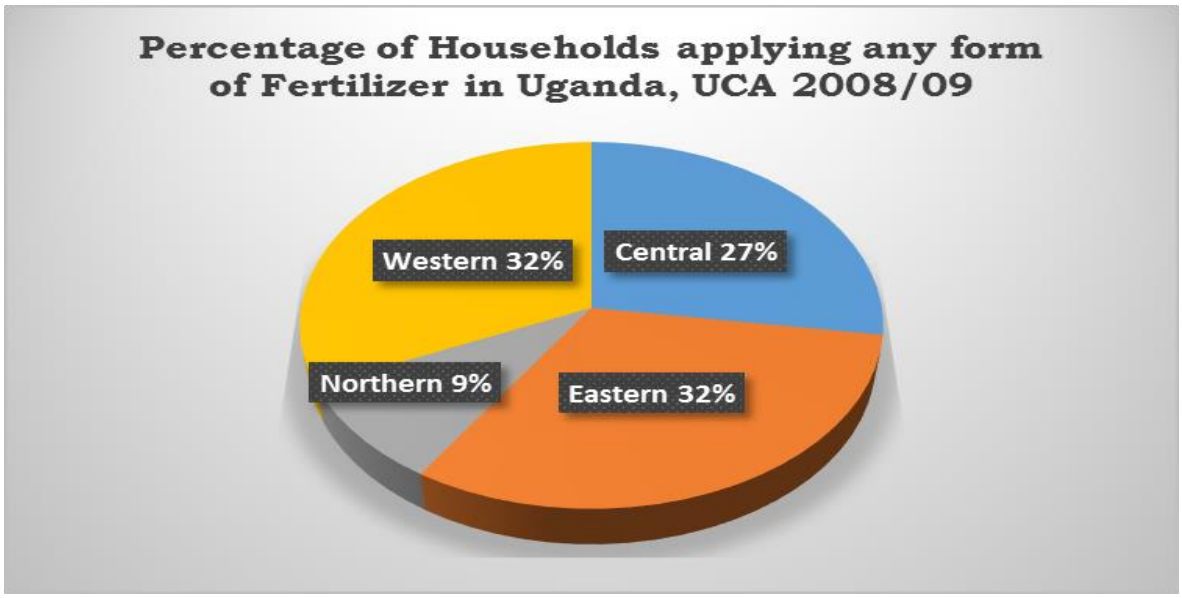
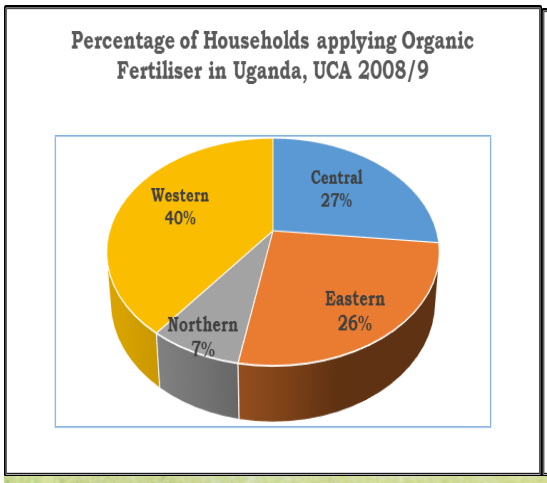
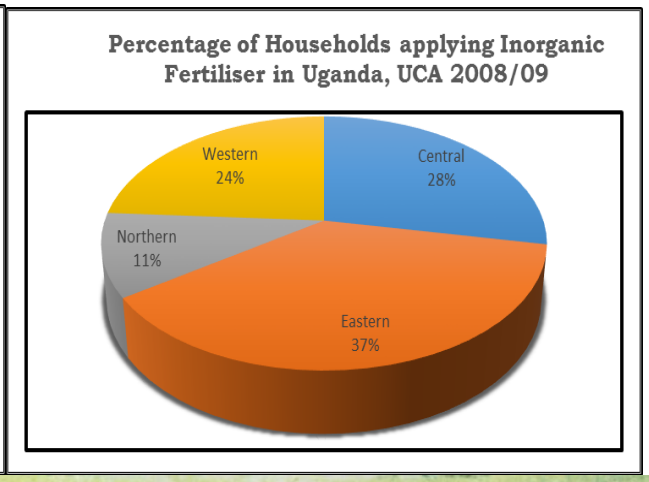
FERTILIZER CONSUMPTION AND FERTILIZER USE BY CROP IN UGANDA









By
Sunday Godfrey, Email: bsgmalthus@yahoo.com. Ministry of Agriculture, Animal Industry and Fisheries
Ocen Dickens, Email: ocendickens@yahoo.com. Uganda Bureau of Statistics

TABLE OF CONTENTS

LIST OF ACRONYMS/ABBREVIATIONS..... II

EXECUTIVE SUMMARY..... IV

CHAPTER ONE..... 1

1.0 BACKGROUND.....1
1.1 OVERVIEW OF UGANDA'S AGRICULTURAL SECTOR.....1
1.2 CROP PRODUCTION.....1
1.2.1 ESTIMATED AREA UNDER CROP PRODUCTION..... 1
1.3.1 CASH CROPS.....3
1.3.2 FOOD CROPS.....4
1.5 THE NATIONAL STATISTICS SYSTEM IN UGANDA.....4

CHAPTER TWO..... 6

2.0 **THE FERTILIZER INDUSTRY IN UGANDA**..... 6

2.1 OVERVIEW OF FERTILIZER LEGAL FRAMEWORK, SUPPLY AND USE IN UGANDA..... 6
2.1.2 FERTILIZER SUPPLY AND USE.....6
2.1.2.1 ACCESS TO INORGANIC FERTILIZERS..... 6
2.1.2.2 KNOWLEDGE GAPS ON FERTILIZER USE..... 7
2.1.4 DISTRIBUTION OF FERTILIZER IN UGANDA.....9
2.1.4.1 LARGE SCALE FARMS:..... 10
2.1.4.2 COMMERCIAL IMPORTERS:..... 10
2.1.4.3 WHOLESALERS:.....11
2.1.4.4 RETAILERS:..... 11
2.1.5 THE FERTILIZER PRICE DATA..... 12
2.1.6 CONSTRAINTS TO FERTILIZER USE IN UGANDA..... 12
2.2.0 STATUS OF SOIL FERTILITY IN UGANDA..... 13
2.2.1 MAJOR SOILS OF UGANDA 14

CHAPTER THREE.....15
3.0 SOURCES OF FERTILIZER DATA.....16
3.1 THE SWOT ANALYSIS ON SOURCES OF DATA..... 17
3.1.1 THE STRENGTH ON SOURCES OF DATA FOR REAL CONSUMPTION OF FERTILIZER..... 17
3.1.2 THE WEAKNESSES ON SOURCES OF DATA FOR REAL CONSUMPTION OF FERTILIZER..... 18
3.1.3 THE OPPORTUNITIES ON SOURCES OF DATA FOR REAL CONSUMPTION OF..... 18
3.1.4 THE THREATS ON SOURCES OF DATA FOR REAL CONSUMPTION OF FERTILIZER DATA.....19

CHAPTER FOUR.....20
4.0 ESTIMATES OF REAL FERTILIZER CONSUMPTION DATA..... 20
4.1 FERTILIZER USE BY CROP IN UGANDA.....20
4.2 FERTILIZER CONSUMPTION IN UGANDA.....23
4.3 FERTILIZER RECOMMENDATIONS.....24

CHAPTER FIVE.....25
5.1 COST EFFECTIVE WAYS OF COLLECTING FERTILIZER DATA.....25

REFERENCES.....29

LIST OF TABLES

TABLE 1: CROP PRODUCTION ('000 MT), ACREAGE (HA) AND YIELD 2010-2013.....2

TABLE 2: FERTILIZER USE BY ACCESS, ASSETS AND SUPPORT SERVICES 7

TABLE 3: COST AND PRICE BUILD-UP FOR DAP FROM NAIROBI, KENYA TO KAPCHORWA, UGANDA.....9

TABLE 4: SOURCES OF FERTILIZER DATA.....16

TABLE 5: INORGANIC FERTILIZER USE BY CROP IN UGANDA (2011-2013)..... 22

TABLE 7: GENERAL RECOMMENDATIONS FOR SELECTED CROPS..... 24

TABLE 7: ESTIMATES OF REAL FERTILIZER CONSUMPTION PER PRODUCT AND PER PRODUCT.....27

TABLE 8: ESTIMATES OF FERTILIZER USE BY CROP..... 28

LIST OF FIGURES

FIGURE 1: TOP 5 IMPORT FERTILIZERS FOR 2013 8

FIGURE 2: TOP 5 EXPORT FERTILIZER FOR 2013 8

FIGURE 3: FERTILIZER ORIGIN FOR 2013..... 8

FIGURE 4: FERTILIZER DESTINATION FOR 2013 8

FIGURE 5: PRINCIPAL PROCUREMENT AND DISTRIBUTION CHANNELS FOR FERTILIZER 10

FIGURE 6: DISTRIBUTION OF AMITSA AGRO DEALERS 12

FIGURE 7: A MAP SHOWING MAJOR SOILS OF UGANDA.....15

FIGURE 8: FERTILIZER CONSUMPTION (KGS PER HA OF ARABLE LAND) 24

LIST OF ACRONYMS/ABBREVIATIONS

ARS	Agricultural Reporting Service
ASSPS	Agricultural Sector Strategic Plan for Statistics
CAADP	Comprehensive Africa Agriculture Development Program
CDO	Cotton Development Organization
CIS	Community Information System
DAOs	District Agricultural Officers
DSIP	Development Strategy and Investment Plan
DP	Development Partners
FAO	Food and Agriculture Organization
FAS	Food and Agricultural Statistics
GPS	Geographical Positioning System
LGs	Local Governments
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MoU	Memorandum of Understanding
NARO	National Agricultural Research Organization
NASS	National Agricultural Statistical System
NASTC	National Agricultural Statistics Technical Committee
NDP	National Development Plan
NSS	National Statistical System
PHC	Population and Housing Census
PNSD	Plan for National Statistical Development
RDS	Rural Development Strategy
TOR	Terms of Reference
UBOS	Uganda Bureau of Statistics
UCA	Uganda Census of Agriculture
UCDA	Uganda Coffee Development Authority

EXECUTIVE SUMMARY

Agriculture currently dominates Uganda's economy, employing 72 percent of the population, contributing 22.2% of GDP and generating 42% of the exports earnings.

