REPUBLIC OF MOZAMBIQUE

NATIONAL FERTILIZER STRATEGY

MOZAMBIQUE

MINISTRY OF AGRICULTURE

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[To further the Five-Year Government Plan, this strategic program sets as its goal to increase fertilizer use in the development of agriculture and environmental protection. It is the culmination of prior commitments to which the Government of Mozambique is signatory, including the Dar es Salaam, Maputo and Abuja Declarations.]

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Preface

To further the Five-Year Government Plan as embodied in the Strategic Plan of Agricultural Sector Development (PEDSA), this strategic program sets as its goal to increase the use of fertilizers in the development of agriculture and environmental protection. It serves as the culmination of several commitments that the country is signatory to, in particular the Dar es Salaam, Maputo, and Abuja Declarations as well as the Comprehensive Africa Agriculture Development Programme (CAADP).

This strategic program was conceived in light of the instruments listed above that call for African farmers to abandon traditional low-yield production methods and adopt more intensive practices for greater productivity through the increased use of improved seed, fertilizers and irrigation.

The Southern African Development Community (SADC) Heads of States at the Dar es Salaam Summit had already recognized that the causes of prevalence of hunger in the region included the lack of adequate agricultural policies and inadequate access to key inputs and markets by farmers (*Dar es Salaam Declaration, 2004)* and they recommended support measures for farmers including the exploration of mineral deposits to manufacture fertilizers in the region.

The *Abuja Declaration on Fertilizer for an African Green Revolution* (*2006*) reiterated that any initiative to reduce the problem of hunger must be based on improving soil debilitation caused by continuous soil mining.

It is estimated that the continent loses the equivalent of over $4 billion worth of soil nutrients per year, severely eroding its ability to feed itself. Studies conducted in Mozambique (*Folmer, 1997*) show a loss of about 25 metric tons (mt) of soil per year, mostly due to erosion and non-replenishment of nutrients, with the greatest incidence in: the eastern region of Nampula Province; Manica Province, close to the border with Zimbabwe; the northern region of Tete Province; and the southern part of Niassa Province, where the rainfall is above 1,000 millimeters. According to the same study, the loss of nutrients is calculated at 122 kilograms per hectare (kg/ha) of nitrogen (N), 60 kg/ha of phosphorus (P_2O_5) and 116 kg/ha of potassium (K_2O) per annum.

Among all outflow of nutrients, erosion is the largest factor in the losses and it is estimated that an annual erosion of 25 mt/ha represents a loss of more than 100 kg/ha N per annum in the cultivated areas. The importance of the loss of nutrients in cultivated areas becomes clear when considering

sustainability of production systems, as the value of nutrients lost can be measured in terms of fertilizers needed to replenish the losses.

The Heads of States Summit (*Abuja, 2006*) also recognized that farmers have neither access to nor can they afford the fertilizers needed to replenish the mineral content of their soils.

Historical experience also shows that no region of the world has been able to expand agricultural growth rates, and thus tackle hunger, without increasing fertilizer use. In Africa, use of fertilizer averages only 8 kg/ha. This was classified by the *Abuja Declaration* as a fertilizer crisis that requires urgent and bold actions. It is important also to recall that average fertilizer use in Mozambique is only 5 kg/ha.

The *Abuja Declaration* recognizes fertilizers as a critical input for the realization of the Green Revolution, recommending the following:

- The urgent need for a strategic investment program to increase the availability and use of fertilizer alongside with other inputs to usher in the Green Revolution on the African continent.
- *Declare* fertilizer, from both inorganic and organic sources, a strategic commodity without borders.
- *Resolve* that the African Union Member States will accelerate the timely access of farmers to fertilizers.
- To increase the level of use of fertilizer from the current average of 8 kg/ha to an average of at least 50 kg/ha by 2015.
- The African Union Member States and the Regional Economic Communities should take appropriate measures to reduce the cost of fertilizer procurement at national and regional levels especially through the harmonization of policies and regulations to ensure duty- and tax-free movement across regions, and the development of capacity for quality control.
- As an immediate measure, the Summit recommended the elimination of taxes and tariffs on fertilizer and on fertilizer raw materials.
- Promote national/regional fertilizer production and intra-regional fertilizer trade to capture a bigger market and take advantage of economies of scale through appropriate measures such as tax incentives and infrastructure development. This should be supported by the African

Development Bank (AfDB), the Economic Commission for Africa (ECA), the regional development banks, the regional economic communities (RECs), other development partners and the private sector.

The AfDB, with the support of the ECA and the African Union Commission (AUC), were called to establish an Africa Fertilizer Development Financing Mechanism that will meet the financing requirements for the various actions agreed upon during the Summit.

The African Union Member States requested that the AUC and the New Partnership for Africa's Development (NEPAD) establish a mechanism to monitor and evaluate the implementation of this resolution. This is being undertaken in collaboration with ECA and AfDB. The AUC began giving progress report to the African Heads of State at each semi-annual African Union Summit, starting in January 2007.

1. INTRODUCTION

The current strategic program was prepared by the Ministry of Agriculture in consultation with interested partners in the fertilizer arena. The purpose of the program is to establish a framework that will lead to the improvement of the quantity and quality of fertilizers available to farmers through sensitization and strengthening of national structures on the importance of fertilizer, on the quality of products as well as their sustainable use.

This program is also a result of literature review, consultations with individuals and institutions involved with importation, distribution and use of fertilizers within MINAG, universities, private sector and civil society.

At the same time, the program aims to respond to the challenges of the Five-Year Government Plan[1], PEDSA and the call from Heads of States and Government Summit of the AUC and NEPAD and to the RECs on the need to develop strategies to increase the use of fertilizers by small-scale farmers in Africa. Through CAADP it is expected that the whole continent will establish and promote the availability and use of fertilizers in order to boost African agricultural production.

The strategic program identifies the main constraints and policy options for the implementation of regional procurement of fertilizers in order to: reduce the cost of importation; encourage national production and distribution of fertilizers; provide a basis to overcome the constraints related to availability, accessibility and utilization of fertilizers; and lead to the implementation of a regional fertilizer strategy which will result in a vibrant fertilizer market in the continent.

1.1 Context

Mozambique is one of the African countries with good economic performance in recent years and achieved an average annual growth rate of 8 percent from 1994 to 2007. The growth rate decreased to 6.7 percent in 2008, as a result of increases in the price of food and oil. The growth rate in 2009 was 6.1 percent and the projection for 2010 was 6.3 percent.

The agricultural sector is one of the main pillars in the national economy. In 2009 it contributed 24 percent of the gross domestic product, or GDP (*INE*). Apart from that, the agriculture sector

[1] Plano Quinquenal do Governo.

employs 90 percent of the female labor force in the country and 70 percent of the male labor force. This means that 80 percent of economically active population of the country is employed in the agricultural sector.

Though the average contribution of the agriculture on GDP has decreased in recent years, this does not necessarily imply a structural transformation in the economy. Rather, the change is mostly due to an influx of energy-related mega-projects such as MOZAL, Pande and Temane gas and heavy sands of Moma. National accounts (INE) show that the contribution of the agricultural sector to GDP has been increasing.

