REPUBLIC OF SOUTH SUDAN

MINSITRY OF AGRICULTURE, FORESTRY, COOPERATIVES & RURAL DEVELOPMENT

SOIL HEALTHAND CONSERVATION POLICY

(2012 - 2015)

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PREFACE

South Sudan's vision to have "Food For All by 2015" which will require improved agricultural productivity through use of improved inputs such as improved seed, organic and inorganic fertilizers, which are still at very low levels of application by farmers. Inorganic fertilizer consumption in South Sudan averages around 4 kg per hectare and less than 1%of the population use fertilizer. The country, with an estimated projected population of 9.16 million in 2011, had an overall cereal deficit of about 291,000 tonnes. An estimated 890,000 people wereestimated to be severely food insecure and an additional 2.4 million people as moderately food insecure.

The general perception of the majority of farmers is that the soil in South Sudan is adequately fertile and therefore unnecessary to useinorganic fertilizer. Although the 2010 national survey demonstrated that 53% of households, particularly in the Green Belt region, Northern Bahr el Ghazal, and Warrap had used organic fertilizers, crop yields were still extremely low to meet the demand for household and national food security. Lack of knowledge, experience and appreciation of the role of fertilizer in improving crop productivity, even among farmers adopting hybrid seeds and improved planting materials, contribute to this negative attitude on inorganic fertilizer. In addition, inadequate extension and technology transfer services limit smallholder farmers' knowledge, skills and capacity development related to appropriate fertilizer use.

Major challenges affecting use and application of organic and inorganic fertilizers include lack of appropriate knowledge and skills on land and soil fertility management, poor access to finance, inadequate transport infrastructure, limited markets and low institutional capacity. The purpose of this policy is to address organic and inorganic fertilizer constraints, challenges and opportunities to transform South Sudan into a food secure and export oriented country within the region and globally.

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EXECUTIVE SUMMARY

The low agricultural yields whereby cereal production is estimated at an average of 0.61 tonne/hectare, is a threat to the realization of the country's overarching objective to guarantee "Food for All" by 2015 through increased agricultural productivity including increasing cereal production from 800,000 to 2 million mt per annum. South Sudan is endowed with abundant natural resources (land, water and weather) with considerable potential for agriculture, fisheries, livestock and forestry.However, only 4% of arable land (1.3 million hectares) is utilized, 90% of which is rain-fed. An estimated 80% of cereal production is from traditional subsistence farms that do not use improved seed or soil fertility management practices, hence the low productivity levels.

Major factors contributing to low agricultural productivity are poor soil fertility and low organic matter content caused by naturally occurring nutrient imbalances and poor soil fertility management practices (including failure to apply supplemental fertilizers). Although the majority of South Sudanese farmers perceive that their soils are fertile, evidence from soil testing clearly shows that many cultivated soils have poor soil fertility and do not supply a balance of nutrients needed by the crops being grown. Considerable yield responses are achieved when improved soil fertility management practices are used, including appropriate application of organic and inorganic fertilizers based on soil tests.

The soils of South Sudan are heterogeneous and require different regimes of management and fertilizer applications. The most commonly deficient soil nutrients are nitrogen, phosphates, calcium and potassium. In many areas of the country, arable lands (even virgin lands) are naturally low in availability of phosphorus, as well as in organic matter. These naturally occurring nutrient imbalances translate into low crop yields, even from newly cultivated fields, and each crop produced further reduces natural soil fertility through nutrient uptake (known as soil mining). Additionally, small-scale farming systems generally do not include effective cultural practices for soil and water management, resulting in high fertility losses from soil erosion.

Fertilizers are rarely used in South Sudan, with an average of about 4 kg per hectare. IFDC estimates that nutrient mining from maize production in South Sudan reaches between 30kg and 60kg[1] per hectare per annum. As a general rule, under normal conditions in the country, it takes 3-5 years of fallow to regenerate the nutrients mined during 2 crop years. And this does nothing to correct the naturally occurring nutrient imbalances in terms of

[1] IFDC 2002-2004. Include Africa Map of soil depletion in the appendix

making available the nutrient balance required by the cultivated crop. Application of a balancing fertilizer mix (organic or inorganic), when combined with soil fertility management practices that minimize soil erosion, not only eliminates the need for long-term fallowing but also greatly enhances crop yields, especially when combined with the use of improved seed and planting materials.

Balancing and maintaining adequate soil fertility is an essential aspect of modern agricultural systems. Poor soil and water management practices exacerbate the rate of natural nutrient depletion and imbalances, further reducing yields. To achieve improved agricultural yields and profitability, RSS urgently must establish a modern soil fertility management policy environment, anchored in cost-effective policies for rapidly developing a private sector driven fertilizer marketing and distribution system throughout the country. As South Sudan embarks on a renewed effort to increase agricultural output and productivity to improve food security and the economic well-being of rural populations, soil fertility must be replenished, balanced and enhanced. A two-pronged approach is required: (1) wide-spread adoption by small-scale farmers of cost-effective soil fertility (and soil moisture) management practices that minimize soil erosion and increase soil organic matter, and (2) judicious use of organic and inorganic fertilizers, based on soil testing, that restores a balance of crop-available nutrients as required by the crop being cultivated.

This document provides guidelines for policies designed to manage soil fertility (including effective use of supplemental fertilizers) in a manner that rapidly and progressively increases crop yields and profitability. The strategy for rapidly improving soil fertility is to promote and facilitate widespread adoption of cost-effective soil fertility management practices, including seasonal application of inorganic and organic fertilizers at levels sufficient to balance crop-available nutrients with crop requirements for optimum yields.

In the absence of an effective fertilizer information, knowledge, marketing and distribution system, small-scale farmers cannot access either fertilizer products or know-how about fertilizer use. Currently there is no national policy for developing fertilizer information, marketing and distribution system in South Sudan, nor is there a policy or implementation strategy for achieving widespread know-how and adoption by small-scale farmers of cultural practices that effectively manage soil fertility (by minimizing soil erosion on cultivated fields). In the absence of the latter, the use of fertilizers to replenish and maintain soil fertility is not cost-effective.

The major objective of this policy is to improve soil fertility to increase agricultural productivity through research based application of organic and inorganic fertilizers, sustainable soil management practices and development of a conducive policy and institutional environment. The following are the policy statements to guide and promote fertilizer availability, access and utilization in South Sudan:

Policy Statement No 1

Ensue that improved cropping and farm management practices are identified and promoted, in order to maintain and enhance balanced soil fertility.

Policy Statement No 2

Encourage domestic production, and when necessary, importation of organic and inorganic fertilizers to satisfy demand.

Policy Statement No 3

Collaborate with the private sector to create a fertilizer which allows easy access to fertilizer by individual farmers, cooperatives, groups and associations.

Policy Statement No 4

Undertake targeted intervention to facilitate efficient and effective utilization of high quality and appropriate organic and inorganic fertilizer based on soil analysis.

