



MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY AND FISHERIES

**Uganda National Rice Development Strategy (NRDS)
2008-2018**



Rice Self-Sufficiency in Uganda by 2018

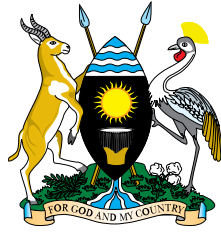


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Rice Self-Sufficiency in Uganda by 2018



GOVERNMENT OF UGANDA

MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY AND FISHERIES

Uganda National Rice Development Strategy (NRDS)

2008-2018

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Produced in 2009 and revised in 2012

A product of the Rice Steering Committee and its sub-ordinate entities.

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2012.

Suggested Citation: Ministry of Agriculture, Animal Industry and
Fisheries (MAAIF), 2012. *Uganda National Rice Development Strategy,*
2008-2018.

FOREWORD

Rice is a relatively new crop to most farmers in Uganda. It is not until about the year 2003 when the promotion of upland rice resulted into increased local supply of rice produced by Ugandan farmers. This has made rice gain an important place as an urban food commodity and a rural cash crop for Uganda. This in turn triggered strategic planning for development of the rice industry as an enterprise for increasing rural incomes and increasing urban food supplies. The National Rice Development Strategy has been developed through engagement of all the stakeholders along the rice value chain.

The National Rice Development Strategy (NRDS, 2008 - 2018) is derived from Uganda's National Development Plan (NDP, 2010/11 - 2014/15), and the Agriculture Sector Development Strategy and Investment Plan (DSIP, 2010/11 - 2014/15). The DSIP is Uganda's Comprehensive Africa Agricultural Development Programme (CAADP) document. The DSIP aims at: (i) Improvement of rural incomes and livelihoods; and (ii) improvement of household food and nutrition security.

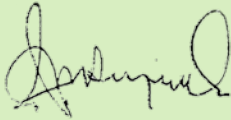
The NRDS (2008 - 2018) seeks to make Uganda self-sufficient in rice production with a strategic target of increasing rice production in Uganda from about 177,800 MT in 2008 to 680,000 MT of un-milled rice by 2018.



I commend all the rice stakeholders, who under the leadership of the Rice Steering Committee, worked tirelessly and accomplished this task. Special recognition is extended to the Coalition for Africa Rice Development (CARD) Secretariat, Nairobi, and the Japan International Cooperation Agency (JICA)-Uganda for the technical support towards the NRDS development process. I also wish to thank the political leadership in Uganda which has continuously supported growth of the agricultural sector.

I wish to appeal to all rice stakeholders to maintain concerted effort towards achieving implementation of the NRDS targeting food and income security in the rural and urban areas engaged in the rice value chain.

For God And My Country



Tress N. Buchanayandi (MP)

Minister of Agriculture, Animal Industry And Fisheries

June 2012

LIST OF ACRONYMS

AAO	Assistant Agricultural Officer
AO	Agricultural Officer
ARC	Africa Rice Centre
AEATRI/ AEATRC	Agricultural Engineering and Appropriate Technology Research Institute / Centre
CAADP	Comprehensive Africa Agriculture Development Programme
CARD	Coalition for African Rice Development
COMESA	Common Market for East and Southern Africa
EAC	East African Community
EIA	Environment Impact Assessment
FAO	Food and Agriculture Organization of the United Nations.
GDP	Gross Domestic Product
GoU	Government of Uganda
Ha	Hectare
IITA	International Institute of Tropical Agriculture
IRRI	International Rice Research Institute
JICA	Japan International Cooperation Agency
LG	Local Government
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MFPED	Ministry of Finance, Planning and Economic Development
MWE	Ministry of Water and Environment

MT	Metric Tonnes
MTIC	Ministry of Trade , Industry and Cooperatives
NAADS	National Agricultural Advisory Services
NaCRRRI	National Crop Resources Research Institute
NARO	National Agricultural Research Organization
NDP	National Development Plan
NEMA	National Environment Management Authority
NERICA	New Rice for Africa
NGO	Non-Governmental Organization
NRDS	National Rice Development Strategy
PEAP	Poverty Eradication Action Plan
PMA	Plan for Modernization of Agriculture
RSC	Rice Steering Committee
RTC	Rice Technical Committee
SACCO	Savings and Credit Cooperative
TWG	Technical Working Group
UBOS	Uganda Bureau of Statistics
Ug. Shs/ Ugx.	Uganda Shillings
US\$/ USD	United States Dollars
WARDA	West African Rice Development Association
WFP	World Food Program
WHO	World Health Organization

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EXECUTIVE SUMMARY

The Government of Uganda (GoU) overall national economic policy framework, the *National Development Plan (NDP 2010/11 - 2014/15)*, recognizes and prioritizes Agriculture as a primary sector that will drive the development of other sectors of Uganda's economy. Consequently the Agriculture Sector has developed her *Agriculture Sector Development Strategy and Investment Plan (DSIP, 2010/11 – 2014/15)*. This DSIP serves as Agriculture component of the NDP as well as Uganda's strategy for implementing the Comprehensive Africa Agriculture Development Programme (CAADP) compact. The DSIP has development objectives of: (i) Rural incomes and livelihoods increased; and (ii) Household food and nutrition security improved. The DSIP has identified strategic enterprises for meeting its objectives, rice being one of them.

In order to actualize the NDP and DSIP rice-related objectives and activities, a National Rice Development Strategy (NRDS, 2008 - 2018) has been developed. The Uganda National Rice Development Strategy (NRDS) lays out Uganda's plan for promotion of rice production between 2009/10 - 2017/18 with the aim of creating quality rice self-sufficiency in Uganda.

Uganda has also aligned its NRDS to the Coalition for African Rice Development (CARD) framework which is mobilizing stakeholders to support Africa to more than double rice production in Africa in the next ten years (2008-2018).



The strategies identified by the Uganda NRDS include:

- * Strengthen the Institutional Framework.
- * Improve Research, Technology Dissemination and Capacity Building.
- * Increase Production, Multiplication and Dissemination of Certified Seed.
- * Improve Fertilizer Marketing and Distribution, and Sustainable Soil Management.
- * Improve Irrigation and Water Management.
- * Improve Post-Harvest Handling, Processing and Marketing.
- * Improve Access to and Maintenance of Agricultural Equipment.
- * Improve Access to Agricultural Finance.
- * Support Policy Development.
- * Ensure Environmental Conservation.

The strategies will result in doubling and tripling rice production in Uganda by 2013 and 2018, respectively, a growth from about 177,800 MT of un-milled rice in 2008 to 313,000 MT (2013) and 680,000 MT (2018).

The Strategies will be implemented using various approaches tailored to the agro-ecological conditions. Overall emphasis will be put on increasing productivity rather than increasing acreage.

Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) will take the lead in coordination of efforts in the implementation of the NRDS assisted by NARO, NAADS and PMA with respect to their agriculture sector mandates. Key collaborators will include: MTIC, MWE and other Agriculture Sector Government Agencies, Development Partners, NGOs, Rice Processors, Rice Traders, Agro-Input Traders and the Rice Farmers.

CARD Secretariat, based in Nairobi, Kenya, which has been guiding the NRDS development process in 22 African countries, is expected to continue advising on the NRDS implementation process.



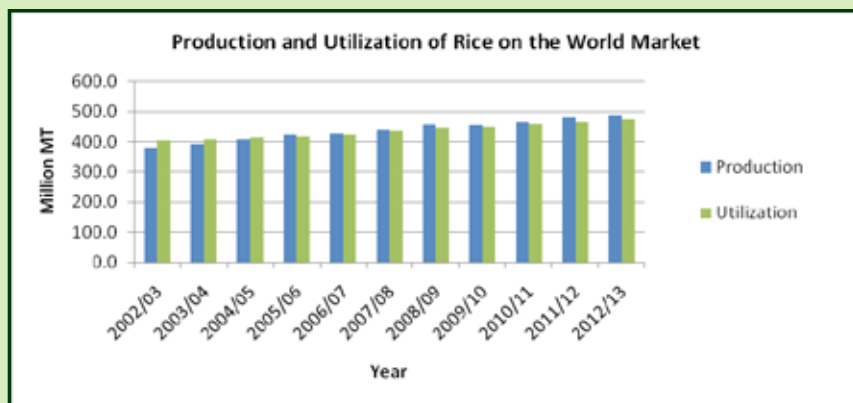
1.0 INTRODUCTION

1.1 GLOBAL RICE SECTOR

Rice has been gathered and cultivated by women and men world-wide for more than 10,000 years (Kenmore, 2003). Tsuboi (2004) observed that the total area under rice cultivation globally is estimated to be 150 million Hectares (Ha.). The annual production averages 400 to 500 million MT (Tsuboi, 2004; FAO, 2012). Thus, rice represents 29 % of the total output of grain crops worldwide (Xu *et al.*, 2003).

Over the years there has been surplus supply of rice on the world market as indicated in figure 1 below. Despite the surplus, rice prices have always remained high. For example in 2008, Food and Agriculture Organization of the UN (UN-FAO) noted a world increase in rice production by 2.3 % nevertheless it anticipated an increase in prices based on a previous 76% increase in rice price (December 2007 to April 2008) despite increased rice production in the same period.

Figure 1: Global Rice Production, Utilization and Stocks



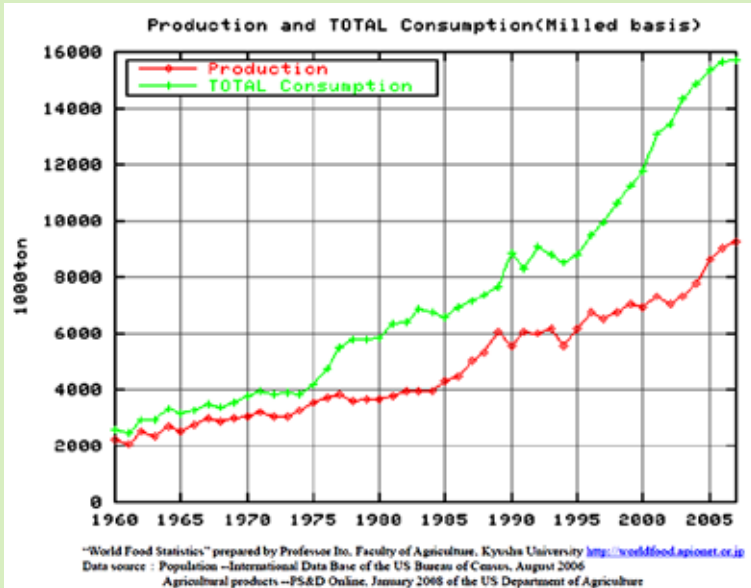
Source: FAO Food Outlook, 2012, www.fao.org.

1.2 AFRICA'S RICE SECTOR

Africa accounts for 13% of the world population (about 800 million people). This population consumes a variety of crops including cassava, potatoes, yams, banana, maize, rice and beans. Rice is the main staple food of the populations in Cape Verde, Comoros, Gambia, Guinea, Guinea-Bissau, Liberia, Madagascar, Egypt, Senegal and Sierra Leone. It is also an important food of the populations in Côte d'Ivoire, Mali, Mauritania, Niger, Nigeria and Tanzania. In addition, rice has become an important food security crop in Angola, Benin, Burkina Faso, Chad, Ghana and Uganda.