Uganda's Population Characteristics

Uganda has one of the fastest growing populations in the world at an annual growth rate of 3.2% and its population stands at about 34.9 million people as of 2014 with 4.2 million small holder farmers.

Crops grown in Uganda

The main cash crops grown in Uganda include Coffee, Cotton, Tea and Tobacco. Other crops grown include: Cereals (Maize, Millet, Sorghum, Rice, Wheat); Root crops (Cassava, Sweet potatoes, Irish potatoes); Pulses (Beans, Cow peas, Field peas, Pigeon peas); and Oil crops (Groundnuts, Soya beans, Sesame) and Plantains.

Area under crop production

In Uganda, cereals occupy approximately 30.6 percent of total area, root crops occupy 23.4 percent, pulses 13.2 percent, plantains 16.9 percent and oil crops 15.9 percent. The total area planted for food crops was approximately 5,743,000 hectares in 2013, registering an increment of 0.2 percent compared to 2012.

Crop subsector contribution to GDP

The cash crop subsector contribution to Uganda's GDP declined in growth, recording a growth of 3.3 percent in 2013/14 compared to a growth of 3.5 percent in 2012/13. The growth in the cash crops was mainly contributed by the following: coffee grew by 6.4 percent, tobacco by 1.4 percent, sugarcane by 11.7 percent, flowers/horticulture grew by 4.7 percent, and cocoa 28.5 percent. The food crops subsector contribution to Uganda's GDP grew by 1.9 percent in 2013/14 compared to a revised growth of 0.2 percent in 2012/13. Specifically; maize production grew by 0.5 percent, bananas by 0.8 percent, cassava by 0.1 percent, Rice by 6.1 percent, and sweet potatoes by 0.2 percent. The food crop subsector contributed 12.2 percent to total GDP at current prices, in the fiscal year 2013/14 compared to 12.1 percent in 2012/13.

Sources of fertilizer data in Uganda

The responsible institutions for collecting data on fertilizers in Uganda are the Uganda Revenue Authority (URA) responsible for registering customs records,

Ministry of Agriculture, Animal Industries and fisheries (MAAIF) responsible for current statistics, Uganda Bureau of Statistics (UBOS) responsible for censuses and surveys, Ministry of Trade and Cooperatives responsible for administrative data on cooperatives and Bank of Uganda (BOU) responsible for balance of payment. To date, only the Regional Agricultural Input Market Information and Transparency System (AMITSA) is assisting the East Africa Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA) address the problem of lack of information about agro-inputs, including fertilizers.

Fertilizer import and export

1) During 2013, a total of 53,447 MT of fertilizer was imported into the country an increment from 49,519 MT in 2012 translating to 9 percent.
2) During 2013, 96.9 percent (51,777 MT) of the fertilizer imported was used on agriculture and 3.1 percent (1,670 MT) was used for industrial or Mines purposes.
3) In the year 2013, the NPK's were the most imported fertilizers accounting for 60% of all officially imported fertilizers. Comparing the imports for the previous year's shows that the NPK'S and Urea have constantly been the most officially imported fertilizers to Uganda.
4) Phosphate rock was the most exported product in 2013. In the last 5 years, export quantities from Uganda were highest in 2013 with a total of 633MT.
5) During 2013, Kenya exported to Uganda 13,754 MT of fertilizer, followed by China with 7, 397 MT and least is Norway with 1,791 MT.
6) In the same period, Uganda exported 300 MT of fertilizer to Sudan, 94 MT to Rwanda and 27 MT to South Sudan.
7) NPK with unknown grades accounted for 98.7% of all NPK complex fertilizers imported to Uganda in 2013.

Fertilizer Usage

During 2013, the total area under the main selected crops was 6.2 million Ha of which 174,288 (2.8 percent) was fertilized across the country with sugarcane recording 29 percent followed by banana with 25 percent. A total of 53, 180 MT of fertilizer was used which translates to about 0.85 Kg per Ha nationally and 30 Kg per Ha on fertilized soils.

Urea and NPK 17:17:17 were the most used fertilizers by crop in Uganda in 2013. Other fertilizer used include DAP, MOP, TSP, CAN, Rock phosphate, NPK (16:6:20) and NPK (25:5:5).

The majority of farmers growing plantain, rice, potatoes, sugarcane, tobacco and coffee applied NPK 17:17:17. About 8,1511Mt of NPK 17:17:17 was used in plantain alone on an estimated area of about 42,753 hectares, an application rate of 200 Kg per Ha.

Sugarcane with an estimated area of 50,590Ha being fertilized, uses about six different types of fertilizers (Urea, NPK-TPL17, DAP, MOP, rock phosphate and TSP) right from planting stage and during second shooting.

The area under maize in 2013 was 1.1 million. Only 3.2 percent of this acreage was fertilized which translates to about 36,248 Ha consuming about 4,531 MT, an equivalent of 125 Kgs per Ha.

Rice in Uganda has become one of the staple food. The area under rice in 2013 was 93,000 Ha. Only 3.3 percent (3,069 Ha) was fertilized in 2013. A total of 920 MT of fertilizer was applied on rice across the country. This translates to about 300 Kg per Ha.

In Uganda, coffee is the main cash crop. The total acreage under coffee in 2013 was 284,624 Ha. Only 9 percent (25,616 Ha) of this acreage was fertilized in 2013 consuming a total of 10,247 MT of fertilizer with NPK and CAN each recording 4,355 MT. This translates to about 400 Kg per Ha being used on coffee across the country.

Challenges in the existing sources of data

During the compilation of this report the following challenges were met and these are: unavailability of official documentation of fertilizer used by crop in Uganda, datasets required to compute acreage fertilized, consumption per crop among others were not available, time series data on crop production at lower administrative level and corresponding number of farmers is generally lacking, and data on fertilizer prices is still a challenge.

Cost effective ways to collecting fertilizer data in Uganda

The main cost effective ways of collecting fertilizer data in Uganda include:

1) The ministry should collaborate with partners to compile an inventory of stakeholders in the fertilizer industry, harmonize data collection tools, reporting arrangements and data dissemination calendar.
2) The ministry should sensitize all private large scale and institutional farms, issue questionnaires on fertilizer use and then agree on the questionnaire retrieval dates.
3) The ministry should sensitize and issue fertilizer dealers (importers, exporters and small scale dealers) a self-administered questionnaire and retrieved monthly.
4) The ministry in collaboration with UBOS should develop harmonized concepts, definitions, and methodologies.
5) The ministry and partners should train and equip officials involved in the collection, analysis and management of fertilizer data in the country from sub county level to the district including the fertilizer dealers and eventually to the ministry headquarters. MAAIF should collaborate with Local Governments, UBOS, FAO and IFDC in collecting fertilizer data at these levels and share the costs of collection. This should include reorienting (training) agricultural field extension officers to basics of data collection as part of their duties.
6) Annual surveys on agriculture should include a module on fertilizer usage and stocks.

CHAPTER ONE

1.0 BACKGROUND

1.1 Overview of Uganda's Agricultural sector

Agriculture currently dominates Uganda's economy, employing 72 percent of the population, contributing 22.2% of GDP and generating 42% of the exports earnings. The agricultural sector is still characterized by low-input, low-output leading to dismal growth in the sector that registered 1.5 percent growth in Financial Year 2013/14.

Uganda's population stands at about 34.9 million people as of 2014. Uganda has one of the fastest growing populations in the world at an annual growth rate of 3.2%. There are about 4.2 million small holder farmers in the country with 23 million (66 percent) people living in agriculture households. Uganda's land area is estimated at 200,523 square kilometres (83% of Uganda's total area) with an estimated 91,151,800 hectares (91,151.8 square kilometres) in 2010 under agriculture

1.2 Crop Production

The main cash crops grown in Uganda include Coffee, Cotton, Tea and Tobacco. Other crops grown include: Cereals (Maize, Millet, Sorghum, Rice, Wheat); Root crops (Cassava, Sweet potatoes, Irish potatoes); Pulses (Beans, Cow peas, Field peas, Pigeon peas); and Oil crops (Groundnuts, Soya beans, Sesame) and Plantains. Wheat has increasingly become a major crop in Uganda in the recent past.

1.2.1 ESTIMATED AREA UNDER CROP PRODUCTION

During 2013, Cereals occupied approximately 30.6 percent of total area, root crops occupy 23.4 percent, pulses 13.2 percent, plantains 16.9 percent and oil crops 15.9 percent. The total area planted for food crops was approximately 5,743,000 hectares in 2013, registering an increment of 0.2 percent compared to 2012. There were generally slight increases in the area for all the categories except pulses and root crops. In addition maize, cassava, beans and groundnuts continue to occupy the largest proportions of cultivated land areas within their broad crop categories.

In terms of production per unit area, bananas and Irish potatoes recorded the highest returns with 4.5 MT per Ha each followed by sweat potatoes with 4.0 MT per Ha, then cassava with 3.5 MT per Ha in 2013. Pulses registered a yield of about 1 MT per Ha in 2013. Table 1 summarizes the production, acreage and yield for selected crops from 2010-13.