The variation in the growth rate of the agricultural sector reflects climatic variations, in particular variable rainfall from one season to another as more than 98 percent of farming relies on rain-fed agriculture.

Agricultural exports constitute only 16 percent of total exports, a modest share taking into account the potential of the sector. Despite the considerable growth in agricultural production in recent years, the country is still a net importer of agricultural products.

1.2 Agricultural Policy and the Role of Inputs in the Promotion of Agricultural Development

The challenge of increasing fertilizer consumption is embodied in PEDSA and the Green Revolution Strategy. However, their implementation must be accompanied by input markets linked with retail networks of upstream wholesalers and the establishment of a downstream market for the commercialization of farm produce.

1.3 Strategic Plan for the Development of the Agricultural Sector

Mozambique's PEDSA envisages doubling of annual production in 10 years and an increase in agricultural productivity to an annual average growth rate of 7.25 percent through the expansion of the input provider network and an increase in the number of farmers with knowledge on technologies that promote productivity and agricultural growth, post-harvest management and commercialization of agricultural products through the reinforcement of extension and research systems as well as the establishment of demonstration units for technology transfer (*PEDSA, 2011*).

This strategic program is aligned with the Government of the Republic of Mozambique's (GRM) general objectives to: promote economic growth; increase farmers' employment, income and food security through the development of public-private partnerships; and the promotion of private investments for agricultural sector productivity, diversification, commercialization and sustainable use of natural resources. PEDSA recognizes the need for increased investment in agriculture to increase productivity, provide an attractive and stable policy environment including credit and market infrastructure development and technical assistance to farmers.

The interventions from PEDSA anticipate the improvement of access to credit and agricultural inputs, the improvement in agricultural technologies, reduction in land degradation and deforestation, improvement in commercialization and market systems and improvement in agricultural extension and cultivation methods (including the development of irrigation systems and water management in areas with higher agricultural potential).

2. FERTILIZER MARKET

2.1 Evolution/Structure of the Inputs Market in the Promotion of Agricultural Development

Before the liberalization of the Mozambican economy in the 1990s in the context of structural adjustment under the auspices of the World Bank and the International Monetary Fund, most of the actors in the fertilizer arena (through 1999) were in the public sector, in particular through KR-2 (Japan's Kennedy 2) program which at that time represented about 47 percent of the total imported fertilizers, and an additional 26 percent coming from commercial concessionary holders such as Agroquímicos, Tabacos de Manica, Açucareiras, Boror and Enacomo (*Zandamela, 2004*). At that time there were no private entities to link fertilizer suppliers with small-scale farmers. Additionally importation through KR-2 was canceled in 2000 due to management failures in importation and distribution.

Despite the fact that the use of fertilizers in Mozambique is still very low in absolute terms, taking into consideration the land currently under cultivation (more than three million ha), consumption increased from 18,000 to 51,000 mt in the last 10 years (see Table 1). If this trend continues (especially at a more accelerated rate), the reduction in the frequency of food crises could become a reality as could meeting targets for increased productivity and food security in the medium- term.

Table 1: Fertilizer Consumption in Mozambique (mt)

Year	Tobacco	Sugar	Others	Total
1999				18,000
2000				18,000
2001				18,000
2002				20,000
2003				25,000
2004				28,000
2005				28,000
2006	13,000	10,000	5,500	28,000
2007	13,000	10,000	5,000	28,000
2008	15,000	12,000	5,000	32,000
2009	16,000	12,000	5,000	33,000
2010	31,400	15,000	5,000	51,400

Sources: TIA – (DINA/MADER), IFDC[2] and tobacco and sugar companies.

Due to the efforts undertaken by the GRM, especially in collaboration with partners such as IFDC in the Beira and Nacala Corridors, the number of agro-dealers is increasing. There are now more than 250 agro-dealers trained and skilled to handle and sell fertilizers. As a result, farmer access to fertilizers is increasing in target areas. By providing farmers with basic information on the use of fertilizers and other agricultural inputs, agro-dealers complement public extension services in the promotion of agricultural development and therefore leverage scarce resources available in the GRM system. Apart from participating in the sale of inputs, agro-dealers also play a role in the commercialization of farmer's produce.

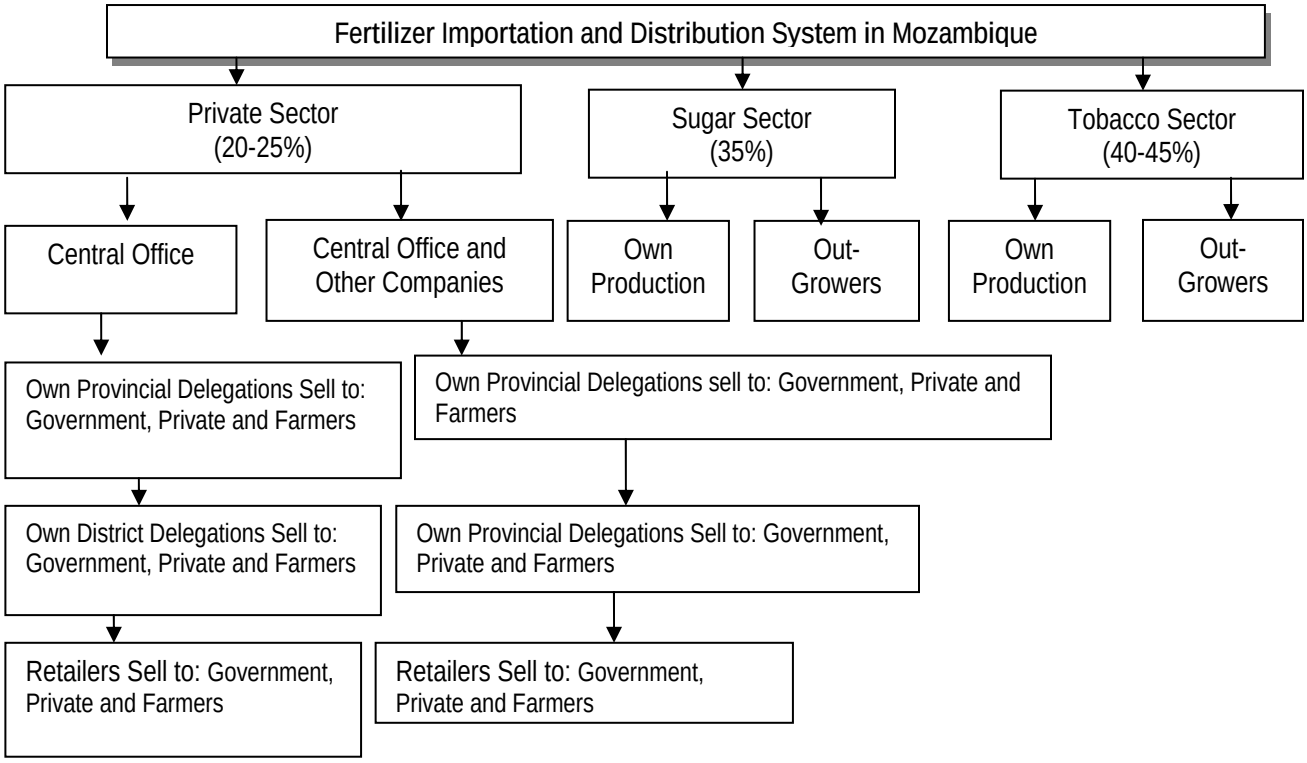
2.2 Fertilizer Supply and Distribution System in Mozambique