In 2008, the continent imported one-third (9.3 million MT) of the total rice available on the international market. This catered for nearly 40% of the total rice consumption needs. Key rice importers include Nigeria, Senegal and Cote d'Ivoire. Dependence on imported rice makes African countries very vulnerable to increases in global rice prices. Nevertheless, 75% of the African countries are engaged in rice production. Thus, with increased rice promotion the import gap can be reduced.

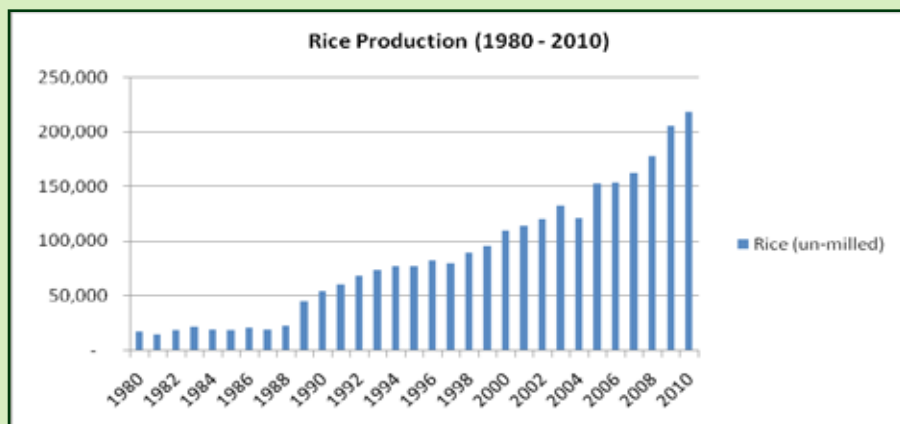
Figure 2: Total Rice Production and Consumption in Africa



1.3 UGANDA'S RICE SECTOR

Rice production in Uganda started in 1942 mainly to feed the World War II soldiers. However, due to a number of constraints, production remained minimal until 1974 when farmers appealed to the then government for assistance. In response, government identified the Doho swamps and constructed the Doho Rice Irrigation Scheme with the help of Chinese experts.

Figure 3: Trend of Rice Production (1980 - 2010)



Source: RIS, 2012b.

Today, rice is grown mainly by small-scale farmers throughout the country. Total production is estimated at 177,000 MT of un-milled rice which is about **115,000 MT of milled rice**. Total rice consumption is estimated to be **175,000MT of milled rice** annually. Population growth rate is 3.2% thus the demand for rice is expected to rise.

Table 1: Summary of Updated Rice Data (2011)

	Unmilled / Paddy	Milled
Production	230,000 MT	145,000MT
Net Imports	69,800 MT	44,000 MT
Consumption	299,800 MT	188,900 MT
Population	34 million	34 million
Per Capita Consumption	8.8 Kg	5.6 Kg

Source: RIS, 2012b.

Uganda has for long grown lowland rice especially in Eastern region. Though high yielding, lowland rice production requires

a lot of water, knowledge and labour. Such factors slowed the adoption of rice. However, with the introduction of NERICA upland rice varieties, rice has been widely adopted by farmers, resulting in rapid growth of household income of rice-farming households. For instance, courtesy of support to seed availability by Rockefeller and other Development Partners, farmers were able to reap \$9 million (Ug.Shs. 14.9 billion) in 2005. Through growth of the rice industry, the country saw rice imports drop between 2005 and 2008. This trend of events, according to the National Agricultural Research Organization (NARO), saved the country about US \$30 million (Ug. Shs. 50.4 billion) in foreign exchange earnings annually. After 2008, upland rice production continued to become popular across the whole country.

The Government of Uganda (GoU) intends to increase rice production with a primary target of meeting the local food security demands and later export any surplus.



2.0 REVIEW OF THE NATIONAL RICE SECTOR

2.1 STATUS OF AGRICULTURE AND RICE IN NATIONAL POLICIES

Status of Agriculture in National Policies

Agriculture is one of the most important sectors of the Ugandan economy. It contributes up to nearly 20 percent of GDP, accounts for 48 percent of exports (UBOS, 2008) and provides a large proportion of the raw materials for industry. Food processing alone accounts for 40 percent of total manufacturing. The sector employs 73 percent of the population aged 10 years and above (UBOS, 2005). Agriculture will be the key determinant in the country's efforts to reduce poverty in the immediate years ahead (MAAIF, 2010).

Despite its importance to Uganda, real growth in agricultural output has declined steadily from 7.9 percent in 2000/01 to 0.7 percent in 2007/08 (although it did show signs of recovery in 2008/09, with a 2.6 percent growth rate). With 73 percent of the households and the majority of the poor in Uganda depending directly on agriculture for their primary livelihood, this is a serious challenge in the drive to eradicate poverty.

The food and nutrition security situation has also been far from satisfactory. The average caloric intake per person per day has improved but only from 1,494 calories in 1992 to 1,971 in 2005. This is still less than the World Health Organization (WHO) recommendation of 2,300 calories per person per day. Worse still, the number of people who are food insecure has increased from 12 million in 1992 to 17.7 million in 2007, a consequence of the high population growth rate.

In contrast, poverty estimates reveal a significant improvement with headcount poverty declining from 38 percent in 2002 to 31 percent in 2005. Agricultural exports have also significantly increased in scope and scale, particularly when informal cross-border trade is taken into account.

The mixed growth of the Agricultural Sector is attributed to several challenges; it is still predominantly rain-fed, non-market oriented, based on rudimentary technologies and environmentally unsound practices. As a result, the country's agricultural products are often of low volumes, poor quality and costly to assemble for sustainable market supply. In addition, the farmers are not efficiently organized in accessing inputs and marketing of their produce, thereby incurring high production and marketing costs that affect the profitability of their enterprises.

Since the Agricultural Sector embraces such a large proportion of the country's population, the Government of Uganda recognized the role of the sector in the national economic policy frameworks. Agriculture is recognized by the National Development Plan (NDP 2010/11 to 2014/15) as a primary sector that will drive the development of other sectors of Uganda's economy which thus requires priority investment. Agriculture will contribute to attainment of the NDP goal; *To enhance Growth, Employment and Socio-Economic Transformation for Prosperity* through contributing to the attainment of NDP objectives (a), (b), (e), (f) and (h) which state that (a) Increasing household income and promoting equity;

(b) Enhancing the availability and quality of gainful employment; (e) promoting science, technology innovation and ICT to enhance competitiveness; (f) Enhancing Human Capital Development; (h) Promoting sustainable use of environment and natural resources.

The Government of Uganda, through MAAIF, is also implementing the Agriculture Sector Development Strategy and Investment Plan (DSIP, 2010/11 – 2014/15) geared towards meeting the goals of the NDP and the Comprehensive Africa Agriculture Development Programme (CAADP) compact. The DSIP was adopted as Uganda's Strategy under the CAADP Compact. The DSIP has development objectives of:- (i) Rural incomes and livelihoods increased; and (ii) Household food and nutrition security improved.

Status of Rice in National Policies

Rice is recognized as one of the strategic enterprises that will enhance attainment of the DSIP objectives. Rice was considered because it (i) has a very high multiplier effect due to its long value chain that employs many players, (ii) has ability to develop other sub-sectors like feeds for the livestock industry, (iii) has high returns to investment, (iv) has high potential in the future and (v) has demonstrated a high ability to reduce poverty.

2.2 CONSUMER PREFERENCES AND DEMAND PROJECTIONS

Consumers prefer aromatic to non-aromatic rice, sticky to non-sticky, unbroken to broken and bulging after cooking to rice that does not bulge, white milled rice to brown.

Total rice consumption is estimated at 169,000 MT (milled rice) annually. Consumption per capita is about 6-8 Kg. Total production is estimated at 106,700 MT (milled rice) annually leaving a

deficit of 60,000 MT (milled rice) annually which is catered for by importation. The total population of Uganda is 29.6 million with annual growth rate of 3.2% indicating that rice consumption is likely to increase every year.

2.3 TYPOLOGY AND NUMBER OF RICE FARMERS, PROCESSOR AND TRADERS

Farmers

About 0.1% (68,446 Ha) of farmland in Uganda is under large scale farming whereas 99% (8,400,789 Ha) is under small-scale farming. Although most rice farmers are practicing small-scale farming, most rice is widely grown at a slightly larger acreage than that of other food crops/non-traditional cash crops mainly because rice is grown as pure stand unlike other crops that are inter-cropped.

About 80% of rice farmers in Uganda are small-scale farmers with acreage of less than 2 hectares. They use simple technologies which include use of rudimentary tools, little or no fertilizer use, and poor quality seed, with little or no irrigation and poor water management practices among others.

About 15% of the rice farmers are medium-scale rice producers with acreage of 2 – 6 hectares (5 to 15 acres). They practice mechanized ploughing but the remaining farm activities involve low technology similar to that of small-scale producers.

The remaining 5% are large scale farmers growing rice on over 6 hectares. Among these are rice schemes with acreage of over 1,000 hectares. Large-scale farmers practice mechanized farming and use improved farm inputs. Fertilizer use though, is still low.

Processors

There are 591 operational rice mills (Odogola *et.al.*, 2008). The rudimentary, poor-performing engalbergs account for 77.5%, mill-tops constitute 20.8% while the medium to large-scale are 1.7% of the total rice mills. The small rice milling cottage factories using engalbergs and mill-top mill 95% of the paddy/ un-milled rice produced in the country significantly contributing to persistent low quality broken rice. This rice cannot compete in the current liberal market economy.

Traders

Trading in rice in Uganda is completely under the private sector. Most of the trading activities are done by middlemen who buy threshed un-milled rice from the farmers at the farm. In some cases these traders meet the farmers at the rice mills.

In 2008, the farm-gate price of un-milled rice was Ug. Shs. 500 to 1,500 per Kg (About 0.5 USD) and the market price of milled rice was Ug. Shs. 1,500 to 2,500 per kg (about 1 USD). Over the years the price has been increasing for example between the year 2008 and 2011, rice prices grew by 40%.

Un-milled rice is usually packed with a target of obtaining 100Kg after milling. Milled rice is usually packed in 50 and 100 Kg bags. Some medium and large scale processors are able to process, package and brand their rice thereby fetching higher market prices ranging from Ug. Shs. 2,500 to 7,500 per Kg. and Ug. Shs. 4,500 to 10,000 in 2008 and 2011, respectively.

2.4 GENDER AND YOUTH DIMENSIONS OF RICE PRODUCTION, PROCESSING AND TRADING

Women play a major role in the rice value chain especially the on-farm production aspects. However due to gender imbalance, the proceeds from rice sales sometimes do not trickle down to the women who have laboured in the production process. This situation is changing for the better as the profitability of rice is drawing men to participate more in all production practices with the hope of increasing returns to investment.