Table 1: Crop Production ('000 MT), Acreage (Ha) and Yield 2010-2013

Crop	Unit	Year			
		2010	2011	2012	2013
Wheat	Production (MT)	20,000	23,000	20,000	20,000
	Area (Ha)	12,000	13,000	14,000	14,000
	Yield (MT/Ha)	1.67	1.77	1.43	1.43
Rice, paddy	Production (MT)	218,111	233,000	212,000	214,000
	Area (Ha)	87,000	90,000	92,000	93,000
	Yield (MT/Ha)	2.51	2.59	2.30	2.30
Maize	Production (MT)	2,373,501	2,551,000	2,734,000	2,748,000
	Area (Ha)	1,032,000	1,063,000	1,094,000	1,101,000
	Yield (MT/Ha)	2.30	2.40	2.50	2.50
Millet	Production (MT)	267,973	292,000	244,000	228,000
	Area (Ha)	167,000	172,000	175,000	175,000
	Yield (MT/Ha)	1.60	1.70	1.39	1.30
Sorghum	Production (MT)	390,779	437,000	336,000	299,000
	Area (Ha)	355,000	364,000	373,000	373,000
	Yield (MT/Ha)	1.10	1.20	0.90	0.80
Cassava	Production (MT)	3,017,118	2,712,000	2,807,000	2,980,000
	Area (Ha)	794,000	822,000	851,000	851,000
	Yield (MT/Ha)	3.80	3.30	3.30	3.50
Potatoes	Production (MT)	167,153	180,000	185,000	175,000
	Area (Ha)	36,000	37,000	39,000	39,000
	Yield (MT/Ha)	4.64	4.86	4.74	4.49
Sweet potatoes	Production (MT)	1,987,203	1,798,000	1,852,000	1,811,000
	Area (Ha)	442,000	450,000	452,000	453,000
	Yield (MT/Ha)	4.50	4.00	4.10	4.00
Beans, dry	Production (MT)	948,771	915,000	870,000	941,000
	Area (Ha)	633,000	654,000	669,000	672,000

Crop	Unit	Year			
		2010	2011	2012	2013
	Yield (MT/Ha)	1.50	1.40	1.30	1.40
Peas, dry	Production (MT)	16,990	17,330	12,000	17,000
	Area (Ha)	28,000	28,000	29,000	29,000
	Yield (MT/Ha)	0.61	0.62	0.41	0.59
Cow peas, dry	Production (MT)	11,649	12,360	10,000	13,000
	Area (Ha)	24,000	25,000	25,000	25,000
	Yield (MT/Ha)	0.49	0.49	0.40	0.52
Pigeon peas	Production (MT)	12,761	12,923	13,000	13,000
	Area (Ha)	32,000	33,000	33,000	33,000
	Yield (MT/Ha)	0.40	0.39	0.39	0.39
Soybeans	Production (MT)	27,216	32,000	23,000	23,000
	Area (Ha)	45,000	45,000	46,000	46,000
	Yield (MT/Ha)	0.60	0.71	0.50	0.50
Groundnuts	Production (MT)	275,767	327,000	295,000	295,000
	Area (Ha)	394,000	409,000	421,000	422,000
	Yield (MT/Ha)	0.70	0.80	0.70	0.70
Sunflower seed	Production (MT)	253,047	265,000	230,000	238,000
	Area (Ha)	207,000	221,000	230,000	238,000
	Yield (MT/Ha)	1.22	1.20	1.00	1.00
Sesame seed	Production (MT)	118,559	142,000	124,000	124,000
	Area (Ha)	198,000	203,000	207,000	207,000
	Yield (MT/Ha)	0.60	0.70	0.60	0.60
Bananas	Production (MT)	4,694,000	4,699,000	4,503,000	4,375,000
	Area (Ha)	978,000	979,000	979,000	972,000
	Yield (MT/Ha)	4.80	4.80	4.60	4.50

Source: UBOS abstract, 2014

1.3 The crop subsector contribution to GDP

1.3.1 CASH CROPS

The cash crop subsector contribution to Uganda's GDP declined in growth, recording a growth of 3.3 percent in 2013/14 compared to a growth of 3.5 percent in 2012/13. The growth in the cash crops was mainly contributed by the following: coffee grew by 6.4 percent, tobacco by 1.4 percent, sugarcane by 11.7 percent,

flowers/horticulture grew by 4.7 percent, and cocoa 28.5 percent. However a decline of 6.6 percent and 24.3 percent was recorded in tea and cotton. The strong decline in cotton was due to the drought at the beginning and end of the growing season and competition from food crops in 2012/13. The cash crop subsector contributed 1.5 percent to total GDP at current prices, in the fiscal year 2013/14 compared to 1.7 percent in 2012/13.

1.3.2 FOOD CROPS

The food crops subsector contribution to Uganda's GDP grew by 1.9 percent in 2013/14 compared to a revised growth of 0.2 percent in 2012/13. Specifically; maize production grew by 0.5 percent, bananas by 0.8 percent, cassava by 0.1 percent, Rice by 6.1 percent, and sweet potatoes by 0.2 percent. However, there was a decline in millet growing by 1.2 percent, and sorghum by 5.8 percent during the same period. The food crop subsector contributed 12.2 percent to total GDP at current prices, in the fiscal year 2013/14 compared to 12.1 percent in 2012/13.

1.4 Agriculture Policy Environment

The policy environment for agriculture in Uganda since 1997 has been shaped by several national level policy frameworks. These include the Poverty Eradication Action Plan (PEAP) and its successor the National Development Plan (NDP); as well as the Prosperity for All (PFA). At agriculture sector level, these frameworks were implemented through the Plan for Modernization of Agriculture (PMA) and the Rural Development Strategy (RDS). The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) published the first DSIP in 2005 to implement the MAAIF component of the PMA and the second DSIP in 2010 to implement the agriculture chapter of the NDP and the third (now Agriculture Sector Strategic Plan) in 2015 being the agriculture chapter in NDP II. These policies are intended to harmonize the different thoughts and approaches to national agricultural development.

1.5 THE NATIONAL STATISTICS SYSTEM IN UGANDA

In Uganda, the National Statistics System (NSS) is decentralized and is comprised of many players, who are data producers and users, with the Uganda Bureau of Statistics (UBOS) as the coordinating agency. These include Government Ministries, Departments and Agencies (MDAs) both public and private. Some of these MDAs have entered into formal arrangements, i.e. Memoranda of

Understanding, for the collection and sometimes publication of specific statistics. Reason being to:

1) Prevent duplication of effort and generation of inconsistent data,
2) Achieve cost-effectiveness in utilization of scarce resources,
3) Avoid working at cross-purposes, and
4) Produce higher quality data.

At present, linkages within the NSS are inconsistent, informal and relatively weak. Therefore, this has complicated the production of data on fertilizer in the country.

CHAPTER TWO

2.0 THE FERTILIZER INDUSTRY IN UGANDA

2.1 Overview of Fertilizer legal framework, Supply and Use in Uganda

In Uganda, the fertilizer industry is private sector led and liberalised. Uganda currently does not produce inorganic fertilizers, although in the past there was production of phosphate fertilizers. There is however, an advanced plan to set up a phosphate fertilizer production facility by Guangzhou Dongsong Energy Group in Tororo district by 2016. Currently all of the inorganic fertilizer used in the country is imported.

2.1.1 The fertilizer legal framework

The National Fertilizer Legal Framework implemented by MAAIF is comprised of the National Fertilizer Policy (NFP), The Agricultural Chemicals (Control) Act, 2006, the Fertilizer Control Regulations and the National Fertilizer Strategy (NFS). The framework provides for mandatory registration of fertilizer dealers, importers and manufacturers. It also gives guidelines on how fertilizer should be packaged, stored and handled during distribution. The MAAIF is the custodian of the regulatory framework and has designated Agricultural Inspectors to enforce the law.

2.1.2 Fertilizer supply and use

2.1.2.1 Access to inorganic fertilizers

According to the UCA 2008/09 (Table 2 below), 35.8 percent of farmers applying organic fertilizers accessed extension services compared to 12.6 percent of the farmers applying inorganic fertilizers. About 40 percent of the farmers applying organic fertilizers accessed credit compared to 15.8 percent of the farmers applying inorganic fertilizers.

The UCA further revealed that 28 percent of the farmers applying organic fertilizers have storage facilities compared to 9.2 percent of farmers applying inorganic fertilizers.

Table 2: Fertilizer use by access, assets and support services

Support services & assets	Percent users of fertilizers			
	Organic fertilizers		Inorganic fertilizers	
	Access	No access	Access	No access
Extension services	35.8	23.6	12.6	7.6
Credit	40.1	24.3	15.8	7.7
Storage facilities	28	23.3	9.2	7.7
Irrigation facilities	50.3	25.7	31	8.3

Source: Calculated Based On UCA 2008/09

2.1.2.2 Knowledge gaps on fertilizer use

While there has been considerable research and policy analysis on fertilizer promotion and use around the world (Crawford et al., 2005), in Uganda this has not been the case. Diminutive research has been carried out on the state of fertility of Uganda's soils; the yield response to fertilizer for key crops and, hence, the profitability of fertilizer use on them; the effectiveness of existing agricultural extension services in promoting fertilizer use; the potential effects of fertilizer subsidies on the private-sector fertilizer market development; and the likely effects of changing climatic conditions on the profitability of fertilizer use. Evidence shows that agricultural research and agricultural extension services on appropriate fertilizer use coupled with input market development, the provision of credit to farmers for agricultural inputs, and, possibly, subsidized distribution channels can successfully increase fertilizer use on crops for increased productivity.

2.1.3 Fertilizer import and export

During 2013, a total of 53,447 MT of fertilizer was imported in the country an increment from 49,519 MT in 2012 which is about 9 percent. In the same period, 96.9 percent (51,777 MT) of the fertilizer imported was used on agriculture and 3.1 percent (1,670 MT) was used for industrial or Mines purposes. The NPK's were the most imported fertilizers accounting for 60% of all officially imported fertilizers as indicated in figure 1. Comparing the imports for the previous year's shows that the NPK'S and Urea have constantly been the most officially imported fertilizers to Uganda. Phosphate rock was the most exported product in 2013 as indicated in figure 2. In the last 5 years, export quantities from Uganda were highest in 2013 with a total of 633MT.