Policy Statement No 5

Take urgent measures to develop human resources and institutional capacity to enhance the development and management of the fertilizer sector**.**

LIST OF ABRREVIATIONS

IFDC	-	International Fertilizer Development Centre
RSS	-	Republic of South Sudan
FAO	-	Food and Agriculture Organization
MFIs	-	Microfinance Institutions
EU	-	European Union
SSFC	-	South Sudan Fertilizer Commission
COMES	-	Common Market for Eastern and Southern Africa
EAC	-	East African Community
WTO	-	World Trade Organization
RECS	-	Regional Economic Communities
AU	-	African Union
AFFM	-	African Fertilizer Financing Mechanism

Photo 1-Mechanised application of liquid fertiliser

1. BACKGROUND AND OVERVIEW OF SOUTH SUDAN

South Sudan has an area of approximately 640,000 sq.km. The waters of the White Nile and its tributaries flow down from the highlands of Uganda, Congo, the Central African Republic and Ethiopia into the low clay basin forming the world's largest contiguous swamp (CFSAM, 2010). The country lies within the tropical zone between latitude 3.5º and 12º North and longitude 25º to 36º East. Mean annual temperatures vary between 26º C and 32º C across the country and rainfall, which supports the nation's agricultural activity, is erratic and significantly variable (Lupai, 2009). According to results of the 2008 Population and Housing Census of Sudan, South Sudan has a total population of 9.16 million. Population density is one of the lowest in sub-tropical countries, with on average only 13.5 inhabitants per sq. km.Administratively, the Republic of South Sudan is sub-divided into 10 States; namely, Central Equatoria, Eastern Equatoria, Jonglei, Unity, Upper Nile, Western Equatoria, Lakes, Northern Bahr El Ghazal, Warrap, and Western Bahr El Ghazal States.

The country is endowed with abundant natural resources (land, water and weather) with huge potential for agriculture, fisheries, livestock and forestry.More than 80% of the inhabitants are dependent on subsistence agriculture, ranging from the migratory and pastoral economy of Nilotic and Nilo-Hamitic tribes to those almost entirely dependent on crop production However, only about 4% agricultural land (1.3 million hectares) is currently utilized, 90% rain-fed, 80% of cereal production from traditional sector.

With over 95% of agricultural production being rain-fed, weather variability is a major factor in determining crops performance. Agriculture is for the most part based on small, hand-cultivated units often farmed by women-headed households South Sudan experiences unimodal and bimodal rainfall regimes. The bimodal areas cover much of Greater Equatoria (Western, Central and Eastern Equatoria), while the unimodal areas characterize the rest of the country. This results in a range of growing seasons from 280-300 days in the south parts of South Sudan to 130-150 days per annum in the northern parts.

1.1 OVERVIEW OF AGRICULTURE IN SOUTH SUDAN

Agriculture in South Sudan is predominantly subsistent in nature, comprising traditional livestock rearing, crop production, fishing, collection of wild fruits and game hunting. About 50% of South Sudan's land[2] has high potential for agriculture. The climate and soils are conducive to a wide range of both cash and food crops. These contribute to specific household economies depending on the livelihood zones. All farm operations, post-harvest and processing are done manually, using a

[2]USAID (2010).Program Description for the Food, Agribusiness, and Rural Markets (FARM) Project in South Sudan.

small range of rudimentary tools and implements with limited application of tractors or ox-ploughs. The main crops grown include sorghum, maize groundnuts, cassava, vegetables, pineapples, oil palm in addition to coffee, tea, and sugar cane. The average subsistence family cultivates an average of two feddans (about 0.84 ha[3]). Based on the 2010 FAO Annual Needs and Livelihood Analysis Report[4], the average yield of cereal production, especially, sorghum over a period of ten years is less than 0.95 t/ha. Balancing and maintaining adequate soil fertility is an essential aspect of modern agricultural systems. Most soils of South Sudan are moderately fertile but in the absence of soil amendments and appropriate cultural practices, the soil will rapidly lose the nutritional balance required for efficient and sustainable crop production. For example uncontrolled land clearing and slash and burn system of farming, contribute to loss of organic matter and depletion of soil nutrients including inorganic fertilizer due to erosion. Other factors that exacerbate decline in fertility are poor soil and water management practices and failure to properly rotate crops.

Soils of the South Sudan are known to be heterogeneous and generally poor in organic matter and nitrogen. The country's soil type is ferralsol which occupies a considerable part of Central Africa. A notable characteristic of ferralsols is advanced weathering known for low levels of nutrients available and reduced capacity to retain. The average fertilizer use in SSA (excluding South Africa), estimated at 9 kilograms per hectare whereby the average for South Sudan is 4kg/ha, 86 kg/ha in Latin America, 104 kg/ha in South Asia and142 kg/ha in Southeast Asia). Therecommended rate by the United Nations Food and Agriculture Organization (FAO) is 200 kg/ha Agricultural yield per hectare for cereals (maize, sorghum, millet, and rice) averages only approximately 0.61 metric tons in South Sudan. In comparison, the average yield in Africa is more than 1 ton per hectare, and more than 2.3 tons per hectare in South Africa and South Asia[5]. Practices such as deforestation, overgrazing, bushfire and failure to apply other water runoff management measures, all have contributed to soil degradation and declining soil fertility, leading to the observed low yields per hectare.

1.2 OVERVIEW OF FERTILISER USE IN SOUTH SUDAN

Fertilizer means any substance containing one or more recognized plant nutrient(s) that is used for its plant nutrient content and is designed for use or claimed to have value in promoting plant growth; specifically:

[3]Kanisio. John O, et al (2010). Joint Baseline Survey Report on the Agriculture and Animal Resources in South Sudan.

[4]FAO (2011).Annual Needs and Livelihood Analysis Report.

[5]Haas, Astrid R.N. And Sarah Armstrong (2011).South Sudan's Greenbelt. Can Tapping Agriculture Assets Become The New Nation's Economic Elixir?

i. mineral fertilizer means fertilizer produced by mineral processes or mined and derived from an organic substance or synthetic organic substance; and

ii. organic fertilizer means fertilizer derived from non-synthetic organic material, including sewage sludge, animal manures, and plant residues produced through the process of drying, cooking, composting, chopping, grinding, fermenting or other methods and makes a declaration of nutrient value on the label.

Based on the top-soil sample analysis by Crop Nutrition Laboratory Services in Eastern Equatoria State in 2011, levels of phosphorous and calcium in most fields are low and variable. Low soil fertility is attributed to nutrient mining of agricultural land. A study by the International Fertilizer) on nutrient mining demonstrates that South Sudan falls within the range of 30kg to 60kg[6] per hectare per annum. Application of fertilizer, both organic and inorganic is therefore necessary to replace the lost nutrients and improve soil fertility and agricultural productivity. Although the majority of South Sudanese perceive that the country is fertile, evidence on improved crop yields through fertilizer application counteracts their perception. For example, field trials carried out at the Gezira Research Station in Sudan for three seasons (1998 to 2000) demonstrated that grain yields increased with the addition of Nitrogen up to 86 kg N/ha, (Nour, Lazim and Fattah, 2010).

