Improving Fertilizer Markets in West Africa: The Fertilizer Supply Chain in Senegal
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African governments, in response to the 2007-8 oil and food crisis and to Resolution 5 of the *Abuja Declaration on Fertilizer,*\(^1\) have been induced to [re-]introduce subsidies as a short-term solution to artificially reduce fertilizer prices and increase its use. Yet, if these subsidies are not managed properly and are implemented in a constrained environment that contributes to inefficiencies and higher fertilizers costs, the introduction of subsidies not only adds to market distortions but also to higher fiscal burdens. Therefore, a primary motivation for this study is to identify key constraints along the fertilizer supply chain and recommend policies to expand fertilizer markets through more efficient distribution and to lower the fiscal burden on governments who wish to effectively increase fertilizer use in their country and in the West Africa (WA) region.

To carry out this work, four country case studies were undertaken in 2009 and 2010 to assess the fertilizer supply chain in West Africa. The countries included are Ghana, Mali, Nigeria and Senegal. Field visits were made to each country to assess the domestic supply chain, including fertilizer distribution channels and their associated supply cost structure in order to identify key constraints, analyze them and ultimately recommend policies necessary to effectively remove such constraints, or at least reduce their negative impact along the domestic supply chain.

This document, part of a series of case studies for the WA region, is based on data and information collected during the country visit to Nigeria for a rapid appraisal, complemented by literature review and analysis of secondary data. In addition, this and the other country assessments are the basis for and a complement to the document “Policy Options for Improving Regional Fertilizer Markets in West Africa” by Bumb, Johnson and Fuentes (IFPRI/IFDC 2011), which has a broader regional perspective.

Opinions expressed in this paper are those of the authors and not of the International Fertilizer Development Center (IFDC) or the International Food Policy Research Institute (IFPRI).

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\(^1\) Resolution 5 of the 2006 *Abuja Declaration on Fertilizer for an African Green Revolution* calls for African governments to improve small/poor farmers' access to fertilizer through targeted subsidies in favor of the fertilizer sector.
Acknowledgments

This study would not have been possible without the collaboration of a number of private organizations, government agencies and individuals who assisted IFDC during field visits to Senegal. In particular, the authors wish to acknowledge the assistance and contribution of Martin Drevon, IFDC-Rwanda and former independent consultant, and other IFDC regional personnel who contributed to accomplish the tasks set forth during the implementation of this study.

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Acronyms

ADPL Agricultural Development Policy Letter
ASAP Agricultural Sector Adjustment Policy
CCS Collateral Control Service
c.i.f. Cost, Insurance and Freight
CNCAS Caisse Nationale de Credit Agricole du Senegal (Senegalese National Bank for Agricultural Credit)
CSPT Compagnie Senegalaise des Phosphates de Taiba (Senegalese Phosphate Company of Taiba)
DAP Diammonium Phosphate
DoA Director of Agriculture
ECOWAS Economic Community of West African States
FNPC Fédération Nationale des Producteurs de Coton du Sénégal (National Federation of Cotton Producers of Senegal)
f.o.b. Free on Board
f.o.t. Free on Truck
GOANA Grande Offensive Agricole pour la Nourriture et l’Abundance (Great Agriculture Offensive for Nutrition and Abundance)
GoS Government of Senegal
ha hectares
ICS Chemical Industries of Senegal (Industries Chimiques du Senegal)
IFDC International Fertilizer Development Center
IFPRI International Food Policy Research Institute
KCl potassium chloride
kg kilograms
km kilometers
MoA Ministry of Agriculture
MOP Muriate of Potash
mt metric tons
mtpy metric tons per year
NAP New Agricultural Policy
OPS Organismes Prives Stockeurs (Private Retailers Organization)
REVA Plan de Retour vers l’Agriculture (Plan of Return to Agriculture)
SENCHIM Société de Commercialisation des Productions des Industries Chimiques du Senegal (Society for the Commercialization of Products from Chemical Industries of Senegal)
SODEFITEX Société de Développement des Fibres Textile (Society for the Development of Textile Fibers)
SSP Single Superphosphate
TSE Tractor Service Equipment
TSP Triple Superphosphate
USAID/AFR/SD Bureau for Africa of the United States Agency for International Development
WA West Africa
Introduction
The main focus of this study is on the marketing/distribution networks and cost structure of the domestic supply chain in the Senegal fertilizer market. The premise of this assessment is that elevated fertilizer prices paid by farmers are the result of high transaction costs along the domestic supply chain (in addition to soaring international prices and transportation), perhaps due to an inefficient distribution structure and ineffective marketing – factors that are also constraining consumption and demand. Although we recognize the intricate nature of supply and demand and the importance of addressing other factors that are also affecting demand and therefore the expansion of the fertilizer market, those factors will not be addressed in this report. However, some of the recommendations made in this document to address issues on the supply side of fertilizer market to ultimately reduce its price will also have an effect on demand.

The fertilizer market in Senegal is the sixth largest in the West African (WA) region, representing an average of 3.4 percent of the total imported (in nutrients base) in the Economic Community of West African States (ECOWAS) after Nigeria, Côte d’Ivoire, Mali, Ghana and Burkina Faso for the years 2005-2009 average. Yet, the average nutrient consumption estimated at close to 4.1 kilograms per hectare (kg/ha) of arable land in 2009 (FAOSTAT, 2010) is slightly higher than the regional average of 4.0 kg/ha but lower, relative to other developing regions of the world.

In Senegal, the fertilizer market is essentially intended for groundnuts, grain crops (mainly rice and corn), horticultural crops (mainly tomato), cotton and sugarcane production. These crops consume the bulk of produced and imported fertilizer and other agricultural inputs. Although the level of fertilizer consumption increased during the 1990s, it decreased during the 2000-10 period as a result of various external economic factors such as the cotton crisis in the late 1990s and early 2000s and the 2007-08 fertilizer crises1 in spite of the government subsidy on fertilizer.

The Fertilizer Supply Chain in Senegal
In spite of Senegal having a natural resource base for producing fertilizer (mainly phosphate rock), the country imports the bulk of fertilizer it consumes, while its resource base is being used to produce intermediate products such as phosphoric acid ($P_2O_5$) for exportation and then use in the elaboration of compound fertilizer products abroad. Part of the reasoning for this process is that the country’s small market size, with estimated imports of 73,000 mt during the 2008-09 season, may not justify investing in production and fertilizer blending facilities to meet the domestic demand and consumption. Although, by investing in blending facilities, there is also a potential opportunity to supply the larger WA regional market along with Toguna Agro-Industries in Mali and Hydrochem-Yara in Côte d’Ivoire, the ability to compete with these already established plants would be an issue. In addition, it is questioned whether there is room for another plant in addition to the Society for the Commercialization of Products from Chemical Industries of Senegal (ICS-SENGHIM) plant, which has been idle or operating at a minimum capacity for many years.

Senegal, like most West African countries, is a price taker and given the small size of its fertilizer market and the current market conditions and procurement/distribution structures, it cannot influence the international market price. Therefore, from the country perspective and for country-specific policy analysis and recommendations, focusing on the cost components along the domestic supply chain, between the entry port and the final consumer, becomes most relevant, since such costs can be influenced by government policies and actions. Figure 1 provides a general illustration of the domestic fertilizer supply chain and cost structure and highlights the role of various actors along the domestic supply chain.

According to Figure 1, costs that arise from the different steps along the domestic fertilizer supply chain contribute to the final cost and therefore the price paid by farmers. In Senegal, the final cost of fertilizer is affected by limited access to finance in the domestic banking system; poor infrastructure, especially ports and rural road conditions; inefficient coordination in the acquisition and distribution of

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1 The fertilizer crisis resulted from the oil and food crisis, which started in 2004, causing an increase in agricultural production costs and creating a panic in the market, manifested in the increase of fertilizer prices in 2007.
products due to weak and underdeveloped marketing and retail networks; and a weak institutional and regulatory environment, as well as an ineffective subsidy. Improving these factors will positively affect the functioning of the fertilizer supply chain in Senegal and reduce transaction costs while improving its efficiency; consequently, the need for subsidies could be reduced. Additionally, in the event that a subsidy is still required, the improved efficiency along the supply chain would lower the ultimate cost of the subsidy program, therefore reducing its fiscal burden on public resources.

**Methodology and Structure of Report**

To accomplish our objective, this study involved gathering a combination of qualitative information and quantitative data through field visits and interviews with private sector traders and government agencies involved in fertilizer procurement and distribution in Senegal. The information was explicitly gathered to identify the distribution channels and assess the cost structure along the domestic fertilizer supply chain, from importation to the point of sale to final consumer. To facilitate the collection of data and information, a consultant on fertilizer markets in Senegal was hired to assist with the coordination of country visits and interviews. Data collection involved informal (semi-structured) and formal interview methods. Informal methods were used to gather qualitative information and documentation on the domestic distribution and cost structure of the fertilizer supply chain, including known constraints and inefficiencies. Formal interviews were conducted to gather cost and price

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**Figure 1. General Fertilizer Supply Cost Structure and Players’ Functions in a Domestic Supply Chain**

Note: The pyramid illustrates the cost structure, involved actors and their functions along the supply chain.

Source: Authors’ creation.
information on the main components of the domestic fertilizer supply chain.

This document is organized as follows. First, agricultural and fertilizer policies and the overall trends of fertilizer markets in Senegal are reviewed in terms of production, importation and consumption (page 3). This is followed by a more detailed assessment of the fertilizer distribution cost structure based on in-country surveys (page 8), with particular attention given to analyzing the domestic fertilizer distribution performance and conduct (page 12). Page 17 identifies key constraints and bottlenecks along the supply chain before concluding with a number of policy recommendations needed to address such constraints (page 19). Finally, the Annex provides a brief and general description of the fertilizer subsidy program in Senegal during 2009.

**Agricultural Policy and Fertilizers in Senegal**

In Senegal, agriculture plays an important role in socio-economic activities as the main source of employment for nearly 60 percent of the labor force and for the vast majority of rural households who rely on agriculture as their main source of food and income. Out of the total land extension, an estimated 3.9 million ha are considered suitable for agriculture production, from which only about 2.4 million ha are being cultivated. The use of land for agricultural production varies according to the climatic diversity of agro-ecological zones in Senegal, defined according to the spatial variation of rainfall and the availability of water for irrigation. As such, Senegalese agriculture is diversified and includes the production of export crops (peanuts and cotton), staple food crops (mainly cereals such as corn, rice, millet and sorghum), commercial crops (sugarcane and arabic gum) and horticultural crops.