Kenya exported to Uganda 13,754 MT of fertilizer, followed by China with 7, 397 MT and least is Norway with 1,791 MT as shown in figure 3. In the same period,

Uganda exported 300 MT of fertilizer to Sudan, 94 MT to Rwanda and 27 MT to South Sudan as shown in figure 4. NPK with unknown grades accounted for 98.7% of all NPK complex fertilizers imported to Uganda in 2013

Figure1: Top 5 imported fertilizer for 2013

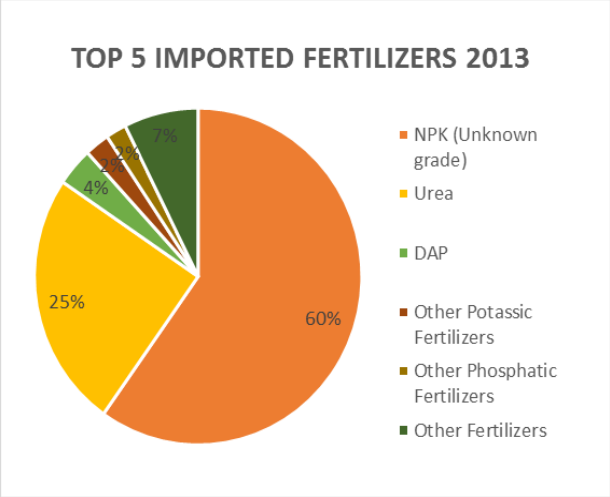


Figure2: Top 5 exported fertilizers for 2013

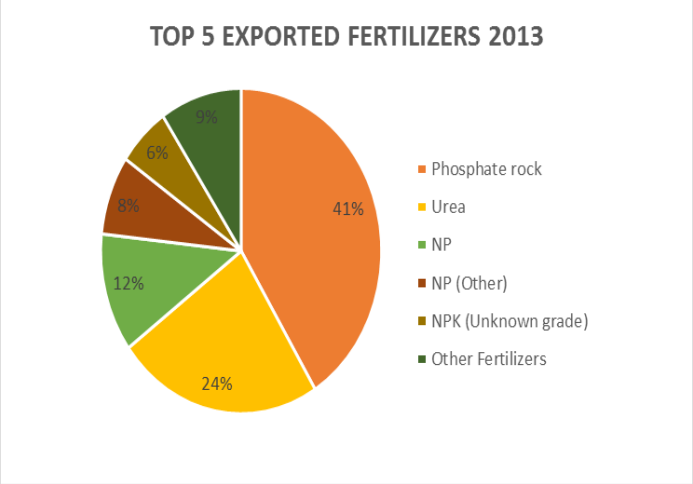


Figure 3: Countries origins for 2013.

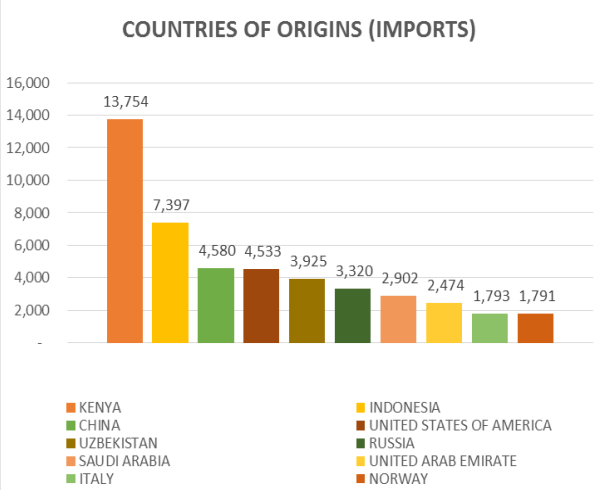
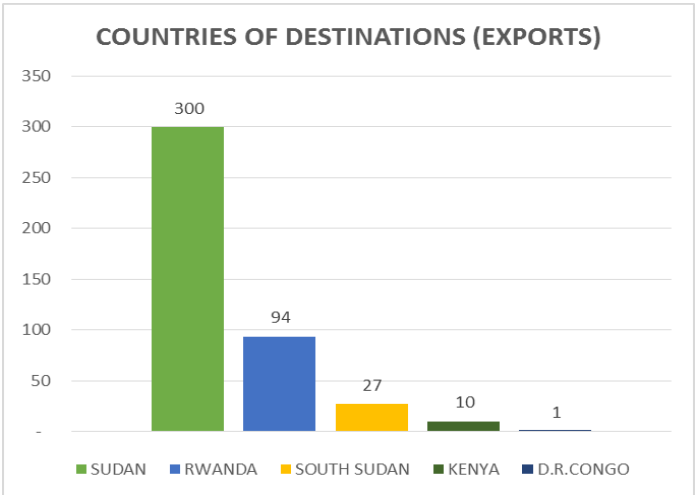


Figure4: fertilizer destination for 2013.



2.1.4 Distribution of Fertilizer in Uganda

The fertilizer industry being private sector led, distribution of fertilizer is entirely, the preserve of the private sector. However, direct importation is limited by the associated stringent requirements such as import permit which are not favourable for small scale importers. Table 3 indicates an estimated cost of $265 per MT in Nairobi translating to about Uganda shillings 472 per Kg with a trader in Mbale making a profit of 22 shillings per Kg and the trader in Kapchorwa making a net profit of 27 shillings per Kg.

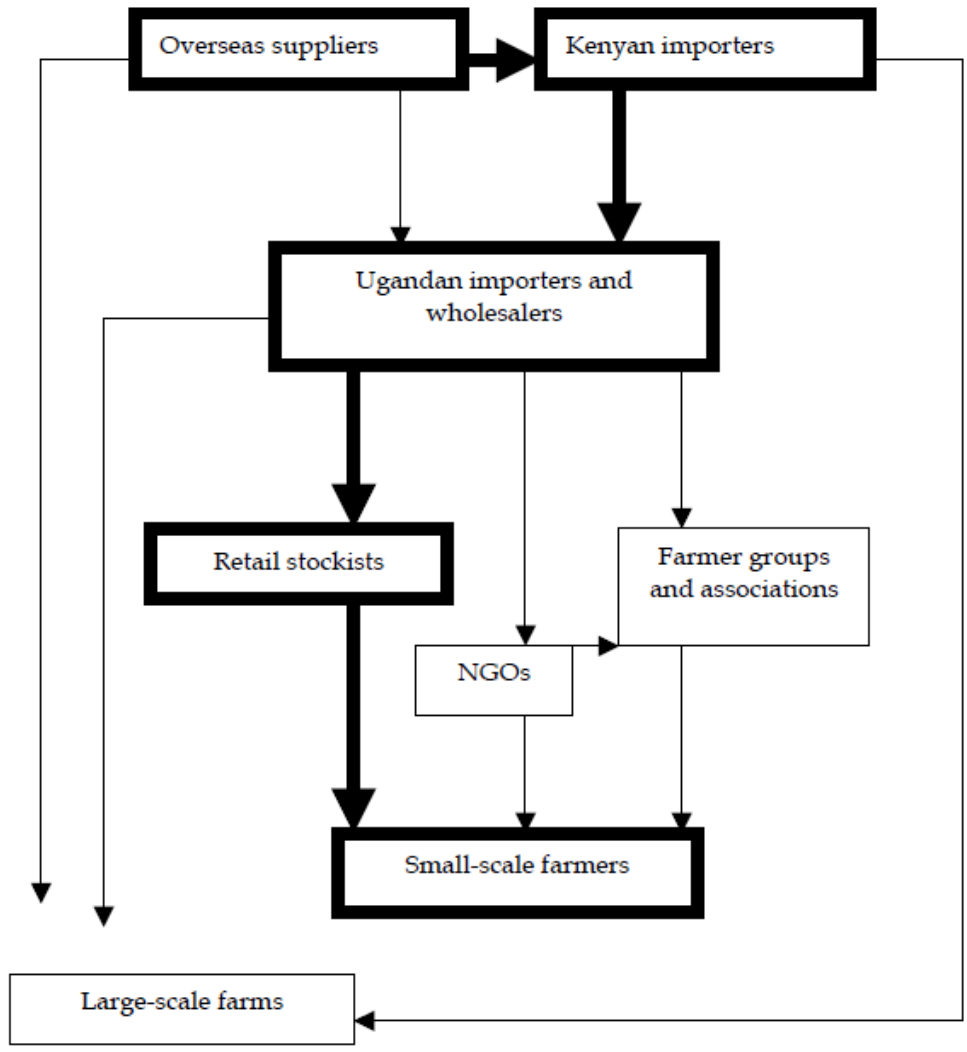
Table 3: Cost and price build-up for DAP from Nairobi, Kenya to Kapchorwa, Uganda

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

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

Fertilizer imports mostly enter Uganda through the Busia border post in eastern Uganda mainly from Kenyan suppliers and the rest from manufactures and suppliers internationally. Locally, the main dealers are importers, wholesalers, retail stockist, farmer groups, NGOs, large scale and small scale farmers. Figure 5 outlines the pprincipal procurement and distribution channels for fertilizer in Uganda during the 2012-2013 cropping year.

Figure 5: Principal procurement and distribution channels for fertilizer in Uganda in the 2012-2013 cropping year



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

2.1.4.1 LARGE SCALE FARMS:

These are mainly commercial tea, sugar, tobacco, flower and rice growers. They typically procure fertilizers directly from the international market or from major fertilizer suppliers in Kenya. Occasionally, they put out tenders for supply by domestic firms. Their estimated market share is about 30%.

2.1.4.2 COMMERCIAL IMPORTERS:

This category consists of about 8-10 fertilizer importers (excluding unlicensed importers), who are mostly based in Kampala and Mbale. The vast majority of

what these importers are wholesalers supplying directly to the large commercial estates and out-grower schemes in Uganda.

2.1.4.3 WHOLESALERS:

There are about 15-20 wholesalers in Uganda, who procure fertilizers from importers and then proceed to sell to retailers and a small number of farmers on retail basis. Save for two importer-wholesalers in Mbale, fertilizer wholesaling is concentrated in Kampala.