Farmers in the rain-fed sector apply less fertilizer than the country average of 4kg/ha. Soil fertility is usually maintained by applying manure or leaving land fallow for 3 to 5) years. Manure is an important factor of productivity in Northern Bahr el Ghazal, Warrap and Lakes States using cow dung. However, it is not easy to determine the contribution of livestock to nutrient status although it has been demonstrated that application of manure assures an increase of grain yields. A case study of eight farmers in Abet showed that yields from manuredfields were 25 to 115% higher than that from non-manured fields in the same locality.

Until the 1980's some cash crop plantations and contract farming operations (e.g., tobacco) used fertilizers on a limited scale in South Sudan, mainly in areas with poor soil fertility. Imported chemical fertilisers were mainly used by farmers in the Aweil Rice Scheme and commercial farmers in Northern Upper Nile and in tobacco farms in the then Yei district. However, during the war, more emphasis was put on application of organic fertilisers where farmers were trainedon the use compost manure to improve soil fertility.

1.3 RATIONALE FOR FERTILIZER POLICY

The need for establishing fertilizer policy in the country is glaringly obvious. Since the independence of Sudan in 1956, there have been poor crop and land management practices, leading to low soil fertility and low crop yields. As the

[6] International Fertilizer Development Centre (IFDC), 2002 - 2004

country embarks on a renewed effort to increase agricultural output and productivity to improve food security and the economic well-being of rural populations, depleted crop nutrients must be replenished and enhanced through adoption of appropriate soil fertility management practices, combined with application of fertilizer mixes based on soil analysis.

This document is an initial effort to provide a policy framework that encourages farmers to replenish depleted nutrients and improve soil fertility management practices that greatly increase crop productivity. The policy proposed below is intended to promote and facilitate adoption by farmers of improved soil fertility management practices, including judicious use of organic and inorganic fertilizers as soil amendments that greatly increase crop productivity and profitability.

Photo 2- A healthy soil is most likely to produce healthy produce like these fruits. Healthy plants are also less likely to be less prone to pests and disease attacks.

2. CONSTRAINTS, CHALLENGES AND OPPORTUNITIES

A major strategy for improving soil fertility is to increase the use of inorganic and organic fertilizers. When combined with adoption of appropriate water runoff management and soil conservation practices, application of supplemental fertilizers to balance crop-available soil nutrients with crop requirements will achieve major improvements in crop yields and profitability. However, there are currently serious constraints and challenges in the country in terms of fertilizer availability, access and utilisation. An understanding of the major constraints and challenges can contribute to identification of strategic options to rapidly increase appropriate fertilizer use, thereby significantly increasing agricultural yields and profitability, achievements that are essential to reaching the national goal of "Food for All" by 2015.

2.1 CONSTRAINTS

2.1.1 LOW FERTILIZER AVAILABILITY

The fertilizer value chain in South Sudan is discontinuous and dysfunctional. In the absence of effective demand in the country, marketing and distribution systems have not been developed. This is in part the legacy of a government controlled public system of fertilizer importation and distribution inherited from Khartoum. Similarly, there is no supporting system to promote and facilitate effective fertilizer use; no policy framework, no installed capacity for soil testing or for information adaptation/interpretation and dissemination, either for soil water management to reduce soil erosion or use of fertilizers to increase crop yields and profitability. Demand must be generated and the supply chain (the entire fertilizer marketing and distribution system) must be developed virtually from scratch.

2.1.2 INADEQUATE LOCAL CAPACITY TO MANUFACTURE FERTILIZER

Peoples' perception in South Sudan is that the land is fertile and that it does not need fertilizer application has suppressed demand for fertilizer use and has also denied private sector's incentive to manufacture or import fertilizer. South Sudan currently produces no inorganic fertilizers, although it has significant mineral deposit for fertilizer production.

The main fertilizer raw materials are hydrocarbons for energy and ammonia feedstock (today mostly natural gas), phosphate rock, sulphur and potassium salts. The country has potential deposits of mineral resources for fertilizer manufacture, including rock phosphate, potash rocks and limestone, sulphur, calcium and magnesium[7]. However, there is need for feasibility studies to demonstrate the cost/benefit of manufacturing fertilizer locally. In the absence of local production capacity, major fertilizer exporting countries in the region (such as Egypt and Saudi Arabia) can supply South Sudan needs at competitive prices for the foreseeable future.

[7]Legge, Patrick (2011). Ministry of Energy and Mining, RSS.

2.1.3 TIMELINESS OF FERTILIZER IMPORTATION AND DISTRIBUTION

In many cases, it takes 12 to 14 weeks between importation orders and arrival of consignments in the country. Delayed procurement caused by policy uncertainty can result in late delivery relative to the planting season as importers comply with formal government importation procedures[8]. Current regulations in South Sudan require importers to have an Import License from the Ministry of Commerce specifying complete product details,approximate value and port of entry. In the absence of a proper import license, importers must pay prior to customs clearance a fee of 2% of the CIF value. Some imports, including fertilizers, genetically modified seeds and agricultural chemicals are prohibited.

2.1.4 DISTANCE TO MARKETS AND LIMITED ACCESS TO FERTILIZER

Farmers in South Sudan have considerable difficulty in accessing fertilizer even if it is available in commercial markets, because of distance to markets, lack of funds and high prices.Infrastructural constraints and long distance haul on roads that become impassable in the rainy season create major barrier for farmers to access fertilizer (and other agricultural inputs). These conditions significantly increase access costs to small-scale farmers, both in terms of transport costs and time invested in searching for product, purchasing and delivery. While this is not a household factor per se, it still has considerable influence on decisions made by the household on whether to use fertilizers or not.

2.1.5 LIMITED ACCESS TO CAPITAL

Due to high rate of poverty in the rural areas, most small-scale farmers do not have ready cash with which to purchase fertilizer, nor do they have access to credit for that purpose. Poverty estimates in South Sudan indicate that 50.6% of the population lives below the poverty line (SDG79.2) of which 24.4% and 55.4% are located in the urban and rural areas, respectively (Southern Sudan Centre for Census Statistics and Evaluation, 2010). Lack of funds and f credit facilities also limit the capacity of small to medium scale agribusinesses to import and distribute fertilizers and other inputs. Inadequate capital base, hastherefore made it difficult for them to stock sufficient quantities of inputs at the time farmers need them.

Efforts by donors and RSS to establish a network of microfinance institutions (MFIs) have not yet had a significant impact on credit availability to small agribusinesses and small-scale farmers. Microfinance offers an opportunity for improved access to agricultural inputs including fertilizer through credit facilities. However, Atil (2009) observes that out of the country's population of 8,260,490, only approximately 6,000 have bank accounts and 21,2973 currently access microfinance. The MFI's estimate of coverage is only 5% of the available clients in the greater Juba region and less than 1% of the potential market in the entire country. MFI clients mainly consist of informal vendors that operate without licenses

[8]http://www.interfreight2000.com/docs/IF%20Sudan%20Import%2007.06%20V.01.pdf

or registry. Trade and services sectors are the main client sectors (68%), with only a small percentage of loans to agriculture and livestock (15%) and to manufacturing (11%). Clearly there is much room for expansion both in terms of breadth and depth of coverage, along with more emphasis on serving the productive sectors.