Since the 1960s until the early 1980s, the sector was characterized by the state intervention in agricultural production and marketing. This intervention was marked by a policy that strongly subsidized agricultural exports through the provision of inputs, equipment and credit, while neglecting an adequate rural development strategy. In 1985, the Senegalese government implemented the New Agricultural Policy (NAP) with the objective to revitalize the rural economy by focusing on food security. Under NAP, the implemented measures were intended to replace the state intervention with the private sector in the provision of agricultural inputs and credit. However, due to the uncertain legal, economic and political environment, the private sector was reluctant to get involved in such activities. In addition to reducing state intervention, NAP was also characterized by government decentralization by means of transferring decision-making from the central government to local communities, empowerment of producers and input/output market liberalization. These measures paved the way for further implementation of economic reforms during the early 1990s — changes that were considered important to incentivize production, processing and input/output markets.

As previously described, the Senegalese agro-ecological zones are characterized by erratic rain patterns in addition to high temperatures dominated by persistent droughts. Therefore, water for irrigation has been considered a limiting factor for agriculture production and development. Consequently, in the late 1980s, the government of Senegal (GoS) implemented a water conservation policy leading to public investments in the construction of dams along the Senegal River for flood control, power generation and for irrigation to supplement natural precipitation in support of agriculture production activities. These projects were expected to pave the way for agriculture development and for growing staple food crops to satisfy the increasing domestic demand. However, the expected benefits were not fully realized; instead, the production of cereals, mainly rice, stagnated and the sector was not able to even meet the national demand. This situation was exacerbated by rural to urban migration, causing a food deficit due to shortage of labor in the rural area while urban food demand increased.

The signing of the Agricultural Development Policy Letter (ADPL) in 1995 led to the implementation of the Agricultural Sector Adjustment Policy (ASAP). These policies allowed for real increases in prices, including agricultural input prices which increased in a larger proportion relative to the increases in production and output prices, resulting in decreases of real revenues to agricultural producers. The fall in revenues was followed by a sharp reduction in the use of agricultural inputs and the obsolescence of agricultural equipment, eventually leading to an overall reduction in productivity and in agriculture output. By the beginning of 1997, most of the ASAP was implemented, and the sector was fully liberalized. Nonetheless, the results were still below expectations and the agricultural sector still had serious difficulties and development constraints.
In light of the problems faced by the agricultural sector, under the new government and in response to a presidential initiative, the GoS started a new input subsidy program in 2000. By 2008, the government launched the Plan of Return to Agriculture (REVA) and the Great Agriculture Offensive for Nutrition and Abundance (GOANA) under the Poverty Reduction Strategy framework. This plan and program, which include a subsidy to improve access to agricultural inputs such as fertilizer, were expected to allow for greater agricultural diversification, an increase in production, particularly in rice, maize and cassava, among other crops, and an increase in producers’ revenues. The amount of fertilizer to be subsidized for the 2009-10 cropping season was estimated at 69,000 metric tons (mt) out of an expressed need of about 120,000 mt. This estimation did not include fertilizer for commercial and export crops such as cotton, since they were not beneficiaries of the new subsidy program. The fertilizer subsidy for cotton is a separate program that has been in place before the REVA Plan and GOANA program and will be explained later in this report.

Legal and Regulatory Environment

Although Senegal is one of the few countries in Africa that has taken important steps to liberalize the agriculture sector and the fertilizer market, the country does not have a legal framework that controls and regulates such a market.

Currently, Senegal does not have a defined national policy on fertilizer other than a mining code by decree at the level of the Ministry of Agriculture (MoA). However, in 2007 a National Fertilizer Committee was created to monitor the importation and quality of fertilizer. This committee is composed of member representatives of the Ministries of Agriculture, Environment, Economy and Finances and Commerce and chaired by a Technical Advisor from the Minister of Agriculture. The installation of this committee was expected to have an unquestionable impact on the quality of the imported fertilizer to protect farmers against “cheaters” after a few producers questioned the effectiveness of certain imported fertilizer formulations. The committee is in charge of sampling imported lots and existing stocks in the country to determine the fertilizer quality and nutrient content according to the product labels. The sampling is supposed to be made on an unexpected basis at the distribution centers near the farmers; however, the National Fertilizer Committee functions have not been properly undertaken due to budgetary constraints.

In Senegal, there is not an apex organization that groups the different players in the fertilizer supply chain; however, there are sector-specific private organizations, such as the Organismes Prives Stockeurs (OPS) in the peanut sector, which provide horizontal and vertical coordination among input importers and distributors and output marketers. This organization support common actions on behalf of its members and defend their interest with the government. The OPS has a set of policies and rules for the provision, marketing, pricing and promotion of products (i.e., labeling), to which all members must adhere on an individual basis in order to ensure that the products they commercialize are of good quality. In the fertilizer industry, there is one known trade organization formed by the distributors’ network of SENCHIM, which at inception claimed 29 members. However, its functions are not clear.

Fertilizer Production

Senegal has been one of the major phosphate producers in the West African region with many deposits of phosphate rock throughout the country. The Taïba and Thies deposits, discovered around 1948, are the main sources of phosphate rock in Senegal. They were exploited by the parastatal Compagnie Senegalaise des Phosphates de Taïba (CSPT), created in the late 1950s. Output of the Taïba mine is estimated at 2 million mt of commercial phosphate per year, with reserves estimated at more than 100 million mt. In 1976, the GoS created the Chemical Industries of Senegal (ICS) for manufacturing phosphoric acid out of the phosphate rock mined by CSPT to be used in the processing and production of soluble compound fertilizers such as di-ammonium phosphate (DAP), single superphosphate (SSP), triple superphosphate (TSP) and N-P-K complex formulations for exportation. This production took place at the ICS Mboa factory located near Dakar, which had a production capacity of 250,000 metric tons per year (mtpy).

In the late 1980s, ICS created SENCHIM as its subsidiary for marketing its produced fertilizer formulations in the domestic and international markets. In addition, SENCHIM was also involved in marketing other agriculture products such as pesticides and seeds. ICS and SENCHIM functioned as two independent entities, in which ICS was involved in production and importation and SENCHIM in marketing and sales. In an effort to transfer part of the subsidy received from the GoS, ICS provided the product to SENCHIM at cost or at a price below the market price to allow it to make profit and maintain its operations.
During the 1990s, while the Senegalese government was reducing its intervention in the agriculture sector, markets and society, ICS-SENCHEM remained as the principal parastatal structure for the production and marketing of fertilizer. ICS constituted the largest manufacturing unit of phosphoric acid and fertilizer in West Africa, making it a strategic entity in Senegal, where economic development had been reliant on agriculture. However, ICS did not live up to its expectations and its importance can now be measured by the amount of investment in the fertilizer industry more than its impact on the development of Senegal. Still, ICS-SENCHEM originally had an important role in the ambitious project of producing, manufacturing and marketing most of the fertilizer and inputs necessary for the intensification of agriculture and the increase in outputs in response to the NAP.

**Fertilizer Imports and Consumption**

Most fertilizer consumed in Senegal, especially non-phosphate sources, is imported to be blended with those locally produced. The main market is for the production of commercial/export crops, for staple food/cereal production and for horticultural crops.

As previously implied, for many years the provision of fertilizer was dominated by ICS and SENCHIM which, as government institutions created for the production and marketing of fertilizer, were also the only institutions authorized to import and distribute fertilizer through other domestic companies, most of which were part of the SENCHIM distribution network. As such, ICS received annual government subsidies for the importation and distribution of fertilizer to farmers. However, in the early 2000s, ICS started experiencing serious and complex financial problems, resulting in a deficit of more than 70 billion CFA francs (US $151.8 million) by 2006 – affecting production and revenues and dangerously threatening its survival. These difficulties were related to inefficiencies in the production process rather than management problems. Such inefficiencies included losses in the SENCHIM private fertilizer distribution system as a result of investments that exceeded the sales forecasts, marketing procedures that did not allow for the optimization of costs and the financing of social obligations.

After many attempts, the refinancing of ICS was possible in 2008 by the recapitalization of the company by the Indian consortium Archean Group (Indian Farmers Fertilizer Cooperative [IFFC] Ltd. and the government of India), holding 85 percent of the company shares against 15 percent by the state of Senegal. However, due to the obsolete and degraded equipment of ICS-SENCHEM, they no longer produce neither commercialize fertilizer products or other inputs. Most of the new capital inflow was allocated for the exploitation of phosphate rock and the production of phosphoric acid for exportation to India, Iran and Japan for the production of compound fertilizer, neglecting the Senegalese domestic market.

Due to financial constraints, which caused the imported quantity of fertilizers and other agro-inputs to be insufficient and arrive late in the season, 2004 was the last year that ICS and SENCHIM were able to supply the agro-input needs in Senegal. Consequently, in 2005, the GoS created an accreditation system for those companies wishing to import and/or distribute fertilizers to farmers under government tenders and authorized SENCHIM distributors to import fertilizer directly. As a result, the fertilizer market started to become privatized.

According to the MoA Director of Forecast and Statistics, fertilizer consumption in Senegal has been below 80,000 mtpy since the 1960s and is declining; thus, the Senegalese fertilizer market is considered small with a potential much higher than the expressed demand of about 120,000 mtpy under the government subsidy program. By early 2005, fertilizer imports fell to an all-time low of 9,000 nutrient tons per year (over 20,000 product tons) (Figure 2), perhaps partly due to the reduction in the planted area of cotton (as a result of the international cotton crisis), which traditionally absorbed a relatively large percentage of fertilizer. This situation was exacerbated by the devaluation of the CFA franc after 1994 and the financial troubles faced by ICS-SENCHEM. Fertilizer importation and consumption decreased despite the implementation of a subsidy program initiated in 2000 when the importation of fertilizer was the highest at 36,000 nutrient mtpy.

Most of the fertilizer imported during the period of low usage was applied to cash crops such as peanuts, cotton and rice and, to a lesser extent, to corn production for industrial/commercial purposes. Traditionally, fertilizer imports have been dominated by urea, followed by N-P-K complex and formulations and to a very minor extent by organic fertilizer.
The main sources of fertilizer imports are from Europe (72 percent from France and Italy), Japan (10 percent) and Morocco and Iran (9 percent each) (IFDC internal report). Most fertilizer imported in Senegal is bagged, with only a small quantity in bulk, perhaps because there are limited operational blending facilities in the country. The only existing facility is the ICS-SENCHEIM plant at Mbao. At the time of the field visit for this assessment, it was unclear how much, if any production was occurring at the plant or if there were any plans to invest funds for upgrading it.

Based on the 2008-09 cropping season, the estimated fertilizer needs in Senegal were divided between urea, which accounts for about 36 percent of needs for most crops, and 65 percent of N-P-K formulations including DAP and KCl (potassium chloride, which is also known as muriate of potash [MOP]). More than 80 percent of these needs are satisfied by importations through the private sector in response to the government tender under the subsidy program, including a small percentage to satisfy demand outside the subsidy.

Table 1 shows the quantities and types of fertilizer used by each crop in Senegal under the subsidized and non-subsidized markets for the cropping season 2008-09. According to this table, the quantity of imported subsidized fertilizer represented about 84 percent of the total imports in 2009, including subsidized fertilizer for cotton. The rest of imported fertilizer was for distribution in the open non-subsidized market. From these totals, 49 percent represent N-P-K formulations, 34.5 percent urea, 11 percent DAP and 5.5 percent MOP.