Youth are less involved in rice production as most of them prefer to seek jobs in urban areas. This poses a danger to future production and food security.

2.5 COMPARATIVE ADVANTAGE OF DOMESTIC RICE PRODUCTION

Ugandan rice is not yet highly competitive on the market due to challenges of low productivity which result into high prices vis-a-vis the price of imported rice (before taxation). In addition, locally produced rice is of low quality; being highly broken, of mixed varieties and contains impurities such as stones.

Overcoming this could result into high competitiveness especially in the case of the aromatic rice varieties. In addition, rice is easier to prepare than most traditional Ugandan dishes making it a high potential food security crop in the currently urbanizing Uganda.

Considering the fact that the East African region is a net importer of rice, Uganda has an opportunity of readily available market.

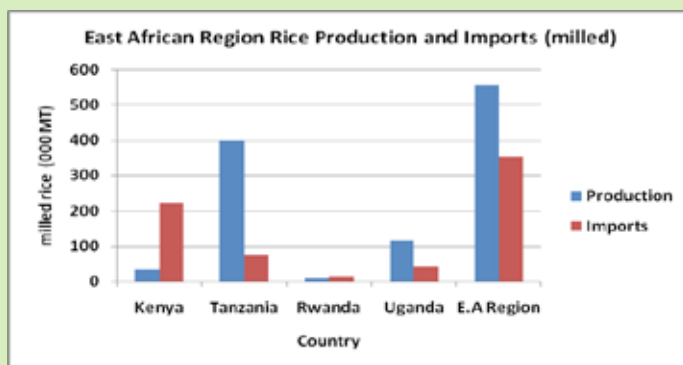
Table 2: Regional Markets for Uganda’s Rice Exports in 2009

COUNTRY	Quantity (MT)	Sum of value (Million Ug. Shs.)
Burundi	0.35	0.523
Kenya	31	183
Rwanda	3,830	2,931
Sudan	224	214
DR. Congo	664	840
Total	5,024	4,168

Source: Ngambeki *et. al.*, 2011. Data obtained from URA, 2010 (Figures converted to MT and millions, then rounded).

Uganda is contributing a small portion of the rice imports by East African countries. The figure below shows that East African countries (Rwanda, Kenya, Tanzania, Uganda and Burundi) import over 300,000 MT of rice per year. Uganda therefore has room to export any surpluses to its neighbours.

Figure 4: East African Regional Demand, Production and Net Imports of Rice



Source: Data in Ngambeki *et. al.* (2011). Modifications made to figures for Uganda by RIS based on revised figures from MAAIF Statistical Abstract, 2011.

2.6 CHARACTERISTIC OF PRODUCTION ECOLOGIES

Uganda has three major rice ecologies namely *rain-fed lowland*, *irrigated lowland* and *rain-fed upland*.

Most rice in Uganda is grown under the *rain-fed lowland* ecology. This area is predominantly located at fringes of wetlands in Eastern Uganda in the L. Kyoga catchment and the foot hills of Mt. Elgon. Similar ecologies have the highest potential but are limited by lack of irrigation facilities.

Some sections of the lowland ecologies have been blessed with irrigation infrastructure thus constituting the *irrigated lowland* ecology. In some instances, the entire wetland has been converted to irrigated rice production like Doho Rice Scheme. A few rice seed production farmers have also made attempts to carry out irrigated production in upland conditions. The irrigated lowland ecology is mainly limited by dilapidated irrigation infrastructure.

Upland rice ecology dominates the new rice growing areas. These include most of Northern Uganda, North-Western Uganda popularly known as West Nile Sub-region, Mid-Western, South-Western and Central Uganda. Northern Uganda and West Nile have vast virgin lands but lack machinery to plough this land. Mid-Western and South-Western enjoy fertile soils which increase competition for agricultural land. Central Uganda has high market potential but with limited land due to high urbanization.

On the whole, therefore, most of Uganda has a high potential for rice production. However, tailor-made interventions are required for the 3 ecologies in addition to the socio-economic conditions of the given locality such as access to agro-inputs, land tenure, access to market and access to agro-financing, among others.

Table 3 below summarises the characteristics, opportunities and challenges for each of the ecologies.

Table 3: Rice Ecologies and their Production Characteristics

	Rice Ecology	(2008) Production(Ha)	Ecological Challenges	Ecological Opportunities
1	Rain-fed lowland: Commonly grown varieties are K5 and K85. New demanded varieties include NERICA	43,406	Unreliable rainfall, environmental impact on wetlands, limited land, fields prone to floods during heavy rains and poor road infrastructure.	Availability of water in rainy season Crop diversification can be practiced
2	Irrigated lowland: Commonly grown varieties are K5 and K85 New demanded varieties include NERICA	5,000	Environmental impact on wetlands, lack of irrigation infrastructure, water-borne diseases, limited land and, pests and diseases.	Highly productive producing 3.0 MT/Ha. Irrigation is a major component under consideration by the GoU
3	Upland rain-fed: NERICA upland rice is the most grown.	26,680	Water stress/drought, Soil erosion reducing soil fertility. Rice competes with other food crops such as maize, beans, and bananas.	Availability of new, drought-resistant, high-yielding varieties such as NERICA rice.

Source: RIS, 2008



3.0 CHALLENGES AND OPPORTUNITIES FACING DEVELOPMENT OF UGANDA'S RICE INDUSTRY

3.1 POLICIES AND INSTITUTIONAL CAPACITY

Agriculture is identified as a primary industry for national development in the NDP. Rice has been identified as a priority crop in the DSIP. Rice stakeholders have formed a Rice Platform constituting of the Rice Steering Committee (RSC), Rice Technical Committee (RTC) and Rice Industry Secretariat (RIS). Further, the RTC and RIS are assisted by Technical Working Groups (TWGs). The National Stakeholders Workshop is organized annually to seek views from a wider audience.

Rice is promoted by several government agencies, development partners and civil society organizations. Most rice promotion interventions have generally been a part of cross-cutting programs and projects that cover several agricultural enterprises. The driving factor for increased adoption of rice has, therefore, been the high economic returns; Rice has ready market fetching a high price in the urban centres of Uganda.

The tariffs on cheap imported rice have also provided a buffer for the locally produced rice.

The policy and institutional capacity in the rice sector still has a number of challenges as well as some opportunities as detailed below;

Challenges

- * Limited facilities such as limited office and research equipment and understaffing in MAAIF, NARO, NAADS and other public and private rice-related institutions.
- * Poor implementation of policies related to agro-inputs and agricultural finance and, soil and water management.
- * Farmer groups are still weak and thus cannot access competitive agricultural facilities such as agricultural loans.
- * Weak institutional linkages.

Opportunities

- * Rice is an emerging priority crop in the GoU strategies because of its potential to greatly reduce household hunger and poverty.
- * Exemption of taxes for some agricultural development inputs.
- * Presence of institutions for agriculture development such as research, extension and agricultural finance.
- * Modernization of agriculture is a key element of current government policy and rice is a priority crop in the agriculture policies.
- * A framework for coordinating rice promotion is in place; the RSC, RTC and RIS.
- * Linkages to development partners such as CARD supporting organizations (AGRA, WARDA, AfDB, IFAD, FARA, FAO and JICA, among others).

3.2 HUMAN CAPACITY

MAAIF, NARO, NAADS and Local Governments have about 10 full-time and 91 part-time staff working directly with rice in policy, research and extension. In addition, there are several extension staff in Local Governments (districts and sub-counties) dealing with several agricultural enterprises including rice. However, the current extension advisory services are mainly based on farmers' selection of three key enterprises. This may result in marginalizing emerging enterprises that farmers may not perceive as important.

The capacity of MAAIF is enhanced through collaborations with other rice-promoting ministries and agencies such as MWE on irrigation issues, MTIC on trade issues, JICA, DFID projects, ARC and IRRI on research and training and NGO's on extension.

Below is the current rice-related staffing in MAAIF.

Table 4: Estimated Number Of Rice-Related Staff.

MAAIF Dept. / Agency	No. of Staff	
	Full Time	Part Time
MAAIF	05	11
NARO	02	17
Local Governments and NAADS	03	63
TOTAL	10	91

Source: RIS, 2008

Rice-related human capacity in Uganda is characterized by the following challenges and opportunities:

Challenges

- * There is general lack of motivation and limited facilitation for district extension staff.
- * Limited specialized knowledge in rice production among researchers and extension staff.
- * Limited number of trainer of trainers and extension staff thus requiring each extension worker to handle various crops and many farmers.

Opportunities

- * Rice has been identified as one of the strategic enterprises under the DSIP.
- * Rice is increasingly having more impact on household income and food security thus an increased possibility of attracting institutions and human resource into rice value chain activities.
- * Presence of several agriculture graduates who can be recruited and trained to promote rice.

3.3 FARMERS

Most rice farmers practice small-scale rain-fed farming, characterized by rudimentary tools and low input use. Nonetheless, farmers have continued to labour hard and have reaped from the current boom of rice prices. This has occurred amidst the following challenges and opportunities:

Challenges

- * Discouraging land tenure system.
 - o High cost of land rent for rice farming.
 - o Lack of collateral for agricultural finance due to lack of

land titles.

- o Undeveloped agricultural land.
- * Inadequate knowledge on rice farming.
- * Rice farming is labour intensive.
- * Lack of capital for rice farming.
- * Poor quality and expensive seed.
- * Late delivery of seeds and other inputs has led to reduced production and slow multiplication of the rice seed.
- * Crop losses due to pests and diseases.
- * Lack of appropriate implements and equipment for rice farming. Most sub-counties do not even have tractors for hire.
- * Drought and unreliable rainfall patterns.
- * There is difficulty in mobilizing the farmers for training.
- * Some rice varieties such as NERICA 4 are very difficult to thresh and require a lot of energy if someone is doing it manually.
- * Lack of drying facilities like tarpaulins or drying yards. Some farmers dry rice on the ground and this reduces the quality of rice.
- * Poor/lack of storage facilities causing loss in rice quality and haphazard sale off of the rice irrespective of the prevailing market prices.
- * Poor book keeping and financial management by farmers thus irrational investment decisions.
- * Poor road infrastructure especially in lowland rice growing areas which in affects marketing.
- * Fluctuating prices usually determined by off-farm factors such as transport costs.

Opportunities

- * Land reform; The Land Act, 1995 is being revised with the hope of improving land tenure of the poor.

- * Strategies for training extension officers and farmers in rice production have been developed by MAAIF and other collaborators.
- * National economic policies have prioritized agriculture and national agricultural policies have prioritized rice.
- * Rice production is highly profitable.
- * Rice has a high market.
- * Rice has long self-life of 3-6 months under low technologies but up to 2 years under high technologies.
- * Availability of superior rice varieties such as NERICA4 that meet farmers needs such as drought tolerance, and disease resistance among others.