2.1.6 FERTILIZER PRICES

High retail prices of fertilizers have constrained application of fertilizers by farmers. Recently for example, the price for a tonne of diammonium phosphate (DAP) from the USA increased by 160% between January 2007 and January 2008, while the price of urea from the Middle East increased by 53% during the same period[9]. Sea freight is also a significant component of fertilizer prices and the high demand for bulk sea freight associated with the commodities boom has seen an increase in international shipping rates of nearly 200% as of December 2006. From 2004, FOB prices for urea have experienced some of the highest increases witnessed since the oil shortage of 1974. These changes reflect the rising cost of oil related charges which escalated quite rapidly in early July 2004. Further analyses shows that inland transportation also is a major cost factor. Rising fertilizer prices without corresponding increases in producer prices discourage farmers from using adequate amounts of fertilizer.

2.1.7 LOW UTILISATION OF FERTILIZER

As mentioned earlier, the rate of fertilizer use in the country averages 4 kg per hectare which is extremely low compared to neighbouring countries in the region. Factors contributing to this situation include lack of knowledge and appreciation of the role of fertilizer in improving crop productivity, especially for farmers adopting hybrid seed and improved planting materials. Also, inadequate extension and technology transfer services limit smallholder farmers' knowledge, skills and capacity development related to appropriate fertilizer use. Furthermore, the predominance of subsistence farming in the country suppresses demand for improved inputs such as fertilizer, leading to low productivity, food insecurity and poverty at household level. Although inorganic fertilizer application enhances productivity, inappropriate use can negatively affect nutrient balance and soil health. In South Sudan, efforts in soil fertility mapping and land use classification in terms of crop production potential have been made in the 1980s. However, reports of these studies are not readily available. Lack of land use classification and soil mapping limit the ability to match fertilizer needs to different soil types. Similarly, lack of soil testing services restricts the ability to use fertilizer to balance the crop-available soil nutrients with crop requirements.

[9]Agrium's Fertilizer Industry 2009/20110 Fact Book.

2.2 CHALLENGES

2.2.1 INADEQUATE TRANSPORTATION INFRASTRUCTURE

Poor transport infrastructure (roads and rolling stock) pose a challenge for agricultural input and output value chain development in South Sudan (including fertilizer value chains). The restoration and development of roads and buildings in the country has been ongoing since the CPA (Peace Security Development Network (2009). With the exception of Juba, where around 100 miles (160.93km) of road surface has recently been bituminized, all other urban, inter-urban, interstate and regional highways have rough surface. Therefore, transport cost, port and handling charges for a land-locked country such as South Sudan can significantly increase costs of imported fertilizer. According to the recent FAO/WFP (2009) assessment report, the cost of transporting ten tonnes of produce from Yambio to Juba was SDG 3,000 (approximately $1,154), which is uncompetitive compared to surrounding countries.

Delays in fertilizer imports can be exacerbated by transportation of humanitarian relief food, creating congestion at the port and also increasing demand and cost of haulage. A greater volume of goods and commodities is imported into South Sudan than is exported. This means that trucks bringing goods into this country must often return empty. The lack of backloads results in inward transport rates well in excess of outward rates. Additionally, trucks travelling regionally are subject to heavy charges levied by the countries through which they pass. Some delays may be encountered at border posts when documents have not been forwarded properly. Other delays in transportation originate from pre-shipment inspections. Imports of FOB value are subject to pre-shipment inspection. The requirement for pre-shipment inspection is expensive for importers, demanding a certain percentage of the value of the import as payment. Delays are experienced in the system, with importers having to pay for storage charges.

2.2.2 LOW OF INSTITUTIONAL CAPACITY

In South Sudan, there are virtually no public or private sector institutions to carry out the roles and responsibilities associated with fertilizer marketing and distribution, such as procurement, labeling and quality assurance, sales and distribution. There is no national fertilizer policy or regulatory framework to guide private and public sector organizations in handling and managing this important agricultural input. The absence of policies and public sector institutional capacity discourages both domestic and foreign private sector investment in developing a viable fertilizer marketing and distribution system to serve farmers at competitive prices.

2.2.3 POOR SOIL FERTILITY MANAGEMENT PRACTICES

Most farmers in South Sudan have not applied effective soil fertility management practices. Unchecked soil erosion from wind and rainfall runoff quickly destroys natural soil fertility. In the absence of appropriate soil conservation measures against wind and rainfall runoff erosion, considerable applied organic and inorganic fertilizer will be lost through soil

erosion. Loss of fertility and organic matter through soil erosion reduces crop yields because of crop-available nutrient loss as well as reduced soil moisture-holding capacity that compromises nutrient uptake capability of the growing crops.

Both rainfall and runoff factors contribute to soil erosion problems in South Sudan. The impact of raindrops on the soil surface can break down soil aggregates and disperse the aggregate material causing disappearance of organic matter. Lighter aggregate materials such as very fine sand, silt and clay can be easily removed by the raindrop splash and runoff water. Soil movement by rainfall (raindrop splash) is usually greatest and most noticeable during short-duration and high-intensity thunderstorms. Although erosion caused by long-lasting and less-intense storms is not as spectacular or noticeable as that produced during thunderstorms, the amount of soil loss can be significant. Run-off erosion usually is greatest during spring months when soils are usually saturated from frequent rains and vegetative cover is minimal.

Inadequate soil and water management measures accelerate both water and wind erosion of cultivated land. Poor tillage and cropping practices, as well as land management practices, directly affect the overall soil erosion problem and solutions on a farm. Soil erosion potential is accelerated by inappropriate tillage operations.

Other inappropriate farming practices that reduce soil fertility include burning of crop residues, failure to rotate crops, bush fires and destruction of tree cover. Shifting cultivation which is commonly practiced among subsistence farmers in South Sudan, also contributes to land degradation and loss of nutrients through destruction of tree and grass cover. Loss of soil cover reduces organic matter and moisture holding capacity. Soil fertility is also limited by soil compaction (use of tractors and animal movement), loss of soil structure, poor internal drainage, salinization, alkalinisation and soil acidity problems.

2.2.4 GENDER DISPARITIES

Though women constitute the majority of agricultural food producers and perform most agricultural tasks, they are also less educated than men and have lower incomes. Extremely high rates of illiteracy (84% among females and 60% among males) limit women's access to information, particularly on soil fertility management practices including the use of fertilizer. Moreover, with the higher poverty rates among females, (57%) of the population living in female headed households are poor compared to 48 % in male headed households) women are less likely to adopt expensive technologies like inorganic fertilizer because of poor access to capital.

2.3 OPPORTUNITIES

2.3.1 POLITICAL WILL

The Government of the Republic of South Sudan has adopted a general development strategy to increase sustainable agricultural productivity and production to improve food security and economic prosperity while protecting the natural environment. Additionally, numerous development partners have provided and can be expected to continue to provide

agricultural development assistance. Many donors have indicated an interest in supporting activities to develop the fertilizer industry and to promote activities to improve soil fertility management practices by small-scale farmers. These include the EU, USAID, IFAD, DFID, World Bank, FAO, UN Women and other UN agencies and NGOs. Some development partners have already started experimenting with the use of fertilizers on vegetable crops with encouraging results, e.g., AGRA, IFDC, JICA, and the FARM Project).