Source: FAO 2010 data.

Figure 2. Senegal: Nitrogen, Phosphate, Potash and Total NPK Imports, 1990/91-2008/09
Table 1. Estimated Imported Fertilizer Quantities per Crop, 2008-09 Season (in metric tons)

<table>
<thead>
<tr>
<th>Agricultural Products</th>
<th>Maize</th>
<th>Vegetables</th>
<th>Other Crops</th>
<th>Groundnuts</th>
<th>Tomatoes</th>
<th>Millet/Sorghum</th>
<th>Sugarcane</th>
<th>Cotton</th>
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</thead>
<tbody>
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<td></td>
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</tr>
<tr>
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<td></td>
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<tr>
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<td>6,000</td>
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<tr>
<td>Millet/sorghum</td>
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<td></td>
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<tr>
<td>Tomato</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other vegetables</td>
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<td></td>
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<tr>
<td>Rice</td>
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<td>Other crops</td>
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<td><strong>Subtotal 1</strong></td>
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<td>6,000</td>
<td>3,000</td>
<td>3,000</td>
<td>12,000</td>
<td>3,000</td>
<td>2,500</td>
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<tr>
<td><strong>Non-Subsidized Private Market</strong></td>
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<tr>
<td>Sugarcane</td>
<td>1,000</td>
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<td></td>
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<tr>
<td>Horticulture (tomato)</td>
<td>4,000</td>
<td>1,000</td>
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<td>6,000</td>
<td>3,000</td>
<td>3,000</td>
<td>12,000</td>
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</table>

Source: IFDC data collected during country visits and interviews.
Fertilizer Market Structure and Distribution System

Since 2004-05, the Senegalese government has made considerable advances on fertilizer market liberalization, giving rise to a private sector distribution network which has been playing an increasing role in fertilizer importation and distribution in replacement of the previous state monopolies. Despite these efforts, the provision of fertilizer continues to be dominated by an annual tender launched by the GoS in response to an estimated demand under the subsidy program, causing distortions in the market. The subsidy program provides limited incentive for the private initiative to expand the market and serve a larger population of smallholder farmers, beneficiaries of the subsidy, beyond what is demanded under the subsidy program. This constrained demand is enhanced by a lack of finance and the subsidy program itself, which sets a price below the market price.

Even though fertilizer may be available and some resource-poor farmers may have access to credit or have their own funds, they are not willing to pay full price for fertilizer once they are aware of the subsidized price. The farmers not eligible for credit or unwilling to pay full price for fertilizer are typically subsistence farmers located in the climatic risk zones. These farmers are dependent on rain for their production activity, and some have been unable to pay their previous debt as a result of climatic factors that affected their crops negatively, causing losses. Consequently, they have been forced to default on their loans.

In addition, the subsidized market is not operating efficiently as a result of the non-transparent government tender, which seems to favor some private importers/suppliers more than others, depending on their political influence with the Minister of Agriculture who manages the tender. With the subsidy program, the government is also neglecting investment in other areas that could have a more sustainable impact in developing the input and fertilizer markets, as well as agricultural outputs. These facts have a direct effect on fertilizer cost and consequently on reducing supply and demand.

Market Players

Currently, the fertilizer procurement and distribution process in Senegal involves the participation of private and public organizations, namely individual and organized farmers, large commercial farmers, the private sector (importers, distributors and retailers) and the government through the MoA. ICS-SENCHEM, which could participate in the process as a private institution, no longer enjoys the exclusivity in importation and distribution as it once did. These institutions and organizations involved in fertilizer procurement and distribution in Senegal are described below.

Agricultural Producers – There are a significant number of producers throughout the agricultural regions in Senegal who are involved in the production of food/staple crops and cereals, industrial crops and export crops. These producers may or may not have access to credit, depending on their individual loan and re-payment history. Their involvement in the fertilizer market is as buyers, mainly for those who have their own funds or have access to credit to cover the non-subsidized part of the fertilizer price. Those farmers with no cash or access to credit are deprived from using fertilizer, despite the subsidy, if they do not have the capability to pay for the non-subsidized part of the price. These farmers have identified finance as one of the key constraints in the expansion of the fertilizer market; hence, the number of farmers that have access to credit in Senegal remains weak. Commercial farmers, whether small or large, typically recognize the importance and benefits of using fertilizer, partly because of their high output/input price ratio; consequently, they comprise the main fertilizer market outside the subsidy program.

Farmers’ Organizations are common among cotton and peanut producers. Cotton is being replaced by peanut production due to the adverse cotton market conditions and to the higher output/input ratio of peanut relative to cotton (according to an interview with the Société de Développement des Fibres Textile [SODEFITEX]). In the cotton sector, the main organization that markets inputs and outputs is the SODEFITEX Cotton Industry, a former parastatal structure that has been privatized since 2003. Small, independent cotton farmers are organized in local, regional and national federations for the procurement of agricultural inputs and the marketing of their output.

Agricultural Banks – Subsidized and non-subsidized agriculture credit and fertilizer credit are channeled through the Caisse Nationale de Credit Agricole du Senegal (CNCAS), the main national agricultural credit institution created by the Senegalese government in 1984, recipient of government funds for implementing agricultural
programs. The bank provides credit to farmers based on historical credit payments. A farmer who regularly repays loans has access to new credit; otherwise, it is denied. CNCAS also finances private sector importation and distribution of fertilizer.

**The Government** initiates and implements the agriculture and rural development policies in support of the Poverty Reduction Strategy. In fertilizer, the government policies are aimed at providing access to subsidized credit for importation to reduce input costs and the price paid by farmers. The rationale behind this policy is that access to cheaper credit and lower fertilizer prices will encourage importation and distribution, making fertilizer available and accessible to agricultural producers to increase productivity and production while reducing the food cost. The subsidy implementation, control and regulation are done through the MoA and it’s Regional Service Offices of the Director of Agriculture (DoA) in response to the estimated needs according to the projected number of hectares and the type of crops planted.

**Private Sector** importing and distribution firms respond to the MoA’s calls to tender to provide fertilizer to the different regions in the country. As a result of ICS-SENCIM’s financial inability to supply the country’s fertilizer needs, few companies were authorized to participate in the government’s call to tender to directly import and distribute fertilizer in Senegal. These are the same companies, part of SENCHIM’s former distribution network, that were able to survive a period of financial difficulties during the market liberalization process. Of these surviving companies, only three of the six that participated in the government tender in 2009 had importation and distribution capacity, namely Tractor Service Equipment (TSE), Agrophytex and SedabSarl. In addition, some of these companies enjoy a good rapport with government officials and have access to funds (whether their own or through credit) and linkages to the international fertilizer suppliers.

Subsidiaries of fertilizer producers or international marketing firms established in the country (such as La Cigogne), normally do not participate in the tender since they have not been certified by the government, have less political clout and are not interested in participating in providing fertilizer under the subsidy program because of late payments (which normally occur a year or later after delivery) in addition to government inconsistency and lack of transparency on the tender assignments. These companies concentrate on the pesticides (insecticides and herbicides) market and provide fertilizer mainly to the limited market outside the subsidy program, especially for industrial and horticultural/export crops on a cash basis. Agrophytex is the only representative of multiple transnational companies (Ameropa, Bauche, Balton) that participates in the government tender and also provides the private market outside the subsidy program.

In 2008, there were five private companies that participated in the government fertilizer subsidy program. The main company was TSE-Afrique, which had the largest participation in the tender process during the last two cropping seasons, supplying about 66-70 percent of the fertilizer under the 2009 government tender, up from 59 percent in 2008. In 2009, the estimated amount of fertilizer demanded under the subsidy program was about 56,000 mt, which represented 48-50 percent of the total identified demand as expressed by the farmers at the end of the cropping season and before the beginning of the next one. Figure 3 (page 10) presents the fertilizer market share among private providers under the government subsidy program in 2008.

**Fertilizer Market and Distribution Outside the Subsidy Program**

The non-subsidized fertilizer market is considered relatively small, consisting of the supply and demand for sugarcane and horticultural products. Of these, the largest in 2009 was horticultural production, mainly tomatoes, which demanded about 9,000 mt, while sugar production demanded about 3,000 mt. A large amount of the fertilizer marketed outside of the subsidy program does not compete with the subsidized products, because they are more expensive (i.e., DAP), normally used in commercial crops and rice production and therefore not covered by the subsidy program. Most commercial producers recognize the importance of applying fertilizer to their crops and since these crops have a high output/input price ratio, these producers are not normally concerned about whether the fertilizer is subsidized or not.

Companies that provide fertilizer to the subsidized market also supply the commercial crops market, in which non-accredited companies such as La Cigogne are able to compete. For this market, the companies that participate in the subsidy program make use of the same facilities and equipment (storage and transportation) to sell fertilizer outside the subsidy program. La Cigogne does not own storage facilities
in the rural area; instead, it relies on small distributors and retailers that come to its main storage facilities in Dakar to purchase inputs on a cash-and-carry basis to take them to the rural area for re-selling.

**Distribution Channels**

Currently, there are various fertilizer distribution channels in Senegal across the different production zones. Each distribution channel serves a different sector, depending on whether the fertilizer is being subsidized or not, on the type of crop (staple food crops or cotton) and the type of farmer (small and subsistent or large and commercial farmers). The intended beneficiaries of the fertilizer subsidy are the small producers of staple food crops. Beneficiaries also include cotton and other crop producers (horticultural crops), especially if they are characterized as small producers. Although large farmers and producers of commercial cash and export crops (with the exception of cotton) are not intended to be beneficiaries of the subsidy program, there have been allegations of leakages of a relatively large amount of subsidized fertilizer reaching larger commercial farmers as a result of corrupt distribution practices. These producers were expected to meet their crop fertilizer needs through private sector suppliers in the open market, outside the subsidy system. However, as previously explained, suppliers to the subsidized market also supply the non-subsidized market. Figure 4 depicts the fertilizer distribution structure in Senegal.

**Figure 3. Fertilizer Providers Under the Government Subsidy Program in 2008**
Figure 4. General Fertilizer Distribution Structure in Senegal
Analysis of the Fertilizer Supply Chain and Cost Structure in Senegal

The analysis of the fertilizer cost structure presented in this section considers all the costs involved along the supply chain (according to the data and information gathered during the country visit). This cost/price structure can be divided in two major components: international cost/price and domestic costs. Since the fertilizer market in Senegal is small and therefore cannot influence the international price, the country is a price taker in the international market, just as other West African countries. Consequently, from the country perspective, the domestic cost component becomes the most relevant since it can be influenced by government policies and actions that can induce the re-structure of the domestic industry to gain access to fertilizer in the international market at better terms. The domestic cost components, which include all charges from entry point (at port or border) until the product reaches the point of final sale to farmers, will be analyzed in this section. Table 2 shows the historical price evolution of fertilizer in Senegal for the last five years, with the respective percentage price changes from one year to another.