In addition, there is a significant parallel market of informal importer/wholesalers who bring small truck loads directly from Kenya, bypassing customs and avoiding payment of the 6% withholding tax that is borne by the licensed importers. These imports never register in the national statistics and the volume they represent is unknown, but they are the primary source of fertilizer for the smallest commercial farmers and retailers – especially in Eastern Uganda

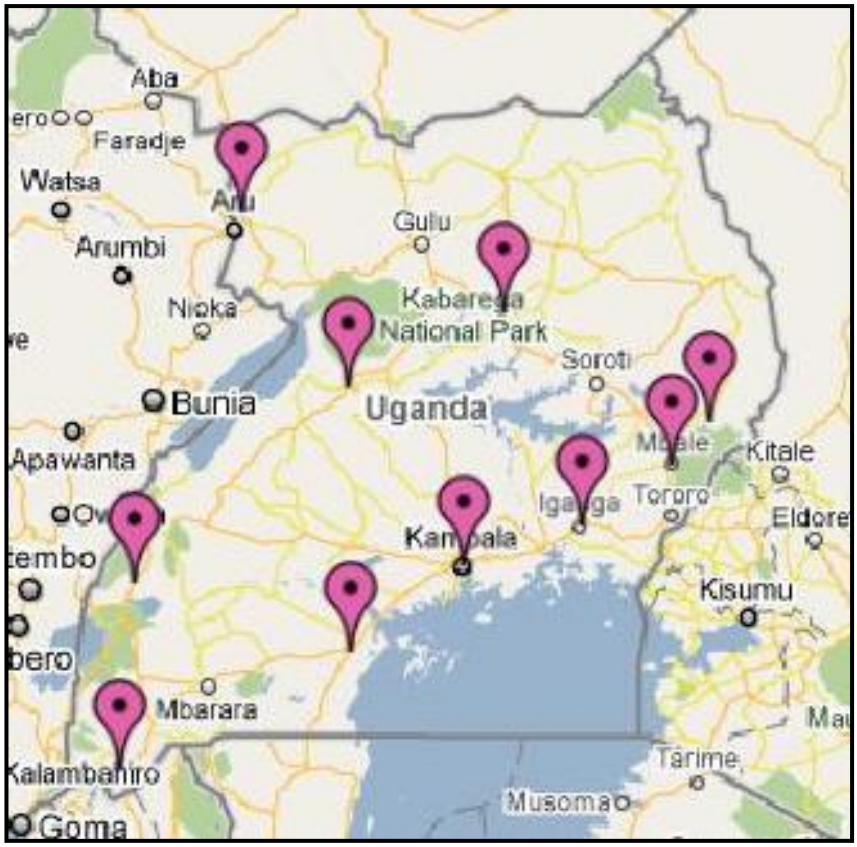
2.1.4.4 RETAILERS:

There are about 966 input retailers in the country. According to the agro-input dealer's census conducted in 2004, the districts with the largest number of fertilizer retailers included Sironko, Masaka, Mukono, Mbale, Iganga, and Kapchorwa. Census results show that only 20 of the retailers selling fertilizer sold more than 1MT per year, and only 8 sold more than 2 MT. The total rural retail sales to smallholders were less than 150 MT. The Census of 2009 revealed a total of 2,064 input dealers indicating an increase of about 114 percent between 2004 and 2009.

2.1.5 The fertilizer Price Data

To date, only the Regional Agricultural Input Market Information and Transparency System (AMITSA) is assisting the East Africa Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA) address the problem of lack of information about agro-inputs, including fertilizers. Few private agencies; Fit Uganda, EAGC, and Farm Gain Africa monitor wholesale and retail prices on selected markets and commodities. Figure 6 presents the distribution of AMITSA agro dealers in Uganda.

Figure 6: Distribution of AMITSA agro dealers



2.1.6 Constraints to fertilizer use in Uganda

According to the Uganda Census of Agriculture 2008/09, only eight in one hundred farm households use inorganic fertilizers and about 26 out of 100 households use organic fertilizers in crop production. The Census reported that most farmers (50%) were not using inorganic fertilizers because they considered them expensive. Other reasons for not using fertilizers included lack of knowledge (25%), Limited access (14.2%) and the perception that fertilizer is not beneficial

(9.5%). Farmers are not able to easily access fertilizer within their proximity, due to poor distribution system. Throughout the country, there are only about 2,064 retailers and poorly resourced stockists as of 2009.

Over 70% (4.2 million) small holder farmers are practicing subsistence agriculture with limited incomes and therefore poor purchasing powers to stimulate effective demand. There is generally lack of the requisite knowledge on how to use fertilizer by majority of the farmers. In addition, the presence of either adulterated, underweight or mislabeled fertilizers in the market, has resulted in the loss of confidence in fertilizer use by farmers. Poor output marketing also presents an obstacle to enhanced fertilizer use. The farmers quite often fail to sell their produce due to lack of markets or low prices in the prevailing markets, acting as a disincentive to invest in fertilizer.

2.2.0 Status of soil fertility in Uganda

Soil fertility is a measure of the ability of a soil to supply essential plant elements/nutrients in the amount and form that a plant can take up easily. It encompasses chemical (nutrients, pH), biological and physical (depth, structure, etc) parameters. The parameters used to assess soil fertility include soil pH, soil organic matter content, available phosphorous, texture, exchangeable calcium, potassium and magnesium. Soil pH and organic matter are the most important soil non-nutrient parameters because they influence availability of plant nutrients.

Soils in Uganda are very old and deeply weathered with very low nutrient holding capacity and deficiencies or toxicities of trace elements. The soils have been mined of nutrients for a long time without replenishment. It is estimated that annual nutrient depletion stands at an average of 87kgs of nutrients (NPK) per hectare per year (38kgs of Nitrogen; 17kg of Phosphorous and 32kgs of Potassium). 200kgs per hectare of mineral/inorganic fertilizer or 3-5MT of composite manure need to be applied annually to replenish the soil nutrients and boost agricultural productivity.

Fertilizer utilization efficiency in the farmer's fields is quite low. For the case of nitrogen, use efficiency from 30-50% in crops. As far as phosphorous is concerned, only 15-20% of the applied P is accessed by the plant. In the case of Potassium only 60% of the fertilizer is recovered by the plant. Similarly, the use efficiency for micronutrients is also minimal e.g. zinc rarely exceeds 10 percent. This therefore,

means that increasing fertilizer use efficiency and hence increasing return per unit of fertilizer is of paramount importance in ensuring increased crop productivity.

2.2.1 MAJOR SOILS OF UGANDA

Low soil fertility is a major hindrance to viable agricultural productivity in Uganda. Figure 7 shows the major soils in Uganda. The major soil types in Uganda are as follows;

2.2.1.1 Lunnyu soils

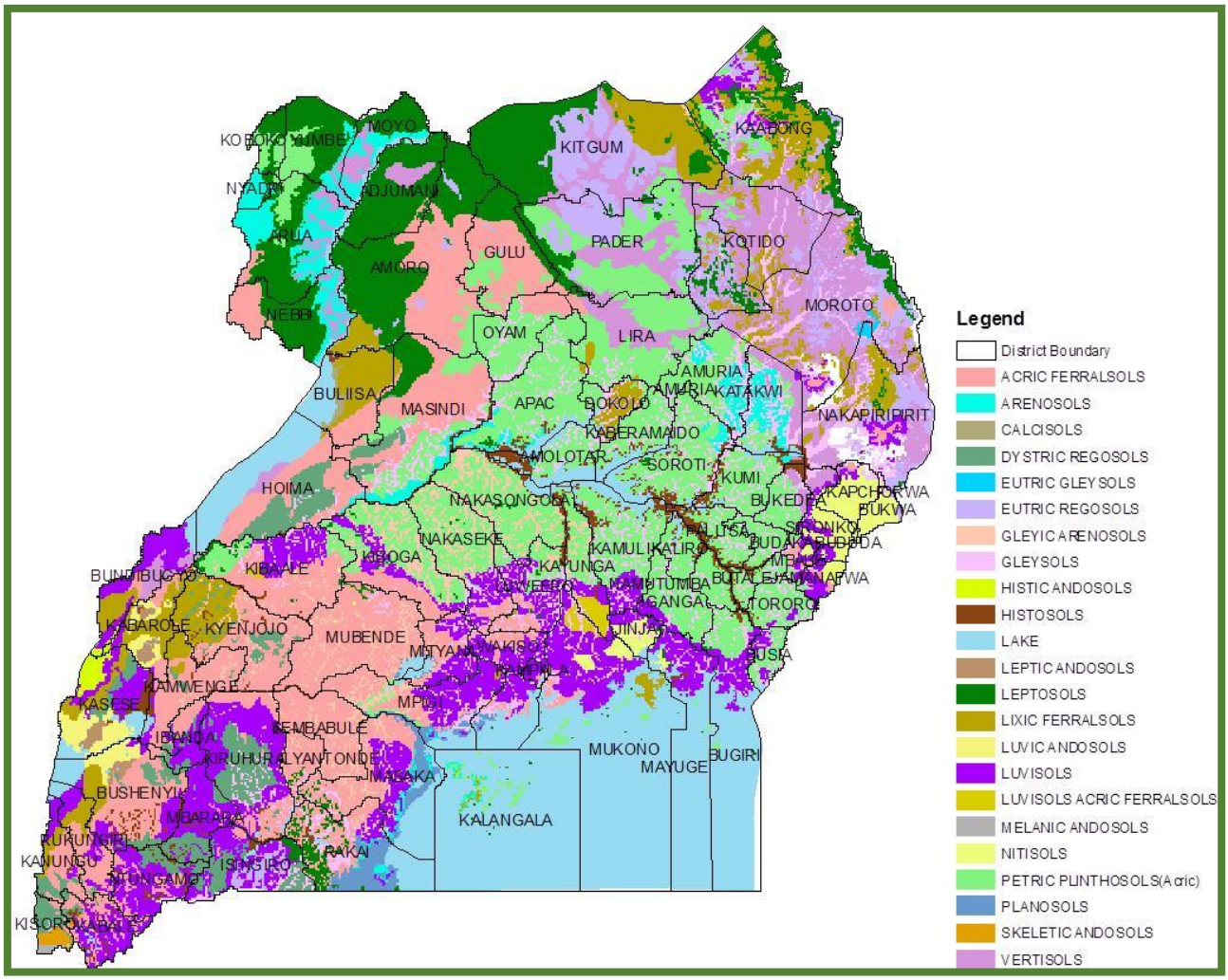
These are acid infertile soils, excessively poor in base content, low in pH, low in CEC, with toxic levels of manganese (Mn) and aluminium (Al). They are patches of unproductive soils found in the high rainfall areas usually as a result of inappropriate soil management. These soils were found in Ssese Islands, Lake Victoria, west Kigezi, East Ankole and many areas in Busoga characterized by pH<5.0, Exch. Mn 200-400 mg/kg (ppm compared with 30 ppm for normal productive soil, an exch. Bases of 5 me/100gm soil.