3.4 RICE PROCESSORS

Rice production in Uganda has automatically sparked off rice milling business in Uganda. The number of rice mills installed has grown with quantity of rice produced in a given area. Some urban areas and trading centres do not necessarily produce rice but serve as collection and milling centres. Such areas usually have electricity unlike some of the localities where the rice farms are located. Rice processors in Uganda face a number of challenges and opportunities including the following:

Challenges

- * High cost of rice mills with high technical performance.
- * High cost of electricity and diesel thus increasing cost of operation.
- * Limited access to repair facilities and services.
- * Most rice mills operate at below their technical capacity due to low quantity of rice produced by farmers.
- * Low quality of rice received at rice mills.
- * Lack of electricity in some rural places affect adoption of

electric-driven rice mills.

- * Poor road infrastructure especially in lowland ecologies thus affecting marketing.
- * Low investment in manufacturing or fabrication of mills or their spare parts.

Opportunities

- * Rice processing is profitable.
- * Rice market is increasing due to population growth.
- * Rice processing machinery is available at a wide range of prices starting from about Ug. Shs. 5 million.
- * Credit facilities are available at local banks.
- * Government policies have adopted Public Private Partnerships (PPP) as one of the development approaches in service delivery. Through this there is future potential for investments in local fabrication of spare parts.

3.5 RICE TRADERS

Rice trade in Uganda is completely private sector driven. Rice trade is characterized by the following challenges and opportunities;

Challenges

- * Low quality of processed rice
- * Fluctuating prices.
- * Poor road infrastructure.
- * High transport costs.

Opportunities

- * The demand for food /rice in Uganda is increasing thus the profitability in rice trade is likely to remain high.

- * High regional demand for rice in East Africa and high demand for seed in Africa.
- * Demand for rice by-products is increasing.

3.6 RICE INPUT DEALERS

Farmers often find inputs expensive thus lack of effective demand for example MAAIF (2011) indicates that 3.3 million out of the 3.9 million farming households use local seeds; this implies that few farmers are purchasing improved seed from input dealers.

Below are key challenges and opportunities faced by rice input dealers.

Challenges

Input Acquisition:

- * Expensive transportation.
- * Inadequate capital for doing meaningful business.

Input distribution and marketing:

- * Low demand for inputs due to lack of capital by rice farmers.
- * Farmers' inadequate knowledge on value of improved seed and, use and management of inputs.
- * Low quality of inputs (seed, fertilizer, agrochemicals, machinery, and other facilities) affecting their performance; consequently farmers are discouraged from further purchase of the same.

Opportunities

- * Increasing sensitization and training of farmers by Government and its partners on the need to use improved inputs. This is likely to increase demand for inputs.
- * Increasing demand for rice is likely to spark off farmers' need for increased productivity thus demanding for agricultural inputs.
- * Government policy emphasizes the need to combat soil degradation in most areas of Uganda.

3.7 JUSTIFICATION OF THE NRDS

The Agriculture sector DSIP, 2010/11 -2014/15 recognizes rice as a strategic enterprise because of its high returns to investment, multiplier effect (benefits of various sections of the value chain) and high potential in the future (food security and incomes). Challenges to the development of the rice industry therefore impedes reduction of hunger and poverty in Uganda.

The National Rice Development Strategy (NRDS) is a policy framework that has been initiated to address challenges affecting the industry and guide its development process.



4.0 VISION AND SCOPE OF THE NATIONAL RICE DEVELOPMENT STRATEGY

4.1 GOAL

To improve household food security and increase household income in Uganda through increased production and availability of high-quality rice in the market.

4.2 MAJOR OBJECTIVE

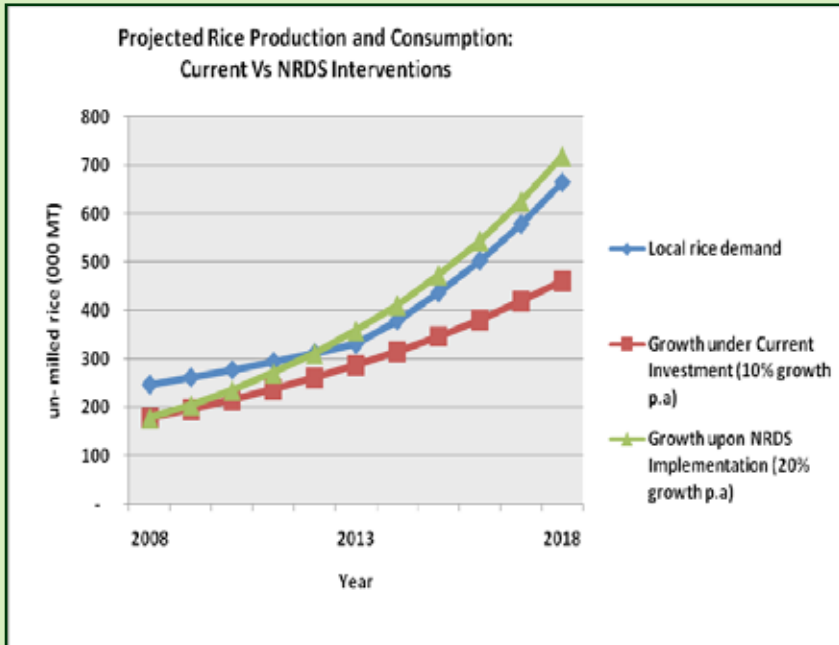
To improve rice production, processing and value-addition for sufficient quality rice that meets domestic consumption needs and surplus for export.

4.3 SPECIFIC OBJECTIVES

1. To strengthen the institutional and policy framework for rice promotion.
2. To increase rice production and productivity.
3. To improve quality of un-milled and milled rice on the market.

4.4 ESTIMATED RICE PRODUCTION AND CONSUMPTION

Figure 5: Trend of Rice Production and Consumption Gap under varying Investment Regimes.



Rice self-sufficiency is attained when local production exceeds domestic consumption, thus the country becomes a net exporter rather than a net importer of rice.

Achieving the rice self-sufficiency described in the graph above will involve increase in production, improvement in productivity in the 3 ecologies as well as improvement in rice quality, as described in tables 5 and 6 below.

Table 5: Current and Projected Rice Production

Year	Rain-fed upland			Rain-fed Lowland			Irrigated			Total		
	Area (Ha)	Yield (MT/Ha)	Prodn (MT)	Area (Ha)	Paddy Yield (MT/Ha)	Prodn (MT)	Area (Ha)	Paddy Yield (MT/Ha)	Prodn (MT)	Area (Ha)	Prodn, milled (MT)	Prodn, paddy (MT)
2008	26,680	2.2	58,740	43,388	2.4	104,130	5,000	3.0	15,000	75,088	177,870	106,700
2013	40,050	2.2	88,110	65,081	3.0	195,244	7,500	4.0	30,000	112,631	313,354	197,400
2018	80,100	2.5	200,250	130,163	3.4	442,553	10,000	4.0	40,000	220,263	682,803	443,800

Table 6: Production, Consumption and Net Imports

Year	Production, Consumption and Importation of rice						Level of Self sufficiency	
	Total Prodn, paddy (t)	Milling ratio	Total Prodn, milled (MT)	Population (million)	Consumption per Capita (Kg)	Total Consumption (M T)		Rice Net Imports (MT)
2008	177,870	60%	106,700	29.6	6	168,000	60,100	64%
2013	313,354	63%	197,400	34.6	7	245,000	47,600	82%
2018	682,803	65%	443,800	40.6	10	443,800	-3,800	109%

4.5 FINANCIAL AND HUMAN RESOURCE COMMITMENT BY THE GOVERNMENT

The Agriculture Sector DSIP identified rice as a strategic commodity for food security and poverty reduction and consequently committed some funds to support rice value chain activities. Government will also promote rice-related Public Private Partnerships (PPP).

In addition, Government has committed several of its staff to the various specialized rice interventions and is willing to recruit short-term specialized staff as the need arises. Below is the number of staff that is currently on rice and the estimated number of staff that is expected to be involved in rice promotion in the future.

Table 7: Number of Rice Specialists in 2008 and Targets in the future

	Rice Agricultural researchers with MSc or Ph D				Rice Research Technicians			Rice Extension Workers spending about 5 -10 hours a week on rice promotion		
	Total	Full time	Part time	Total	Full time	P a r t time	Total	Full time	Part time	
2008	09	02	07	10	00	10	63	-----	63	
2013	20	06	14	20	06	14	80	20	60	
2018	30	09	21	30	09	21	160	40	120	

Note: Several staff will be committed to rice-related policy and institutional framework development.

4.6 GOVERNANCE OF NRDS

The Government of the Republic of Uganda through MAAIF will oversee the entire NRDS implementation process.

MAAIF constituted the *Rice Steering Committee (RSC)* to oversee and guide the formulation and implementation of rice related policies. The RSC is chaired by the Permanent Secretary- MAAIF and the Commissioner - Crop Production and Marketing is the Secretary. In addition to the RSC, a *Rice Technical Committee (RTC)* was constituted as well as a *Rice Industry Secretariat (RIS)*. The RSC through its technical arm, the RTC will coordinate the responsible Government agencies in guidance, supervision, monitoring and evaluation of the NRDS implementation process. The related day to day activities of the RSC and the RTC will be organized by the RIS.

Composition of the Rice Steering Committee

The Steering Committee is composed of *representatives* of key stakeholders whose mandate directly affect rice production in Uganda. Current members of the RSC include:

- » Permanent Secretary of MAAIF as Chairperson,
- » Commissioner - Crop Production and Marketing as Secretary,
- » Representative of the Office of the Vice President,
- » Executive Director-NAADS,
- » Director General-NARO,
- » Executive Director-NEMA,
- » Director Crop Resource-MAAIF,
- » Chairperson Rice Processors Association,
- » Representative of Local Government,
- » Representative of Uganda Seed Trade Association (USTA),
- » Representative PMA Development Partners,

- » Representative of Uganda Farmers Association (UNFFE),
- » Permanent Secretary-Ministry of Trade, Industry and Cooperatives (MTIC),
- » FAO Representative in Uganda, and
- » JICA Chief Representative in Uganda.