The fertilizer market in Mozambique starts with importation by three main operators, namely: private inputs companies;[3] sugar companies; and tobacco companies. There are three entry points for fertilizers in Mozambique including: Beira Port; Nacala Port; and South Africa (by truck). However, rural areas are not yet well-served by the input retail network (agro-dealers who sell seed, fertilizer and crop protection products) which results in poor access to these inputs. In fact, in many zones, farmers have to travel 30-40 or more kilometers (km) to buy inputs (*Pitoro et al., 2007*). These long distances not only increase the cost of fertilizers but also discourage or impede farmers to utilize these

[2] International Fertilizer Development Center.
[3] The main companies in the fertilizer area are Agrifocus, Tecap, Hygrotech, Agroquimicos, Savon, Green Belt and Mozambique Fertilizer Company.

inputs. The current system of supply and distribution of fertilizers in Mozambique is summarized in the figure below.

Figure: Fertilizer Supply and Distribution System



The importation of fertilizers by the private sector is generally in small amounts from South Africa and is transported by road, resulting in high transaction costs. The development of a fertilizer market requires demand stimulation and development of a distribution value chain. The accelerated development of a fertilizer market is an integral part of PEDSA; it is consistent with and forms part of the medium-term plan to achieve the Millennium Development Goal (MDG 1) that calls for poverty reduction and halving hunger by 2015.

2.3 Government Policies and the Fertilizer Market

As referenced above, until 1996, the GRM was responsible for the importation of fertilizers and other inputs. Following privatization, dysfunctional state farms (EEs) with their lack of capital, meant that there were no organizations capable of fertilizer importation and distribution. Companies importing

fertilizers were only able to do so if there was a guarantee that they would find a market for the products.

It is important to note the rationale behind the structural adjustment and economic reform programs initiated in 1987. Once the State privatized state enterprises involved in fertilizers, it was expected that the private sector would automatically step in. However, for many reasons, the private sector did not step in and develop an input distribution network in a significant way.

Due to the past history of the GRM monopoly, most operators in the private sector lacked the necessary skills and capital to develop market networks. These factors delayed the transition from the public distribution system to the private sector, creating a vacuum. To remove this vacuum, the GRM is being asked to support the development of organizations involved in production, importation and timely distribution of fertilizers to farmers. The GRM is also being asked to help the private sector to acquire the necessary skills and capital to develop the market (both inputs and commercialization of farmer produce) particularly in rural areas through the development of distribution networks that would eventually sell products at lower prices.

These initiatives should be accompanied by measures to prevent inappropriate use of fertilizers that will harm the environment. That involves the correct application of fertilizers, resulting in the following benefits:

- Increase in the amount and quality of biomass produced by unit area that will help protect the soil against erosion.
- Increase in fiber foods produced, reducing the need to produce crops in soils not suitable for agriculture.
- Increase in nutrient accumulation in the soil through biomass, minimizing deep percolation of soluble nutrients to underground waters.
- The reduction of deforestation to increase agricultural production through increased yields.

Due to these factors, the GRM needs to encourage research to provide information and recommendations on plant nutrients that do not harm the environment. Educating farmers and other participants will result in higher food production while protecting the environment. In order to guarantee the sustainable use of fertilizers, the GRM needs to encourage the following activities:

- Soil and plant analysis correlated with the needs and fertilizer specificities, soils, crops and climate.
- Protection of the land against erosion.
- Long-term research programs using multiple combinations of soils, climate, crops and cultural practices to quantify the effects of fertilizers on the environment.

2.4 Existing Projects and Interventions for Increased Availability and Use of Fertilizers

The basic principle for increased availability and utilization of fertilizers is to increase small-scale farmers' access to inputs and to establish linkages between farmers and output markets through commercialization. In order to achieve these objectives, the GRM has a memorandum of understanding with several institutions such as the International Fertilizer Development Center (IFDC), which has supported the implementation of projects summarized in Table 2.

Table 2: Current Projects Implemented by IFDC in Mozambique

Project	Coverage	Objectives	Activities	Donor
1.Agricultural Inputs Market Strengthening	Beira and Nacala Corridors	1. Increase inputs availability 2. Increase productivity 3. Reduce costs of inputs	1. Support to agro-dealers and development of business plans 2. Market information 3. Training modules with CNFA	USAID
2. Maize Intensification in Mozambique	Manica, Nampula, Zambézia	1. Improve maize yields 2. Improve farm incomes and welfare	1. Develop action plans 2. Field demonstrations 3. Training	IFA/IPI/IPNI/ CropLife
3. Mozambique Agro-Dealer Development	Manica, Sofala and Tete	1. Increase availability, efficiency of inputs 2. Increase farmer productivity 3. Reduce costs of inputs	1. Identify agro-dealers 2. Develop training materials 3. Exchange visits 4. Develop technology packages 5. Soil samples for analyses 6. Business plans	AGRA
4. Purchasing power support for farmers (subsidies)	Manica, Nampula, Sofala, Tete, Zambézia	Subsidies on seed and fertilizers for maize and rice	1. Identify agro-dealers 2. Select farmers 3. Distribute vouchers 4. Monitor field activities	EU/FAO
5.Savings, Subsidies and Sustainable Food Security (BASIS)	Manica	Study the impact of the fertilizer subsidy	Work with 2,400 farmers to determine: - Family per capita income - Maize yield - Use of improved seed - Use of fertilizers - Opening and use of bank accounts as savings	University of Wisconsin University of Michigan

2.5 Primary Fertilizers Used in Mozambique

The primary fertilizers used in Mozambique are urea (46 percent N) and NPK (12:24:12) for food crops (maize, rice and vegetables). For tobacco, the most common fertilizers are urea (46 percent N), NPK (10:24:20) and CAN (26 percent N). For sugarcane the most common fertilizers are urea (46 percent N), NPK (1:0:1; 1:0:2), CAN (26 percent N), DAP, MOP and ammonium sulfate.

2.5.1 Current Levels and Trends of Fertilizer Use in the Last Five Years

As indicated previously, the use of fertilizers in Mozambique is very low, with tobacco farmers using about 61 percent, sugar growers 29 percent and the remaining 10 percent used on all other crops. This situation can be attributed to the lack of incentives for the use of fertilizers due to poor commercialization of food markets and crops. For example, the zones of surplus maize production are in the north of the country, far from the main markets in the south. Input providers also have little incentive to increase the amount or variety of inputs available due to lack of effective demand. However, in suburban zones, farmers use fertilizers on crops such as Irish potatoes, tomatoes and other vegetables for which there is high demand. This in turn creates an incentive for the use of fertilizers. Additionally, apart from high prices, cyclic droughts that affect rain-fed agriculture also discourage farmers from using fertilizers. The use of fertilizers in the last five years is summarized in Table 3. In general, this data corroborate the statistics from the agricultural survey that indicate an average of fertilizer use of about 3.73 percent between 2002 to 2008.