2.2.1.2 Acid soils

Acidity itself is often not a problem, unless the pH is very low e.g. <4; but these soils often have high exchangeable Al and Mn which severely restrict the growth of some crops e.g. maize. On the other hand, acidity influences several soil processes and nutrients which consequently affect plant growth. Wetlands, when drained, develop very acidic conditions depending on the sulfur content of the material. In places like Kabale, isolated dead swamps developed and some places become completely barren to the extent that no crops could grow there because of the oxidation of sulphides to sulphate).

For highly degraded soil lime plus organic matter is the best rehabilitation; but lime should carry a number of cations such as gypsum and wood ashes. Lime application rates should be calculated to reduce exchangeable Al to about **15%** rather than aiming at increasing soil pH. For wetlands-restrict to the use of low intensity drainage (use ridges, mounds or raised beds) or use crops that are tolerant to water logged conditions and high soil acidity. Wetland soils should be characterized in terms of acidification, rate of organic matter subsidence, nutrient content, cation exchange capacity (CEC), soil structure and levels of **S, Fe** and **Al**.

Figure 7: A map showing major soils of Uganda



CHAPTER THREE

3.0 SOURCES OF FERTILIZER DATA

The responsible institutions for collecting data on fertilizers in Uganda are the Uganda Revenue Authority (URA) responsible for registering customs records and avails the same to the users, Ministry of Agriculture, Animal Industries and fisheries (MAAIF) responsible for current statistics such fertilizer import and export permits, fertilizer usage and stocks among others, Uganda Bureau of Statistics (UBOS) responsible for censuses and macro statistics, Ministry of Trade and Cooperatives responsible for administrative data on cooperatives and Bank of Uganda (BOU) responsible for balance of payment publication. The table 4 below summarizes the type of fertilizer data, the sources, frequency of collection and corresponding remarks.

Table 4: Sources of Fertilizer data

Type of Fertilizer Data	**Sources of Data**	**Frequency of data collection**	**Remarks**
Import and Export	URA	Daily	Customs data collected on a daily basis at all border points
Import and Export	UBOS and BOU	Monthly	Collects data on informal border trade, compiles and disseminate customs data from URA.
Consumption and trade	IFPRI MAAIF	Research base	Carried out a Survey on "The Supply of Inorganic Fertilizers to Smallholder Farmers in Uganda"
Trade	MAAIF	Regularly	Issuing of Permits to investors
Production	MAAIF	Monthly	Guangzhou Dongsong Energy Group has been licensed to explore and develop the phosphate industry in Tororo, by 2016. Not operational currently.
Consumption	UBOS	Annually	Household Surveys and Censuses
	Commercial Farms	Annually	Private large scale and institutional farms
Fertilizer application	NARO, MAAIF	Research based	Conducts research on various commodities

3.1 The SWOT analysis on Sources of Data for Real Consumption of Fertilizer and Fertilizer Use by Crop

3.1.1 The Strength on Sources of Data for Real Consumption of Fertilizer and Fertilizer Use by Crop

1) The Automated System for Customs Data (ASCUDA) operated by URA in place led to the simplification of procedures and a reduction in the number of documents required for imports and exports. The system resulted in more accurate and complete trade data, as well as the analysis and storage of customs records.
2) The tracking system of imports and exports by MAAIF while issuing permits. The fertilizer control regulation of 2012 mandates the Ministry as the only institution responsible for issuing import and export permits. With the system in place, tracking of fertilizer movement is possible.
3) The UBOS Act of 1998, mandates it the collection, monitoring and managing the national statistics. In Uganda, the National Statistics System (NSS) is decentralized and is comprised of many players, who are data producers and users, with the Uganda Bureau of Statistics (UBOS) as the coordinating agency. These include Government Ministries, Departments and Agencies (MDAs) both public and private. The statistical legislation is aimed at improving coordination and synergy within the National Statistical System.
4) The fertilizer dealers' register. All fertilizer dealers keep records of fertilizer stocks and sales. A survey of fertilizer sales and stocks from the importers can reveal useful statistics for Uganda, the source being records by fertilizer dealers. The fertilizer industry being private sector led, its activities are coordinated by Uganda National Agro-Input Dealers Association (UNADA). UNADA has an established office, executive and an article of association. This association is a key source of data and a list of fertilizer dealers.
5) The ministry generates and disseminates annual acreage and production data for selected crops and the series begin in 1980. With all other variables present, the computation of fertilizer utilization is possible.
6) The National Agriculture Research Organisation has a list of updated fertilizer application rates for Uganda. This eases the computation of fertilizer use by crop.

3.1.2 The Weaknesses on Sources of Data for Real Consumption of Fertilizer and Fertilizer Use by Crop

1) The number of households applying fertilizers in Uganda is not available to enable the computation of fertilizer usage in Uganda. It is worse when it comes to time series data as well as disaggregation by fertilizer type used by crop. During the development of this report, the author managed to make acceptable assumptions to derive figures for 2013.
2) The crop area fertilized is not available too, this renders computation of fertilizer utilization very difficult.
3) Crop acreage especially cash crop is still challenge. Cash crops account for about 30 percent usage of fertilizers in Uganda. With this acreage missing, computation of fertilizer utilization remains a challenge.
4) Limited knowledge of officials managing fertilizer data in the country on the technical terms when registering fertilizer information and analysis.
5) Traders hesitate to share data on stocks, sales purposes among others. This results into an incomplete picture of the situation on the ground
6) Customs records (Imports and exports) are based on invoices by traders with minimal verification. It is a common practice for traders to under report and sometimes over report depending on the situation which benefits the traders. On tax matters, they will always under report but when it comes identification of traders with largest volumes, they over report.
7) Little or no Pre-validation at the border. Customs officials hardly post review the entries to confirm accuracy. Mistakes are human, so a wrong entry may find its way into the database.

3.1.3 The Opportunities on Sources of Data for Real Consumption of Fertilizer and Fertilizer Use by Crop

1) Establishment of statistics Division at Ministry and The Directorate of Agriculture and Environment Statistics in Uganda Bureau of Statistics are huge resource in the conducting surveys on fertilizer use. There has been manpower challenge in the collection and management of data on agriculture in Uganda. The creation and recruitment of officials into these two bodies will highly improve the collection and management of data on agriculture including fertilizers.
2) There is a strong political will of government to promote the use of fertilizer as stated in the wealth creation program. Fertilizers are already among the inputs being distributed to farmers.

3) The Technical Working group on fertilizers for the country is in place. This team is responsible for the management of data on fertilizers in the country including bringing together fertilizer stakeholders to validate data on fertilizers.

3.1.4 The Threats on Sources of Data for Real Consumption of Fertilizer and Fertilizer Use by Crop

1) Government has slapped a tax on agriculture inputs in the country. This will result into under reporting by fertilizer dealers for fear of taxation.
2) Adding a fertilizer module on household surveys may render the exercise very expensive. It will impact on quality and timely of data dissemination.
3) The ASCUDA software may breakdown. In addition technology is changing very rapidly. This automatically affects data availability and quality.
4) The customs officials are not trained to manage fertilizer data most especially the detail. The Ministry and Uganda Bureau of statistics officials managing fertilizer data are largely untrained in this area. To date, only a single training on validation has been conducted. No other plans are available to train managers, users and customs officials on fertilizer data.
5) Growth of informal trade in the country rendering fertilizer data unreliable as information on this trade isn't captured

CHAPTER FOUR

4.0 ESTIMATES OF REAL FERTILIZER CONSUMPTION DATA

4.1 Fertilizer Use by Crop in Uganda

The following main crops in Uganda were used in the analysis of fertilizer utilization and these are; Wheat, Rice, Maize, Millet, Sorghum, Cassava, Potatoes, Sweet potatoes, Beans, Peas, Cow peas, Pigeon peas, Soybeans, Groundnuts, Sunflower seed, Sesame seed, Bananas, coffee, tea, tobacco and sugarcane. Details are shown in table 5.

The area under the main food and cash crops increased from 6.206 million Ha in 2012 to 6.242 Ha in 2013 and this translates to about 0.6 percent. The total area under these crops that is fertilized increased from 151, 231 Ha in 2012 to 174, 288 Ha in 2013 indicating a percentage increase of about 1.6. The total amount of fertilizer used increased from 48,610 MT in 2012 to about 53,180 MT in 2013.

Urea and NPK 17:17:17 were the most used fertilizers by crop in Uganda in 2013. Other fertilizer used include DAP, MOP, TSP, CAN, Rock phosphate, NPK (16:6:20) and NPK (25:5:5).

Table 4.1 shows that the majority of farmers growing plantain, rice, potatoes, sugarcane, tobacco and coffee applied NPK 17:17:17.

The majority of farmers growing plantain, rice, potatoes, sugarcane, tobacco and coffee applied NPK 17:17:17. About 8,1511Mt of NPK 17:17:17 was used in plantain alone on an estimated area of about 42,753 hectares, an application rate of 200 Kg per Ha.

Sugarcane with an estimated area of 50,590Ha being fertilized, uses about six different types of fertilizers (Urea, NPK-TPL17, DAP, MOP, rock phosphate and TSP) right from planting stage and during second shooting.

The area under maize in 2013 was 1.1 million. Only 3.2 percent of this acreage was fertilized which translates to about 36,248 Ha consuming about 4,531 MT, an equivalent of 125 Kgs per Ha.

Rice in Uganda has become one of the staple food. The area under rice in 2013 was 93,000 Ha. Only 3.3 percent (3,069 Ha) was fertilized in 2013. A total of 920

MT of fertilizer was applied on rice across the country. This translates to about 300 Kg per Ha.

In Uganda, coffee is the main cash crop. The total acreage under coffee in 2013 was 284,624 Ha. Only 9 percent (25,616 Ha) of this acreage was fertilized in 2013 consuming a total of 10,247 MT of fertilizer with NPK and CAN each recording 4,355 MT. This translates to about 400 Kg per Ha being used on coffee across the country

Annex table 7 indicates that Urea (12,793 MT) was the most highly available straight nitrogenous fertilizer in the country in 2013 followed by ammonium sulphate with 843 MT, followed by ammonium nitrate with 442 MT.