Prices presented in Table 2 are average non-subsidized prices for different fertilizer products: N-P-K/T-15 (commonly used in maize and rice), N-P-K 6-20-10 (peanut formulation), DAP and urea. According to this table, fertilizer prices have suffered an average increment of about 61 percent between 2004 and 2009. This increment has been driven by price increases in N-P-K products on an average of 84 percent, relative to a 10 percent average increase in urea. As a result of this price increase, the GoS has implemented a subsidy program under which beneficiary producers pay an average of 50 percent of the actual market price. For example, the price to farmers for urea in 2009 was US $31.71; the government subsidized US $15.85 and the farmer paid the difference (same amount) with his or her own financial resources or with credit. It is important to clarify that the 50 percent price subsidy applies to all fertilizer products, but prices may be higher or lower depending on the fertilizer product and region of the country.

<table>
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<tr>
<th>Fertilizer Product</th>
<th>Unit</th>
<th>Prices (US $)</th>
<th>Percentage Changes (%)</th>
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</thead>
<tbody>
<tr>
<td>N-P-K (peanuts)</td>
<td>50 kg</td>
<td>$17.32</td>
<td>$17.32</td>
</tr>
<tr>
<td>N-P-K (com, rice)</td>
<td>50 kg</td>
<td>--</td>
<td>$17.32</td>
</tr>
<tr>
<td>DAP</td>
<td>50 kg</td>
<td>$24.39</td>
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</tr>
<tr>
<td>Urea</td>
<td>50 kg</td>
<td>$28.78</td>
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</tbody>
</table>

Source: Prepared by authors based on data collected through interviews and surveys to stakeholders during country visits, 2009. Exchange rate: 410 CFA/US Dollar.

Fertilizer Procurement and Delivery under the GoS Subsidy

In Senegal, a high percentage of fertilizer procurement and distribution is based on a tender under a government subsidy. The subsidized fertilizer prices in Senegal are not determined in an open market, but are the results of a tender process in which the government negotiates the price with providers. However, the negotiated subsidized price includes the same cost components from an open market. The price to the final consumer is expected to be the same in all regions of the country, but differs according to the fertilizer type and formulation. Consequently, the final price to producers partly reflects the competitiveness of the tender process and the price negotiated by the government with the providers on behalf of farmers. Price determination is based on a tender with participation of three to five importing companies that have links in the international fertilizer market and rapport with high-level government officials, including the president and the MoA, which manage the tender process. On the demand side, the tender process is dominated by the government on behalf of farmers and their organizations. Farmers do not have any influence in
the price determination, but they are only recipients of the product and the final beneficiary of the government subsidy program; as such, they are price takers.

Fertilizer importers in Senegal typically negotiate with international providers’ importation Free on Truck (f.o.t.-Dakar) price, in part as a result of the relatively small quantities imported by individual importers. Since there is just one blending plant operating at a low capacity and catering to one of the main importers in the country, most fertilizer is imported ready to be distributed in bags, and the blended product is also directly imported from regional blending plants, mainly from Mali and Côte d’Ivoire. Imported fertilizer is placed directly on importers’ trucks at the port, in most cases to be transported directly to the communal warehouses, according to the specific contracts. In general, under the subsidy program, since the contracts are assigned by lots, an importer that wins the bid for a lot must import all the fertilizer assigned to that lot (e.g., N-P-K T-15, or urea) and deliver the assigned quantities of that lot to each communal warehouse to make fertilizer available to the producers as assigned by the local committees. Each fertilizer type may be split in more than one lot and delivered to the warehouses by the company that wins the bids. Transportation from the community-based warehouses to the farm is the farmers’ responsibility. For the cotton sector, the subsidy and delivery process is different. SODEFITEX has been the main recipient of the subsidy and therefore makes its own arrangements for procurement and distribution with international providers and domestic importers and distribution companies. In fact, 2009 was the last year SODEFITEX was to receive the government subsidy, according to an interview with organization officials. During the fertilizer delivery, the company places the fertilizer closer to the farmers at a village level, the same point where the company collects the harvested cotton; consequently, cotton producers incur lower transportation costs, in part because of the subsidy provided by the government through SODEFITEX and also due to the shorter distance between the village warehouse and their farms. This document’s annex elaborates more on the GoS fertilizer subsidy program, given its effect on the availability of fertilizer and the fertilizer prices farmers pay in the domestic market.

Fertilizer Cost/Price Structure

As previously described, the cost structure along the fertilizer supply chain can be divided into two general components: international costs and domestic costs. The international price or cost of a product typically includes insurance and freight (c.i.f.) costs, which is the cost of the product in the international market (free on board [f.o.b.] price) plus the cost of insurance and transportation to the importing country port. For the purpose of this assessment and simplicity, clearance charges by the forwarding agent are considered part of the international product cost since they are typically due before the product is unloaded and are based on the declared value of the cargo according to the bill of lading. At the same time, inland and/or additional costs along the domestic supply chain include port charges, vessel unloading and bagging, government charges, finance cost, transportation cost (inland and domestic for landlocked countries) and marketing and distribution margins. Figures 5 and 6 (page 14) show the cost structure of four typical fertilizer products in Senegal: N-P-K blends, TSP, DAP and urea. The costs represented in the graph are the average costs according to the gathered data and information among government and private sector players.

The findings of this assessment indicate that fertilizer prices in Senegal increased by an average of 34 percent of the c.i.f. cost, from import to distribution to final consumer (Figure 5, page 14). This price increase is attributed to additional and cumulative domestic costs incurred from port until the product reaches the final consumer.

Figure 6 (page 14) presents the sub-components of domestic costs. According to this figure, the largest domestic cost component across products is transportation, followed by marketing and distribution margins and finance cost. Port charges and product handling related to vessel unloading (and bagging when necessary) are the smallest cost components along the whole domestic fertilizer supply chain.

**Domestic Transportation Cost**

According to Figure 6, transportation cost in Senegal is the highest cost component along the domestic fertilizer supply chain, accounting for an average of 28.3 percent and ranging between 27 percent and 30 percent of the total domestic cost, depending on the fertilizer product being distributed. In monetary terms, these figures represent an average of US $3.22 per 50-kg bag across all fertilizer products considered in this assessment.

The most used mode for domestic transportation is by trucks over the road, although there is also a potential to use rail transportation, especially to reach some
areas in the northwestern regions, the furthermost eastern departments in the Tambacounda region toward Mali and some of the central regions where the railroad crosses. Rail transportation, if available, is expected to be cheaper than truck transportation; however, currently it may not be the most effective mode given the deteriorated condition of the infrastructure and equipment (engines and cargo wagons).

Truck transportation is more widely used given that the road infrastructure, despite needing improvement, provides access to most regions, departments and villages in the country. The estimated average domestic transportation cost from Dakar to all regions in Senegal is US $0.09/mt/kilometer (km) (or US $0.144/mt/mile) for full truck loads (up to 40 mt/truck) and longer distances (between 100 and 700 km). For shorter distances within 100 km of the Dakar region (which could be the case of moving the product from the port to local warehouses in Dakar) or within the Dakar region, transportation cost is estimated at about US $0.134/mt/km (or US $0.21/mt/mile). These costs could be further reduced and/or the service substantially improved if roads are improved and the transportation load is regulated to preserve the roads, consequently reducing damages to roads and trucks.

Source: Prepared by authors based on data collected through interviews and surveys to stakeholders during country visits, 2009.

Figure 5. Fertilizer General Cost Components in Senegal in US $/mt, 2009

Source: Prepared by authors based on data collected through interviews and surveys to stakeholders during country visits, 2009.

Figure 6. Fertilizer Domestic Cost Components in Senegal per 50-kg bag in US $/bag, 2009

Source: Prepared by authors based on data collected through interviews and surveys to stakeholders during country visits, 2009.
Marketing and Distribution Margin

Marketing and distribution margins are the second highest cost component along the domestic distribution and supply chain in Senegal. This cost is typically set as a percentage of the total transaction cost, including the product cost, added by each agro-input business owner along the distribution chain to cover part of their unaccounted costs and their profit or compensation for their entrepreneurial efforts. Factors that affect the marketing and distribution margin are all other cost components along the supply chain, especially the high-cost components such as transportation and finance costs, in addition to the inherent risks associated with agriculture, which have a higher incidence in the margin. Because distributors typically do not have an explicit interest rate on their own finance or an explicit opportunity cost for the inherent risk of investing in agriculture-related activities, these factors are typically incorporated in the marketing margin. Consequently, implementing policy measures to reduce the other cost components along the domestic supply chain and the risk associated with investing in agriculture-related activities will also help to reduce the marketing margin and therefore the final cost of delivery.

In Senegal, the total average marketing and distribution margin for fertilizer has been estimated at 25.5 percent, ranging between 23.2 percent and 26 percent of the total cost along the domestic supply chain. In monetary terms, these figures represent an average of US $2.9 across products, ranging between US $2.73 and US $3.07 of the domestic additional cost per 50-kg bag, depending on the fertilizer product being distributed.

Finance for importers and for farmers eligible for credit is channeled through the CNCAS. Every year, the government deposits funds in the CNCAS equivalent to 75 percent of the 12-15 billion CFA francs allocated for credit under the agricultural support program. Farmers eligible for credit receive a subsidized rate of 7.5 percent, with the government paying the rate differential of 5.5 percent to the CNCAS through the government funds deposited in the agricultural credit fund. The private sector, mainly importers, receives credit from the CNCAS at a rate of 12 percent per year. This rate can be up to 16 percent if credit comes from private banks. For financing importation, the CNCAS, in collaboration with the importer, sets up collaterals managed by a Collateral Control Service (CCS) firm, in which the collateral is the same product being imported. The imported product is placed in a storage facility in-country (i.e., at the port of Dakar) by the international producer/marketing firm. Since the product is in consignment, taxes do not have to be paid until after the product has been paid by the importing company and retrieved from storage. The CCS firm releases the fertilizer based on a bank authorization once importers make the payment with a Letter of Credit to the international producer or marketing firm that owns the product consigned in the storage facilities.

Government Charges

Fertilizer imports in Senegal are not fully exempt from government-related charges despite being subsidized to the final consumers – the farmers. These charges are not necessarily taxes, according to the government; they are, however, according to the industry. Government charges are the fourth largest domestic cost, representing a relatively large percentage for an average of 11.7 percent across products and ranging between 10 percent and 12.6 percent, or US $1.34 and ranging between US $1.07 and US $1.52 per 50-kg bag (about US $28.6/mt).

Finance Cost

Finance cost is the third highest cost along the domestic supply chain, despite being partially subsidized. Cumulative finance cost along the domestic supply chain accounts for an average of 25.1 percent, ranging between 24.4 percent and 25.8 percent. In monetary terms, these figures represent an average of US $2.9 across products, ranging between US $2.73 and US $3.07 of the domestic additional cost per 50-kg bag, depending on the fertilizer product being distributed.