Organic fertilizers are used in even smaller proportions by farmers. Though there has been a trend of increased use of organic fertilizers – from 2 percent in 2003 to 5 percent – (*TIA, 2007*), this is still limited to families that raise livestock (which is the source of the organic fertilizer). In general, the consumption of fertilizers in Mozambique is showing a positive trend and increased from an average of 3.2 kg/ha between 1996 and 2002 (*FAOSTAT*) to 5.3 kg/ha in 2010 (*MozSAKS, 2011*).

Table 3: Fertilizer Consumption (ton), 2006-2011

Year	Tobacco	Sugar	Others	Total	Average kg/ha
2006-2007	13,000	10,000	5,500	28,000	
2007-2008	13,000	10,000	5,000	28,000	4.8
2008-2009	15,000	12,000	5,000	32,000	5.3
2009-2010	16,000	12,000	5,000	33,000	
2010-2011	31,400	15,000	5,000	51,400	

Sources: Tobacco – Mozambique Leaf Tobacco; Sugar and Others – Agrifocus.

This level of fertilizer use is below the average of Sub-Saharan Africa (8 kg/ha) and the African continent (20 kg/ha) and far less that of other underdeveloped countries such as Egypt (>300 kg/ha), Bangladesh (>110 kg/ha) and Pakistan (>110 kg/ha).

The consumption of fertilizers in Mozambique is limited by low levels of irrigation (only 50,000 ha are currently irrigated); although there are about 3,000,000 ha that could be irrigated (*ENI, 2010*). As a result, Mozambican agriculture has only one cropping season for major food crops. It is estimated that about 70 to 80 percent of fertilizers are used annually in the period from October to December though some applications occur in the dry season (mostly on vegetables).

It is also important to mention that in Mozambique there has been little effort made to date to undertake studies to determine specific fertilizer recommendations by soil nature and crop. However, despite limited resources, the former National Institute for Agronomic Research (INIA) produced a basic guide on fertilizer needs per crop in 1998, which constitutes an important step in the improvement of fertilizer management. The recommendations developed by INIA are presented in Table 4.

Table 4: Recommendations for Fertilizer Use (kg/ha)

Crop	N	P_2O_5
Maize	30-100	0-60
Rice	50-100	0-60
Wheat	30-60	0-30
Soya beans	0-20	0-40
Groundnut	0-25	0-60
Beans	30-60	0-45
Cotton	20-60	20-60
Sunflower	30-80	0-60
Potatoes	60-100	30-60

Source*: Guerts (1997).*

NB: No recommendation was made in relation to application of potash (K_2O) or micronutrients.

2.5.2 Production Capacity and Joint Fertilizer Procurement

Mozambique is a net fertilizer importer. Imports grew from 18,000 mt in 1999 to 51,400 mt in 2010. Imports are predominantly from the Middle East, East Asia, Europe and South Africa – despite the country's available mineral resources that could be used for fertilizer manufacturing (including phosphates, calcium and organic deposits).

2.5.3 National Production of Fertilizers

There are two blending factories in the country – the Mozambique Fertilizer Company located in Manica Province and the Greenbelt Company in Sofala Province – that blend fertilizers using imported raw materials. Current blending capacity is about 20 mt per hour for each company with a potential for expansion up to 60 mt per hour if needed.

It is important to note that the quality of the blends will improve if factories are located close to the location where the fertilizers are being used, not only to reduce the transportation cost but also to critically minimize the separation of fertilizer granulates which occurs during transportation.

The dependence of the country on imports could also be reduced if Mozambique could produce fertilizers domestically. Several of these initiatives are currently being undertaken by potential investors keen to establish factories for manufacturing fertilizers from natural gas available in the country though utilization of these deposits are still being investigated.

2.5.4 Joint Fertilizer Procurement

A study conducted by IFDC in 2007 examined the feasibility of establishing a terminal warehouse in Beira Port to allow the importation of fertilizers into Mozambique and neighboring countries at a more favorable cost and to improve the distribution system in rural zones.

The study found that the market in Mozambique, Zambia and Malawi was estimated at 478,000 mt with significant increases expected in the next 10 years, so that by 2017 demand could reach about 800,000 mt per year (excluding Zimbabwe), due to increased use of fertilizers by small-scale farmers

as well as the expansion of commercial production in sugarcane, tobacco, banana and other crops (Table 5).

Imports were found to be in uneconomical sizes (resulting in higher prices), with multi-port discharges (due to cargo being offloaded at Dar es Salaam, Nacala, Beira, or Maputo) adding a $5/ mt surcharge to the price for each additional port. The Beira Port is the most central with better cost-benefit for these markets.

The study also showed that it was possible to secure a warehouse close to the Beira Port through repair of existing facilities and/or construction of new ones for which land seems to be available. Additionally, roads and railways already exist. If this strategy is implemented, it will respond also to the main recommendations of the *Abuja Declaration* action plan, which stated that it could be one of the most attractive projects for funding under the African Mechanism for Financing Fertilizers established by the Summit. The success of this initiative depends on the following factors:

- Dredging of Beira port channel (15 meters or more) to allow in ships carrying 25,000 to 30,000 mt of cargo.
- Removal of the customs duty of 2.5 percent on fertilizer imports for use in Mozambique to ensure a more favorable environment for the movement of fertilizers to surrounding countries.[4]
- Permission to freely import and re-export fertilizers into and from this holding warehouse.
- Rail link from Beira to Malawi to be restored.
- Consistent national policies followed in the region to remove interference that distorts the fertilizer market.
- Simplification of customs procedures to allow entry of fertilizers to the Beira terminal and storage without consignment to any importer or specific owner.
- Permission to re-export unsold stocks.

The Beira fertilizer terminal seems to be a deserving initiative to obtain funds from the African Mechanism on Fertilizer Financing as it satisfies most of the objectives of this instrument. However, this action needs to be undertaken in concert with other national governments in the region for full implementation.

[4] A 2.5 percent tax of F.O.B. value is charged on fertilizers for use in Mozambique. Imported fertilizers through Beira Port for neighboring countries are exempted from this tax.

One additional problem is that fertilizers arrive in small quantities at the peak of the season, which sometimes causes congestion at the port, long delays and congestion in land transport. This makes it more difficult for small importers (2,000 to 5,000 mt of fertilizers) to acquire stocks when needed as these operate using shorter lead times.

