Ensure truth-in-labeling and quality control

Human Capital Development

Farmers:

- Provide farmers with context-relevant training on:
  - Crop-specific best husbandry practices using agricultural inputs
  - Positive impact of agricultural inputs on farm income and the environment
  - Safe use of agricultural inputs
  - Marketing options for different crops

Distributor-dealers:

- Provide distributors and dealers with training on:
  - Best business practices in the agricultural inputs trade
  - Managing business finance
  - Crop-specific best husbandry practices using agricultural inputs
  - Safe use of agricultural inputs

Importer-wholesalers:

- Provide importer-wholesalers with opportunities to:
  - Improve linkages with other market actors both upstream and downstream
  - Participate in study tours to neighboring countries confronting similar problems

Business associations:

- Strengthen existing associations and create new associations to:
  - Provide a platform for policy dialogue
  - Sustain the capacity development process
  - Ensure quality through peer pressure
  - Provide training and market access services to members
  - Communicate with potential partners and the general public

Supply Side Support

Blending:

- Support the trend to install blending capacity by:
  - Focusing on countries with sufficiently large domestic markets (i.e., greater than 100,000 metric tons) to justify blending operations
  - Providing technical assistance to existing and potential blenders on best practices

Finance:

- Provide a financial mechanism for firms along the supply chain that lack access to international capital markets to:
  - Procure fertilizer on international markets for importer-wholesalers

- Fund stocks for distributors and dealers
- Maintain inventories for retailers and stockists
- Create a loan guarantee fund that shares risk among local banks, fertilizer actors, and the Gates Foundation

Pooled imports:

- Focus efforts on pooling imports to achieve economies of scale:
  - At the national and not regional level to prove the concept can work
  - Through pilot programs of "piggyback" imports, whereby smaller markets (e.g., Mozambique and Uganda) procure their needs through business relationships with larger importers in neighboring countries

Demand Side Support

Market information system:

- Support the MISTOWA project's TradeNet operation to:
  - Extend West African activities beyond September 2007
  - Expand the commodities covered under TradeNet to more agricultural inputs
  - Enlarge rollout of TradeNet services to other countries
  - Engage an independent review of lessons learned under TradeNet
  - Leverage lessons learned to initiate market information systems in eastern and southern Africa

Subsidized demand:

- Promote a market-friendly approach to subsidizing demand that allows poor farmers to participate in markets while improving the functioning of these markets:
  - Target the farmer, not the firms.
  - Assist firms through increased turnover and greater demand for their product line.
  - Combine a voucher system for domestic food crops with augmented "outgrower" schemes for export crops.

Research and Technology Transfer

Research:

- Support research into:
  - Creating new national and regional fertilizer formulations for major crops
  - Costs and benefits of different types of voucher-based agricultural input subsidy schemes

Technology transfer:

- Promote technology transfer by:
  - Establishing farm service centers to provide farmers with soil testing, fertilizer recommendations, and demonstration plots

- Developing crop-specific digital training films highlighting best husbandry practices, improved agricultural inputs, and the benefits that accrue to farmers
- Strengthening the capacity of public (MINAG) and private sector (agro-dealers) staff to provide extension advice to farmers

Transport and Logistics

Solutions to improve the road and rail systems in the sample countries could offer considerable cost savings in fertilizer transport but are capital-intensive, with no immediate opportunities to reduce costs. If they are considered, the focus should be on:

- Relieving port congestion
- Improving road and rail elements with the largest return in lowering transport costs

Potential Partners

The following list of potential partners and ideas is presented by category and country where possible. It is not intended to be an exhaustive list but, rather, a first attempt at organizing and presenting a disparate body of general and specific information. The list is representative of the types of activities and institutions the Gates Foundation could consider for support and diversification of its existing activities.

Business Associations

There is ample opportunity for the Gates Foundation to work with the nascent associations of agricultural input dealers in Africa to broaden and deepen their level of penetration in the countryside and their overall role in developing the marketplace. This includes ORIAM in Mali, GAIDA in Ghana, AISAM in Malawi, and others. These associations group private and public partners around a common theme to develop the agricultural industry in their respective countries. The additional benefit to the Gates Foundation is that the associations are non-profit although their individual members are not. Hence, the association can become the foundation's preferred partner.

Coincident with the national associations is the development of regional federations. The one example encountered is at the idea stage in West Africa and is tentatively called the Fédération Africaine de Commerce en Intrants Agricoles (FACIA). Similar output-oriented federations at the regional scale have been established and supported through the USAID-funded RATES project based in Nairobi and should offer significant lessons learned.

Output associations should be considered in addition to the obvious input association partners. Examples include the national coffee associations in East and Southern African countries, which are grouped under the East African Fine Coffee Association (EAFCA) based in Uganda. An example of a national association member of EAFCA is the Coffee Association of Malawi (CAMAL). Similar groups exist in almost all coffee-growing countries in East and Southern Africa. Other output-oriented groups cover cotton and dairy commodities in East and Southern Africa.

International Non-Profit Organizations

The most likely partners that can provide some level of scaled operations in multiple countries are the major international non-profit organizations. Those that have experi-

ence and expertise in the six areas highlighted in this report include IFDC, CNFA, ACDI-VOCA, CIPE, and CLUSA. There are also numerous smaller specialized groups that deal with specific aspects of the six recommended intervention areas.

IFDC, the International Fertilizer Development Center, is a non-profit international center that has provided technical assistance, research, training, and problem-solving services for more than 30 years. Its results-oriented projects cover specialties such as agribusiness, engineering and technology development, management information systems, plant nutrient management, policy reform, and market development. IFDC is the one non-profit devoted to fertilizer issues while the other groups listed have either worked with fertilizer issues in the past or are generally involved in agricultural development with an association-strengthening perspective.

CNFA, the Citizens Network for Foreign Affairs, was founded in 1985 as a non-partisan, non-profit organization dedicated to stimulating economic growth around the world by nurturing entrepreneurship, private enterprise, and market linkages. Based in Washington, D.C., CNFA promotes public-private partnerships to jump-start economic growth. The organization specializes in engaging private sector investment in training, new technology, and marketing to increase overall competitiveness, expand exports, and ultimately generate higher incomes all along the value chain for farmers, processors, and distributors. CNFA has established and worked with agro-input dealer networks similar to the IFDC programs.