2.3.2 Abundant Natural Resources to Manufacture Fertilizer

South Sudan has abundant natural resources to develop its own fertilizer industry for domestic and foreign markets. Analysts estimate that the country holds nearly 7 billion barrels of oil and 2.5 trillion cubic feet (tcf) of natural gas. The country also has plenty of animals which can produce manure and bio-gas. Oil and natural gas are basic ingredients in the manufacture of fertilizers and other products such as pesticides, plastics, dyes, paints, detergents and synthetic fibers (polyester, nylon, and acrylic), make-up and candles. The establishment of a refinery in 1986 for crude oil sourced from South Sudan provided an opportunity for a joint venture between the United States and North Sudan to build a fertilizer plant south of Khartoum. Now that this country is independent, the same opportunity exists to construct a refinery within the proximity of the oil fields to facilitate manufacturing of fertilizer which can help to stimulate domestic agricultural productivity and also to contribute to the generation of foreign exchange through trade of various agro-chemicals. However, this should be considered as a long term agenda considering that the cost of the plant may be prohibitive to the country, unless it is taken as a facility to service the wider eastern and central Africa region.

2.3.3 Training Institutes

South Sudan has training institutes in Yambio, Yei, Kagelu, Marial Lou, Rumbek and Padak that can be utilized to strengthen the capacity of middle level staff to deal with issues related to soil fertility management and fertilizer handling and use. Further, the faculties of agriculture in Juba, Wau, and Malakal Universities can provide professional courses and training for upgrading higher level skills.

2.3.4 Traditional Practice of Using Organic Fertilizer

Cultural practices such as application of organic fertilizer, for example manure, provides an opportunity to improve soil fertility and productivity. It has been observed that maize yield increase due to NPK fertilizer application can be as high as 150%, but when the soil is amended with lime and manure, yield responses of 184% are obtained. It is further argued that intensive agricultural land used to produce high crop yields, demands intensive use of natural manure, inorganic fertilizers and efficient and effective agricultural extension services to ensure that the quality and the fertility of the land is maintained and sustained.

One advantage of organic fertilizer including compost is that it is readily available and less costly than inorganic fertilizer. Biomass, especially plant and animal waste products can be used to produce organic fertilizer. South Sudan has an estimated number of 11 million

head of cattle and 27 million head of small ruminants (14 million goat and 13 million sheep)[10] which can contribute significantly to organic fertilizer through manure. Application of both organic and inorganic fertilizers in the country would reduce the cost of production and improve farmers' benefits.

2.3.5 NATIONAL, REGIONAL AND INTERNATIONAL INSTITUTIONS

A regional African network already exists for harmonisation and rationalisation of fertilizer policies and regulations. This network provides an opportunity for South Sudan to strengthen its national and international linkages in promoting agricultural productivity to improve food security and sustainable economic growth and development. The RSS has been actively involved in developing working relations with regional governments and institutions. South Sudan can benefit considerably from membership in sub-regional, regional and international bodies concerned with fertilizer marketing, distribution and use, and from ratification of fertilizer treaties and conventions. This is an important step for management and control of fertilizer at global and regional levels. These linkages can make available to South Sudan useful and practical information generated by global research, and can facilitate access to technologies developed in other countries for improved fertilizer use and soil fertility management.

[10]FAO/WFP (2011).Crop and Food Security Assessment Mission to Southern Sudan.

3.0 VISION, MISSION AND POLICY STATEMENTS

3.1 VISION AND MISSION

In furtherance of MAFC&RD strategic plans and sector-wide policy framework, this fertilizer policy statement seeks to promote the following vision, mission, goal, guiding principles and objectives:

3.1.1 VISION

To increase agricultural productivity through improved soil fertility, thereby improving farm profitability and expanding market-oriented production that contributes to national food security, reduces poverty and accelerates gender-responsive sustainable economic growth.

3.1.2 MISSION

To facilitate transformation of soil management practices and improve availability, access and utilization of organic and inorganic fertilizers, through improved business management practices and commercialization of subsistence farming, while protecting the environment and address gender concerns.

3.1.3 GOAL

To sustainably increase agricultural productivity through optimal utilization of organic and inorganic fertilizers and other soil and water management practices that increase land and labour productivity for increased competitiveness and food security.

3.1.4 GUIDING PRINCIPLES

Policy instruments and directives presented herein are based on the following guiding principles:

i. Private sector-led competitive fertilizer market;

ii. A Harmonised soil fertility management and fertilizer policies, legislation and regulations with regional and international countries;

iii. Stakeholders involvement especially the poor and disadvantaged groups such as women in the development, implementation, monitoring and evaluation of such policies to facilitate adoption of fertilizer usage.

iv. Ensure accountability and transparency in policy implementation; and

v. Ensure compliance and consistency with international fertilizer safety standards based on guaranteed analysis, packaging and labeling for protection and conservation of the environment.

vi. Promotion of organic manure where applicable

3.2 MAJOR OBJECTIVE

Improve soil fertility to increase agricultural productivity through research based application of organic and inorganic fertilizers, sustainable soil management practices and development of conducive policy and institutional environment.

3.3 POLICY STATEMENTS

3.3.1 POLICY STATEMENT ON IMPORTATION AND PRODUCTION OF FERTILIZERS

Problem Statement No. 1

Inadequate facilitation of imported and domestic production organic and inorganic fertilizers

Policy Statement No. 1

Encourage importation and domestic production of organic and inorganic fertilizers.

Implementation strategies for policy No. 1

i. Establish a fertilizer bonded warehouse through an agreement with an international agent to supply fertilizer to the private sector at competitive global prices;

ii. Encourage private sector including agro-dealers to market and distribute fertilizer widely;

iii. In collaboration with SSARO, encourage the exploration and development of the country's raw material potential for fertilizer production based on comprehensive feasibility studies;

iv. The private sector will be encouraged to invest in fertilizer manufacture and establish a number of fertilizer blending plants close to areas of utilization[11]; and

v. Promote public and private sector partnership to facilitate construction of fertilizer production plants, marketing and storage infrastructural chains in the country.

<u>Flagship project for policy no.</u> 1

Construction of Fertilizer Blending and/or Production Plants

[11]Blended fertilizer is cheaper than granulated fertilizer.

3.3.2 POLICY STATEMENT ON COLLABORATION WITH, AND FACILITATION OF PRIVATE SECTOR IN FERTILIZER MARKETING

Problem Statement No. 2

Poor private sector collaboration to undertake targeted intervention to facilitate a transparent and market-friendly environment

Policy Statement No. 2

Collaborate with the private sector to undertake targeted intervention to facilitate market-friendly and transparent access to fertilizer by individual farmers, cooperatives, groups and associations.