Table 5: Current Consumption and Projections on Fertilizer Use in the Region (mt)

Year	Mozambique	Zambia	Malawi	Total
2007	28,000	180,000	270,000	478,000
2008	32,200	192,600	283,500	508,300
2009	37,000	206100	297,700	540,800
2010	42,600	220,500	312,600	575,700
2011	49,000	235,900	328,200	613,100
2012	53,900	247,700	338,000	639,600
2013	59,300	260,000	348,200	667,500
2014	62,200	273,000	358,600	693,800
2015	71,700	286,700	369,400	727,800
2016	78,900	301,000	380,500	760,400
2017	86,800	316,000	391,900	794,700

3. CONSTRAINT ANALYSIS

Though the GRM has begun to show more interest in the use of fertilizers, the country has not yet been able to articulate and put in practice necessary measures to allocate resources for the development of this sector. Even programs supported by donors such as the Agricultural Sector Investment Program (PROAGRI), overlooked this aspect and failed to make any recommendations on developing the fertilizer market and/or promoting fertilizer use to obtain greater yields in smallholder farming. Although MINAG recognized the lack of appropriate technologies, most of its focus under PROAGRI was on seed production and plant protection; it failed to identify the low use of mineral fertilizers as a critical constraint.

Because of its small size, the private sector has not yet taken the lead in developing the fertilizer market. The retail network is scarce and its abilities are still weak. Therefore the private sector *per se*, needs support to improve its technical knowledge base and market skills.

Similarly, the majority of farmers do not have experience using fertilizer. Even those who have seen the benefits of fertilizers through demonstration plots and from former state farms, because of poor integration with the market they have little incentive to invest in fertilizers.

This strategic program thus seeks to correct these issues, without which Mozambique will have difficulties in transforming its agriculture and attain its socioeconomic objectives of food security, poverty alleviation and improve its balance of payments. The main constraints to increased fertilizer use in Mozambique are summarized below.

3.1 Policy- and Fiscal-Related Constraints

In the policy area the primary constraint is the 2.5 percent tax on the importation and the restrictions on re-export of fertilizers. Though the Ministry of Finance has agreed to remove the fertilizer importation tax and has exempted some companies involved in fertilizer importation such as Mozambique Fertilizer Company, it is still necessary to have an approval from Parliament for a definitive solution. The lack of approval of this instrument by Parliament is seen as a constraint that can bring difficulties and discourage the development of a larger fertilizer market in the region.

The lack of a regulatory system to control the quality of fertilizers circulating in the country is also a significant constraint. The major challenge is developing an efficient market-oriented system that responds to farmers' needs. The establishment of a system requires a holistic approach to address several critical components concurrently.

The system must take into account the need to: (a) create a favorable policy environment; (b) improve the importation mechanisms; (c) establish retail networks; (d) produce recommendations on fertilizer use; (e) transfer this information to the farmers; (f) create demand for fertilizers for food and cash crops at the small-scale farmer level; (g) develop adequate credit schemes to meet the needs of inputs providers and farmers; (h) manage fertilizers provided by donor funds; and (i) improve market transparency.

Mozambique requires legislation and regulations on fertilizer use that cover the registration, sale and circulation of these products as well as empowers MINAG with the mandate to prepare and enforce the required legal instruments. The National Directorate of Agricultural Services (DNSA) is the

institution within MINAG responsible for the application and administration of the anticipated regulations.

Development of the fertilizer market in Mozambique needs bold interventions (covering technical assistance and training), infrastructure and capital in an orderly manner. These interventions are required to simultaneously create demand for fertilizers, eliminate the constraints and encourage a sustainable development of the fertilizer market through the establishment of an open and competitive market with full participation of private sector and investments. Key activities needed include:

- Analysis and policy reforms.
- Develop supply and market systems.
- Develop and disseminate technologies.
- Develop credit systems.
- Improve market transparency.

It is important to emphasize that the interventions proposed in this strategy should occur in an integrated manner and be executed concurrently instead of in a sequential basis. For example, policy reform is essential to create a favorable environment for private sector investment; technology transfer should occur simultaneously to develop demand at the farmer level and technical assistance to inputs providers is needed for quality products to enter the market. Development of a credit system must also occur early on as banks in Mozambique do not have experience in extending credit to inputs providers; the banking community should be involved so that they include fertilizer credit in their portfolio. Market transparency is another critical element for success where public sensitization on market opportunities is essential to induce investments. Finally, an adequate management of donor-financed programs will be necessary to ensure that activities do not conflict with market forces.

Given the limited investment in the research and extension system there has not been enough capacity to develop adequate technology generation and transfer systems in the fertilizer domain. Currently, there are fewer than five researchers dedicated to fertilizer research and only 780 public extension agents all over the country a number inadequate to cover approximately 3.3 million farming households. As a result, the recommendations on fertilizers are still general and, in some instances, overdue and there is limited capacity for soil analysis or for undertaking fertilizer trials. These are serious constraints for the development of the sector.

3.2 Demand-Related Constraints

A number of factors affect the consumption of fertilizers in Mozambique. These include: high fertilizer prices, adverse climatic conditions, farmers' and agro-dealers' lack of knowledge and skills, poor fertilizer quality, inappropriate package sizes for small farmers, inadequate procurement and transportation systems, etc. These factors affect both demand and supply as described below.

The joint procurement strategy is in line with the *Abuja Declaration* that calls for the creation of procurement centers and the regional distribution of fertilizers as well as the removal of tariff and non-tariff barriers. Implementation of this strategy will assist in the development of small importers and wholesalers in the country and in neighboring countries by allowing for the procurement of fertilizers in small amounts, which is currently impossible (because small distributors have to depend on intermediaries who add to transaction costs). Additionally, one of the advantages of the Beira terminal is its railway link with neighboring countries such as Zimbabwe, Zambia and Malawi.

3.2.1 Poor Access to Credit

Lack of access to credit continues to be one of the main constraints faced by small-scale farmers, inputs providers and agro-dealers, as high interest rates are one of the main limiting factors to increased fertilizer availability. Access to finance is a key limitation for all those in the supply chain – importers, distributors and farmers. Both high interest rates and limited bank guarantees make it difficult to access to the banking system. Due to the high risk in agricultural operations, commercial banks are skeptical of lending funds for this activity. Even the initiatives from Banco Terra to introduce bank guarantee programs have been oriented towards export crops or for large-scale commercial farmers. Therefore, the lack of funds for risk management and guarantees for importers and inputs providers are an important constraint.

Small-scale farmers involved in producing agricultural products or beverages (as well as hiring out their labor or pursuing other small businesses) as their source of income have low purchasing power capacity because they do not earn much from these sources. This is aggravated by the deficient linkages with the input and output markets.

3.2.2 Low Prices of Agricultural Products

The economics of fertilizer use are also dictated by unstable prices of agricultural products, especially food crops. When food production is for family consumption, demand is determined by the size of the household, rainfall and previous production experience. When food is produced for the market, apart from climatic risks, insecurity related to market volatility adds an additional risk. Consequently, farmers have not shown significant interest in investing in fertilizer application due to the fluctuating market prices of agricultural products.

3.2.3 Poor Organization of Farmers and Lack of Knowledge on the Use of Fertilizers

Most small-scale farmers who are not organized in groups cannot benefit from economies-of-scale and buy fertilizers individually in small quantities due to their limited financial capacity, often at exorbitant retail prices. Transformation of farmer organizations into clubs or cooperatives would help them acquire fertilizers through joint procurement from wholesalers. The other merit of having farmers organized is that they have access to other services related to fertilizer use in an efficient and cost-effective manner.