ACDI-VOCA's name dates to the 1997 merger of Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance. Both were U.S. non-profit economic development organizations working largely in agriculture. The merger achieved new economies of scale and blended the complementary strengths of ACDI's long-term development approaches and VOCA's people-to-people volunteer activities. ACDI-VOCA is known for working with agribusiness systems, enterprise development, financial services, and community development.

CIPE, the Center for International Private Enterprise, is a non-profit affiliate of the U.S. Chamber of Commerce that works to involve the private sector in policy advocacy and institutional reform, improve governance, and build understanding of market-based democratic systems. CIPE provides management assistance, practical experience, and financial support to local organizations to strengthen their capacity to implement democratic and economic reforms.

CLUSA, the Cooperative League of the USA, was organized in 1916 and is still recognized in many countries though it is officially known today as the National Cooperative Business Association (NCBA). NCBA's CLUSA International Program focuses on providing rural communities, farmers, and entrepreneurs with the skills and resources they need to improve incomes, increase food security, and create long-term, scalable, and sustainable business opportunities that ensure long-term economic growth. CLUSA began providing assistance to developing countries in 1953, with its first program in India, and has managed more than 200 long-term projects

in 53 countries, in addition to conducting 1,000-plus short-term consultancies in 79 countries. The organization offers comprehensive education, coop development, communications, and public policy assistance, and helps coops strengthen their businesses so they can better serve their members.

B3. Donor Projects

There are many donor-funded projects working in agriculturally related areas in each of the countries studied. They are key sources of information on present conditions and trends, while also providing insights into other potential partners in the public and private sectors. Notable examples in Mali include USAID's TradeMali project and the Dutch-funded Marketing Inputs Regionally (MIR) project, which works to harmonize input markets. In Ghana, a regional trade project known as the West Africa Trade Hub (WATH) is working on regional policy issues involving tariffs and transport. Collaboration with the group implementing this project could maximize results in areas of common interests (e.g., tariffs and transport).

Public-Private Partnerships

The largest importer-wholesalers have joint outreach programs with public and associative institutions, which bear further examination. These are often called "outgrower" schemes and are common in East Africa among private sector agricultural interests (producers and input suppliers) as well as existing public extension systems or national commodity-specific producer associations. Of course, this represents enlightened self-interest as these firms attempt to develop new markets and differentiate their products in a non-price fashion. Nonetheless, they do strengthen technology transfer and stimulate demand for agricultural inputs.

Lessons Learned from Implementation of the Study

The key lesson learned from implementation of this study is the need for additional time to analyze the data collected. The combination of quantitative and qualitative information is the correct approach for this type of action-oriented research as it makes it possible to put numbers and statistics in context. However, the eight-week turnaround was too short to collect both quantitative and qualitative data on six African countries. One-week visits in each of the six countries, plus travel time, consumed the bulk of the time available, although 10 days in each country would have been more appropriate. Given the time constraints, the team's focus was on collecting and presenting the information, leaving little time for reflection and depth of analysis.

While the data collection process could have benefited from more time, the main impact of a compressed timeframe was on reflection, analysis, and discussion. Indeed, not enough time was available to engage in an in-depth, cohesive analysis of all that had been learned by four separate researchers. It is important for researchers to distance themselves from the logistics of data collection and report preparation to examine the ramifications of their findings. The original idea of presenting mid-term findings to the Gates Foundation in a face-to-face setting would have helped everyone involved better understand the type of information needed for decision-making. It is understandable that this event was foregone to save time, but it remains an appropriate interaction to guide future studies. Additional opportunities to interact with colleagues and debate specific action items would be welcome to test ideas.

Teamwork was essential to successful implementation of the research strategy within the given timeframe. There was no room for time overruns or unforeseen events. Splitting research responsibilities based on the strengths of the two partner institutions (IFDC and Chemonics) was vital to completing the task at hand. To this end, it was extremely important for the partners to meet face-to-face, discuss the program, and outline responsibilities. The follow-up meeting at the end of the data collection process was also crucial to share ideas and delegate responsibilities for the final report production process.

The report contains a wealth of information about African fertilizer markets — their structure, functioning, performance, constraints, and the measures needed to make them perform better for the benefit of smallholder farmers. With additional time, quantitative data could be analyzed more carefully to glean additional trends and comparisons. Dissemination to a wider audience should be considered to share some of the insights garnered from this research. Additional analysis, drafting, editing, and review would be needed to provide more cohesion and rigor to any publication for wider circulation, and would require approximately one month of work.

Comparative Fertilizer Market Structures in the Six Sample Countries

MALI	GHANA	UGANDA		TANZANIA		MALAWI			MOZAMBIQUE	
International Exporter manufacturer and/or raw material supplier. or Trader										
		Kenya Importer								
Importer/Wholesaler	**Importer/Wholesaler**	**Importer/ Wholesaler**	**Agro Business**	**Importer/ Wholesaler**	**Agro Business**	**Private**	**Co-Op**	**GOM**	**Importer/ Wholesaler**	**Agro Business**
1. Yara Mali 2. Toguna 3. La Cigogne Banikono 4. DTE Chinese..	1. Wienco Yara. 60% 2. Dizengoff 3. Chemico 4. Golden Stork Cigogne. 95%	1. Uchumi 2. Balton 3. Green House	1. Tea 2. Sugar 3. Tobacco 4. Rice 70%	1. TFC 2. Nutricare 3. Export Trading Co. 4. Premium Agro-Chem 5. Shival Tank & Co.	Tobacco 16% 2 firms	1. EFC 2. Yara 3. FW-Agora 4. MFC 5. Others	NASFAM	1. SFFRFM (ADMARC)	1. Agrifocus	1. Sugar 35% 2. Tobacco 45%
Distributor	**Distributor**	**Distributor**		**Wholesaler/ Distributor**		**Wholesaler/ Distributor**		**GOM Distributor**	**Wholesaler/ Distributor**	
1. GDCM 2. Agri2000 3. SAD/SAT 4. PA 5. Syatel 6. SOMADECO 7. Gnoumani 8. Faso Jigi	35 registered distributors/ retailers in the 10 regions				**Cooperative Societies**	1. EFC 2. Yara 3. FW-Agora 4. MFC 5. Others		2. SFFRFM ADMARC.	1. Agrifocus 2. Agroquimicos 3. Hygrotech 4. Tecap 5. Savon 6. Biomed	
	Retailer	**Retailer**		**Retailer**		**Retailer AgroDealer NGOs**	**Co-Op**	**GOM Retailer**	**Retailer**	
	300 retailers in the 10 regions of Ghana					ETC – 25 FW-Agora 81 Nylambo 66 Yara 7	43 Co-Ops	SFFRFM 56 (ADMARC)	60 shops selling seed, fertilizer & ag chemicals	
						400 formal private and public outlets 226 informal agrodealers				
Farmer	**Farmer**	**Farmer**	**Own Farming**	**Farmer**	**Own Farming**	**Farmer**			**Farmer**	**Own Farming**
			Contract Farming	Includes: Estates Large Scale Small Scale	**Contract Farming**				Includes: GOM NGOs Farm Demos	**Contract Farming**