Port Charges

Port charges, which for the purpose of this assessment include vessel unloading, are charges associated with the use of the port facilities and
include site occupation or berth charges, wharf charges and pilotage service, among others.

These combined charges, which average 9.9 percent and range between 9.4 percent and 10.4 percent depending on the efficiency of port services, are the fifth largest cost component along the domestic supply chain. In monetary terms, these values represent an average of US $1.13 and range between US $1.10 and US $1.15/50-kg bag, depending on the product. As such, this cost may be an indication of port efficiency influenced mainly by the vessel unloading, since this activity can contribute to the increase in port charges, especially demurrage, depending on the efficiency of the process. Perhaps because of its location in the furthermost point of West Africa, the port of Dakar is one of the main entry points for fertilizer entering Senegal and neighboring countries, mainly Mali and Burkina Faso.

Vessel unloading costs are part of the port charges since most fertilizer is imported in bags f.o.t.-Dakar, which includes vessel unloading. These charges, when incurred separately, represent a very small proportion of the domestic additional cost, with an average of 2.5 percent of the domestic cost or about US $0.30/50-kg bag.

**Figure 7** (below) summarizes the findings in this section as indicators of the performance of the different cost components along the domestic fertilizer supply chain in Senegal.

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*Performance indicators are average percentages and monetary values across different products on a 50-kg bag.*

*This 34 percent increase includes government charges, which account for 11.7 percent (US $1.34/50-kg bag) of domestic cost.*

**Source:** Prepared by authors based on data collected through interviews and surveys to stakeholders during country visits, 2009.

**Figure 7. Performance of Fertilizer Supply Chain in Senegal, 2009**
Identifying Key Constraints along the Domestic Supply Chain

As previously shown, much of the costs of fertilizer in Senegal can be attributed to the incidence of a number of factors along the domestic supply chain, from the port to the final consumer point of sale. This section will elaborate on the key findings according to the fertilizer supply chain performance in Figure 7. Section 6 will elaborate on the policy implications and recommendations based on such findings.

Deteriorated Transportation Infrastructure and Equipment

According to this assessment, the high domestic transportation cost is the main issue facing fertilizer distribution in Senegal. The domestic transportation cost seems to be the major factor that contributes to the cost of fertilizer in Senegal, increasing the price to farmers and affecting the profitability of distribution. As in most countries, transporting fertilizer via trucks over the road is the main mode of transportation in Senegal. While railroad transportation is an alternative mode, it has not been used effectively due to obsolete infrastructure and equipment. Railroads are mainly used for the transportation of people rather than for cargo, with limited routes to the northeastern region and to the foremost point in the western region toward Mali. The southern region can be accessed only by road; however, the road infrastructure is characterized by low maintenance and underinvestment. Consequently, private sector access and cost of distribution to more remote areas are high, affecting the price farmers have to pay for fertilizer. Poor road conditions due to low maintenance and underinvestment are causing a rapid deterioration of transportation equipment, which, added to the dependence on imported oil, contributes to high transportation costs. This situation also inhibits the further expansion of the retail network to remote rural villages.

High Marketing and Distribution Margins

As previously explained, this cost is typically set by the business owner as a percentage of the total transaction cost, including the product cost; it is added by each agro-input business owner along the distribution chain to cover part of their unaccounted costs and their profit or compensation for their entrepreneurial efforts. Consequently, the costs of the product, transportation, finance and other costs (in addition to the inherent risk of agriculture-related business) have a greater influence on marketing and distribution margins. The higher the former costs the higher the latter; consequently, the higher the final price of the product. This cost can also be influenced by business practices, as in the case of the government subsidy program, which restricts the participation of some companies in the tender through certification. This process reduces competition and grants a certain level of market power and control to some of the importing businesses, allowing them to capture a larger market share and/or margin, especially those that have better rapport with government officials. Furthermore, given that distributors and retailers typically do not have an explicit interest rate for their own finance or an explicit opportunity cost to account for the risk associated with investing in agriculture activities, these are costs typically incorporated in the marketing margin. Consequently, implementing policy measures to reduce cost components along the supply chain will also help to reduce the marketing and margin cost.

Poor Access to Finance and Credit

According to the industry players, the main issue facing the development of the fertilizer distribution network in the supply chain in Senegal is the availability of and access to credit, despite the government-subsidized credit under the agricultural programs channeled through the CNCAS. This is due to the stringent regulations for issuing credit. Low accessibility to credit is the result of a high default on agricultural loans; therefore, according to financial institution regulations, credit can be made available only to eligible farmers based on their credit history, a criterion that eliminates a high percentage of small agricultural producers in Senegal. Although the subsidized credit rate can be as low as 7.5 percent, such credit and/or rate are not accessible to many farmers for the previously stated reasons. In addition, when loans are issued to eligible farmers, such loans are short-term and insufficient to cover their needs. Distribution and retail businesses pay a higher rate of 12 percent up to 16 percent, depending on the source (whether public or private bank), in addition to the storage and financial costs incurred during the consignment period at the port before the fertilizer legally enters the country and the time waiting for the subsidy payments by the GoS. Furthermore, there is a lack of risk management instruments for lending and investments in agriculture. However, according to CNCAS, the government has expressed interest in developing such instruments and making them part of farmers’ loans to increase access to credit;
such instruments are not yet in place. These different financial costs add up to make the cost of finance the third largest cost component in the Senegalese fertilizer supply chain.

Weak Institutional and Regulatory Environment

Although Senegal does not have a specific fertilizer law, the country does have a series of laws and regulations for the importation, control, sale and distribution of major products, including agro-inputs and the law can be applicable to fertilizer. However, these regulations are rarely implemented or not applied consistently. Despite Senegal not following or inconsistently applying the law and not having a rigorous testing program due to lack of financial resources, there are some isolated cases of farmers’ mistrust about the recommended quantity and quality of fertilizer applied to their crops; so far, this is not a widespread issue. However, the government seems to have taken the right steps to control fertilizer quality by creating the National Fertilizer Committee for monitoring the quality of imported fertilizer – an activity that has been latent due to the lack of operational budget.

Therefore, key regulatory problems in Senegal include the non-existence of a law specifically applied to fertilizer; the inconsistent application of regulations for input distribution and sales; and more importantly, the lack of institutions for implementing the law and enforcing the regulations for quality control and the industry’s operation. Additional problems include the weak institutional capacity to provide technical assistance to farmers and the lack of a well-structured institution and knowledgeable personnel to provide an effective technical assistance service.

Restrictive Fertilizer Marketing Policies

The subsidy program provides an incentive to import all subsidized fertilizer contracted by the government, which covers a small percentage of the total potential fertilizer need and about 50 percent of the expressed need under the government programs. However, importers may not have the incentive to expand the market for smallholder producer beneficiaries of the subsidy and import extra quantities to supply unforeseen needs or to supplement the needs of those producers within the subsidy program who have been excluded because they are not eligible for credit but may have their own purchasing power to acquire fertilizer, especially if it is subsidized. At the same time, the subsidy program provides an incentive for some farmers not to consume fertilizer from the open market since once they learn about the subsidized price, they are not willing to pay full market price.

Moreover, because subsidized fertilizer retail prices are determined by negotiations between importers and the government under a tender process, this is an activity that requires a substantial amount of capital. To fund this activity, domestic companies have access to government guarantee funds through the CNCAS to comply with the tender deposit guarantee requirement and for importation – especially those companies that have a good rapport with the government and the ability to secure fertilizer in a timely manner from international providers. For domestic companies that are subsidiaries of international providers, finance is not much of an issue since they have access to the international financial market or perhaps a cheaper internal finance source (for some); however, they normally do not participate in the government tender-bid process of subsidized fertilizer to the benefit of the domestic company, which reduces competition.

Low Farmers’ Demand

Perhaps the major issue that is deterring farmers from using fertilizer is their unwillingness to purchase fertilizer at full market price given both weather- and market-related risks. This fact is exacerbated by low access to credit and the existence of the subsidy on fertilizer. The subsidy discourages farmers from using optimal amounts of fertilizer beyond the quantities allowed by the subsidy, because farmers are not willing to pay full price for fertilizer once they are aware of the subsidized price, even if they have their own funds.

Making matters worse are the lack of technical knowledge on the use and potential benefits of fertilizer and the lack of research and extension on farming practices and on the use of other inputs and technologies. The same can be said about limited access to output markets and other agricultural and rural support services, resulting in a low output/input ratio and consequently discouraging the use of fertilizer and other inputs. Lack of market information is another issue among rural smallholder farmers in remote areas. In most cases, farmers do not have access to physical markets or to market information in terms of input or output prices and demand.

Other Constraints

One key challenge facing the cotton sector is the continued reliance on a single company, in this case
SODEFITEX, for the provision of inputs, other services and output procurement. This has introduced a number of market inefficiencies that add to the costs of fertilizer. The company’s practice of making late payments for cotton sales from farmers and early delivery of fertilizers to rural warehouses introduces higher storage and financing costs. Apparently, this occurs as a result of SODEFITEX’s dual transport strategy in which fertilizers are supplied at the same time that cotton is collected from farmers in order to avoid a dead transport leg. The problem is that the time of collecting the cotton does not coincide with the time fertilizer is needed for cotton production; therefore, the delivered fertilizer must be stored for the following cropping season, causing physical and financial losses. Moreover, like many of the fertilizer importers, SODEFITEX also delays the payment to fertilizer providers for one year; practice that reduces the number of providers willing to carry such credit or financing costs and ultimately leads to higher fertilizer costs and prices paid by cotton producers. The practice of delaying payments to farmers for their cotton only further exacerbates the problem of higher financial costs and overall market inefficiencies. The farmers can potentially fail to meet their own payment obligations to other input and service providers, and at times even default on existing credit or loan obligations, ultimately leading to their inability to access credit and purchase fertilizer and other inputs in the future.

While the commercial cotton sector has its problems to overcome, the public sector’s role also introduces other unnecessary costs. For example, the inability of the DoA and the national and local committees to comply with their mandates in tracking crop areas planted to determine actual farmers’ needs for fertilizer use (real demand) leads to inefficiencies in the distribution and allocation of appropriate fertilizers throughout the country. Adding to this is the inability to implement a systematic quality control system for imported fertilizer. Government bureaucratic inefficiencies also add to higher fertilizer costs. Among these, delays in government disbursements to pay for subsidies to the private importers are especially damaging to the efficient operation of the domestic fertilizer market and thus result in increased prices for farmers. This typically occurs as a result of cumbersome and lengthy administrative processes which can take months or up to a year or more to complete. The lack of a more generalized call to tender for fertilizer distribution (by requiring only those businesses certified by the government) introduces the potential for rent-seeking behavior and lowers competition. As a result, other organizations that may be well-placed to support the development of a distribution system are explicitly kept out, such as some of the international importing firms.