3.2.4 Transport and Distribution Costs

The fertilizer market in Mozambique is currently too small and fragmented to achieve economies-of-scale in importation. This is aggravated by the nature of the Mozambican fertilizer market, which has poor linkages with international markets coupled with a lack of demand necessary to facilitate the bulk purchase of fertilizers. This situation allows few opportunities for bulk purchases, resulting in high costs for fertilizer imports and as a consequence exorbitant retail prices of fertilizers.

To facilitate the fertilizer market in the country, the integration of regional procurement seems to be the only way to reduce costs. Regional procurement would allow importers to purchase more significant volumes and allow for sufficient quantities of inputs to meet the current and future needs of Mozambique and neighboring countries.

The necessary funds for the implementation of these kinds of initiatives can be mobilized from development programs through NEPAD, SADC the Alliance for a Green Revolution in Africa (AGRA) or the AfDB through joint ventures with the private sector with the mandate to manage

fertilizer terminals on a commercial basis. The private sector must be encouraged to include not only fertilizer suppliers and importers but also the main users such as the sugar and tobacco industries and farmer associations.

Quantities of fertilizers imported into Mozambique are generally so small that they incur high transaction costs. Handling and transport of small amounts is always expensive due to lack of economies-of-scale. These costs are passed on to farmers who have to buy the products at very high prices. The additional cost of transportation of goods by road are exacerbated, as truck drivers are often reluctant to penetrate rural areas due to poor roads, high fuel costs and the high cost of spare parts.

3.2.5 Market Information Systems

There is little information on the sources, prices, types and use of fertilizers at either the retail or farmer levels. Thus, farmers and input providers are not able to make informed decisions on what fertilizer to buy and where to find it. In the absence of enough specialized agro-dealers, it may be necessary that shops that sell other agricultural products also sell fertilizers in order to improve information dissemination on fertilizer.

In the past, most of the farmer training has been the GRM's responsibility through extension services, transferring knowledge generated by research. This approach was suitable prior to market liberalization. In the current open market, competition must be encouraged in such a way that the private sector develops and promotes its products (including fertilizers) that better respond to the specific needs of each crop. In turn, the Government should focus its resources on regulating recommendations for specific crops.

3.2.6 Inadequate Retail Network

There are about 250 retail agro-dealers trained in fertilizers; they are concentrated in the Beira and Nacala Corridors. The agro-dealers are focused in the provincial capitals and district headquarters, meaning that large areas are not covered and farmers have to travel 40-50 km to find a fertilizer provider. The agro-dealer network should be extensive enough so that they are located much closer to their farmer-customers.

Most fertilizers are sold in 50-kg bags, making it difficult for many rural smallholder farmers to afford these inputs. There is now an effort to repackage fertilizers into smaller package sizes; however, suppliers could increase their capacity to package fertilizer in smaller size packages and penetrate the rural market if effective demand is created.

3.2.7 Internal and External Analysis Environment (SWOT)

A summary (see Table 6) of strengths, weaknesses, opportunities and threats (SWOT) that characterize the fertilizer sector show that the country has conducive conditions to develop a vibrant fertilizer market that can contribute to the objective of increased agricultural productivity and food security sought by the Government.

Table 6: SWOT Analysis in the Context of Fertilizer Strategic Program

Internal Environment		**External Environment**	
Strengths	**Weaknesses**	**Opportunities**	**Threats**
Approval of PEDSA anticipating increase in productivity	Non–existent a domestic fertilizer industry	Existence of raw materials for fertilizer industry (hydrocarbons, calcium, organic fertilizers, etc.)	Lack of quota on hydro-carbons for fertilizer industry at short- to medium-term
	Low demand for fertilizers	High potential of farmers not using fertilizers	Low levels of demand result in fertilizers being less cost-effective in rural areas
Existence of agrochemical unit for registry and control of DNSA	High prices of fertilizers in the country	Increase in the loss of quality of soils in many regions of the country	
Increase in production in cash crops requiring additional use of fertilizers	Non-existent fertilizer regulatory framework	Existence of agro-dealer shops in rural zones	High cost of fertilizers due to importation taxes
	Commercial networks not prepared to sell fertilizers in rural zones	Interest of domestic and foreign private sector to invest in the fertilizer industry	
Existence of land and water sector at IIAM	Abusive use of 12:24:12 formulation	Reduction of unit cost in case of importation in bulk	

4. STRATEGIC ACTIONS FOR THE NATIONAL FERTILIZER PROGRAM

The Fertilizer Strategic Program (PENF) seeks to promote fertilizer use in the development of the agriculture sector and protection of the environment to further the implementation of PEDSA recently

approved by the GRM. PENF can also contribute to the implementation of several international commitments such as CAADP, Dar es Salaam Declaration, *Abuja Declaration,* Maputo Declaration, among others, to which the country is a signatory.

4.1 Vision and Mission

PENF is based in the vision of "*an agricultural sector that is prosperous, competitive and sustainable which can respond to the challenges of food and nutritional security and reach global agricultural markets*." The mission is to "*contribute to food and nutritional security and income for farmers in a competitive manner and guarantee social and gender equity*."

4.2 General Objective

The general objective of PENF is to stimulate the supply and demand of fertilizers to farmers in order to increase soil and crop productivity while taking into account environmental considerations.

4.3 Specific Objectives of the Fertilizer Strategic Program

4.3.1 Supply

- Stimulate national production of organic and inorganic fertilizers (natural gas and phosphates, diatomite and guano exist).
- Facilitate access to raw materials.
- Stimulate the design of fiscal incentive packages for the establishment of fertilizer production.
- Facilitate access to credit.
- Facilitate importation in bulk.
- Guarantee the supply of quality fertilizers.
- Develop and implement fertilizer regulations in Mozambique.
- Map soil fertility in the country and update fertilizer recommendations by crop.
- Train extension agents and fertilizer providers.
- Revitalize rural agro-dealers for inputs and farmer produce.

4.3.2 Demand

- Design and implement a subsidy program (incentives) for fertilizers and complementary inputs (seed, market information, etc.) for farmers.
- Establish training programs for farmers on fertilizer use and management.
- Promote the development and adoption of integrated use and management of fertilizers.
- Facilitate access to credit.

4.4 Role of the Fertilizer Strategic Program in the Promotion of Agricultural Development

The Fertilizer Strategic Program promotes the development of agriculture through the improvement in the physical flow of fertilizers based on a well-defined distribution system. The distribution system can be operated partially or completely by the public or private sectors.

The public sector participates totally or partially in the fertilizer distribution system in place of the private sector when the private sector is unable to supply fertilizers to farmers on time and at competitive prices. In many cases, the role of the private sector in fertilizer distribution is weak due to insufficient geographical coverage in rural zones and poor information channels between farmers and wholesalers and major import companies.

Apart from that, PENF promotes the development of agriculture through the provision of information to facilitate the dissemination and adoption of innovations to farmers. The GRM uses its extension services to disseminate innovations through field days, field demonstrations, in-service training, pamphlets and radio and TV programs.