Fertilizer Sector Action Areas

THEMATIC AREA	AREA %	SUB AREA	SUB AREA %	RECOMMENDED ACTIONS	ACTION %	POTENTIAL ACTIVITY	POTENTIAL PARTNERS
Policy & Regulatory Environment	9%	Policy	4%	Elimination of tendering	1%	Perform more rigorous analysis of additional costs of tendering and provide information to decision makers	International (ex., IFDC, IFPRI, etc.), regional (ex., INSAH, etc.) and national research (ex., IER, CSIR, etc.) institutes
				Better management of subsidies	1%	Provide council and advice to existing input subsidy schemes based on objective socio-economic research	IFDC, IFA and National Governments
				Regional collaboration to achieve policy harmonization	1%	Elicit agreement on fertilizer formulations arising from new agronomic research	ECOWAS, COMESA, UEMOA, SADC, IFDC
				Removal of tariffs & taxes	1%	Remove or minimize all tariffs on agricultural inputs, similarly remove VAT taxes	World Bank, IMF, ECOWAS, COMESA, IFDC, IFPRI, CIPE and national governments
		Regulation	5%	Establish regulatory system to assure truth in labelling	5%	Provide training, technical equipment and public awareness of fertilizer formulation testing	IFDC, IFA and national governments
Human Capital Development	30%	Training	20%	Farmers	10%	Train farmers in best agricultural husbandry practices and the advantages of modern inputs	IFA, CLUSA and IFDC
				Distributor/dealers	5%	Train dealers and stockists in rural areas in business practices, finance and agronomic techniques	IFDC, CLUSA, ACDI VOCA CNFA
				Importer/wholesalers	5%	Train Importers and wholesalers on finance, stock management and developing market linkages	IFDC, CLUSA, ACDI VOCA CNFA
		Organizational Capacity	10%	Development of business linkages	2%	Improve linkages between importers and international suppliers, domestic wholesalers and distributors, distributors and dealers	IFDC, IFA, CLUSA, ACDI VOCA CNFA
				Business association strengthening	8%	Aid associations to better assist & provide services to their members	IFDC, IFA, CLUSA, ACDI VOCA, CNFA
Supply Side Support	20%	Blending	4%	Improving supply-blending operations	4%	Provide technical assistance to existing blenders for selected countries with large enough domestic demand (presently excludes Uganda and Mozambique)	IFDC, IFA and private companies
		Finance	15%	Improved access to finance for importers, wholesalers and retailers	15%	Develop a financial facility to service those economic agents in the domestic supply chains without access to international capital markets	IFDC, CNFA/RF, domestic banks and national governments
		Packaging	1%	Small packaging	1%	Develop extension materials for smaller quantities	Private companies, IFDC, CNFA, ACDI VOCA
Demand Side Support	20%	Market Information System	10%	Market information system & transparency	10%	Fund MISTOWA to continue work in West Africa pilot program, evaluate, use lessons learned to expand program to East and Southern Africa	IFDC
		Subsidized Demand	10%	Targeted subsidies	5%	Design and implement a pilot test of a market enhancing agricultural input subsidy program	IFDC, CNFA
				Output market development	5%	Test pilot program with existing outgrower schemes to expand coverage	IFDC, CLUSA, ACDI VOCA, TechnoServe
Research & Technology Transfer	14%	Research	8%	Fertilizer recommendations	4%	Commission research on most appropriate fertilizer formulations for major crops in each country	International (ex., IFDC, ICRISAT, IITA, ICRAF, etc.), regional (ex., INSAH, etc.) and national research (ex., IER, CSIR, etc.) institutes, involve private sector input suppliers to obtain test products in a public-private partnership
				Soil testing	2%	Component part of the fertilizer formulation research	
				Development of market-enhancing agricultural input subsidy programs	2%	Cross-country review of agricultural input subsidy schemes to identify best practices	International (ex., IFPRI), regional (INSAH) and national soci-economic research institutions
		Technology Transfer	6%	Investment in liming & phosphate rock	2%	Commission economic & feasibility analyses of most promising continental sources of primary materials	IFDC
				Strengthening public & private extension	4%	Provide digital training films on major crops, overlay in multiple local languages	IFDC, ACDI-VOCA, CNFA
Transport & Logistics	7%	Transport	3%	Port facility improvements	1%	Formal review of port facilities, limitations & potential for improvements	IFDC
				Improve selected road & rail infrastructure	2%	Commission study of potential bottlenecks in the African road and rail infrastructure at both national and regional levels, create an online GIS of African infrastructure	IFDC, IFA
		Logistics	4%	Regional warehousing	1%	Review the Kenya ConAgra-Mea arrangement for lessons learned	IFDC
					3%	Run a test pilot program in either Tanzania or Mozambique	Public-private partnership
	100%		100%		100%		

FERTILIZER TRADE AND PRICING IN UGANDA

SW Omamo[1]

Abstract

Liberalized fertilizer markets in eastern Africa typically deliver fertilizer to smallholder farming regions at prices that render its use unprofitable. Simultaneously, faced with little demand for fertilizer in these regions, fertilizer traders appear unwilling to invest in measures that might reduce farm-gate prices. A basic question throughout the region is therefore how to cost-effectively increase smallholders' access to fertilizer, under conditions of liberalized and privatised trade in the input. This paper explores that question for Uganda using data from a wide-ranging study of Uganda's fertilizer sub-sector. The prevailing system of fertilizer procurement and distribution is found to imply a market structure dominated by retail-level trade, high prices, and low net margins. The study concludes that there is no inherent pressures in the extant system of fertilizer procurement and distribution toward development of a wholesaling backbone that might allow capture of scale economies. But with imaginative and sustained investments in institutional innovation and strengthening, there is scope to reduce prices and increase net trading margins.