Composition of the Rice Technical Committee

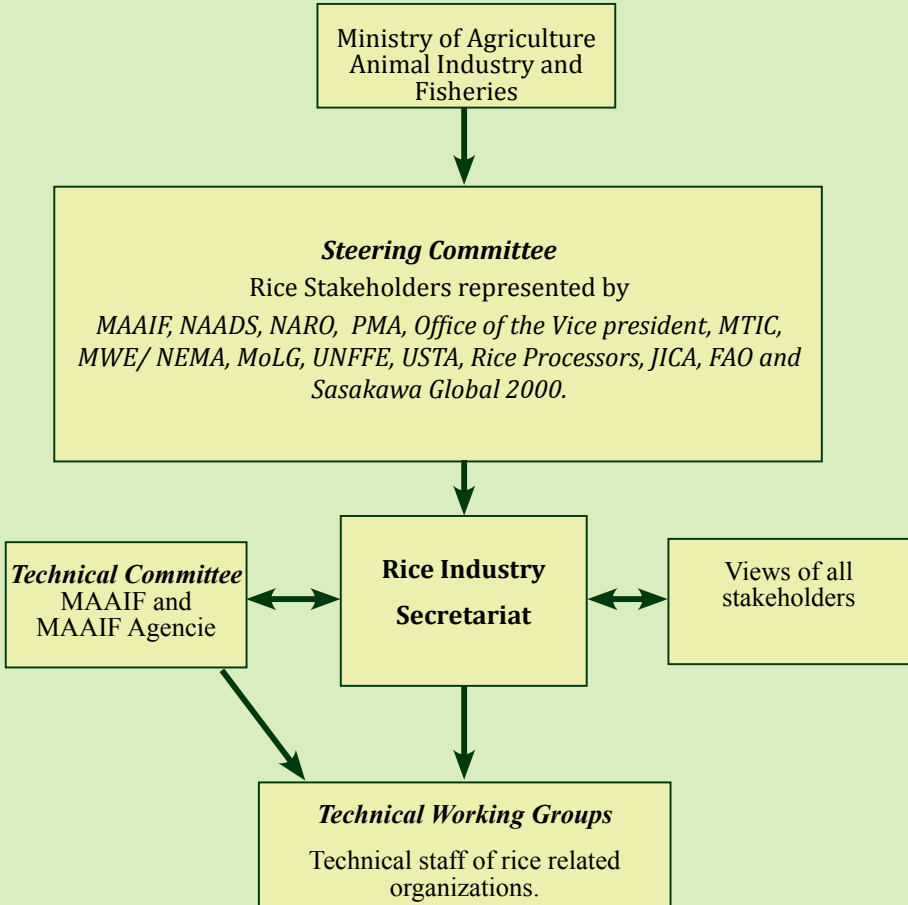
To ensure no technical expertise is left out there is a technical committee appointed by the Steering Committee. The technical committee operates by bringing on board temporary Technical Working Groups which are competent in a specific issue requiring elaboration. The RTC builds on the availed information and reports back to the RSC. The RTC is chaired by the Director Crop Resources (DCR) and the Commissioner Crop Production and Marketing (CCP&M) serves as its Secretary. Other members are:

- » Commissioner Farm Development,
- » Commissioner Crop Protection,
- » Commissioner Agricultural Planning,
- » Head Cereals Programmes, NaCRRRI
- » Technical Service Manager, NAADS and,
- » Temporary members adopted from CSOs, Private Sector and Development Partners dealing in rice.

Composition of the Rice Industry Secretariat

1. Secretary, Rice Steering Committee/ Secretary, Rice Technical Committee (CCP&M)
2. Program Officer-Rice
3. Assistant Program Officer-Rice

Figure 6: Institutional Structure for Coordinating Rice Development Activities in Uganda



Source: RIS, 2008

4.7 NATIONAL STAKEHOLDERS AND LINKAGES TO TRANSBOUNDARY / REGIONAL INITIATIVES AND PARTNERSHIP BUILDING

National Stakeholders and Linkages

MAAIF and its Agencies: MAAIF has 2 directorates (Animal and Crop) and 8 Semi-autonomous agencies namely; National Agricultural Research Organization (NARO), National Agricultural Advisory Service (NAADS), Plan for Modernization of Agriculture (PMA), National Agricultural Genetic Resources Centre and Data Bank (NAGRC&DB), Cotton Development Organization (CDO), Uganda Coffee Development Authority (UCDA), Dairy Development Authority (DDA), and Coordinating Office for the Control of Trypanosomiasis in Uganda (COCTU).

Other National Stakeholders: The RSC, RTC and the Rice Technical Working Groups comprise of representatives from all rice sub-sector stakeholders in Uganda including: seed producers, researchers, agricultural extension officers, rice farmers, processors, traders, academia, Non-Government Organizations (NGOs) and international development partners. All these groups of people are involved in dialogue concerning rice promotion. There is need to strengthen mechanisms for enhancing stakeholder participation in the policy formulation, implementation process and information sharing.

Regional and International Linkages

Uganda is a member of the East African Community (EAC) and the Common Market for East and Southern Africa (COMESA). Uganda is also signatory to the Comprehensive Africa Agriculture Development Programme (CAADP) compact which is an initiative

of the New Partnership for Africa's Development (NEPAD), a programme of the African Union. In addition, Uganda is a member of the Coalition for African Rice Development (CARD). MAAIF, especially research (NARO), is in close linkage with Africa Rice Centre, Alliance for Green Revolution in Africa (AGRA), Forum for Agricultural Research in Africa (FARA) and International Rice Research Institute (IRRI).

Uganda is also a member of the UN and collaborates with UN institutions such as the United Nations Development Programme (UNDP), FAO and World Food Programme (WFP). Uganda is a signatory to the International Rice Treaty and several agricultural and environment management treaties such as the Ramsar Convention.

4.8 NRDS IMPLEMENTATION FRAMEWORK

The implementation of the NRDS will be by all agricultural stakeholders under the leadership of the RSC and RTC which are overseen by MAAIF. The Secretariat of the RSC and RTC called the *Rice Industry Secretariat*, hosted by the Department of Crop Production and Marketing in MAAIF, will also serve as the secretariat for coordination of the NRDS-related activities.

Research and technology development will be spearheaded by NARO. Rapid production of foundation seed will be spearheaded by NaCRRI, an institute of NARO. All existing efforts will be strengthened alongside the new ones. Research on value-addition and various technologies will be conducted by NARO. MAAIF will support verification and multiplication of technologies for uptake by extension/NAADS.

Technology dissemination will be done by NAADS and other line departments for example irrigation development will be spearheaded by Department of Farm Development. The NAADS

will also work with the existing private sector extension services and Civil Society Organizations such as Sasakawa Global 2000 and Brac-Uganda. Irrigation and water management strategies will be implemented in conjunction with Ministry of Water and Environment (MWE) in addition to other stakeholders. MWE is represented on the RSC by National Environment Management Authority (NEMA).

Through extension and advisory services especially by NAADS and in collaboration with Ministry of Trade, Industry and Cooperatives (MTIC), farmer groups will also be strengthened to take advantage of the processing and marketing opportunities.

National Environment Management Authority (NEMA) will be responsible for ensuring that the NRDS related activities are environmentally sound.

The NRDS will be implemented in collaboration with relevant stakeholders and with participation of the targeted beneficiaries.

4.9 KEY INTERVENTIONS OF THE NRDS

Through various stakeholder interventions and synergies, the rice industry in Uganda has gained strength for takeoff. It is now imperative that the means to achieve the well desired rice self-sufficiency be devised and implemented.

The NRDS, therefore, proposes the following strategies;

1. Strengthen the Institutional Framework.
2. Improve Research, Technology Dissemination and Capacity Building.
3. Increase Production, Multiplication and Dissemination of Certified Seed.

4. Improve Fertilizer Marketing and Distribution, and Sustainable Soil Management.
5. Improve Irrigation and Water Management.
6. Improve Post-Harvest Handling, Processing and Marketing.
7. Improve Access to and Maintenance of Agricultural Equipment.
8. Improve Access to Agricultural Finance.
9. Support Policy Development.
10. Ensure Environmental Conservation.

5.0 STRATEGIES OF THE NRDS

5.1 STRENGTHEN THE INSTITUTIONAL FRAMEWORK

Various stakeholders have been instrumental in developing the rice industry. This has resulted in rapid adoption of rice across Uganda. In order to strengthen and coordinate rice development efforts, stakeholders established a unifying institutional framework / platform known as the Rice Steering Committee (RSC), the Rice Technical Committee (RTC) and the Rice Industry Secretariat (RIS). This framework is spearheading the development and implementation of the NRDS.

These stakeholders and the rice platform face the following challenges:

- * Weak policies on promotion of rice production.
- * Limited facilities in institutions responsible for rice promotion.
- * Limited technical capacity of rice promoting institutions.

Rice-related institutions and the rice platform entities (RSC, RTC and RIS) require strengthening to enhance technical backstopping, supervision, monitoring and evaluation of the NRDS

operationalization process. In addition, all policy and technical rice-related institutions require the necessary operational facilities.

The strategies for strengthening the rice-related institutional framework are summarized in the table below:

Table 8: Strategies for Strengthening the Institutional Framework

Strategies	Targeted Output	Activities	Verifiable Indicators	Targets	
				2013	2018
Develop a database	Rice database in place.	Conduct assessments on the stakeholder data needs.	Rice database(s)	Rice Database with district level rice data.	Rice database with sub-county level rice data.
		Hold rice surveys and meetings.		Over 50% of key stakeholders participating	Over 80% of key stakeholders participating
Reinforce policy dialogue	Policy dialogue reinforced.	Hold stakeholder fora's annually.	Participation of Rice Stakeholders in advocating for rice-related policies.	Over 50% of key stakeholders participating	Over 80% of key stakeholders participating
		Conduct assessments on the stakeholder data needs.			

Capacity building for Extension Officers	Policy makers, researchers and extension officers trained.	Train staff in rice promotion, production and post harvest handling technologies.	No. of staff trained, Specializations trained in and No. of trained staff participating in rice promotion activities	5 Policy, 20 researchers, 20 technicians, 80 extension staff.	10 Policy, 30 researchers, 30 technicians, 160 extension staff.
Improve facilities in rice development institutions.	Facilities and logistics provided to rice promotion staff.	Provision of facilities and logistics.	% of total number and type of required facilities that are actually provided.	50%	100%
Conduct Impact Assessments for rice promotion in Uganda	Impact of rice promotion activities assessed.	Assess socio-economic impact on livelihoods.	Improvement in livelihoods arising from participation in rice value chain activities.	Over 50% of rice stakeholders not among the poor Ugandans as per Uganda (UBOS)/ UN poverty scale.	100% of rice stakeholders not among the poor Ugandans as per Uganda (UBOS)/ UN poverty scale.
		Assess impact on natural resources			

5.2 IMPROVE RESEARCH, TECHNOLOGY DISSEMINATION AND CAPACITY BUILDING

Rice research and technology is spearheaded by MAAIF under its Agency, NARO. NARO has a crop research institute (NaCRRI), an agro-machinery research centre (AEATRC), a soil research centre – the National Agricultural Research Laboratories, (NARL) at Kawanda, National Semi-Arid Agricultural Research Institute (NaSAARI). In addition, 10 Zonal Agricultural Research Development Institutes (ZARDI's) responsible for technology generation and testing in the different agro-ecologies of the country. FAO/MAAIF rice projects, NERICA Rice Promotion Project and the SIAD project were among the rice projects that built capacity of rice research and extension.

There are several important technology generation and dissemination issues in rice production including the following:

- * Rice variety development.
- * Genetic resource conservation.
- * Soil fertility and natural resource management in rice agro-ecosystems.
- * Water management.
- * Intermediary technologies for post-harvest handling and processing especially medium size rice milling technologies that consist of compound rice mills (abrasive and friction types), de-huskers, de-stoners and graders.
- * Capacity building of extension staff.
- * Extension materials.
- * Capacity building of farmers.

The strategies for addressing these key issues are summarized in the Table 9 below.