Finally, while the domestic phosphate fertilizer industry has the potential to produce compound and blended fertilizer products for the domestic market because of the country’s natural deposits of phosphate rock, the industry has not been able to expand due to heavy startup and operating costs relative to the small size of Senegal’s effective and even potential domestic demand; therefore, the industry would not be able to compete with imports. This is also the reason why most fertilizer production in Senegal is for prime material (P₂O₅) for exportation and the elaboration of compound products abroad.

**Summary Conclusion and Policy Implications**

Like most countries in the region, Senegal has the potential to increase productivity and production by increasing the use of agricultural inputs such as fertilizer. Although the GoS has implemented a program to subsidize fertilizer and increase the consumption of fertilizer, this alone will not guarantee a sustained increase in productivity without other complementary investments to improve access to other inputs, output markets and services (e.g., access to improved seeds, finance, and extension service and market information). The inherently low input/output ratios under traditional production practices among a majority of small and subsistence farmers in Senegal will require such broader interventions to sustain any significant increase in productivity in the long run. Even if farmers increase the level of one input (i.e., fertilizer) while maintaining the rest of the traditional technological package, they would still get relatively low output, keeping their low input/output ratio and discouraging further the use of fertilizer – a situation that would also contribute to further soil depletion.

In the meantime, however, the more immediate desire of the GoS to increase fertilizer consumption and raise productivity will require removing a number of critical bottlenecks along the fertilizer supply chain in order to ultimately lower the price farmers face, and with a subsidy in place, lower the total fiscal burden of the subsidy program itself. In analyzing the structure, conduct and performance of the domestic fertilizer supply chain in Senegal, this study found that domestic transportation costs, high marketing and distribution costs and poor access to
credit contribute the most to the costs associated with distributing fertilizer to the final consumer (farmers) from the port-of-entry.

To lower these costs, the GoS will need to seriously consider introducing a number of policy options and investments targeted at improving the efficiency of operations along these components of the fertilizer supply chain. The study outlines these policies, beginning with the broader macro-economic, institutional and regulatory policies intended to help lower credit and transaction costs for doing business and encouraging more competition among importers, distributors and rural agro-dealers and/or traders. This is followed by the consideration of longer term complementary investments that will help lower transportation costs while increasing the consumption of fertilizer over time.

**Macro-Economic Stabilization and Targeted Subsidies**

Senegal is a relatively stable country and the government must continue with the stabilization of the economy to create an environment conducive to nurturing and developing the domestic inputs and the fertilizer private distribution network. In this area, it is important for the government to at least maintain the stabilization of the fiscal imbalance to influence the reduction of the interest rate and promote the use (demand) and supply of fertilizer by reducing its costs and increasing investors’ and businesses’ confidence for fertilizer importation and distribution. To this end, it is important for the GoS to implement fiscal reforms and at least rethink or refocus the agriculture support and subsidy program to be market friendly and reduce its cost. If the government is compelled to implement subsidies for the agriculture sector, it should use a well-targeted, time-limited subsidy and perhaps cover a wider range of inputs and services such as credit and crop insurance in addition to fertilizer. An important policy measure is to allocate an adequate amount of funds in a timely manner to give more access to credit in support of agriculture production activities and to promote the use and consumption of fertilizer and other inputs.

**Financial Reforms**

To help increase accessibility to credit, better policies are needed to help strengthen domestic financial markets that can be easily accessible to farmers and input dealers (traders) alike. The goal would be to provide incentives for private sector finance providers to offer innovative financial instruments (e.g., special savings accounts for agricultural loans, risk management or crop insurance instruments) to rural farmers and traders. Ideally, the incentives would be designed to protect the financial institutions’ lending portfolios and farmers’ incomes from adverse weather patterns (i.e., drought or excessive rain), thus ultimately helping to guarantee the reimbursement of bank loans. Such measures should be coupled with proper technical assistance to support agriculture production and market access. Without eliminating major credit constraints facing both farmers and input dealers, the expansion of the fertilizer market within and outside the subsidy program will remain very limited. A more open market is needed to promote and nurture a healthy competition among importers and distributors in which producers will have access to credit and the freedom to purchase fertilizer at the lowest possible price in the market.

**Establishing a Strong Regulatory Framework**

Establishing a rule of law with the necessary enforcing institution is important to protect consumers, producers and merchants. It is also important to recognize that quality control and truth-in-labeling, although not pervasive issues in Senegal, are critical for the proper development of a market, particularly when it becomes more dynamic. In Senegal, the government needs to enact and approve a fertilizer law and regulatory system and establish the proper institutions needed to enforce the laws and regulations in order to induce investment confidence and assure consumers that the agricultural inputs they purchase are not nutrient deficient, adulterated or sold in short-weight bags. Therefore, it is recommended that the Senegalese government implement measures that go beyond strengthening the National Fertilizer Committee by allocating it an operational budget and that the government also enact and implement a law and regulations for the fertilizer industry to avoid mistrust becoming widespread among farmers – a practice that would further discourage farmers from using fertilizer altogether.

Establishing clear rules that underlie the tender-bidding process would also be very helpful. Even more importantly, the GoS should consider implementing a transparent enforcement mechanism that ensures that rules are respected to avoid favoritism and costly litigations. For example, in 2009 Agrophyttx won through arbitration a complaint filed in 2007 to the Authority for the Regulations of Public Markets of Senegal, related to the mismanagement and wrong assignment of a public tender for the provision of fertilizer, in their detriment.
Rural Transportation and Infrastructure Improvements

Inefficient transportation systems, road conditions and per unit transportation costs all add to high fertilizer distribution costs in Senegal. Although improving the macro-economic environment is a necessary condition for market development, it is not sufficient to reduce transaction costs and increase fertilizer consumption unless supplemental policies and investments supporting the development of efficient input and output marketing systems throughout the country take place also. It is necessary to also improve the conditions of major roads, feeder roads and even the rail system and to increase the maintenance and upgrading of many parts of the rural area, including the densely populated and high agricultural potential zones. Unless improvements are made, many farmers will continue to rely more on traditional means of production and be unable to have timely access to fertilizer and other modern inputs or to lucrative output markets in urban areas.

Aside from improved transportation infrastructure, further investigations may also be beneficial to examine the structure and performance of the domestic transportation industry. Studies conducted in other countries in the region (USAID West Africa Trade Hub, 2010) have found evidence of oligopolistic type behavior among the larger trucking companies, which typically result in much higher per unit transportation costs than would be the case under more competitive conditions.

Considerations for policy are also needed to incentivize private sector investments in a number of areas over time. First, a number of investment areas could include establishing public-private partnerships to help develop thriving input and output markets in rural areas. More specifically, these would include infrastructure investments for improved transportation, feeder roads, storage, communications and energy. Second, there is real potential to exploit the large resource base of rock phosphates in Senegal in order to produce fertilizer for domestic consumption. However, the right incentives need to be in place to attract potential large investors, whether international or local.

Third, investments are also needed for irrigation projects that take advantage of the water conservation investments along the Senegal River to promote the use of productive complementary inputs (such as fertilizers and seeds) and consequently support input market development. Fourth, investments in improved soil management technologies are also needed to restore and improve natural soil fertility and maximize the benefits from using improved seeds and fertilizer in a more sustainable and environmentally friendly way. Finally, investments to improve access to market information and extension services can go a long way toward helping establish a more competitive and open market for inputs and outputs. In the process, both farmers and agro-dealers (including output traders) can make better and more informed decisions about what to produce and market.

Investment in Human Resource Development

Lack of knowledge (technical and otherwise) is another barrier to increasing the use of agricultural inputs such as fertilizer and for agriculture and economic development. This seems to be one more among the myriad of factors that are constraining the increase in agriculture productivity and development in Senegal and in Sub-Saharan Africa. The most important factor is the basic knowledge of technological and management skills that farmers need for proper use of their resources, fertilizer and other inputs. This knowledge can be achieved by investing in research and extension programs with a farmers’ participatory approach to address crop-specific and location-specific issues, with a training component for farmers and by farmers. This participatory approach is expected to create a better link among researchers, extension agents and farmers in which farmers will be empowered and have better participation in the market as buyers and sellers of inputs, produce, services and factors of production. The training can be extended to suppliers so that they can serve as private extension agents in support of the small farmer. Training topics for input suppliers can include business management and the proper usage of inputs.