1. FERTILIZER TRADE AND PRICING IN UGANDA

Soil nutrient depletion is widespread on small farms in eastern Africa (De Jager *et al*, 1998; KARI, 1998; Pender *et al*, 2001; Sanchez *et al*, 1997; World Bank, 2001). Improved management of soil organic matter is well recognized as crucial to soil fertility replenishment in the region (Woomer & Swift, 1994). Greater use of inorganic fertilizers is also central to realizing the productivity and yield increases required to override smallholders' motives to pursue nutrient-depleting subsistence-oriented production strategies (Palm *et al*, 1997). But throughout the region, farmers typically apply inorganic fertilizers at rates well below recommended levels, or not at all (Tegemeo, 1998; Pender *et al*, 2001).

Low rates of fertilizer adoption and utilization have been linked not only to poor knowledge and understanding of fertilizer-based cultural practices

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among smallholders (Seward & Okello, 2000), but also to systematic exclusion of smallholders from fertilizer markets (Tegemeo, 1998). These recently liberalized markets typically deliver fertilizer to smallholder farming regions at prices that render its use unprofitable (Mose, 1998; Mose *et al*, 1997; Tegemeo, 1998). Simultaneously, faced with little demand for fertilizer in smallholder regions, fertilizer traders appear to be unwilling to invest in measures that might reduce those farm-gate prices (Omamo & Mose, 2001).

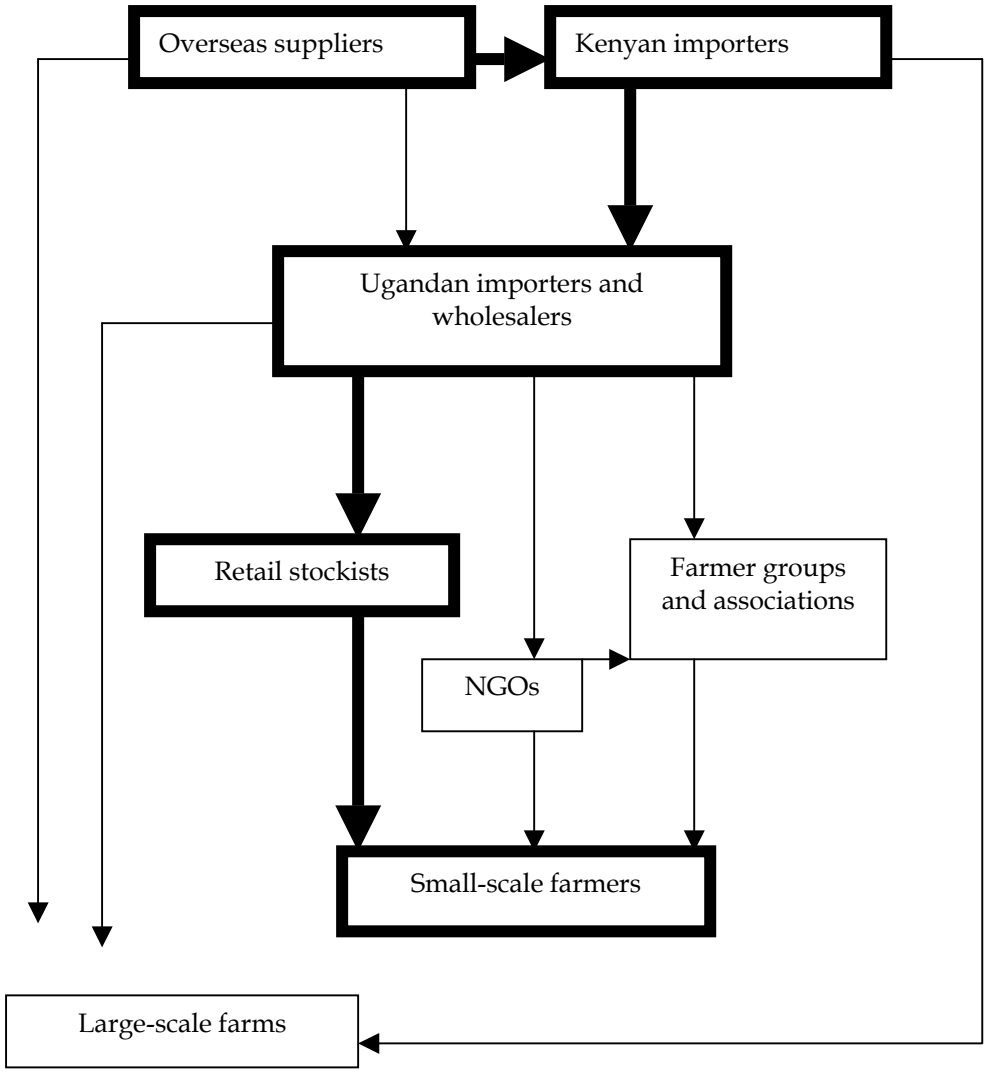
Several efforts are underway in the region to try to override these failures in fertilizer markets. Initiatives range from relatively isolated but focused, community-oriented initiatives (e.g. Seward & Okello, 2000), to wider-reaching programs aiming to build stockist networks in smallholder areas (e.g. IDEA, 2002; SG-2000, 2002; AT-Uganda, 2001), to centrally coordinated national schemes with broad development aims (e.g. World Bank, 2001). A basic question facing all of these efforts is how to cost-effectively increase smallholders' access to fertilizer, under conditions of liberalized and privatised trade in the input.

This paper explores that question for Uganda using data from a wide-ranging study of Uganda's fertilizer sub-sector. The study was undertaken between November 2001 and June of 2002 and comprised informal interviews and a structured survey of a range of stakeholders including fertilizer traders, transporters, farmers, farmer organizations, NGOs, and government officials. Secondary data sources were also exploited. In this paper, qualitative information on how fertilizer trading is organized is combined with quantitative data on trading costs and price formation to assess prospects for market-based reductions in retail fertilizer prices and trading margins.

The next section describes the principal channels used to procure and distribute fertilizer in the country. Prices and marketing margins for the major traded fertilizers are then analysed. This is followed by a discussion of options for reducing prices and increasing marketing margins. Implications for policy are drawn.

2. PROCUREMENT AND DISTRIBUTION

Figure 1 shows the current organization of fertilizer procurement and distribution in Uganda. Table 1 shows total imports and import shares of the leading firms.



Source: Author's survey of traders.
Note: The principal procurement and distribution channel is shown in bold.