Table 9: Strategies for Improving Research, Technology Dissemination and Capacity Building

Strategies	Targeted Output	Activities	Verifiable Indicators	2013	2018
1. Increase and improve research and technology generation	Research and technology generation improved	Conduct stakeholder needs assessment surveys. Enhance farmer's participation in research. Provide grants to research in rice production.	Number of rice technologies generated and disseminated.	All Production technologies	Irrigation and machinery
2. Increase access and adoption of knowledge and technologies	Access and adoption of knowledge and technologies increased	Train farmers. Train extension officers. Provide facilities and logistics to AO's. Develop study materials including videos, charts, books and other suitable formats.	% of rice farmers using improved rice production technologies.	40%	60%

5.3 INCREASE PRODUCTION, MULTIPLICATION AND DISSEMINATION OF CERTIFIED SEED.

Rice seed is on high demand not only in Uganda but the whole of Africa. Uganda is involved in rice seed research including rice variety development, trials and dissemination. This is done by the National Crop Resources Research Institute (NaCRRI) in NARO. NaCRRI works in close collaboration with international partners such as ARC/WARDA, IRRI and IITA. In 2008 – 2011, NERICA Rice Promotion Project in NARO with JICA support carried out variety trials and production of foundation seed for NERICA 1, 4 and 10. The UN-FAO/MAAIF NERICA Projects implemented between 2006 and 2010 and some Sasakawa Global 2000 Projects have also supported production of foundation seed. In addition, through the UN-FAO support, NaCRRI - Namulonge was provided with improved seed grading equipment.

NaCRRI produces foundation seed in collaboration with selected private seed companies. The Department of Crop Production and Marketing, MAAIF, supervises the foundation seed multiplied by the private sector. The Seed Certification Unit under the Department of Crop Protection, MAAIF, certifies the foundation seed and the certified or registered seed.

The government effectively monitors multiplication of the first foundation seed but has challenges of further monitoring multiplication of larger quantities of seed which are later disseminated by agro-input dealers. In addition, farmers are sometimes engaged in informal cross border trade of seed.

The released rice varieties include NP2, NP3, UK2, NARIC 1 (ITA 257), NARIC 2 (ITA 325), NARIC 3 (NERICA 4), NERICA 1 and NERICA 10. They are all upland varieties. Unreleased varieties include Bugala; K5, K6, K12, K23, K85, K264; Basmati (370), Sindano; WAB 165, Supa V-88, TOX 9, WAB 450, Siena, ITA 335 and TOX 6 which include upland, lowland and irrigated rice varieties.

NaCRRRI, MAAIF and various Civil Society Organizations have trained several farmers in rice seed production. FAO/MAAIF NERICA projects provided farmers with rice seed and seed production trainings however sustainability of this support was hampered by a weak seed distribution system. In addition some farmers who personally took up the initiative of seed production sometimes failed to find market for their seed. This could have been exacerbated by failure of the seed producers and the potential market to match the seed variety of interest. For example, high-yielding, quick maturing versus better tasting varieties such as NERICA versus Sindano.

Seed demand has continued to grow. It is estimated that by 2018, the annual demand for foundation seed will be 200MT and that for certified seed will be 20,000MT. Below is a summary of Uganda's rice seed system.

Table 10: Seed System for Uganda

Seed Type	Responsible Institutions	Required Quantity (Annually)	Location/ Institution
<i>Breeder Seed</i>	NaCRRRI obtains breeder seed from IRRI, Africa Rice Centre (ARC) and other sources. NaCRRRI conducts varietal trials. The Variety Release Committee approves the release of any variety.	01 MT of rice seed (10 to 50 Kg of each rice variety can be obtained and multiplied.)	NaCRRRI, Namulonge
<i>Foundation seed – Level1</i> (Produced and maintained by Research).	NaCRRRI and ZARDIs multiply the breeder seed to obtain Foundation Seed.	-20MT of NERICA seed is available for multiplication. -20 MT of other varieties.	NaCRRRI and ZARDI's

<p><i>Foundation seed – Level 2 (produced and multiplied for distribution to seed producers).</i></p>	<p>Under request by <i>MAAIF (Crop Production Department and its Local Government line departments)</i>, NaCRRRI and ZARDI's distribute the foundation seed to selected <i>Seed Companies</i> for further seed multiplication.</p>	<p>200 MT</p>	<p>Seed</p>
<p><i>Certified Seed -produced by seed companies/ seed producers).</i></p>	<p><i>Private Sector /Seed Companies, Civil Society Organizations and Government</i> produce and disseminate certified seed to farmers.</p>	<p>20,000 MT</p>	<p>Seed</p>

Since rice is a self-pollinated crop, there are high hopes of rapidly improving and increasing rice seed multiplication among farmers. To achieve this however, the following key challenges should be addressed:

- * Weak seed distribution system.
- * Fake Seed (variety mixing, low germination and a lot of foreign material) and several unreleased varieties illegally imported from neighbouring countries.
- * Limited facilities and financial support for multiplication of foundation and certified seed.
- * Inadequate capacity of private sector to multiply and disseminate seed.

The strategies for increasing availability of certified seed are presented in Table 11 below:

Table 11: Strategies for Increasing Production, Multiplication and Dissemination of Certified Seed

	Strategies	Targeted Output	Activities	Verifiable Indicators	Targets	
					2013	2018
1.	Development and maintenance of genetic resources improved.	Varietal release mechanisms improved.	Research on and release of improved rice varieties.	No. of varieties released. Compliance of variety release process with variety release law.	8 Varieties legally released and disseminated.	8 Varieties legally released and disseminated.
			Improving facilities for trial and release of high-yielding varieties.			
		Increased production of high-quality seed.	Produce Breeder Seed.	Quantity of Breeder seed produced. Quantity of Foundation Seed produced.	20 Kg of Breeder Seed for each key variety. 600 Kg of Foundation Seed for each key variety.	200 Kg of Breeder Seed for each key variety, 6,000Kg of Foundation Seed for each key variety.
			Produce Foundation Seed.			

2.	Capacity building in seed production and certification.	Increase multiplication and dissemination of quality seed.	Produce Certified Seed Improve seed dissemination to farmers.	Quantity of Certified seed produced. Quantity of quality certified seed accessed by the farmer.	10,000 MT produced annually.	20,000 MT produced annually.
	Researchers trained in seed production and certification.	Researchers trained in seed production and certification.	Training and recruiting researchers and technicians in seed production and certification.	Number of researchers and technicians involved in seed production.	1 PhD, 2 MSc., several BSc, 5 Certificates/ Diplomas.	2 PhD, 4 MSc., Several BSc, 5 Certificates/ Diploma's
	Agricultural officers and farmers trained in quality seed production and multiplication.	Agricultural officers and farmers trained in quality seed production and multiplication.	Training extension officers, private sector and rice farmers in seed multiplication.	% of farmers with pure rice seed (95% purity).	50%	100%

5.4 IMPROVE FERTILIZER MARKETING AND DISTRIBUTION, AND SUSTAINABLE SOIL MANAGEMENT

Uganda has different types of soils with unique characteristics which have direct implications on production of crops such as rice. Nitisols for instance, are mainly found in parts of Mukono, Jinja, Iganga, Kamuli, Kabale, Rukungiri, Kabarole and Mbale. These are the most fertile and productive soils in Uganda. Brown Andosols mainly found in Mbale, Kisoro, West-Nile areas such as Moyo are reflectively young and possess adequate nutrient reserves. They are soils of volcanic origin and alluvial deposits and are also fertile and productive. Plinthisols are less productive soils scattered throughout the country but concentrated in Gulu and Tororo. These soils require careful usage to preserve their poorly developed top soils. Ferralsols are the most dominant soil group spread all over the country but have little or no mineral reserves to draw on and are highly weathered. Productivity of Ferralsols depends largely on bases held in the clay and organic complexes for their fertility and on favourable rainfall, adequate depth and maintenance of the humic top soil. A summary of the categorization of Uganda's soil types, area of coverage and status developed by the National Agricultural Research Laboratories at Kawanda (NARL) indicates that majority of our soils are now less productive.

Table 12: Soil Types, Coverage and their Productivity

Soil Type	Area (Km ²)	Inherent Productivity
Andosol	5,814	High to very high
Gleysols	24,019	Moderate to high
Ferralsols	67,572	Low to moderate
Calcisols	204	Low to moderate
Arenosols	5,579	Low to very low

Source: RIS, 2008 (Adopted from working papers of NARL, Kawanda).

Numerous reports and observations from all over the country point to the ever declining yields largely attributed to loss of soil fertility through nutrient mining, and exportation. Annual nutrient depletion of Uganda soils is estimated at 72 kg of nitrogen, 23 kg of phosphorous and 43 kg of potassium per hectare. Overall, it is estimated that nutrient mining of Uganda soils is currently averaging 87 kg/ha per annum and continues unabated (Magunda, 2010).

Several initiatives by MAAIF, Ministry of Water and Environment (MWE), NARO, Makerere University, Swedish International Development Agency (SIDA) and other partners have been implemented to reverse soil degradation. These include:

- * Government does not tax fertilizer importation,
- * Massive research, training and demonstrations have been conducted on soil fertility management, soil and water conservation,
- * Management of below ground diversity and,
- * Holistic adoption of improved land use and management practices, among others.

The challenge facing most soil management initiatives is limited adoption of technologies by farmers and limited funding to soil/natural resource management programmes. This is often created by complexity in assessing value for money invested in soil technologies despite their important role in the short and long term.

Use of fertilizers has been identified as the key soil management strategy for rice production in Uganda. However, the following issues need to be tackled in order to increase fertilizer use.

- * Limited quantities of fertilizer on the market.
- * Limited access to fertilizer by rural farmers.
- * Poor quality fertilizer on the open market.
- * High cost of Inputs.

Estimated Fertilizer Requirements Annually

The NRDS will emphasize fertilizer use in the rain-fed upland ecology which is usually over-farmed and the irrigated ecology where there is proper water management. The rain-fed lowland ecology will be ignored for the time being due to potentially high wastage arising from leaching and erosion. Adoption of fertilizer use may be gradual (NRDS targets at least 20% of rice farmers using fertilizers by 2018) or may involve a major revolution. Below are the actual national fertilizer requirements for rice production based on the nutrients depleted through rice production.

Table 13: Estimated Annual Fertilizer Requirements

		Rain-fed Upland	Irrigated	Total
Annual Production, un-milled (MT)		192,096	42,000	234,096
Fertilizer requirements (MT)	Nitrogen (N)	2,881	630	3,511
	Phosphorous (P)	1,537	336	1,873
	Potassium (K)	2,881	630	3,511
	Total	7,300	1,596	8,896
<i>Rates used: 15Kg of N, 8kg of P and 15kg of K per one Ton of rice produced.</i>				
Estimates are based on 2018 targeted production in the 2 ecologies which accounts for about 35% of the rice farmers.				

Other Sustainable Soil Management Technologies

Whereas chemical fertilizer application is the most efficient, farmers can also engage in other complementary practices. For example, rice straw is high in potassium thus using it for making bunds can facilitate release of these nutrients back into the soil.

Strategies

Below are a number of interventions that are required to increase and sustain soil fertility for increased rice production.