Table 3 (page 22) summarizes constraints to the Senegalese fertilizer domestic supply chain and their respective policy implications and present specific recommendations in addition to the recommendations previously mentioned.
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<th>Constraints</th>
<th>Nature/Description of Constraints</th>
<th>Effect on Fertilizer Market and/or the Cost Along the Supply Chain</th>
<th>Policy Measures/Recommendations</th>
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<tr>
<td>I. Ineffective subsidy program</td>
<td>Ineffective, not transparent, burdensome and poorly designed and implemented subsidy program based on a tender-bid process, which discourages private sector competition and is seemingly plagued with corruption.</td>
<td>Subsidy program has created a fertilizer supply push condition, while neglecting complementary investments to increase supply and demand. Subsidized fertilizer is being controlled, rationed and assigned arbitrarily among farmers’ recipients of the subsidy, regardless of their actual needs. Subsidy program does not provide incentive for importers to supply additional quantities of fertilizer to the targeted audience beyond what the program demands, restricting market expansion. There is displacement of products in the market since farmers are unwilling to purchase fertilizer in the open market at a full price once they are aware of the subsidy. Late subsidy payments, from months up to a year or more, further discourage some companies from participating in the tender, reducing market competition.</td>
<td>If the government is compelled to implement a subsidy on fertilizer or any other agricultural subsidy, it should be well-targeted, time-limited and perhaps covering other inputs and services, i.e., seeds, credit and insurance. Well-targeted multiple subsidies and investments targeted at both the supply and demand sides are expected to have a multiplicative effect rather than a single subsidy on the supply side. The level of subsidy must be set within the country budgetary constraints in ways that will not discourage domestic private sector participation in the subsidy program due to late/no payments. The government should look into the feasibility of providing incentives to invest in revitalizing the domestic fertilizer industry for local consumption and regional exports by revamping production and replacing the obsolete blending facilities, based on the domestic resources available, mainly phosphate rock.</td>
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<td>II. The subsidy tender process</td>
<td>Existence of a government certification procedure to participate in the tender and importation of subsidized fertilizer reduces competition. Although there seem to be a potential fair competition at the import level, the more successful companies participating in the tender are the ones with better rapport with the MoA and at times, such companies are unable to comply with their contractual obligation. Participation in the tender requires a monetary deposit as guarantee for delivery. Non-transparency in tender awards.</td>
<td>Fertilizer price is determined based on a tender-bid process under the government subsidy program. The process is inconsistent, lacks transparency and seems to be plagued with corruption, contributing to the product cost increase. Subsidiaries of international corporations based in country are unable to be certified and consequently are discouraged from participating directly in the tender, a practice that reduces competition and perhaps gives room for rent-seeking opportunities at the import level. The deposit guarantee to participate in the tender increases the cost of finance and consequently the fertilizer cost while reducing competition. At times, fertilizer is delivered late or not delivered at all.</td>
<td>The government should eliminate the tender process and favor more open competition in the importation and distribution to increase the amount of fertilizer in the market and promote the expansion of the distribution network closer to farmers.</td>
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<td>III. Port costs</td>
<td>Although the port cost does not seem to be a major issue, perhaps it is important to improve or at least maintain its level of performance and efficiency.</td>
<td>It is possible that given the fact that most fertilizer for Senegal is imported in bags, the unloading process is the only one captured as part of its efficiency; the bagging process is not reflected in such cost, making the port cost low and port operation apparently efficient when compared with other ports in the region.</td>
<td>Revise and update port regulations according to current economic conditions to allow for more effective and efficient processes and eliminate unnecessary/obsolete and unjustified charges, if any. Provide fiscal incentives for continuous upgrading of port facilities and modern equipment in an effort to increase port operational efficiency.</td>
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<td>IV. Finance cost</td>
<td>In spite of finance being subsidized, its cumulative cost along the supply chain is relatively high. Most subsidized credit is used in the importation process, neglecting credit for distribution and to farmers for agriculture production. There is a lack of financial and risk management instruments for lending and investment in agriculture, especially for production activities.</td>
<td>The low access to subsidized finance by farmers, which reflects the risk aversion of the financial system, reduces the demand for fertilizer. Producers not eligible for credit must rely on their own limited finance (if any), discouraging the use of fertilizer. The relatively high finance rate influences a high marketing margin along the supply chain as a result of the inherent risk involved in agricultural business.</td>
<td>Provide fiscal incentives for the development of financial risk management instruments to promote lending to the agriculture production subsector. Envision mechanisms for alternative credit programs to provide a new opportunity for farmers not eligible for credit to gain credit worthiness, increasing the number of farmers eligible for credit and consequently the demand for fertilizer.</td>
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<td>V. Degraded roads and obsolete domestic transportation equipment</td>
<td>Roads in Senegal are deteriorated. The existing alternative transportation mode (rail) is also deteriorated. There is a lack of access and feeder roads in remote rural areas as well as a lack of building infrastructure for storage and business development (banks, offices, etc.).</td>
<td>Increases in transportation costs and consequently in fertilizer prices to consumers result from deteriorated road conditions and the obsolete and rapid deterioration of trucks and other transportation equipment. There is limited or no access to remote rural areas for distribution and use of fertilizer – a fact that increases the cost of transportation for the end user (the farmer).</td>
<td>Invest in repairing/improving the current road network. Enact, approve and implement a road regulation aimed at maintaining good road conditions and extending the useful life of transportation equipment. Provide fiscal incentives to invest in improving transportation equipment. Create programs for building rural feeder roads while creating employment in the rural areas. Examine the feasibility of investing in restoring and upgrading the railroad system, perhaps as a regional initiative to connect other markets and ports within the West African region.</td>
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<td>VI. Undeveloped domestic distribution/retail network</td>
<td>The private sector distribution network outside the subsidy program is undeveloped, in part because of the limited amount of fertilizer product being demanded outside the program. The private distribution network within the subsidy program, although seemingly functioning properly, is not well developed. In many cases, the delivery of the product is too late or too early according to the practice of the importer/distributor. Most agro-dealers lack managerial and technical skills and product/input knowledge. There is a lack of market and technical information for the decision-making process.</td>
<td>Due to the subsidy, there is no incentive for the private distribution/retail network to expand their operations closer to the farmers, where the product is most needed. Under the subsidy program, the product is typically delivered to regional warehouses and there is little incentive for the importers to expand their distribution closer to farmers, increasing the cost to the end user – the farmer. Early delivery, as in the case of SODEFITEX, causes losses in storage and increases the cost of finance; late deliveries make fertilizer use ineffective. As result of the lack of managerial skills and technical knowledge, agro dealers are not in the position to manage their businesses effectively. Farmers lack technical knowledge on input and output markets.</td>
<td>Provide fiscal incentives for investing in physical infrastructure in rural areas closer to farmers and for the development of financial risk management instruments to promote lending to the agricultural sector. Implement or reinforce extension and educational services oriented to agro-dealer training programs to develop and improve their business managerial and technical skills to run their businesses more effectively as well as to serve as de-facto private extension agents to make sound technical recommendations to smallholder producers, especially in remote rural areas. Develop and establish market information systems for input, output and technical information.</td>
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<td>VII. Low farmer demand</td>
<td>Farmers, especially smallholders, do not make use of fertilizer due to their limited funds, including access to credit, and lack of technical knowledge about the use and benefits of inputs. Many farmers lack basic productive infrastructure, mainly access and feeder roads and water-harvesting or irrigation infrastructure.</td>
<td>Many small farmers are unable to access finance due to their poor credit history, causing them to rely on their own finances (if any). Although the allegations of adulterated products and the violation of truth-in-labeling in terms of content, quantity and quality are not widespread in Senegal, it is important to ensure truth-in-labeling and induce trust among farmers to increase confidence.</td>
<td>Envision incentives for alternative credit programs (e.g., special savings accounts) to provide a new opportunity for farmers not eligible for credit to gain credit worthiness, increasing the number of farmers’ eligible for credit and consequently the demand for fertilizer.</td>
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<td>Smallholders face unfavorable input/output price ratios, especially for staple food crops, in part due to lack of access to local markets and/or market information. Even when fertilizers are subsidized, farmers do not use them in economically efficient quantities due to the unavailability of additional (non-subsidized) fertilizer even if they are willing to pay full price.</td>
<td>Farmers do not trust recommendations made by non-professional or outdated extension agents or by retailers. Farmers and other agricultural producers are not aware of new technologies.</td>
<td>The government must revamp and rethink/restructure research and development and extension/educational services with a farmers’ participatory approach, by farmers and for farmers to improve their technical skills and make effective and efficient use of inputs.  Develop research according to new crops and genetic materials, considering current soil fertility to make the proper recommendations in terms of formulations and quantities to producers, whether for food or commercial crops.  Provide fiscal incentives for investing in physical infrastructure in rural areas closer to farmers and for the development of financial risk management instruments to promote lending to the agricultural sector.  Create programs for building access and rural feeder roads while creating employment in rural areas and providing better physical access to local markets.  Provide better support to the current National Fertilizer Committee for the monitoring of fertilizer quality.  Enact, approve and implement a comprehensive fertilizer law and a clear regulatory system in support of the law and as a guide for enforcement.  Develop and establish an input and output market information system to aid farmers’ decision-making process.</td>
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References


USAID. 2009. “Commercial Legal and Institutional Reform Diagnostic of Senegal’s Agriculture Sector (AgCLIR: Senegal): Agenda for Action.”

Because of the importance of the Senegalese government subsidy program on the determination of the fertilizer cost and price, it is relevant to provide a description of the program, which has been implemented since 2000 and became more relevant after the food crisis of 2008. It should be noted, however, that the description of the program is based on field surveys undertaken in 2009. At the time of this assessment, it was not clear how long the program was expected to be in place. Although there have been intentions by the government to gradually reduce the amount of the subsidy every year to phase out the program, this idea has been abandoned due to farmers’ discontent, their low purchasing power and mainly for political reasons.

The government tender, expected to be competitive, determines the fertilizer price and quantities to be imported and distributed within the subsidy in a pan-territorial basis. This quantity represents about 50 percent or more of the expressed total needs without considering commercial crop needs, which represent a small quantity relative to the total subsidized plus non-subsidized fertilizer.

**Overview**

The portion of fertilizer being supplied in an “open” market condition or outside the government subsidy program mainly includes fertilizer for commercial crop production. Within this market, the proportion for staple food crops is negligible since farmers that are aware of the subsidy program are not willing to pay full price for fertilizer. Therefore, as previously stated, the subsidy program is inhibiting the expansion of the fertilizer market, especially among smallholder farmers, the intended beneficiaries of the subsidy. Consequently, most fertilizer procured and distributed under the government subsidy program benefits those producers (whether small or not) who have their own cash or access to credit to pay for the non-subsidized part of the price.

The fertilizer subsidy program was initiated as part of the government commitment under the revised agricultural policy in compliance with the NAP to revitalize the agricultural sector in an attempt to increase productivity, improve food security and increase living standards of the rural population of Senegal. The NAP enunciates that fertilizer is an element of great importance in agricultural production; consequently, its consumption must be increased to boost agricultural productivity.

Under the revised policy, the government is to support agricultural sector development and assigns an annual budget for implementing projects and programs, including the subsidy on fertilizer, which absorbs an estimated 60 percent of the budget.

The level of subsidy (in percentage terms) varies according to the fertilizer product and the market price; however, it is intended to cover an average of up to 50 percent of the price paid by farmers for a 50-kg bag, with farmers paying the market price differential above and beyond the subsidy with their own cash or credit. The subsidy is also intended to cover up to 50 percent of the total annual needs expressed by beneficiary farmers (whether organized or not), who are mainly smallholders and producers of staple food and other crops.

In theory, all agricultural producers of staple food crops can benefit from the subsidy, especially if they are considered smallholder farmers (cash and commercial crop farmers are not explicitly excluded), but in practice, they may not be able to take advantage of the subsidy or have access to fertilizer if they lack cash or do not have access to credit. In addition, even those who have their own cash and are eligible for credit may not be able to acquire the total amount of fertilizer needed according to their crops and planted areas, because the distribution of subsidized fertilizer to farmers is arbitrary, depending on the availability at the regional level and the estimated farmers’ needs; the subsidy program covers just about 50 percent of farmers’ expressed and estimated needs.

Therefore, the beneficiary farmers can make use of the subsidy to partially meet the fertilizer needs required by their crops and complement the unmet needs with purchases in the open market using their own resources (including credit) at a non-subsidized price, if available. For example, a producer with two hectares of planted corn could get enough subsidized fertilizer for just one hectare and purchase with his/her own resources fertilizer for the second hectare in the open market and at a non-subsidized price, if available. Alternatively, the farmer may spread the acquired subsidized fertilizer across the two hectares of planted corn because he/she typically does not have the additional funds or access to credit. This practice of spreading fertilizer thin is widely used among small farmers but not recommended from the agronomic or economic perspective since it reduces the effectiveness and efficiency of the fertilizer, which is reflected in the overall low yield.

Annex. Senegal’s Fertilizer Subsidy Program
In the process, by limiting the amount of subsidized fertilizer used by farmers, the goals of increasing productivity and production for food security and obtaining higher incomes may not be realized, while the inefficient or low use of fertilizer could contribute to soil nutrient depletion.

Although some commercial crop farmers (i.e., cotton producers) fall under different input and fertilizer distribution and subsidy system managed by SODEFITEX, there are leaks in the systems in which subsidized fertilizer intended to be used for one crop may actually be used for another. This could be the case for small farmers who have diversified production activities including cash/commercial crops and food crops for subsistence and/or to supply the domestic market.