Among the straight phosphate fertilizers, Uganda mainly stoked superphosphate totaling to 668 MT. Among the Potassic fertilizers, there were 655 MT of potassium chloride in 2013. In the same period, the country was able to stock about 2,098 MT of DAP.

It is estimated that 12,623 MT of Urea was used on crop production in 2013 and 2,098 MT of DAP in the same period. A total of 915 MT of superphosphate was used on crop production and 645 MT of potassium chloride.

In 2013, the area under Banana plantain was 972,000 Ha producing 5 MT per Ha. Only 5 percent of the planted area was fertilized. Of the recommended application rate of 120, 100, 100 NPK, the actual application realized is 0.9, 1.0. 1.0 Kg nutrient per Ha of NPK consuming 40 MT of NPK. Table 8 summarizes fertilizer use by crop for the period 2011-13.

Table 5: Inorganic fertilizer use by crop in Uganda (2011-2013)

Crop	Year	Area under Crop (Ha)	Crop Area Fertilized (Ha)	Fertilizer Type	Application rates (Kg/Ha)	Fertilizer Volume (MT)
1. Plantain Bananas	2011	979,000	25,446	NPK (17:17:17)	200	5,089
	2012	979,000	30,984	NPK (17:17:17)	200	6,197
	2013	972,000	42,753	NPK (17:17:17)	200	8,151
Cereals						
2. Maize	2011	1,063,000	26,894	UREA,DAP,NPK(120:60:60)	50/75/100	4,332
	2012	1,094,000	29,233	UREA,DAP,NPK(120:60:60)	50/75/100	4,455
	2013	1,101,000	36,248	UREA,DAP,NPK(120:60:60)	50/75/100	5,548
3. Rice	2011	90,000	2,277	UREA, NPK(17:17:17),DAP	150/100/50	683
	2012	92,000	2,475	UREA, NPK(17:17:17),DAP	150/100/50	743
	2013	93,000	3,069	UREA, NPK(17:17:17),DAP	150/100/50	921
4. Wheat	2011	13,000	800	DAP	125	100
	2012	14,000	800	DAP	125	100
	2013	14,000	800	DAP	125	100
5. Other cereals	2011	536,000	-	N/A	N/A	N/A
	2012	548,000	-			
	2013	548,000	-			
Roots & Tubers						
6. Potatoes	2011	37,000	936	NPK(17:17:17)	275	257
	2012	38,000	1,018	NPK(17:17:17)	275	280
	2013	38,000	1,262	NPK(17:17:17)	275	347
7. Other roots &	2011	1,272,000	-	N/A	N/A	N/A
	2012	1,303,000	-			
	2013	1,304,000	-			
Pulses						
8. Pulses	2011	740,000	-			
	2012	756,000	-	N/A	N/A	N/A
	2013	759,000	-			
Oil crops						
11. Sun flower	2011	221,000	3,591	DAP	125	449
	2012	230,000	4,078	DAP	125	510
	2013	238,000	5,536	DAP	125	692

Crop	Year	Area under Crop (Ha)	Crop Area Fertilized (Ha)	Fertilizer Type	Application rates (Kg/Ha)	Fertilizer Volume (MT)
12. Other Oil crops	2011	1,081,000	-	N/A	N/A	N/A
	2012	1,111,000	-			
	2013	1,120,000	-			
13. Sugarcane	2011	64,000	50,000	UREA/NPK(17:17:17)/DAP/MOP/RockPhospahet/TSP	160/100/117/20/15/50	23,100
	2012	62,000	50,563	UREA/NPK(17:17:17)/DAP/MOP/RockPhospahet/TSP	160/100/117/20/15/51	23,411
	2013	70,000	50,590	UREA/NPK(17:17:17)/DAP/MOP/RockPhospahet/TSP	160/100/117/20/15/52	23,423
Beverages						
14. Tobacco	2011	18,000	5,000	NPK(17:17:17)/CAN	100/50	750
	2012	17,784	4,940	NPK(17:17:17)/CAN	100/50	741
	2013	17,568	4,881	NPK(17:17:17)/CAN	100/50	732
15. Tea	2011	28,000	8,400	NPK(25:5:5)	250	2,100
	2012	38,000	11,400	NPK(25:5:5)	250	2,850
	2013	52,000	15,600	NPK(25:5:5)	250	3,900
16. Coffee	2011	282,283	23,205	NPK(17:17:17)/NPK(16:6:20)/CAN	60/170/170	9,282
	2012	283,454	23,311	NPK(17:17:17)/NPK(16:6:20)/CAN	60/170/171	9,324
	2013	284,624	23,416	NPK(17:17:17)/NPK(16:6:20)/CAN	60/170/172	9,366
TOTAL	**2011**					**46,142**
	2012					**48,610**
	2013					**53,180**

NB. Crop area sourced from official data. Crop area fertilized and fertilizer volumes are computed by author.

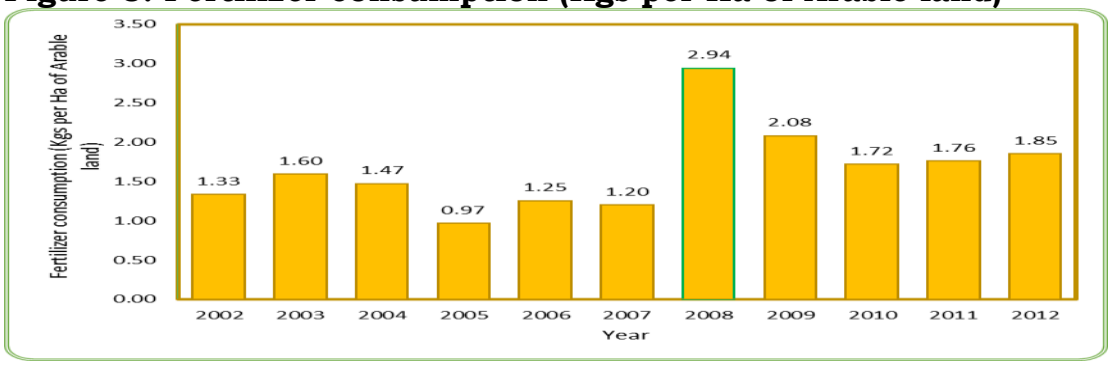
4.2 Fertilizer Consumption in Uganda

During 2013, the total area under the main crops was 6.2 million Ha of which 174,288 (2.8 percent) was fertilized across the country with sugarcane recording 29 percent followed by banana with 25 percent. A total of 53, 180 MT of fertilizer was used which translates to about 0.85 Kg per Ha nationally and 30 Kg per Ha on fertilized soils

According to FAO estimates, Uganda's fertilizer consumption is 1.85 kgs per Ha as of 2012. The FAO estimates indicate a decline in fertilizer consumption per hectare of arable land in Uganda from 2.94 kgs per hectare in 2008 to about 1.85 kgs in

2012 with 2010 recording the lowest consumption kg per hectare of arable land of 1.72 kgs in the same period. Figure 8 illustrates the fertilizer consumption in Kgs per Ha of arable land.

Figure 8: Fertilizer consumption (Kgs per Ha of Arable land)



4.3 FERTILIZER RECOMMENDATIONS

The National Agriculture Research Organisation (NARO) established the fertilizer requirements (Table 5.2) of selected crops in the zonal Agricultural Research Institutes (ZARDI) with different ago-ecological and farming systems in Uganda. Table 6 indicates the general recommendations for selected crops.

Table 6: General recommendations for selected crops

Crop	N (Kg/ha)	P_2O_5 Kg/ha	K_2O Kg/ha
Rice	120-150	60	40-60
Wheat	120	60	40-60
Maize	120	60	60
Cotton	80	40	40
Pulses	10-20	30-50	20-25
Groundnut	20-25	50-80	20-25
Potato	100-250	80-100	60-100
Tobacco	50-100	50-80	80-100
Sugarcane	150-200	75-100	100

CHAPTER FIVE

5.0 CHALLENGES IN THE EXISTING SOURCES OF DATA

During the compilation of this report, a number of challenges were encountered which affected the content and nature of this report. The following are sighted as challenges in this regard.

1) To date, there is no official documentation of fertilizer used by crop in Uganda. This report is regarded as the very first documentation on fertilizer use by crop in the country rendering comparison data and information a challenge.
2) A number of datasets required to compute acreage fertilized, consumption per crop among others were not available. A number of estimations and assumptions were adopted to arrive at some useful statistics.
3) Time series data on crop production and number of farmers at lower administrative levels is generally lacking.
4) Data on fertilizer prices is still a challenge. Only AMITSA is assisting Uganda to compile data on prices from selected input dealers.
5) Sampling frame. The available sampling frame used in household surveys in Uganda is as old as 2002. This renders data collection expensive as listing has to be done before sampling of households to be included in the sample.
6) Fertilizer is not among the 16 minimum core indicators recommended by FAO for inclusion in agriculture censuses and surveys. This makes automatically makes collection of fertilizer data as an unfunded priority in the survey and census program, and hence affecting ists availability and reliability.

5.1 Cost effective ways of collecting real fertilizer consumption and FUBC data in the context of Uganda

1) The ministry in collaboration with partners should compile an inventory of stakeholders in the fertilizer industry to harmonize data collection tools, reporting arrangements and data dissemination calendar.
2) The ministry should sensitize all private large scale and institutional farms, issue them with questionnaires on fertilizer use and then agree on the questionnaire retrieval dates preferably by extension officials or statisticians from the ministry.

3) The ministry should sensitize and issue to fertilizer dealers (importers, exporters and small scale dealers) a self-administered questionnaire and retrieved monthly.
4) The ministry in collaboration with Uganda Bureau of Statistics should develop harmonized concepts, definitions, and methodologies (sample designs, sample size determination), including frequencies of collecting various fertilizer data as per users' needs at various levels, specifically on usage, wholesale, and retail prices.
5) The ministry and partners should train and equip officials involved in the collection, analysis and management of fertilizer data in the country from sub county level to the district including the fertilizer dealers and eventually the ministry headquarters.
6) The ministry should collaborate with Local Governments, Uganda Bureau of Statistics, FAO and IFDC in collecting fertilizer data at these levels and share the costs of collection because all stakeholders need this data in the planning and decision making. This should include reorienting (training) agricultural field extension officers to basics of data collection as part of their duties.
7) MAAIF should develop and coordinate an agricultural statistical production system that include all stakeholders such that each of them is given an obligation, rights, and responsibility in the system, rules and regulations in sharing data.
8) All household surveys in Uganda should have a module on fertilizer utilization and stocks.