Table 14: Strategies for Improving Fertilizer Marketing and Distribution, and Sustainable Soil Management

Strategies	Targeted Output	Activities	Verifiable Indicators	Targets	
				2013	2018
Availability of fertilizer at the required time, quantities and quality.	Policy on fertilizer developed.	Support development of a policy on fertilizer usage and soil management. Create awareness of stakeholders on the fertilizer and soil management policies.	Fertilizer Policy in place and printed no. of copies.	Fertilizer Policy in place.	Advocate for policy implementation.
	Farmers able to access fertilizers.	Avail fertilizers at parish level.	% of rice farmers using fertilizers.	10%	20%
	Required quality of fertilizer ensured before dissemination.	Improving the facilities at the fertilizer certification institution. Support research in soil and natural resource management.	Tonnes of fertilizers imported, compliance with the fertilizer policy.	900 Tonnes annually for rice	1,800 Tonnes annually for rice

Dissemination of other soil conservation technologies	Soil fertility conserved.	Package and disseminate other proven soil and water conservation (SWC) / soil fertility management (SFM) technologies for increased rice production and productivity.	% of farmers using SWC and SFM technologies.	10%	50%
Cost of fertilizer reduced to make it more affordable.	Agricultural Officers and farmers trained in efficient fertilizer use.	Train extension/ agriculture officers on efficient fertilizer usage.	% of farmers using fertilizers.	10%	20%
		Train farmers on efficient fertilizer usage.			

5.5 IMPROVE IRRIGATION AND WATER MANAGEMENT

In the past, government constructed some irrigation schemes however due to poor maintenance, their infrastructure has broken down. These schemes include Doho Rice Scheme, Mubuku Irrigation Scheme and Olweny Swamp Rice Irrigation Scheme. The government, with support from African Development Bank, has embarked on renovation of these schemes. In addition, the Sustainable Irrigated Agricultural Development (SIAD) Project (2003-2011) promoted establishment of small-scale irrigation infrastructure such as irrigation channels and bund construction among smallholder rice farmers in Eastern Uganda.

One of the greatest opportunities to Uganda's irrigation strategy is the presence of sufficient surface water characterized by several streams, rivers and lakes. However, there is still a challenge of sustainable harnessing of this water.

The government of Uganda is currently developing a framework for improving Water for Agricultural Production (WfAP). This is being spearheaded by MAAIF and Ministry of Water and Environment.

In order to promote rice irrigation the following challenges should be addressed:

- * Dilapidated irrigation infrastructure.
- * Poor operation and maintenance of present infrastructure.
- * Limited irrigation infrastructure.
- * Competing uses for water.

The following strategies will therefore guide the development of water resources for rice production

Table 15: Strategies to Improve Irrigation and Water Management

Strategies	Targeted Output	Activities	Verifiable Indicators	Targets	
				2013	2018
1	Refurbishment of current irrigation infrastructure.	Repair irrigation infrastructure. Redesign some sections of current infrastructure to improve irrigation efficiency.	No. of irrigation schemes repaired.	4 Schemes	4 schemes and 8 Dams
2	Set up new irrigation infrastructure.	Set up new irrigation infrastructure.	No. of new schemes and their capacity (cubic metres)	0	4
3	Policy for Water for Agricultural Production (WFAP).	Advocate for completion of the Policy for Water for Agricultural Production	Policy available	01 policy.	01 policy revised.

4	<p>Maintenance framework for all current and new irrigation facilities established.</p>	<p>Technical maintenance of irrigation infrastructure carried out.</p>	<p>Support effective maintenance and operation. Public-Private Partnerships in management of the irrigation infrastructure developed. For example, maintenance fees can be collected through farmer groups.</p>	<p>No. of maintenance frameworks</p>	<p>01 frame work per scheme.</p>	<p>01 frame work per scheme.</p>
<p>Collaboration between water use and management Stakeholders increase.</p>			<p>Strengthen policy on water use, access and management. Train farmers in water management and water catchment management. Create collaborations in developing water use projects.</p>	<p>No. of functional water user associations.</p>	<p>4 (At least 1 per scheme rehabilitated.</p>	<p>12 (At least 1 per scheme rehabilitated/ constructed.</p>

5.6 IMPROVE POST-HARVEST HANDLING, PROCESSING AND MARKETING

The current post-harvest handling practices by rice farmers are relatively poor. Although majority of farmers harvest rice when its moisture content is about 21 – 24% wet basis, other subsequent operations are poor. After cutting the paddy, it is heaped for 1 – 3 days before threshing. Majority of farmers believe that the heaping enables pre-mature grains to reach maturity period. The heaping causes the paddy to ferment which leads to aflatoxin contamination and high fissure development in the paddy. Aflatoxin contamination of 25pbb have been recorded, which is above the allowable limit (20pbb) given by FAO. The threshing is currently done by mainly beating the heaped rice on a tarpaulin, plastic sheeting or mat (68.9%). About 21.6% of the farmers thresh rice by beating it on bare ground. Such a practice usually leads to heavy contamination of the paddy with stones and other foreign matter which significantly contributes to low quality of the milled rice and increased rate of wear and tear of mill parts. Use of improved threshers is very minimal.

Except Tilda (U) Ltd., the rest of the farmers dry their paddy using open sun drying method. The paddy is spread on bare ground or tarpaulin in the open to dry by sunshine. The drying thickness is usually about 10 mm which is too small. This causes rapid drying which further lead to high fissure level development in the paddy. The paddy in most cases is not uniformly dried to the right moisture content.

The paddy supplied to the rice milling plants is usually of low quality. Odogola (2008) observed that rice millers indicated that most of the paddy supplied is wet and contaminated with stones, metals, straws and dust. About 95% of the local rice is milled by the small rice milling plants which have inferior technologies (only englebergs and mill-tops). These types of rice mills heavily

contribute to the low quality and market value of the processed rice. Most of the local processed rice falls in the lowest grade US 40 of Uganda Bureau of Standards.

MAAIF and its agencies especially AEATRC / NARO with support from partners such as JICA and SG2000 have made several outstanding initiatives in the last ten (10) years including the following:

- » JICA has trained two scientists from AEATRC in post-harvest handling and processing of rice.
- » AEATRC together with other partners is conducting studies on rice processing in Uganda.
- » JICA in partnership with AEATRC is building a rice processors' training unit in Namalere. The training unit will be used for training rice millers, extension staff and artisans improved milling practices and technologies.
- » AEATRC and SG-2000 have adopted 2 designs of motorized threshers.
- » AEATRC has initiated work on development of pedal threshers and improved open-sun drying method for local rice varieties and under local weather conditions. But these efforts have been hampered by inadequate funds.
- » AEATRC, in partnership with JICA and SG-2000, has conducted a study to establish the "Status of Rice Milling Industry in Uganda".
- » AEATRC is conducting a study on socio-economic constraints and consumer/market requirements of rice in Northern Uganda.
- » FAO and MAAIF are set to install milling machines in Northern Uganda under Public –Private Partnership (PPP) arrangement.

- » Training farmers in post-harvest handling of rice through the various MAAIF, NARO and NAADS activities.

Despite the above initiatives, challenges still exist in rice processing which include, among others;

- * Agricultural extension staff and farmers have inadequate knowledge in post-harvest handling and processing of rice, especially timely harvesting, proper threshing, proper drying and general handling.
- * Poor drying mechanisms and labour intensive threshing technologies.
- * Poor performing rice mills particularly at the small rice milling plants.
- * Inadequate rice supply to sustain the rice milling plants throughout the year.
- * Low prices for locally produced rice resulting from low quality (stony, broken).

The following strategies will address the above constraints among others:

Table 16: Strategies for Improving Post-Harvest Handling, Processing and Marketing

Strategies	Targeted Output	Activities	Verifiable Indicators	Targets	
				2013	2018
1 Capacity building for extension officers, technicians, artisans and farmers.	Training centres equipped. AOs, technicians and farmers trained.	Strengthen rice millers training unit at AEATRC to post harvest rice technology development centre. Train extension officers, technicians, artisans, rice millers and farmers in post harvest handling and processing.	No. of trainers recruited, type and no. of equipment installed and no. of trainings held. No. of personnel trained.	Capacity to train on milling processes.	Capacity to train on fabrication and manufacturing processes. 200 personnel from each group.

3	Branding and identifying market niche that give high prices.	Market information on equipment and rice standards available.	Avail market information on rice quality and standards, and processing equipment.	Market information on equipment and standards available.	40% access to market information by farmers	60% access to market information by farmer.
	Availability of Storage facilities near the farmers	Support establishment of storage facilities at local, communal and national level.	% quantity of rice stored in appropriate storage facilities.	20%	40%	
	High quality non-stony, less than 10% broken well packaged and branded Ugandan rice on the market.	Improve rice quality to give value for money	% of broken rice, % of stones and foreign matter. No of Ugandan registered rice brands.	40% of rice millers availing the market rice of at least Grade 3 of UNBS.	40% of rice millers availing on the market rice of at least Grade 3 of Uganda National Bureau of Standards.	
		Promote packaging and branding		04 brands		
		Support Information dissemination on prices.		06 brands		

5.7 IMPROVE ACCESS TO AND MAINTENANCE OF AGRICULTURAL EQUIPMENT

Over the years, the government has provided farmers with free rudimentary tools and incentives for tractor acquisition such as contributing 50% of the funds required by a farmer group to purchase a tractor. Such schemes have not benefited small-scale farmers as most cannot raise the remaining capital contribution.

A machinery strategy has been developed by the government through MAAIF. It focuses on provision of equipment to small scale farmers organized in groups which can raise the share capital required by the government and can provide guarantee to proper management of the equipment.

On the whole, rice production is still done by rudimentary tools thus making it highly laborious yet human labour costs are always on the rise.

Attempts to mechanize rice production have been affected by the following set-backs:

- * Most rice is grown on small acreages of land making tractor use uneconomical.
- * High cost of operation and maintenance including high cost of fuel.
- * Low utilization of available machinery due to lack of capital to hire the services.
- * Lack of capital to purchase machinery coupled with lack of collateral for accessing loans.

The strategies to address some of the challenges above and enhance increased rice mechanization re summarized in Table 17 below; and enhance increased rice mechanization include the following:

Table 17: Strategies for Improving Access to and Maintenance of Agricultural Equipment

Strategies	Targeted Output	Specific Intervention	Verifiable Indicators	Targets	
				2013	2018
1. Acquisition of agricultural machinery and equipment for land preparation, agronomy, irrigation and post harvest.	Agricultural machinery and equipment for land preparation, agronomy, and irrigation and post harvest acquired.	Public-Private Partnership in acquisition of machinery and equipment by farmers	% of farmers using appropriate machines and % of farm operations mechanized.	40%	60%
		Avail farmers with information on access of machinery and equipment and cost of utilization and maintenance			
2. Efficient operation and maintenance of machinery and equipment.	Efficient operation and maintenance of machinery and equipment.	Conduct assessment surveys on farmers capability to manage and utilize the machinery before dissemination.	% of machinery efficiently utilized and maintained.	40%	60%
		Train farmers, technicians and artisans in use, management and fabrication of machinery.			