Figure 1: Principal procurement and distribution channels for fertilizer in Uganda in the 2001-2002 cropping year

The key players are importers based in the capital, Kampala, and in Mbale, a town near the border with Kenya. These importers procure fertilizer either directly from overseas suppliers or from other, larger importers based in Nairobi, Kenya. The latter source is the more common of the two. Fertilizer availability in Kenya therefore determines that in Uganda; fertilizer prices in Uganda are based on those in Kenya.

An important feature of the marketing system is that Uganda's importers also function as wholesalers. The survey of traders did not yield a single wholesaling operation outside Kampala and Mbale. Save for two importer-wholesalers based in Mbale, fertilizer wholesaling is concentrated in Kampala.

Large-scale farms typically procure fertilizer directly from overseas, only occasionally putting out tenders for supply by domestic firms. The market is therefore essentially a retail market.

Table 1: Estimated import shares of leading firms in Uganda, 2001

Rank of importer	Quantity imported (tons)	Share of imports (%)	Cumulative share (%)
1	4,933	25	25
2	3,500	18	43
3	1,814	9	52
4	908	5	57
5	500	3	60
6	390	2	62
7	350	2	63
8	175	1	64
Total of top 8	**12,570**	**64**	**64**
Total for Uganda	**19,564**	**-**	**-**

Sources: Uganda Revenue Authority and author's survey of traders.

The absence of a geographically dispersed wholesaling backbone is the most important feature of Uganda's fertilizer market. Virtually all the fertilizer sold outside Kampala and Mbale is sold on a retail basis. Several interviewed traders quote "wholesale" prices. But almost invariably, "wholesale" refers to a few 50 kg bags. "Retail" refers to fertilizer sold in 5 kg or 1 kg bags.

Given the extreme seasonality in fertilizer sales, fertilizer retail stockists are invariably engaged in other retailing activities. Other agricultural inputs, various farm implements, and common consumer dry goods are typical groupings. Scales of operation are small. In most cases, fertilizer trade occurs in one-person outfits sited in small stalls (kiosks) in or near central market places.

A number of NGOs involved in agricultural development have invested in building capacity for input supply among stockists and in catalysing demand for inputs by smallholders, typically in collaboration with local farmer groups and associations. In some cases, the NGOs merely serve to link farmers with Kampala and Mbale based importer-distributors, with trade proceeding on a commercial basis (e.g. AT-Uganda, 2002; IDEA, 2002; SG-2000, 2002). In other cases, the NGOs actually procure fertilizer and distribute it to farmers at a subsidized rate (Gasparotti, 2002). In some towns—such as Mbarara and Kabale in western Uganda—district branches of the Uganda National Farmers Association (UNFA) are active, selling fertilizer at rates that appear to reflect major marketing costs.

Liberalization of Uganda's fertilizer market has induced a vigorous response from the private sector, implying that broad efficiency gains have accrued to the farming sector. However, due in large part to the high cost of entry and participation in fertilizer importation, the fertilizer market is imperfectly competitive. The level of concentration is high. The eight leading importer-wholesalers—i.e., those who do not concentrate on the large-farm segment of the market—jointly account for 12,500 tons of fertilizer imports, almost two-thirds of the entire market of 19,500 tons.[2] Their actual share of domestically traded fertilizer is much larger, since direct imports of fertilizer by large-scale farms account for most of the remaining 7,000 tons. For instance, one large tea estate in western Uganda imported 1,845 tons in 2001; one firm that concentrates on large-scale flower producers accounted for 800 tons in that year. The leading importer accounts for fully one-quarter of the market. The top four firms—all Kampala-based—account for almost 60% of the market.

3. PRICES AND MARGINS

Fertilizer prices in Uganda have fallen significantly in recent years.[3] But they remain high. In late May 2002, the wholesale price of one tons of diammonium phosphate (DAP) in Kampala was $325. In comparison, the price in Nairobi was $265/ton. The fob price in Tampa, US was $165.

Given that retail sales dominate fertilizer trade in Uganda (Figure 1), the remainder of this section focuses on retail prices and margins.

Within Uganda, retail prices rise steadily from Mbale in the east to towns like Mbarara and Kabale in the west (Table 2). At the time of the trader survey (May-June, 2002), retail margins ranged from 5% (in Bukedea) to 28% (in Kabale). These margins were generally lower than were those reported for 2000 (IFDC, 2001). The reason for this decline is not fully clear. One cause might be increased competition as more firms enter a market that is growing slowly, if at all.[4]

To build understanding of the nature of that market, consider prices and margins in the three towns of Bukedea, Iganga and Kabale.

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[2] *At 19,500 tons, the size of Uganda's market (i.e., excluding the large farm sector) in 2001 appears to be equivalent to its size in 2000 (IFDC, 2001).*

[3] *Urea and diammonium phosphate (DAP) prices fell from between US$26.25 and US$31.25 per 50 kg bag, respectively, in late 1998 to US$16.70 and US$$20.55 per 50 kg bag, respectively, in December 2000.*

[4] *Cf. footnote 1.*

Table 2: Retail prices and gross retail margins for major fertilizers in selected locations in Uganda, May-June 2002

Location	DAP		CAN		Urea	
	Average retail price (Ushs/kg)	Gross retail margin (%)	Average retail price (Ushs/kg)	Gross retail margin (%)	Average retail price (Ushs/kg)	Gross retail margin (%)
Eastern						
Mbale*	670	10	520	12	570	11
Kapchorwa**	740	8	580	7	600	10
Bukedea**	800	5	-	-	-	-
Iganga*	750	18	725	10	650	12
Western						
Kampala*	705	7	628	11	620	9
Buwana**	-	-	700	na	700	na
Masaka*	720	8	560	14	-	-
Mbarara**	900	22	-	-	900	22
Kabale**	900	23	-	-	800	28
Kasese**	760	8	-	-	700	11
Fort Portal**	760	9	-	-	760	9
Averages						
(Ushs/kg)	777	12	639	11	704	15
(US$/bag)	21.81	0.34	17.94	0.30	19.79	0.41

Source: Author's survey of traders.

Notes: Ushs = Uganda shilling; 1 Rand = Ushs 205; DAP = diammonium phosphate; CAN = calcium ammonium nitrate; * = commonly quoted price for a 50 kg bag; ** = commonly quoted price for one kilogram; - = fertilizer was not available at the time of the survey; na = the information was not available, or that traders were unable or unwilling to provide the information.