Implementation strategies Policy no. 2

i. Design and implement a program to develop a network of trained and certified agro-dealers to serve the rural interior and hence increase physical access to fertilizer;

ii. Design and implement a five to ten year market friendly input intervention program (with an exit plan) using a flexible voucher system that allows disadvantaged and poor farmers, including women and youths, to buy fertilizer and hybrid seeds for production of appropriate crops based on suitable agro-ecological zones;

iii. Ensure that fertilizer prices are determined by market forces to facilitate competitive fertilizer markets and benefits to the private sector;

iv. In consultation with the Ministry of Roads and Bridges identify and prioritise rural feeder roads and intensify maintenance and construction at county and payam levels, through community income generating activities such as food for work, cash for work and fertilizer for work; and

v. Establish a risk sharing mechanism for importers and agro-dealers to facilitate farmers' access to loans for purchase of fertilizer.

Flagship project for policy no. 2

Input use Intervention Programme

3.3.3 POLICY STATEMENT ON ENHANCING EFFICIENT AND EFFECTIVE FERTILIZER UTILISATION

Problem Statement No. 3
Poor intervention to facilitate efficient and effective fertilizer usage based on soil analysis
Policy Statement No. 3
Established a system for targeted intervention to facilitate efficient and effective utilization of high quality and appropriate organic and inorganic fertilizer based on soil analysis.

Implementation strategies policy no. 3

i. Implement a gender-responsive, comprehensive, pluralistic and demand driven farmer and agro-dealer training program to enhance integrated utilization of organic and inorganic fertilizer and related inputs[12];

ii. Encourage judicious use of fertilizers consistent with optimum environmental health;

iii. In collaboration with SSARO, support studies to identify soil characteristics and composition in different agro-ecological zones;

iv. Develop public-private sector partnership to enhance effective utilization of the market infrastructure to distribute fertilizer in the country;

v. Promote effective use of inorganic and organic fertilizers through extension services to improve soil fertility and agricultural productivity; and

vi. Ensure that soil erosion problems are addressed through application of modern soil management practices appropriate to local conditions.

<u>Flagship project for policy no. 3</u>

SSRO Laboratories for Soil Analysis for Fertilizer use Recommendations

[12]Effective and efficient utilization of fertilizer is compromised by inadequate skills and knowledge among the majority of smallholder farmers and input dealers.

3.3.4 POLICY STATEMENT ON CROPPING AND FARM PRACTICES TO ENHANCE BALANCED SOILS

Problem Statement No. 4
Poor management of cropping and farm practices to enhance balanced soil fertility.
Policy Statement No. 4
Ensure that improved cropping and farm management practices are identified and promoted, in order to maintain and enhance balanced soil fertility.

Implementation Strategies Policy no. 4

i. Promote incorporation of nitrogen through crop rotation and adoption of nitrogen-fixing crops;

ii. Introduce and expand compatible inter-cropping techniques;

iii. Promote agro-forestry practices where appropriate; and

iv. Promote conservation agriculture through the use of reduced and minimum tillage and appropriate mulching practices.

3.3.5 POLICY STATEMENT ON HUMAN RESOURCE AND INSTITUTIONAL CAPACITY DEVELOPMENT

Problem Statement No. 5
Lack of human resource development and institutional capacity to enhance management of the fertilizer sector.
Policy Statement No. 5
Measures to develop human resources and institutional capacity to enhance the development and management of the fertilizer sector.

Implementation Strategies Policy no. 5

i. Establish a South Sudan Fertilizer Commission (SSFC) which shall operate independently with initial financial support from Government and Donors and eventually by the fertilizer industry; the SSFC shall facilitate an enabling environment for public-private sector partnership in the development of the fertilizer industry;

Implementation Strategies Policy no. 5

ii. In collaboration with SSARO, develop appropriate institutional arrangements for carrying out applied soil sciences activities at the national and state levels;

iii. Rehabilitate and equip existing soil laboratory facilities;

iv. In collaboration with the Directorate of Research, Training and Extension, train medium and high level soil fertility professionals and technicians, both in-country and abroad;

v. Enhance the capacity of farmers through extension services in the use of fertilizer without destroying soil fertility;

vi. Review fertilizer legislation and regulations and establish a national regulatory service which is capable of implementing quality measures, particularly at the point of sale; and

vii. Establish linkages with national, regional and international fertilizer institutions for harmonisation and rationalisation of fertilizer policies, legislation and regulations which will provide the country an opportunity to improve productivity, food security and sustainable economic growth and development.

Flagship project for policy no. 5

South Sudan Fertilizer Commission

4.0 INSTITUTIONAL AND IMPLEMENTATION FRAMEWORK

Implementation of the South Sudan Fertilizer Policy requires innovation, strong political will and leadership, competent technical direction and adequate financial support. Throughout all stages of implementation of this policy, there will be need for collaboration among many public sector agencies and private stakeholders, as well as accountability and widespread application of safe practices (both human and physical environment). In addition, it is essential to gradually develop a collaborative approach that creates a socio-economic environment conducive to change. This requires a process of consensus-building and adaptation to local conditions, as well as gradual establishment of functional soil science institutional support structures. To be successful, the policy must promote and facilitate improvements by small-scale farmers in soil fertility management practices that consistently and sustainably increase crop yields and profitability. Such practices include not only supplemental fertilization that balances crop-available nutrients with crop needs, but also adoption of a range of cost-effective improved soil conservation and cultural practices that minimise soil fertility and organic matter losses through soil erosion by wind and rainfall runoff. This combination of balanced fertilizer use and adoption of appropriate cultural practices to protect soil fertility levels adds value through increased yields and reduced production costs.

4.1 INSTITUTIONAL ARRANGEMENT

Currently, there is inadequate mechanism to promote and facilitate adoption of organic and inorganic fertilizer by farmers to improve soil fertility management practices and including judicious use of fertilizers as soil amendments that greatly increase crop productivity and profitability. In addition, the capacity and regulatory authority to ensure quality and standards of soil fertility enhancing products are non-existent. However, strategies to plan, coordinate, monitor and evaluate fertilizer development programmes among small, medium and large scale agricultural producers is in a nascent stage through MAFC&RD/RSS and IFDC. Implementation of this fertilizer policy will be iterative as progress generates new insights and knowledge.

The policy institutional framework and governance structure will require the following activities:

- Formulate fertilizer Legislation and Regulations to ensure compliance with quality and international standards within the industry;
- Establish a South Sudan Fertilizer Commission (SSFC) which will facilitate an enabling environment for public-private sector partnership in the development of the fertilizer industry;
- Encourage establishments of public and private sector institutions to facilitate fertilizer importation, arrangements and appropriate legal dispositions of the product;

- In collaboration with SSARO, establish a Soil Science Department in MAFC&RD/RSS, with fully functional units at the state level, with the capacity to undertake a dynamic program of soil analyses, and to provide leadership and guidance in the implementation of this policy;
- Undertake appropriate procedures to become a member of existing Regional and International Conventions related to fertilizer use, soil fertility and plant nutrition; and
- Recruit and deploy soil fertility specialists and technicians as required for policy implementation.