4.5 The Role of the Fertilizer Strategic Program in Accessibility and Incentives to Farmers

Apart from programs implemented by non-government organizations, in the recent history of Mozambican agriculture there are no examples of the significant use of fertilizers by small-scale farmers. However, MINAG, in collaboration with projects such as Sasakawa Global 2000 and the Special Program for Food Security of FAO, was able to triple the yields of major crops in the intervention zones. Average yields of maize and rice were 3.5 mt /ha compared with current yields of 1.0 mt/ha attained by farmers in their traditional farming systems (DNER, 2002).

One lesson learned from these interventions is that farmers, even illiterate ones, understand that improved technologies increase yields and improve the quality of commodities as well as save significantly on labor requirements. Therefore, farmers are interested in using these technologies as long as they prove to be profitable, the inputs are available at affordable prices and their farm produce can be sold to commercial markets.

The other lesson learned through the intervention of these programs was that though upstream (inputs providers) and downstream (output buyers) actors are aware of their critical role in support of small-scale farmers, if they continue to be dispersed and fragmented they will never be able to fully undertake their role and the value chain will remain broken. To minimize this situation, the strategy needs to find ways to allocate resources and harmonize joint programs in collaboration with partners in order to achieve a holistic impact.

4.6 Expected Results

- Availability and consumption of fertilizers increased.
- System for quality control on fertilizer established.
- Technicians, farmers, extension agents and others taught to properly use and manage fertilizers.
- Favorable environment for the establishment of a fertilizer industry established.
- Soil mapping updated.
- Number of farmers using fertilizers increased.
- New technologies for production of organic fertilizers generated.
- Fertilizer regulations approved and implemented.
- Fertilizer subsidy programs prepared and implemented.

These results will be achieved among others, through the activities summarized in Table 7. This allows for future activities to build on previous ones.

Table 7: Activity Matrix

Expected Result	Activities	Indicators	Target
1. Availability and consumption of	1.1 Create facilities for access to credit for fertilizers	Convene coordination meetings with financial institutions	1

Expected Result	Activities	Indicators	Target
fertilizers increased	1.2 Establish a credit line for fertilizers managed by financial institutions	Credit line established through public tender	1
	1.3 Facilitate commercial importation in bulk	Metric tons of fertilizers imported	At least 90,000; 120,000 and 150,000 mt in 2013, 2014 and 2015, respectively
	1.4 Exempt custom duties and VAT in fertilizer transactions	Taxes removed	Up to September 2012
	1.5 Establish fertilizer regulatory framework	Fertilizer regulations approved	Up to the end of 2012
	1.6 Create incentives to improve the use of fertilizers by farmers	Number of beneficiaries of fertilizer subsidy program	About 200,000 farmers benefit until 2016
	1.7 Extend the distribution of inputs to rural zones	Production zones by district with agro-dealers established	At least 50 percent of production zones until 2016
2. System for quality control on fertilizer established	2.1 Establish regional labs for quality analysis in fertilizers	Labs established	4 (1 in 2013 and 3 in 2014)
	2.2 Recruit and train inspectors and lab technicians	Number of inspectors recruited	26 (2 in each province and 4 at central level)
		Number of inspectors trained	22 (2 in each province)
		Number of lab technicians trained	40 (10 in each lab)
3. Technicians, farmers and extension agents taught to use and manage fertilizers	3.1 Train technicians and extension agents in the use and handling of fertilizers	Number of technicians and extension agents trained	About 1,450 (700 technicians and 750 extension agents)
		Number of farmers using fertilizers	200,000 farmers
	3.2 Disseminate technologies to farmers	Number of hours on radio diffusion for sensitization messages realized	30 minutes per week in 10 sessions of 10 minutes each
		Number of CDRs installed	50 percent of "*Postos Administrativos*" with agricultural potential by district up to 2016
	3.3 Train technicians and extension agents in fertilizer use	Number of beneficiaries trained	At least 1,450 technicians and extension agents; and about 200,000 farmers
4. Favorable environment for the fertilizer industry established	4.1 Negotiate hydrocarbons quota for fertilizer industry	Percentage of quota on hydrocarbons allocated to fertilizer industry	About 5-10 percent of national production
	4.2 Install units for fertilizer production	Factories established	1 up to 2014, 1 in 2015 and 2 in 2016
5. Soil mapping updated	5.1 Undertake lab analysis to determine the quality of soils	Number of analysis done	4,800 analysis per year starting 2013
	5.2 Elaborate soil fertility maps for the country	Map of soil fertility for PEDSA development corridors realized	In the 6 development PEDSA corridors

Expected Result	Activities	Indicators	Target
6. New technologies for production of organic fertilizers generated	6.1 Generate technologies for fertilizer use (inorganic and organic)	Technologies generated	6 (at least one for specific conditions of each agro-ecologic zone)
	6.2 Update technical guidelines of fertilizer use by crop	Technical guidelines updated	Up to May 2013
	6.3 Undertake a study on recycling of urban garbage	Study realized	Up to May 2013
7. Fertilizer regulations approved and implemented	7.1 Elaborate fertilizer regulations	Regulations elaborated and approved	Up to the end of September 2012
	7.2 Disseminate and implement regulations	Number of beneficiaries covered	1,500,000 of farmers (50 percent of target) up to 2017

4.7 Strategic Implementation Actions

DNSA is the institution within MINAG responsible for the coordination of all strategic, implementation and operationalization actions. In fact, its mandate is the preparation of proposals and the implementation of policy and regulations on inputs including seed, crop protection products and fertilizers. For technical aspects, DNSA will collaborate with its sister institutions such as Mozambique's Institute for Agricultural Research (IIAM) in the implementation of the strategy through the following actions.

a) Intensify Training for Farmers on the Use and Management of Fertilizers

This will be achieved through a survey on the training needs of farmers in the areas of fertilizer use and management followed by preparation of training manuals for farmers and extension agents. Competent specialists will be recruited to undertake comprehensive training for extension agents; the extension agents will be responsible for training farmers. Training will be organized to include refresher courses to update the extension agents and farmers on the use and management of fertilizers. During the training, farmers and leaders will be identified for the dissemination of technologies on fertilizers.

For an effective training, these farmers will be organized in groups that later could be transformed into associations with the involvement of importers and fertilizer distributors. The associations will be responsible for the negotiations with GRM and other partners on aspects related to the fertilizer market such as import taxes, credit and policies.

In these groups, farmers will have the opportunity to benefit from increased negotiation power to access credit in procuring fertilizers. In the context of this strategy, the associations will also convene training sessions on association leadership to ensure that they operate effectively in the promotion of adequate fertilizer use.

Apart from the training sessions, field days and demonstrations will be organized as a supplement for training. PENF will organize competitions for better demonstrations. Best farmers will receive a prize. Theatre, radio, comedy and sensitization campaigns will also be used to encourage the use of fertilizers.

b) Train Inputs Providers on the Use, Management and Fertilizer Market

PENF will intensify training for inputs providers through seminars on the use and management of fertilizers and the promotion of informal training sessions to ensure that farmers are involved and participate in the fertilizer business.