5.2 Conclusions

There are currently very few government and private agencies that collect data on fertilizer in Uganda. All these are collecting data for their clients' need which may not necessarily serve the needs of the whole nation. Data on fertilizers often collected are mostly imports and re-exports. Data on prices is only collected by AMITSA. Government of Uganda currently is lacking a system of agricultural data collection. The Ministry of Agriculture, Animal Industries and Fisheries developed a plan for agricultural statistics as part of the national statistical system, which is expected to be implemented beginning the 2015/16 financial year. Agricultural statistics data are very important to the country since its economy and food supply depends on this sector. The absence of credible and up-to-date agricultural statistics in the country may lead to ineffective agricultural policies thus leading to the underdevelopment of the sector.

TABLE 7: Estimates of real fertilizer consumption per product and per nutrient for 2010-2013

AGRICULTURAL RESOURCES - FERTILIZER UTILIZATION																	
HS CODE	COMMODITY	A			E				F				G				NOTES. e.g. different year used, different unit used,
		Plant nutrient content			DOMESTIC AVAILABILITY (metric tons of product)				NON FERTILIZER USE (including feed use) (metric tons of products)				USED FOR CROP PRODUCTION (metric tons of product)				
		N	P_2O_5	K_2O	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013	
STRAIGHT NITROGENOUS FERTILIZERS																	
2814	Ammonia, anhydrous				30	51	-42	33	30	51	33	33	0	0	-75	0	to be verified
310230	Ammonium nitrate				1,982	1,797	594	442	1,982	1,797	594	442	0	0	0	0	
310221	Ammonium sulphate				2,327	795	415	843	487	728	330	266	1,840	66	85	578	
310240	Calcium ammonium nitrate				0	0	0	175				122	0	0	0	53	
310210	Urea				6,477	10,743	9,711	12,793	688	20	57	170	5,790	10,723	9,654	12,623	
310280	Urea and ammonium nitrate solutions				0	58	606	-35		58	606		0	0	0	-35	to be verified
STRAIGHT PHOSPHATIC FERTILIZERS																	
310310	Superphosphate				358	566	668	915	X	X	X	X	358	566	668	915	
31031010	Superphosphate above 35%				0	0	0	0	X	X	X	X	0	0	0	0	
31031090	Superphosphate other				0	0	0	0	X	X	X	X	0	0	0	0	
2510	Phosphate rock				-113	-72	-162	-191					-113	-72	-162	-191	to be verified
STRAIGHT POTASSIC FERTILIZERS																	
310420	Potassium chloride				536	410	907	655	4	123	13	10	532	286	894	645	
310430	Potassium sulphate				57	23	99	4	18	9	27	3	39	14	71	1	
COMPOUND FERTILIZERS																	
310530	Diammonium phosphate (DAP)				631	823	786	2,098	X	X	X	X	631	823	786	2,098	
310540	Monoammonium phosphate (MAP)				513	254	220	94	X	X	X	X	513	254	220	94	
310551 and 310559	Other NP compounds				104	1,540	135	251	X	X	X	X	104	1,540	135	251	
310510 and 310520	NPK complex				0	0	0	0	X	X	X	X	0	0	0	0	
310510 and 310520	NPK blends								X	X	X	X	0	0	0	0	
310560	PK compounds				70	370	21	13	X	X	X	X	70	370	21	13	
283421	Potassium nitrate				27	365	119	61	27	48	119		0	317	0	61	
OTHER FERTILIZERS (specify below)																	
310290	Other N				722	233	55	88	0			0	721	233	55	88	
310390	Other P				406	2,265	3,640	1,070				15	406	2,265	3,640	1,055	
310490	Other K				1,670	1,507	1,957	1,264		1	6		1,670	1,506	1,951	1,264	
310590	Other NPK				20,562	18,956	25,236	30,933					20,562	18,956	25,236	30,933	
310100	Organic Fertilizers				19	73	14	54					19	73	14	54	
310260	Calcium Nitrate				1,330	649	3,320	1,293	586	137	364	383	744	512	2,956	910	
310250	Sodium Nitrate				18	0	17	10	18	0	17	10	0	0	0	0	
310229	Double Salts of AS or AN				7	164	-2	1		0	0	0	7	164	-2	1	to be verified
28142	Ammonium Hydroxide				16	82	4	-55	18	100	79	66	-2	-18	-74	-121	

It is assumed that Ammonium Nitrate is used mainly by the mining companies in Uganda, so all Ammonium Nitrate are reported under Non Fertilizers. Phosphate Rock trade quantities were not processed but were added from a trade summary provided by Ministry. Negative values exist in the data

Table 8: Estimates of fertilizer use by crop for 2011-13 as per IFA format

Fertilizer Use by Crop Statistics

Country : Uganda

Color Legend

Cell to be filled out | Cell with automatic calculations (Not to be | **Cell to be filled out *if information is available***

Patrice Annequin: data provided in the report

	Planted	Average Yield (kg/ha)	Percent of the Planted Area that is Fertilized (%)			Recommended Application Rate (kg nutrient/ha)			Actual Application Rate (kg nutrient/ha)			Total Fertilizer Consumption ('000 metric tonnes nutrients)		
			N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Plantain														
2		4,800	3%	3%	3%	120	100	100	1.7	1.7	1.7	0.04	0.04	0.04
2012	979	5,000	3%	3%	3%	120	100	100	1.3	1.3	1.3	0.04	0.04	0.04
2013	972	5,000	5%	5%	5%	120	100	100	0.9	1.0	1.0	0.04	0.04	0.04
Maize														
2011	1,063	2,300	3%	3%	3%	120	60	60	0.4	0.2	0.2	0.01	0.01	0.01
2012	1,094	2,200	3%	3%	3%	120	60	60	0.3	0.2	0.2	0.01	0.01	0.01
2013	1,101	2,300	3%	3%	3%	120	60	60	0.3	0.1	0.1	0.01	0.01	0.01
Rice														
2011	90	2,400	3%	3%	3%	150	60	60	18.7	18.7	18.7	0.04	0.04	0.04
2012	92	2,300	3%	3%	3%	150	60	60	18.3	18.3	18.3	0.04	0.04	0.04
2013	93	2,500	3%	3%	3%	150	60	60	18.1	18.1	18.1	0.04	0.04	0.04
Other cereals														
2011	536	1,450	3%	3%	3%				0.0	0.0	0.0			
2012	548	1,145	3%	3%	3%				0.0	0.0	0.0			
2013	548	1,050	3%	3%	3%				0.0	0.0	0.0			
Irish Potatoes														
2011	37	4,700	3%	3%	3%	250	100	100	45.4	45.4	45.4	0.04	0.04	0.04
2012	39	4,700	3%	3%	3%	250	100	100	41.4	41.4	41.4	0.04	0.04	0.04
2013	39	4,700	3%	3%	3%	250	100	100	33.7	33.7	33.7	0.04	0.04	0.04
Other roots& Tubbers														
2011	1,272	3,650												
2012	1,303	3,700												
2013	1,304	3,750												
Groundnuts														
2011	409	800												
2012	421	800												
2013	422	800												
Other Oil crops														
2011	469	870												
2012	483	700												
2013	491	700												
Tobacco														
2011	18.0		28%	28%	28%				315.3	315.3	315.3	1.58	1.58	1.58
2012	17.8		28%	28%	28%				320.3	320.3	320.3	1.59	1.59	1.59
2013	17.5		28%	28%	28%				327.3	327.3	327.3	1.59	1.59	1.59
Coffee														
2011	282	369	9%	9%	9%	250	20	300	37.4	20.4	44.2	0.95	0.52	1.12
2012	283	369	9%	9%	9%	250	20	300	37.5	20.4	44.3	0.95	0.52	1.13
2013	284	369	9%	9%	9%	250	20	300	37.5	20.4	44.3	0.96	0.52	1.13
Sugarcane														
2011	64	5,000	78%	78%	78%	200	100	100	0.8	0.8	0.8	0.04	0.04	0.04
2012	62	5,100	81%	81%	81%	200	100	100	0.8	0.8	0.8	0.04	0.04	0.04
2013	70	5,200	71%	71%	71%	200	100	100	0.8	0.8	0.8	0.04	0.04	0.04
Tea														
2011	28	2,400	70%	70%	70%	90	90	90	32.2	6.4	6.4	0.63	0.13	0.13
2012	38	2,300	70%	70%	70%	90	90	90	23.6	4.7	4.7	0.63	0.13	0.13
2013	52	2,400	70%	70%	70%	90	90	90	17.3	3.5	3.5	0.63	0.13	0.13
TOTAL														
2011	2,542.7											1.75	0.82	1.42
2012	2,586.8											1.76	0.82	1.43
2013	2,610.5											1.76	0.82	1.43

References

1. Geoffrey O. & Mildred B: Constraints to Fertilizer Use in Uganda, 2012: Insights from Uganda Census of Agriculture 2008/9.

2. Stephen B.K. 2011: Inorganic fertilizer in Uganda—Knowledge gaps, profitability, subsidy, and implications of a national policy

3. Todd B., Patrick L., Stephen B.K., Tewodaj M. & Julian N. 2012: The Supply of Inorganic Fertilizers to Smallholder Farmers in Uganda, Evidence for Fertilizer Policy Development

4. Uganda Bureau of Statistics (UBOS), 2013. Uganda Census of Agriculture 2008/09, Volume 3.

5. Uganda Bureau of Statistics (UBOS), 2013. Uganda Census of Agriculture 2008/09, Volume 111.

6. Uganda Bureau of Statistics (UBOS), 2013. Uganda National Panel Survey, 2011/12: Wave III report

Sunday Godfrey, Email: bsgmalthus@yahoo.com. Ministry of Agriculture, Animal Industry and Fisheries
Ocen Dickens, Email: ocendickens@yahoo.com. Uganda Bureau of Statistics