4.1.1 INORGANIC AND ORGANIC FERTILIZER DEVELOPMENT CONSULTATIVE FORUM

Sharing of information and ideas among farmers, NGOs the private sector, academia, the donor community and the Government can effectively contribute to sustainable development of the fertilizer industry in South Sudan. International fertilizer organizations can also deepen knowledge and skills about the development and implementation of the fertilizer value chain. Against this background, an Inorganic and Organic Fertilizer Development Forum (IOFDF) will be convened annually through the SSFC. The forum is also o provide advice and guidance to the SSFC in managing the fertilizer sub-sector in the country. The forum will be convened annually and will be chaired by the Minister and facilitated by the Corporation.

4.1.2 NATIONAL, REGIONAL AND INTERNATIONAL COLLABORATION

National, regional and international collaboration in inorganic and organic fertilizer development is a very important factor to carve out a more viable fertilizer market and enhance the realization of economies of scale and the attendant efficiency gains to all the stakeholders. According to ECAPAPA (2003), countries within the Eastern and Central Africa region have pursued different policies for their fertilizer sectors. Moreover, in spite of their inherent interdependence, countries have also prescribed fertilizer standards, laws and trade procedures with minimal, if any, reference, to practices in other countries within the region. The overall result of the disharmonious policies, standards, laws and procedures is the emergence of disparate fertilizer markets within countries in the region. This has not only impeded regional trade in fertilizers but also negated the aspirations of the existing trade agreements and protocols e.g. the Common Market for Eastern and Southern Africa (COMESA) and the East African Community (EAC). Moreover, they weaken the case for a common strategy in view of challenges of globalization under the aegis of the World Trade Organization (WTO).

The following issues need to be looked into in order to enhance regional trade in fertilizers. These include: elimination of re-inspection requirements for fertilizers

exports from country within the region, implementation of a common evaluation and registration policy, adoption of common tax policies on fertilizers, formulation of common fertilizer standards and a shared enforcement policy and the creation of a private-public sector regional forum for exchange of information on fertilizer issues.

Moreover, harmonization of fertilizer policies and regulations among the countries of the region will also help establish a common regional market viable enough to attract more investment in the sub-sector.Efforts to rationalize and harmonise fertilizer policies have been made through ECAPAPA in Kampala, Uganda (2005) and the African Union and NEPAD in Abuja (2006 and 2009). One of the key resolutions in the 2009 Abuja Fertilizer Conference was that the Regional Economic Communities (RECs) will need to take concrete steps to translate their programs into substantive changes on the ground in terms of policy and regulatory reforms, lower fertilizer prices and ultimately, increased fertilizer consumption. Based on deliberations on the rationalization and harmonization of fertilizer policies, South Sudan need to link up with national and regional fertilizer bodies to comply with the following recommendations agreed during the 2009 Abuja Conference by AU member states on inorganic and organic fertilizer:

- immediate commitment of funds from national budgets to bridge the funding gap required to make the African Fertilizer Financing Mechanism operational;
- provision of smart fertilizer subsidies;
- elimination of all taxes and tariffs on fertilizer and on fertilizer raw materials;
- improving access to finance for fertilizer importers and agro-dealers; and
- develop and implement policy and regulatory frameworks.

South Sudan has several entry points in rationalizing and harmonizing fertilizer policy. These include NEPAD, COMESA and the East African Community (EAC). Therefore, it is imperative that after the fertilizer Policy has been finalized, the country should engage regional bodies to standardize rules and regulations governing international fertilizer transactions and services.

5.0 STRATEGIC PLAN

Immediately the policy is accepted by the Legislative Assembly, the SSFC will facilitate Fertilizer Development Strategic Plan through the Directorate of Agriculture. The Fertilizer Development Strategic Plan will focus on improving organic and inorganic fertilizer availability, access and utilisation among small, medium and large scale farmers in the country. Furthermore, the outcomes of the strategies will include soil mapping and classification in terms of the country's nutrient status. This strategy will be a Result-based Fertilizer Strategic Plan in collaboration with public and private sectors stakeholders. The implementation of the Strategic Plan will be the responsibility of the SSFC. However, monitoring and evaluation will be conducted by independent fertilizer consultants, periodically.

5.1 RESOURCE MOBILISATION

The call for the establishment of the Africa Fertilizer Financing Mechanism (AFFM)[13] was one of the major resolutions of the June 2006 African Union's (AU) Africa Fertilizer Summit in Abuja. At the Summit, African Heads of State and some eminent persons resolved that it was necessary to establish an AFFM for the purpose of increasing fertilizer use in Africa so as to boost agricultural productivity. This in turn, will contribute to economic growth, food security, and sustainable management of natural resources in Africa.

The summit charged the African Development Bank with the responsibility of establishing the AFFM by 2007. The AFFM is intended to serve as a vehicle for financing the various activities agreed upon at the Abuja Summit. Specifically, it will: i) help the African public and private sectors conduct feasibility assessments and secure financing for promising fertilizer production ventures; ii) improve the "economies-of-scale" of fertilizer production, procurement, and distribution, for example by creating "platforms" to help the private sector be more cost effective in delivering key agricultural inputs to even the smallest, most remote farm-gates; iii) boost fertilizer demand at the wholesale and retail levels by disseminating information about fertilizer's impact on return on investment (ROI), and by extending credit guarantees to farmers and suppliers; and iv) exploit other potential "targets of opportunity" in the value added chain, i.e. by helping to better align transnational customs policies, which currently make cross-border transactions inefficient and costly.

Besides this source of financing, development partners, donors and the private sector also have a role to contribute to the development of the fertilizer industry. For example, IFDC is already planning to promote use of organic and inorganic fertilizer in South Sudan through financial support of the USAID. Other sources of financing fertilizer procurement include increased national budgetary allocation through

[13]http://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/10000033-En-Framework-For-The-Establishment-of-The-Africa-Fertilizer-Financing-Mechanism.pdf

subsidies targeting low income farming households. Increased budgetary allocation emanates from the Maputo Declaration on Agriculture and Food Security in Africa in which the African Heads of State and Government during the Second Ordinary Assembly of the African Union in July 2003 in Maputo, endorsed the "commitment to the allocation of at least 10% of national budgetary resources to agriculture and rural development policy implementation within five years". Therefore, increased budgetary allocation to agriculture and forestry sector becomes one of the pillars to support fertilizer availability, access and utilization.

5.2 IMPLEMENTATION SCHEDULE

There are many challenges affecting implementation of policies. These include human and technical capacity, resources mobilization and political will. As a newly independent country, there is need to consider timeframe on how these critical issues can be addressed. A sample matrix of the proposed implementation plan and expected budget is shown in Appendix 1. This will be developed immediately after endorsement of this policy document. However, in the short term it is expected that the following actions will be undertaken in 2012.