5.8 IMPROVE ACCESS TO AGRICULTURAL FINANCE

Government Budgetary allocation to the agriculture sector is usually only about 4% of the national budget. Fortunately, Government has, in the recent years, prioritized key areas that directly affect the agriculture sector such as construction of rural roads.

Rice is now becoming a priority crop to complement the traditional cash crops i.e. coffee, cotton, tea and cocoa in addition to food crops which have been very important in hunger and poverty reduction in Uganda. Rice is thus likely to attract more funds from the entire agricultural budget.

Government is initiating efforts to increase lending to agriculture by putting in place loans with low interest of about 15%. Collateral is, however, a key challenge to the small-scale farmers. Large-scale farmers and processor may on the other hand benefit from these initiatives as the physical items procured using the loan contribute to the collateral. Government is also promoting Savings and Credit Cooperatives (SACCOs). SACCOs have simplified the process of small scale farmers to access credit. SACCO's have however been hindered by weak management structures that often result in mismanagement of funds.

The following salient challenges need to be addressed in order to increase agricultural financing for rice production:

- * Land tenure system that has maintained the farmers' land as weak collateral
- * Lack of other forms of collateral by farmers.
- * High interest rates on most loans in Uganda of 22-30% with no exception to loans for agriculture.
- * Dissemination of agricultural loans usually favours processing and marketing but ignore production because it is a highly risky business. Small-scale farmers, therefore, often do not benefit from such government interventions.

Table 18 below presents strategies that will improve access to agricultural finance by rice farmers.

Table 18: Strategies for Improving Access to Agricultural Finance

Strategies	Targeted Output	Specific Interventions	Verifiable Indicators	Targets	
				2013	2018
1. Advocate for Improvement of policies on agricultural finance.	Policies on agricultural finance improved.	<p>Develop policies on Agricultural Finance.</p> <p>Introduction of an agricultural loan financing scheme.</p> <p>Lobby for more direct prioritization of agriculture in financial and macro-economic policy environment.</p> <p>Lobby for prioritization of rice in agricultural sector policy.</p> <p>Lobby government and development partners such as CARD partners to relinquish more funds for rice interventions.</p> <p>Training of farmers in investment and management of agricultural finance.</p>	% No. of rice farmers with sufficient funding to improve their enterprises.	40%	60%

2.	Advocate for reforms in land tenure and property ownership in Uganda.	Land reforms	Advocate for land tenure reform.	Improvement in land reforms to facilitate securing of agricultural finance.	40%	60%
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5.9 SUPPORT POLICY DEVELOPMENT

The cornerstone of Uganda's policy framework was the long-standing and widely respected Poverty Eradication Action Plan (PEAP) which was first formulated in 1995 and expired in 2008. The PEAP was succeeded by the National Development Plan (NDP, 2010/11-2014/15).

As for the agriculture sector itself, investments have, since 2000, been guided by the Plan for Modernization of Agriculture (PMA) whose main objective was poverty reduction through agricultural commercialization. The PMA was designed as a multi-sectoral approach to agricultural development, based on the recognition that some of the investments needed to make a difference in agriculture lay outside the mandate of MAAIF for example the roads, financial services and energy. However, comprehensive and appealing as it was, implementing the PMA proved more difficult than was envisaged because of problems in coordinating the activities of thirteen ministries and agencies. Nevertheless some activities in agencies such as the National Agricultural Research Organisation (NARO) and the National Agricultural Advisory Services (NAADS) made progress with Acts of Parliament supporting their consolidation.

In response to the gaps of PMA, the MoFPED, in 2005, designed the Rural Development Strategy (RDS). Later on, government developed the Prosperity For All (PFA) Program. This program has a goal of each household in Uganda earning at least Ug. Shs. 20 million per annum.

The agriculture sector will implement the Agriculture Sector DSIP which will holistically address the entire agriculture value chain for key agricultural enterprises including rice. Most of the upcoming policies and strategies in agriculture are drawing their mandate from this strategy.

The NRDS also draws its mandate from the Agriculture Sector DSIP. Other policy areas need to be developed alongside the NRDS to create an *enabling environment* for implementing the NRDS. Some of the key areas that should be addressed include the following:

- * Development of relevant rice related policies
- * Improving institutional linkages
- * Conducting socio-economic and natural resources/ environmental impact assessments.

The proposed strategies to support policy development are presented in Table 19 below;

Table 19: Strategies for Supporting Policy Development

Strategies	Targeted Output	Activity	Verifiable Indicators	Targets	
				2013	2018
1	Develop relevant policies for promotion of rice production. Agricultural policies developed.	Develop or improve Policies on the following: - Agro-inputs and soil management. - Agricultural finance - Post-harvest handling, value addition and marketing. - Irrigation and water use. - Mechanization - Develop a rice/pulses policy	Policy documents.	Cereals and Pulses Policy in place.	-
2	Institutional linkages strengthened.	Hold stakeholder fora's.	% No. and type of stakeholders involved of all stakeholders	80% of known rice promoting agencies participating in annual stakeholders meeting.	100% of known rice promoting agencies participating in annual stakeholders meeting.

5.10 ENSURE ENVIRONMENTAL CONSERVATION

Uganda has laws and policies for safe-guarding the environment. Most rice interventions in place have undergone basic EIA. The responsible agency (NEMA), however, does not have enough capacity to track the activities of small holder farmers.

Implementation of activities under the NRDS will adhere to environmental legislation in Uganda.

6.0 ESTIMATED COST AND RETURNS TO INVESTMENT

6.1 ESTIMATED COST

Table 20: Estimated Cost

	Strategic Area	Cost (Million)		
		2008 -2013	2014 -2018	Total
1.	Strengthen the Institutional Framework	1,600	3,700	5,300
2.	Research, Technology Dissemination and Capacity Building	10,000	80,000	90,000
3.	Improve Irrigation and Water Management	102,000	238,000	340,000
4.	Seed Production, Multiplication and Dissemination of Certified Seed	18,000	42,400	60,400
5.	Increase Utilization of Agro-Inputs and Sustainable Soil Management	2,500	5,750	8,250
6.	Post-harvest handling, Processing and Marketing	1,800	4,230	6,030
7.	Mechanization	4,800	11,200	16,000
8.	Access to Agricultural Finance	300	700	1,000
9.	Policy Development	150	350	500
10.	Environmental Conservation	300	700	1,000
	Total	Ugx. 141,450 USD 59	Ugx. 387,030 USD 161	Ugx. 528,480 USD 220
	Costs excluding capital assets		Ugx. 149,030 or USD 63	

6.2 RETURNS TO INVEST

At a net profit of Ugx. 700/= per Kg, the current net income earned by rice producers from 177,800 MT is Ugx. 124 billion. With implementation of the NRDS, the net income will grow to 476 Billion annually (generated from 680,000 MT of rice). This requires an investment of 528 billion (USD 220 million)

After 2018, capital investments such as irrigation infrastructure will be already in place. Thus the annual net profit is likely to increase.

7.0 CONCLUSION

The NRDS gives the Government of Uganda and its development partners an entry point to sustainably reduce hunger and poverty in Uganda. Its implementation will demonstrate the potential that agriculture has in transforming African economies.



8.0 BIBLIOGRAPHY

Africa Rice (2010). e-Publications: A CD on Africa Rice Publications.

Anon (2005). Uganda districts information handbook, expanded edition 2005-2006. Fountain Publishers, Uganda.

Food and Agriculture Organization (FAO) and Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). 2011. Ngambeki, D.S., Okwelle R., Guma A. P., Sarich A. and Okaasai S. O. Report on Collation and Dissemination of Rice Data and Database on the Status of the Rice Industry in Uganda.

Kasirye (2007). Ministry of Finance, Planning and Economic Development (2008). Agricultural Sector Investments and Institutional Performance in Uganda. Discussion Paper 17.

Kenmore P. (2003): Sustainable rice production, food security and enhanced livelihoods, in "Rice Science: Innovations and Impact for Livelihood, pg. 27-34. Edited by Mew.

Haneishi Y., Maruyama A., Asea G., Okello S.E., Tsuboi T., Takagaki M., Kikuchi M. (2011). Exploration of rain-fed rice farming in Uganda based on a nation-wide survey: Regionality, varieties and yield. A report of NaCRRI-JICA NERICA Project: Namulonge.

Japan International Cooperation Agency, (JICA) in Collaboration with Sasakawa Africa Association Uganda (2006). Odogola R. Wilfred, Lead Consultant. Final Survey Report on The Status of Rice Production, Processing and Marketing In Uganda

Japan International Cooperation Agency (2007). The Study on Poverty Eradication through Sustainable Irrigation Project in Eastern Uganda. Final Report.

Jian Song (2003) Sustaining food security, on pg 5-6 of the Proceedings of the International Rice Research Conference, 16-19 September 2002, Beijing, China.

Mathias Magunda (2010). Paper presented at the Stakeholders Workshop for harmonization of Sustainable Land Management

Initiatives in MAAIF – Feb 2010 at Ridar Hotel, Mukono-Uganda.

Ministry of Agriculture, Animal Industry and Fisheries (2010) Agriculture Sector Development Strategy and Investment Plan (DSIP): 2010/11 – 2014/15.

Ministry of Agriculture, Animal Industry and Fisheries (2011). Statistical Abstract, 2011.

Ministry of Finance, Planning and Economic Development (2008). Agricultural Sector Investments and Institutional Performance in Uganda. Discussion Paper 17.

National Agricultural Advisory Services (2004). Annual Report 2003/04; Ministry of Agriculture Animal Industry and Fisheries, Entebbe.

National Environment Management Authority (2008). State of the Environment Report for Uganda.

National Planning Authority (2010). National Development Plan (NDP): 2010/11-2014/15.

Rice Industry Secretariat (RIS), MAAIF. 2008. Compilations from Working Papers, Policy and Technical meetings on rice.

Rice Industry Secretariat (RIS), MAAIF 2012a. 2008 revised rice data using the 2008 UBOS/MAAIF Crop Census data, MAAIF (2011), Haneishi *et. al.* (2011) and Ngambeki *et. al.* (2011).

Rice Industry Secretariat (RIS), MAAIF. 2012b. Updated Rice data (2012). Data obtained from MAAIF Statistics Unit, 2010 and working papers on rice.

Tatsushi Tsuboi (2005). Paper presented at the WARDA – NERICA rice Workshop, Ivory Coast, 8th October, 2005.

Uganda Bureau of Statistics (2004). Uganda National Population and Housing Census, 2002. Main Report

Uganda Bureau of Statistics and Ministry of Agriculture, Animal Industry and Fisheries (2011). Uganda Census of Agriculture (UCA) 2008/9 at a Glance.

Uganda Bureau of Statistics and Ministry of Agriculture, Animal Industry and Fisheries 2011. Uganda Census of Agriculture (UCA) 2008/9. Volume 3: Crop Area and Production Report.

WARDA (2004) <http://www.warda.org>. “The Rice Challenge in Africa”.

Xu Kuangdi and Shen Guofang (2003). Promoting Chinese rice production through innovative science and technology, pg 11-18 of the Proceedings of the International Rice Research Conference, 16-19 September 2002, Beijing, China, edited by Mew T.W. *et al.*