Taking into account the GRM's scarce financial and human resources, the involvement of providers in the training of farmers on fertilizer use and management can reduce the pressure that the GRM is subject to and minimize the market distortion. It is also expected that with the implementation of this strategic program, inputs providers will be located in the same areas as the farmers are. This will help providers better understand farmers' needs and eventually make it easier to implement location-specific recommendations.

It is expected that PENF will also encourage input providers to intensify field demonstrations of fertilizers by organizing farmer-to-farmer visits, distribution of pamphlets on use and management of each type of fertilizer and ensure that the messages reach even illiterate farmers.

c) Facilitate Training of Inputs Provider Associations

The GRM's role will be to define strategies to attain economies-of-scale for inputs providers and farmers by encouraging them to work in groups such as associations. By combining their resources, the inputs providers strengthen their access to credit through increased collateral as well as their ability to procure larger volumes of fertilizers to sell in their retail channels.

d) Develop other Capacities for Inputs Providers

Apart from increasing the availability of fertilizers, it is expected that PENF will contribute to an increase in the capacity of the private sector to manage larger amounts of fertilizers through initiatives to build fertilizer terminals.

PENF can also benefit from a number of under-utilized warehouses such as those belonging to the "*Instituto de Cereais de Moçambique"* whose activities have been reduced. This could be done by transferring their ownership to inputs provider associations through a well-organized plan.

e) Improve the Implementation of Fertilizer Subsidy Programs

Taking into consideration that commercial fertilizer operators have weak coverage in the country and the prices of fertilizers are very high, the GRM can opt for subsidy programs. However, the implementation of these programs needs to take into account the development of private sector enabling its coexistence with the public sector in light of the experience of the pilot voucher program undertaken in the 2009/10 and 2010/11 cropping seasons in Manica, Nampula, Sofala, Tete and Zambézia provinces with support from FAO and IFDC and financed by the European Union and the United States Agency for International Development (USAID).

f) Establish an Information System on Production and Fertilizer Market

PENF will document fertilizer production and market statistics to form a database; establish a center for data collection to specifically collect, analyze and disseminate information on the production and sale of fertilizers based on public and private sectors. PENF will encourage both public and private sectors to undertake market studies at all levels both domestic and international. The strategy will sensitize the farming community and merchants on the availability and use of fertilizers to facilitate its planning process. Similarly to what happens with Agricultural Market Information System (SIMA), prices on fertilizers must be publicized on radio as well as in the newspapers to guarantee the dissemination of information and allow for competition in the market.

PENF must undertake a deliberate effort to facilitate an effective coordination between farmers and private sector actors through the provision of information and statistics in such a way that all players

are in a position to make relevant decisions that are based on information on production, marketing and use. For this to happen, the program will establish a comprehensive information system on production and marketing within MINAG. PENF will establish a database on the production and marketing of fertilizers including domestic production and imported fertilizers. Though the GRM does not interfere on fertilizer prices, this information can help PENF to stimulate its regulation through the establishment of a comprehensive distribution system.

4.8 Identification of Key Players

Producers and inputs providers from the private sector, Government and public enterprises will be the main players in the implementation of PENF. For the implementation of the strategic program, participatory methods will be used for the selection of program beneficiaries.

4.9 Duration of the Implementation

It is expected that PENF will be implemented for a five-year period after which it will be reviewed and adjusted according to the realities of each phase.

4.10 Proposed Financing Mechanisms

It is expected that PENF activities will be financed by the GRM. Other government and non-government institutions such as IFDC, AGRA and the private sector are well-positioned to support financing of such an agenda and could aid its implementation. The total cost for its implementation is estimated at US $1,126,871,550 as detailed in Table 8.

4.11 Monitoring and Evaluation System

A baseline survey will be undertaken in the first year PENF's implementation. The survey will be undertaken in consultation with major partners in order to consolidate the data from the baseline survey. A report on the baseline will be distributed to all partners to facilitate the implementation of the program. Statistical data analyzed from the baseline survey will serve as a basis for the information system on production and fertilizer marketing to be established in MINAG.

During the PENF implementation phase, data on production, importation, prices, quantities sold, use of fertilizers, prices of agricultural products, volumes of production and quantities commercialized among others will be summarized in reports. There will be review meetings involving several players every six months. Verification visits will also be used to see what is occurring in different partner's arenas. Existing structures at the level of each partner will be used to collect monitoring data. A data-sharing system and reports will be organized and coordinated by MINAG, where the information system on production and marketing on fertilizers will be housed.

5. FOLLOW-UP ACTIONS

After the approval of PENF, the following actions will be necessary for its full implementation:

5.1. Preparation and approval of a legislative and regulatory fertilizer framework for registry of fertilizers circulating in Mozambique.

5.2. Mandate MINAG and other concerned institutions to implement both PENF and the Regulatory System.

5.3. Wide dissemination of PENF and regulations.

5.4. Baseline study.

5.5. Establish a subsidy program.

5.6. Establish laboratories.

5.7. Prepare an Act for Fertilizers and submit to Parliament for approval.

6. BUDGET

Total budget for five years is US $1,126,871,550 (Table 8) of which 93 percent will be used in the input subsidy program in the context of the implementation of the Integrated Plan for Production and Productivity (IPPP). Of the annual US $210 million, $150 million is meant for credit in inputs and the remaining $60 million is for commercialization, insurance and other operational[5] expenses. It is also important to note that the expenses related to the elaboration of the Regulatory Framework (budget lines 1 and 3) as well as part of the amount (6.8 percent) for financing the establishment of laboratories has been secured from AGRA.

[5] For more details, please see the "Plano Integrado de Produção e Produtividade."

Table 8: Budget for the Implementation of the National Fertilizer Strategic Program

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1. Elaboration of Fertilizer Regulations	7,000					7,000
2. Dissemination of Fertilizer Regulations	60,000	60,000	30,000			150,000
3. Baseline Study	30,000					30,000
4. Establishment of 4 Labs	512,000	512,000				1,024,000
5. Implementation of Subsidy Programs	210,000,000	210,000,000	210,000,000	210,000,000	210,000,000	1,050,000,000
6. Training of Technicians	100,000	100,000	100,000	100,000		400,000
7. Expansion of Retailer Network	2,000,000	1,500,000	1,000,000	500,000	100,000	5,100,000
8. Quality Control	50,000	100,000	150,000	200,000	250,000	750,000
9. Strengthening Research in Fertilizers	500,000	500,000	1,000,000	1,000,000	1,000,000	4,000,000
10. Mapping of Soil Fertility in 6 Corridors	3,000,000	3,000,000	3,000,000			9,000,000
11. Extension and Dissemination of Technologies	500,000	500,000	500,000	500,000	500,000	2,500,000
12. Supervision of the Program	50,000	50,000	50,000	50,000	50,000	250,000
Sub-total	216,809,000	216,322,000	215,830,000	212,350,000	211,900,000	1,073,211,000
Contingencies (5%)	10,840,450	10,816,100	10,791,500	10,617,500	10,595,000	53,660,550
TOTAL	**227,649,450**	**227,138,100**	**226,621,500**	**222,967,500**	**222,495,000**	**1,126,871,550**

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