The following short-term schedule is proposed:

Actions	Responsible	Timing
1. Formulation of fertilizer legislation and Regulations	MAFC&RD Senior Executive	March 2012
2. Establishment of the SSFC	MAFC&RD Senior Executive	June 2012
3. Strategic Plan	SSFC	March 2012
4. Inorganic and Organic Fertilizer Development Consultative Forum	IOFDCF	Oct 2012
5. National, Regional and International Collaboration	Minister	June 2012
6. Resource Mobilisation	MAFC&RD/RSS and SSFC	June 2012
7. Monitoring the Implementation Schedule	Minister	Continuous

5.3 EFFECTIVE DATE

This fertilizer policy shall be applicable when approved by the Council of Ministers, and shall apply until modified by appropriate legal dispositions. The tenets of the policy shall have long-term application, and shall continue in force indefinitely, until

specifically modified by law. Any such modifications shall not change the intent or philosophy of this Fertilizer Policy.

5.4 APPLICABILITY

All public and private stakeholders in the Agricultural sector shall respect the content and spirit of this fertilizer policy. A legislative proposal and regulations shall be introduced in due course to establish the South Sudan Agricultural Fertilizer policy.

Relevant legal provisions that may be enacted are:

a. The South Sudan Fertilizer Law in furtherance of this policy framework; and,

b. Establishment of soil laboratories to service all agro-ecological zones.

5.5 MONITORING AND EVALUATION

To keep South Sudan Fertilizer Policy current and applicable to changing conditions, MAFC&RD/RSS will from time to time make recommendations to the Government on relevant issues of importance to improved fertilizer use and enhanced soil fertility management. The responsible Ministers shall consider such recommendations; discuss them with State Ministers responsible for the Agricultural Sector, consult with other stakeholders, and, in accordance with applicable laws, issue modifications to South Sudan Fertilizer Policy and regulations, in order to improve suitability and applicability to current conditions without changing the long-term intent or legitimacy. Plans of action shall be prepared and updated from time to time to serve as guides to both public and private actors and stakeholders in the implementation of actionable components of this policy. The plans of action shall be based on the goals, objectives and strategies outlined in this policy and shall specify (1) outputs and activities expected from the recommended interventions, (2) implementation time frames, (3) responsible and/or implementing institutions, and costs, budgets and other resource requirements. The MAFC&RD shall oversee preparation of plans of action but all participating institutions will be invited to propose specifics relating to components for which they are responsible.

Appendix 1- Timeframe for Implementation of Activities under Each Output

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
1. **Output 1: Importation and domestic production of organic and inorganic fertilizers encouraged and promoted**.															
1.1 Establish a fertilizer bonded warehouse through public-private partnership agreement: Activities:															
1.1.1 ff															
1.1.2 ff															
1.2 Encourage private sector including agro-dealers to market and distribute fertilizer widely; Activities:															

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
1.2.1															
1.2.2															
1.3 Comprehensive feasibility studies for establishing fertilizer factory using the country's raw materials (RSS in collaboration with SSARO) Activities:															
1.3.1															
1.3.2															
1.4 The private sectorto invest in fertilizer manufacture and fertilizer blending plants close to areas of utilization; Activities:															

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
1.4.1															
1.4.2															
1.5 Promote public and private sector partnership for the fertilizer plants and distribution network Activities:															
1.5.1 construction of fertilizer production plants,															
1.5.2 Marketing and storage infrastructural chains in the country.															
2. Output 2: a system established for the private sector to undertake targeted intervention to facilitate market-friendly															

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
and transparent access to fertilizer by individual farmers, cooperatives, groups and associations.															
2.1 Design and implement a program to develop a network of trained and certified agro-dealers to serve the rural interior Activities: (list below)															
2.1.1 Activity 1:															
2.1.2															
2.2 Design and implement a five to ten year market friendly input intervention program (with an exit plan) using a flexible voucher system that allows															

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
disadvantaged and poor farmers, to buy fertilizer and hybrid seeds based on suitable agro-ecological zones;															
2.2.1 Activity 1:															
2.2.2 Activity 2:															
2.3 Ensure that fertilizer prices are determined by market forces to facilitate competitive fertilizer markets and benefits to the private sector;															
2.3.1 Activity 1:															
2.3.2 Activity 2:															
2.4 In consultation with the Ministry of Roads and															

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
Bridges identify and prioritize rural feeder roads and intensify maintenance and construction at county and payam levels,															
2.4.1 Activity 1:															
2.4.2 Activity 2:															
2.5 Establish a risk sharing mechanism for importers and agro-dealers to facilitate farmers' access to loans for purchase of fertilizer.															
2.5.1 Activity 1															
2.5.2 Activity 2															
3. Output 3: Targeted															

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
intervention to facilitate efficient and effective utilization of high quality and appropriate organic and inorganic fertilizer based on soil analysis undertaken.															
3.1 Implement a gender-responsive, comprehensive, pluralistic and demand driven farmer and agro-dealer training program to enhance integrated utilization of organic and inorganic fertilizer and related inputs14;															
3.1.1 Activity 1:															

[14]Effective and efficient utilization of fertilizer is compromised by inadequate skills and knowledge among the majority of smallholder farmers and input dealers.

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
3.1.2 Activity 2:															
3.2 Encourage judicious use of fertilizers consistent with optimum environmental health;															
3.2.1 Activity 1:															
3.2.2 Activity 2:															
3.3 Support studies, in collaboration with SSARO, to identify soil characteristics and composition in different agro-ecological zones;															
3.3.1 Activity 1:															
3.3.2 Activity 2:															

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
3.4 (iv) Develop public-private sector partnership to enhance effective utilization of the market infrastructure to distribute fertilizer in the country;															
3.5 Promote effective use of inorganic and organic fertilizers through extension services to improve soil fertility and agricultural productivity; and															
3.6 (vi) Soil erosion problems are addressed through application of modern soil management practices appropriate to local conditions															

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
4. Output 4: Improved cropping and farm management practices for ensuring enhanced and balanced soil fertility are identified and promoted															
4.1 Promote incorporation of nitrogen through crop rotation and adoption of nitrogen-fixing crops;															
4.2 Introduce and expand compatible inter-cropping techniques;															
4.3 Promote agro-forestry practices where appropriate; and															
4.4 Promote conservation agriculture through the use															

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
of reduced and minimum tillage and appropriate mulching practices.															
5. **Output 5: Urgent measures undertaken to develop human resources and institutional capacity for the development and management of the fertilizer sector**															
5.1 Establish an independent South Sudan Fertilizer Commission (SSFC) to facilitate an enabling environment for public-private sector partnership in the development of the fertilizer industry;															

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
5.2 Develop, in collaboration with SSARO, an appropriate institutional arrangements for carrying out applied soil sciences activities at the national and state levels;															
5.3 Rehabilitate and equip existing soil laboratory facilities;															
5.4 In collaboration with the DRTE, to train medium and high level soil fertility professionals and technicians															
5.5 Enhance the capacity of farmers through extension services in the sustainable															

Output and Activities	Budget	PHASE I						PHASE II							
	US$	2012		2013				2014		2015		2016		2017	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4	Q1-Q2	Q3-Q4
use of fertilizer															
5.6 Review fertilizer legislation and regulations and establish a national regulatory service which is capable of implementing quality measures, particularly at the point of sale; and															
5.7 Establish linkages with national, regional and international fertilizer institutions for harmonization and rationalization of fertilizer policies, legislation and regulations															