The Subsidy Tender Process

Every year, the Senegalese government makes a budgetary allocation to implement agricultural programs, which include credit and a fertilizer subsidy. The agriculture program is prepared by the DoA based on production reports from the previous year according to information collected by the regional services from the DoA to set production targets for the new season based on the production potential for each region. The amount of fertilizer to be subsidized is based on estimated planted areas, types of crops and, when possible, farmers’ expressed needs for the following season. The estimates are made at a departmental and regional level, and for simplicity, these estimates are increased by one to two percent for the next cropping season. Based on this information, the government decides how much fertilizer to subsidize based on the available funds.

Given the government’s commitment to increase the use of fertilizer in the agriculture production process, the agricultural program allocates a large percentage of the budget to subsidize the price of fertilizer paid by the farmers. In spite of the increased budgetary allocation since the re-introduction of the subsidy program, the amount of fertilizer being subsidized has not been increasing in proportion to the budgetary increase, as a result of the international price and continuously increasing costs of distribution.

Based on the subsidized fertilizer procurement and distribution plans, by January of every year, the government accredits Senegalese private companies to participate in the tender. These companies must be legally established and in good standing with the government, demonstrate the financial and technical capability to meet the terms of the contract and have experience in acquisition and distribution of fertilizer and/or the ability to develop or support a distribution network down to the rural community level closer to the farms. The companies that typically meet these requirements are those that formed the distribution network of SENCHIM and therefore have been able to flourish in the new semi-liberalized system.

According to the subsidy program plan, which is rarely met, the Ministry of Agriculture launches a call to tender to the accredited companies during late January or in February. The tender call specifies the fertilizer lots, each lot indicating the required quantities and types of fertilizer with the specific technical characteristics (different N-P-K formulations and urea); a schedule of delivery (no later than May) of each lot; and the specific delivery location in each region. Each participating company must submit a letter of interest to participate in the tender and fill out forms indicating their facilities (storage in rural areas, transportation, etc.), a model of authorization from the international supplier or manufacturer, prices and calendar of delivery to the tender-specified locations and a delivery guarantee consisting of a deposit or a policy emitted by an insurance company in case of no compliance, among other minor requirements. The price offered by the bidding companies is as delivered at the communal warehouse specified on the tender, which includes transportation and storage costs. This price is the same for all producers across the different regions in the country, since the same provider will supply the same kind of fertilizer to the allocated regions according to the pre-assigned lots during the bidding process. Consequently, the providers must estimate the average costs of delivery and storage for each lot before submitting the bid price.

The Subsidized Fertilizer Delivery Process

After evaluating the bids, the MoA assigns the lots to the lowest bidders for each lot. The lots are delivered to the specific locations in each region according to the contracts; therefore, each lot can be divided in different regions to be placed in the provider warehouses to later be retrieved by the farmers according to the following procedure.

In each rural community, an ad-hoc committee is created for the duration of the cropping season to allocate fertilizer to each producer. The committee has representation from different economic and social groups in the community and is organized under the initiative of the state representative in the region and/or department who typically occupies the committees’ chair.
The committee role starts with the reception of the delivered fertilizer at the provider regional warehouse to ensure the quality and quantity according to the bid. The committee chairman or president signs a receipt slip to the provider once the product has been delivered and received at the local warehouse. The delivery receipt is one of the essential documents for the provider to claim the subsidy part of the delivered price from the government treasury. Once the fertilizer has been delivered to the warehouse, it is announced among farmers who must go to the committee to request the amount of fertilizer required according to the specific crop planted.

Following the reception of the fertilizer, the committee meets a few hours a day on a set schedule to deliberate on the eligibility criteria for assigning fertilizer to farmers in the community. Each committee for each community defines their criteria independently from the others. However, the general criteria for assigning fertilizer to farmers is based on the government intentions of equitable fertilizer distribution and to benefit the largest number of farmers possible, regardless of their financial means and planted areas. Since the committee does not have the means or resources to verify farmers’ claims regarding crops and areas, they typically assign the amount of subsidized fertilizer to each farmer on a first-come, first-served basis and on the number of claims and the quantity of fertilizer available in the regional warehouses. Following the farmers’ requests, the committee issues a document signed by the committee’s president indicating the amount of subsidized fertilizer to purchase and the warehouse where they can retrieve the product (typically the local warehouse). Farmers can request more fertilizer later in the season if there is unclaimed fertilizer in the provider warehouse; however, by then it is typically too late for the crop to take advantage of the additional fertilizer application.

The farmer can only purchase the amount of fertilizer indicated in the document issued by the committee. At the time of retrieval, farmers must pay the non-subsidized part of the price and sign (endorse) the document issued by the committee and a duplicated receipt from the provider, which he must take back to the committee to be recorded in a book as proof of fertilizer delivery from provider to the farmer. The committee records all the sales made by each provider warehouse, and such records must be signed by the committee president and the provider representative at the warehouse. These records are the second most important document required by the distributor to receive payments from the government for the subsidy part of the fertilizer price. If the providers have any remaining stock in the local warehouse late in the cropping season, they are allowed to move the product to another warehouse in another region where the product may be needed. The additional transportation cost of moving such product is borne by the farmers who purchase the product after the subsidized price. For example, in 2009 a stock of N-P-K fertilizer (Triple 15) arrived late in the season for maize production and the provider was unable to sell it in the maize-producing regions; consequently, the MoA authorized the provider to re-allocate the product to the horticultural producing regions where it could be sold. This re-allocated fertilizer was sold at a higher price than the one agreed on the tender; the price differential represented the transportation cost incurred in moving the product from one region’s warehouse to another.

The Subsidy Payment Process to Providers
As previously explained, the subsidy payment is not issued directly to the farmers, but to fertilizer providers, who are reimbursed only for the fertilizer sold and not for the entire amount of fertilizer imported according to the assigned lot in the tender bid process. In order for the providers to claim the reimbursement after the fertilizer has been sold, they must submit to the MoA the product delivery report to the local warehouse signed by the committee president in addition to all sales receipts along with the signed document issued by the community fertilizer committee that allocates a given amount of fertilizer to the recipient farmers. The MoA verifies and consolidates the information provided with the community committee records previously signed by the distributor representative in the community warehouse and the committee president. Once the MoA has verified all the provided documentation and proofs of sale, it issues an authorization to the treasury to make effective the payment to the provider. Payments from the government treasury to fertilizer providers may take from a few months to a year or more.

Fertilizer Distribution in the Cotton Sector
As previously mentioned, fertilizer for cotton production is also subsidized. The justification for subsidizing a commercial crop is because a large proportion of small farmers’ livelihoods depend directly on cotton production, a situation that has been changing for the last few years as a result of the international cotton crisis in the late 1990s. As result of this crisis, cotton farmers have been shifting to the production of peanuts, which seems to offer a better return than cotton.
The fertilizer subsidy for cotton has been traditionally channeled through SODEFITEX, a semi-private society whose main shareholders are a French private holding group, the Fédération Nationale des Producteurs de Coton du Sénégal (FNPC), the CNCAS and the government of Senegal. SODEFITEX has traditionally provided support to farmers in the form of technical assistance, input supplies, ginning processing and marketing services to cotton producers in addition to transportation, including development and maintenance of road infrastructure in the cotton-producing regions. Under the SODEFITEX structure, small farmers are organized in regional organizations and associations to form the FNPC, which represents them in the SODEFITEX Board of Directors. With the government subsidy allocation, SODEFITEX pre-finances the inputs to the farmer and gets the credit payment with the marketed cotton. The government subsidy is revised annually and is intended to partially subsidize the cost of input supply for the cotton sector. As the organization continues being privatized, the level of government subsidy is being reduced. In 2009 the subsidy amount was 1.5 billion CFA francs, or just about US $3 million.

To determine the fertilizer needs, each regional organization that forms SODEFITEX collects information on the potential area to be planted with cotton at the department level from individual farmers. This information is in turn passed to the regional and then to the national level through the federation. The potential needs are then evaluated to determine the veracity of the information by SODEFITEX technical staff.

Until 2004, ICS-SENCIM provided most fertilizer needs to SODEFITEX. However, as a result of ICS financial troubles, SODEFITEX has imported its own fertilizer or used domestic importers to distribute it among cotton producers since 2005. The traditional acquisition procedure has been as follows: Once the fertilizer needs have been corroborated, SODEFITEX launches an international call to tender. The international providers supply the product directly to SODEFITEX, or through domestic companies if they do not have in-country representation. The international bids are evaluated by a dual committee. The first committee, formed by the National Fertilizer Committee, a representative of SODIFITEX, the government and the FNPC, makes the first evaluation of the bids and provider selection based on technical criteria according to the tender and then files a report to the second committee internal to SODEFITEX. The second committee, based on the first committee report, assigns the lots of fertilizer requirements to the lowest bidders for each lot. According to the tender, SODEFITEX purchases the fertilizer f.o.t. at the port of Dakar, where it is loaded onto its own trucks to be taken to the regional warehouses in the rural areas.

More recently, due to financial constraints faced by SODEFITEX (partly the result of the government subsidy reduction triggered by the privatization process and of the cotton crisis), SODEFITEX is no longer in the position to import their own fertilizer; instead, in 2009 they made a contract with the Mali-based company, Toguna Agro-Industries, to supply fertilizer to the cotton-producing regions in Senegal. Under this new arrangement with Toguna Agro-Industries, fertilizer is delivered directly to SODEFITEX regional warehouses from the port or from Bamako in Mali, where Toguna has its main operations including the blending facilities. The product is imported by Toguna Agro-Industries, mainly through Dakar or Abidjan ports, then taken to Bamako to be blended (if required) and finally shipped to Senegal to SODEFITEX warehouses according to the contract. The main cotton production zones in Senegal are located in the eastern side of the country near Mali.

Once fertilizer is received at the warehouses, it is distributed and delivered to the villages at the same time that SODEFITEX collects the harvested cotton; consequently, fertilizer is delivered after harvest and before the next planting season in an effort to reduce transportation costs by avoiding dead hauls during cotton collection and inputs delivery. This collection and delivery process also coincides with the dry season when roads are more accessible. As such, SODEFITEX transportation between the regional warehouses and the villages was considered a subsidized service until 2008 when the company started experiencing financial troubles and consequently started charging for the transportation cost involved in the collection of the harvested cotton and the delivery of fertilizer.

The collected cotton is taken to the company ginning plants to be processed and then marketed in the international market. SODEFITEX pays farmers for their cotton with revenues from cotton sales in the international market, after making a deduction for the credit in input supplied and other costs. These payments are made a year later, typically after the next planting season has started (a practice that justifies the provision of SODEFITEX subsidized credit to farmers in the form of input supplies).
According to SODEFITEX, in a typical year the amount of fertilizer (N-P-K and urea combined) required for cotton production in Senegal has been around 10,000 mt; however, this quantity declined to 5,900 mt in 2008 and to 2,200 mt in 2009. This decline was due to a reduction in the cotton-planting area in favor of peanuts and in 2009 due to overstock carryover from the previous season resulting from less area planted as a consequence of a prolonged dry season in 2008 and exacerbated by high prices of fertilizer in the international market.