Bukedea is a small rural trading centre roughly 30 kilometres west of Mbale on the road to Kumi and Soroti. There is just one agricultural input trader in the town that sells these inputs along with various consumer essentials. Fertilizers and seeds are supplied to the trader on credit by an NGO working to develop an input stockist network in that part of the country. The NGO suggests retail prices and associated margins. The in-kind credit arrangement calls for repayment as stocks are sold. Sales of seeds are brisk. The opposite is true for fertilizers, despite the very small margin taken (5%). Fertilizer sales for 2000 totalled just 200 kg (four 50 kg bags). The trader attributes this sluggish demand to lack of awareness of fertilizer use among farmers. Price likely also matters. DAP costs 16% less in nearby Mbale. The fertilizer supplied by the NGO was sourced in Kampala, where prices are higher than they are in Mbale. The trader is well aware of that differential, having recently begun to re-stock seed supplies from an Mbale-based wholesaler. But the trader is unwilling to invest in new, lower-priced supplies of fertilizer until her slow-moving high-priced stock sourced in Kampala is sold. She is also unwilling to lower prices of held stocks and incur the associated loss.

Iganga is an important regional township, roughly midway between Kampala and Mbale. The town serves a large and vibrant rural community and boasts two relatively large agricultural input supply shops—one of which sold over 4 MT of fertilizer in 2001—and a number of one-person operations exist—one of which sold 800 kg of fertilizer in 2001. Fertilizer sourced in both Kampala and Mbale can be found in the town, with that from Kampala appearing to be more plentiful and thus more important in price determination. Gross retail margins for traders sourcing fertilizer from Mbale are roughly 10% higher than they are for traders sourcing from Kampala. But Kampala appears to be preferred as a source by more traders because of the greater range of fertilizer types available there. This is especially true for certain N-P-K combinations used on horticultural crops grown primarily as cash crops.

The highest prices and margins were recorded in Kabale, a remote town in the hilly southwestern corner of the country, near the border with Rwanda. In addition to the district UNFA branch, several private traders operate in the town, principally from stalls located in the central market place. All fertilizer sold in the town is sourced in Kampala—i.e., including that sold by the UNFA branch. At the time of the survey, all the traders in the town (eight in total) were carrying the same fertilizers (DAP and Urea) and charging the same prices. Margins were also very similar. With sales of 1 MT in 2001, the UNFA district branch was by far the largest trader. The branch's pricing scheme this appeared to be the basis for other traders' prices and margins. All traders—including the UNFA branch--identified sluggish demand as the primary problem with the fertilizer business, especially in comparison to the seed business, which they said was vigorous and rewarding.

Table 3: Prices, margins, and transport costs for fertilizers and other agricultural inputs sold in Fort Portal, western Uganda

	Buying price (Ushs/unit)	Selling price (Ushs/unit)	Gross margin (Ushs/unit)	Transport cost (Ushs/unit)	Transport cost ÷ gross margin
DAP (50 kg bag)	35,000	38,000	3,000	1,000	0.33
Urea (50 kg bag)	35,000	38,000	3,000	1,000	0.33
Longe 1 maize seed (5 kg bag)	4,250	5,750	1,500	100	0.07
Cabbage seed (pkt)	1,450	1,800	350	30	0.09
Bean seed (5 kg bag)	4,500	6,000	1,500	100	0.07
Tetracycline (bottle)	2,200	3,000	800	14	0.02

Source: Author's survey of traders.
Notes: Ushs = Uganda shilling; 1 Rand = Ushs 205.

A basic problem facing fertilizer traders across the country is that while fertilizer prices and margins are high, these prices and margins are low relative to unit costs of transporting fertilizer, especially relative to other important farm inputs. For instance, in the western Uganda town of Fort Portal, the ratios of transport costs to gross retail margins for DAP and Urea are five times those of popular seed varieties, and more than ten times that of a common veterinary input (Table 3). Were traded quantities of these fertilizers high, these relationships would not be so damaging. But traded quantities are low.

Table 4: Cost and price build-up for DAP from Nairobi, Kenya to Kapchorwa, Uganda

Cost item	Description	Cost (Ushs/kg)	Cumulative cost (Ushs/kg)
Nairobi			
Nairobi sales price	$265/mt	472	472
Mbale			
Transport to Mbale	Road transport @ $US 2.90 per 50 kg bag	103	575
Clearing charges at border	Agent commission Ushs 100,000/15 mt lorry	7	582
Unloading	Ushs 50/bag	1	583
Handling	Ushs 50/bag	1	584
Storage	15 mt for 2 weeks @ 18%	62	646
Overheads	(0.2*1,701,000)/175,000	2	648
Licences	(0.2*350,000)/175,000	0.4	648
Total costs	Nairobi price + marketing costs	648	
Selling price	Actual selling price	670	
Importer's net margin	Selling price - total costs	22	
% mark-up of importer	*Net margin*100/selling price*	*3.23*	
Kapchorwa			
Transport to Kapchorwa	Road transport @ Ushs 1000/ 50 kg bag	20	668
Unloading	Ushs 50/bag	1	669
Handling	Ushs 50/bag	1	670
Storage	10 bags for @ 18%	7	677
Overheads	(0.2*70,000)/500	28	705
Licences	(0.2*20,000)/500	8	713
Total costs	Nairobi price + marketing costs	713	
Selling price	Actual selling price	740	
Trader's net margin	Selling price - total costs	27	
% mark-up of trader	*Net margin*100/selling price*	*3.60*	

Source: Author's survey of traders.

Notes: Ushs = Uganda shilling; 1 Rand = Ushs 205.

The figures in Table 3 thus illustrate the basic impediment to development of a wholesaling backbone in Uganda's fertilizer market. Better roads would reduce transport costs and improve the ratios somewhat for all the items. But such reductions would not change the basic fact that fertilizer has a very high

transport cost relative to its sale value. That conclusion is further reinforced by the finding of small *net* margins to fertilizer trading at all levels of the market (Table 4 and 5). Ranging from 3 to 5%, these net margins are lower than are many of those in Kenya, which range between 1 and 9% (Wanzala, 2001).

Table 5: Cost and price build-up for DAP from Nairobi, Kenya to Fort Portal, Uganda

Cost item	Description	Cost (Ushs/kg)	Cumulative cost (Ushs/kg)
Nairobi			
Nairobi sales price	$265/mt	472	472
Kampala			
Transport to Kampala	Road transport @ $US 3.50/50 kg bag	125	597
Clearing charges at border	Agent commission Ushs 100,000/15 mt lorry	7	604
Unloading	Ushs 50/bag	1	605
Handling	Ushs 50/bag	1	606
Storage	15 mt for 2 weeks @ 18%	62	668
Overheads	(0.2*1,701,000)/175,000	2	670
Licences	(0.2*350,000)/175,000	0.4	670
Total costs	Nairobi price + marketing costs	670	
Selling price	Actual selling price	705	
Importer's net margin	Selling price - total costs	35	
% mark-up of importer	*Net margin*100/selling price*	*4.92*	
Fort Portal			
Transport to Fort Portal	Road transport @ Ushs 1000/50 kg bag	20	690
Unloading	Ushs 50/bag	1	691
Handling	Ushs 50/bag	1	692
Storage	10 bags for @ 18%	7	699
Overheads	(0.2*70,000)/500	28	727
Licences	(0.2*20,000)/500	8	735
Total costs	Nairobi price + marketing costs	735	
Selling price	Actual selling price	760	
Trader's net margin	Selling price - total costs	25	
% mark-up of trader	*Net margin*100/selling price*	*3.24*	

Source: Author's survey of traders.

Notes: Ushs = Uganda shilling; 1 Rand = Ushs 205.

4. REDUCING PRICES AND INCREASING MARGINS

What is the scope for reducing fertilizer prices to farmers? Preliminary answers are suggested by the results in Tables 4 and 5. Viewed in light of additional information obtained during fieldwork, the results in the tables identify different forms and organizational arrangements in transportation and direct importation of fertilizer as possible sources of costs reductions.

4.1 Road transport

Tables 4 and 5 show that at each level of the market, road transport costs account for between 50 and 60% of marketing costs. Fuel, maintenance, and depreciation charges dominate these costs. It is difficult to imagine significant reductions in such charges. The need to traverse Kenya's Rift Valley is unavoidable. Road quality is improving in Uganda but not in Kenya. Interest rates are high on both countries. However, the survey revealed that improved management and coordination of transportation services can lead to meaningful reductions in fertilizer prices. For instance, the retail price of calcium ammonium nitrate (CAN) in Masaka (a large town 120 kilometres west of Kampala) in early June was Ushs 560 per kg (Ushs 28,000 per 50 kg bag). This price was 11% lower than that in Kampala and only 8% higher than that in distant Mbale. The gross retail margin was also higher than were those in most other towns. This low price and attractive margin resulted from a Masaka-based maize trader's having transported maize to Busia in Kenya. Finding cheap CAN on sale there, the trader back-loaded it to Masaka. Similar opportunities to reduce transport costs may exist elsewhere in the country. Improved market information (intelligence) is crucial to identification and exploitation of such opportunities.

4.2 Rail transport

An obvious avenue through which to reduce fertilizer costs lies in greater use of rail transport. Traders indicate that a one-third reduction in transport costs between Nairobi and Kampala could emanate from this source. Such a reduction in transport costs would translate into a 7% (Ushs 42 per kg) reduction in the cost of delivering fertilizer to Kampala, doubling the associated net margin.

But rail transport is unreliable and delay-prone. The costs associated with these delays are enormous. Consider DAP moved from Nairobi to Kampala (Table 5). The cost of capital tied up for the 3 to 4 weeks currently required to move this fertilizer between these two cities by rail would add 7% to total costs (i.e. Ushs 46 per kg), wiping out profit margins. There are few indications of improvements in railway administration in either Kenya or Uganda.

Improvements in railway administration would require cross-border cooperation and coordination between Kenya and Uganda. As the East African Community gathers momentum, such cooperation and coordination may become more likely than it appears to be at present.

4.3 Direct imports

Every interviewed importer identified direct importing of fertilizer into Uganda—i.e., rather than via Kenya—as an attractive and feasible option for reducing fertilizer prices. For DAP, data reported in Wanzala (2001) suggest potential savings of at least Ushs 65 per kg from circumvention of Kenya-based handling and storage costs. This would mean 10% reductions in prices of DAP in both Kampala and Mbale. Assuming other costs were to remain the same, net margins in Kampala would be thrice as high; those in Mbale would be four times larger.

The principal stumbling block to realization of such gains is the requirement by overseas suppliers that consignments be at least 300 MT in size. Such consignments cost more than $100,000 (close to Ushs 180 million), well beyond the reach of the typical Ugandan importer. Limited overdraft facilities, high interest rates on such overdrafts (18% and above), and a range of stiff service charges and commissions on foreign exchange transactions add between 3 and 5% to these costs. Only two firms indicated that they regularly imported fertilizer directly from overseas. Their ability to do so was clearly based on relationships with large exporters in Europe (a parent company in one case). With these relationships comes the availability of cheap credit from European sources, relatively long repayment periods for in-kind credit, and circumvention of high charges, commissions, and cash deposit requirements levied by local banks. Resulting savings are high.

The highest hurdle facing newcomers to fertilizer importing appears to be the need to demonstrate the ability to cover up-front the full costs of a large consignment. To qualify for letters of credit, most Ugandan banks require importers to deposit into their accounts amounts equivalent to the costs of entire consignments. This effectively excludes all but one or two companies from the direct importing business.

Recently, the Bank of Uganda provided an official guarantee that circumvented the deposit requirement and facilitated granting of a letter of credit by a private bank to a consortium of private grain traders. This made possible procurement and export of 40,000 MT of maize to southern Africa at a time when the domestic market was awash with the commodity and prices had hit rock bottom. A similar arrangement might permit direct importation of fertilizer and lead to associated reductions in prices and increases in margins. This would require a brand of organization and collective actions among fertilizer traders that is currently absent. A major challenge would be to convince the Ugandan government that a measure used to rescue the maize

market in a year of unusually low prices is sorely needed in the fertilizer market in all years.

5. SUMMARY AND CONCLUSIONS

The basic message of this paper is that the prevailing system of fertilizer procurement and distribution in Uganda implies a market structure dominated by retail-level trade, high prices, and low net margins. The high transport cost of fertilizer relative to its price means that scale economies are largely captured in Kenya, or at the first stage of the marketing chain within Uganda. There are no inherent pressures toward development of the kind of wholesaling backbone that exists in Kenya.

Governments in the region—including that in Uganda—are under pressure from international lending agencies to "let markets work." Most of these governments have taken that edict to mean that they should not do anything at all in markets. That interpretation is unfortunate because it ignores the fact that the default condition for many markets is failure. Potential efficiency-enhancing markets far outnumber actual ones. Uganda's fertilizer market clearly exists. But its most fundamental efficiency-enhancing component—a wholesaling backbone—remains in the domain of the potential.

Is there scope for efficient intervention in the fertilizer market that would reduce prices to farmers and increase net margins to traders? The results suggest that this scope lies in improved market information systems, improved rail services, and flexibility in application of rules governing financing of imports.

Given the structure of Uganda's fertilizer market, the impetus for changes that could lead to realization of this potential must come from private importers. But that raises a number of challenges. The data suggest few incentives for these large market participants to invest in market development. A crucial recognition is that the small-scale retail-oriented trade predominant in Uganda's farm input sector reflects small-scale subsistence-oriented production patterns across the rural landscape. Such production systems imply low demand for improved inputs. Success in developing Uganda's fertilizer market thus hinge to a large degree on success in spurring new demand for fertilizer among smallholders.

Experience from Kenya suggests that a promising innovation lies in linking fertilizer packaged and distributed in small, affordable sizes ("mini-packs") with dissemination of improved information on cultural practices, broadly

defined—e.g., planting in rows, spacing between rows, seeding rates, timing and rate of fertilizer application (Seward & Okello, 2000). Such an approach requires cooperation between local community organizations, NGOs, and fertilizer traders. It is likely to prove appropriate in Uganda since, like their Kenyan counterparts, Uganda's smallholders are constrained by both poor access to credit and poor access to relevant and timely information.

The Ugandan government also has a crucial role to play. Local communities, NGOS, and private traders are unlikely to invest in the improved market information systems, or in the improved functioning and coordination of rail services that the analysis suggests are central to significant cost and price reductions in fertilizer markets. Individual traders are unlikely to be able to convince conservative bankers to bend long-established rules. The Ugandan government should be preoccupied with such concerns; it should be able to convince private traders to organize themselves toward profitable collective outcomes; and it should be able to convince private financial institutions to make low-risk adjustments in standard procedures. The current analysis indicates that such investments are also required if potential reductions in retail prices and increases in net margins are to be realized.

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REFERENCES

AT-UGANDA (2002). *Kampala: Appropriate Technology-Uganda*. Various Reports of Appropriate Technology-Uganda. www.enterpriseworks.org.

DE JAGER A, KARIUKI I, MATIRI FM, ODENDO M & WANYAMA JM (1998). Linking economic performance and nutrient balances in different farming systems in Kenya: A synthesis towards an integrated analysis of economic and ecological sustainability. *Agriculture, Ecosystems, and Environment* 71(2):81-92.

GASPAROTTI A (2002). *Personal communication*. Mr Andrea Gasparotti, Marketing Advisor to Technoserve Uganda Project, Kampala, Uganda.

INTERNATIONAL FERTILIZER DEVELOPMENT CENTER (IFDC) 2001. *An assessment of fertilizer prices in Kenya and Uganda: Domestic prices vis-à-vis international market prices.* Unpublished paper of the International Fertilizer Development Center, Alabama.

INVESTMENT IN DEVELOPING EXPORT AGRICULTURE (IDEA) (2002). *Fourteenth Semi Annual and Seventh Annual Progress Report of Uganda's Investment in Developing Export Agriculture (IDEA) project*. Agribusiness Development Centre, Kampala, Uganda.

KENYA AGRICULTURAL RESEARCH INSTITUTE (KARI) (1998). *Soil fertility research priorities in Kenya*. KARI-Soil Fertility and Plant Nutrition Research Program. Kenya Agricultural Research Institute, Nairobi, Kenya.

MOSE L (1998). *Factors affecting the distribution and use of fertilizer in agriculture: A preliminary assessment*. Unpublished Manuscript, Egerton University Tegemeo Institute. Egerton University Tegemeo Institute of Agricultural Policy and Development, Nairobi, Kenya.

MOSE L, NYANGITO H & MUGUNIERI L (1997). *An economic analysis of the determinants of fertilizer use among smallholder maize producers in western Kenya*. Unpublished Manuscript, KARI. Kenya Agricultural Research Institute, Nairobi, Kenya.

OMAMO SW & MOSE L (2001). Fertilizer trade under market liberalization: Preliminary evidence from Kenya. *Food Policy* 26:1-10.

PALM CA, MYERS RJK & NANDWA SM (1997). *Combined use of organic and inorganic nutrient sources for soil fertility maintenance and replenishment*. In: Buresh RJP, Sanchez A & Calhoun F (eds), Replenishing soil fertility in Africa. Soil Science Society of America, Madison, Wisconsin.

PENDER J, JAGGER P, NKONYA E & SSERUNKUUMA D (2001). *Development pathways and land management in Uganda: Causes and implications*. EPTD Discussion Paper No. 85. International Food Policy Research Institute, Washington DC.

SANCHEZ PA, SHEPERD KD, SOULE MJ, PLACE FM, BURESH RJ, IZAC A-MN, MOKWUNYE AU, KWESIGA FR, NDIRITU CG & WOOMER PL (1997). *Soil ferility replenishment in Africa: An investment in natural resource capital*. In:

Buresh RJ, Sanchez PA & Calhoun F (eds), Replenishing soil fertility in Africa. Soil Science Society of America, Madison, Wisconsin.

SASAKAWA GLOBAL 2000 (SG-2000) (2002). Various reports of Sasakawa Global 2000. Sasakawa Global 2000, Kampala, Uganda.

SEWARD P & OKELLO D (2000). *SCODP's mini-pack method: The first step towards improved food security for small farmers in western Kenya.* Paper presented at the 68th Annual Conference of the International Fertilizer Industry Association. Oslo, Norway, May 22-25.

TEGEMEO INSTITUTE OF AGRICULTURAL POLICY AND DEVELOPMENT (1998). *Monitoring for improved agricultural sector policy making*. Working Paper, Egerton University, Tegemeo Institute of Agricultural Policy and Development, Nairobi, Kenya.

WANZALA M (2001). *Fertilizer markets and agricultural production incentives: Insights from Kenya*. Background document for the Tegemeo Institute Agricultural Monitoring and Policy Analysis Conference on Poverty, Technology and Competitiveness, September 6th, Nairobi, Kenya.

WOOMER PL & SWIFT MJ (eds) (1994). *The biological management of tropical soil fertility*. John Wiley and Sons, Chichester.

WORLD BANK (2001). *Tanzania soil fertility recapitalization and agricultural intensification project*. World Bank African Regional Office, Washington DC.