GOVERNMENT OF UGANDA

UGANDA NATIONAL RICE DEVELOPMENT STRATEGY (UNRDS)

2ND DRAFT

MINISTRY OF AGRICULTURE ANIMAL INDUSTRY AND FISHERIES

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LIST OF ACRONYMS

AAO Assistant Agricultural Officer
AO Agricultural Officer
AEATRI Agricultural Engineering and Appropriate Technology Research Institute
CARD Coalition for African Rice development
FAO Food and Agricultural Organization of the United Nations
GoU Government of Uganda
JICA Japan International Cooperation Agency
LG Local Government
MAAIF Ministry of Agriculture, Animal Industry and Fisheries
NAADS National Agricultural Advisory Services
NaCRRI National Crop Resources Research Institute
NARO National Agricultural Research Organization
NERICA New Rice for Africa
NGOs Non Governmental Organizations
NRDS National Rice Development Strategy
PEAP Poverty Eradication Action Plan
PMA Plan for Modernization of Agriculture
UBOS Uganda Bureau of Statistics
WARDA West African Rice Development Association

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EXECUTIVE SUMMARY

The Government of Uganda (GoU) recognized the role of the Agricultural sector in poverty eradication and is therefore implementing a *Poverty Eradication Action Plan* (PEAP), as the key national development agenda for a few decades to come (MFPED, 2000). Rice production is a major intervention identified in the Ministry of Agriculture Animal Industry and Fisheries (MAAIF) development Strategy and Investment Plan (DSIP) 2009/10 -2013/14 for food security and poverty reduction in Uganda.

The Coalition for African Rice Development (CARD) envisages to double Rice production in Africa in the next ten years following the TICAD IV declaration. Uganda is a member of CARD and the NRDS is its framework for achieving this objective.

The Uganda National Rice Development strategy (NRDS) lays out Uganda's strategy for promotion of rice production between 2009/10 - 2017/18 with the aim of increasing household food security and reduce household poverty through increased production of high quality rice.

The major strategies identified include Strengthening the Institutional Framework; Research, Technology Dissemination and Capacity Building; Production, Multiplication and Dissemination of Certified Seed;Improve Irrigation and Water Management; Increase Utilization of Agro-Inputs and Sustainable Soil Management; Post harvest Handling, Processing and Marketing; Mechanization; Access to Agricultural Finance; and, Policy Development. The strategies will result in more than tripling rice production in Uganda from about 165,000tonnes to an anticipated 334,250 tonnes in 2013 and later to an anticipated 499,200 tonnes in 2018.

The Strategies will be implemented using various approaches tailoring each approach to the needs for example small scale farmers different from large scale, conventional agriculture with intensive use of agro-chemicals different from conservation tillage, e.t.c. Overall emphasis will be put on increase productivity rather than extensive cultivation.

MAAIF will take the lead in coordination, monitoring and evaluation of efforts in the implementation of the NRDS.

1.0 INTRODUC TION

1.1 Global Rice Sector

Rice has been gathered, consumed, and cultivated by women and men world wide for more than 10,000 years (Kenmore, 2003), longer than any other crop.

The total area under rice cultivation is globally estimated to be 150,000,000 ha with annual production averaging 500 million metric tons (Tsuboi, 2004). Rice represents 29 % of the total output of grain crops worldwide. (Xu et al., 2003)

The FAO is forecasting a record rice harvest in 2008 (up 2.3% to 666 million tonnes), although it is also cautioning that 'rice prices could remain high in the short term, as much of the 2008 crops will only be harvested by the end of the year'. According to the FAO's rice price index 'rice prices have skyrocketed by around 76% between December 2007 and April 2008'.For prices to fall 'favourable weather conditions must prevail in the coming months and governments relax rice export restrictions'.

1.2 Africa's Rice Sector

Rice is also becoming increasingly popular in Africa.

Consumption of rice in Africa is within the range of 16 metric tonnes while production is at 14 metric tones, creating a deficit of 2 million metric tonnes.

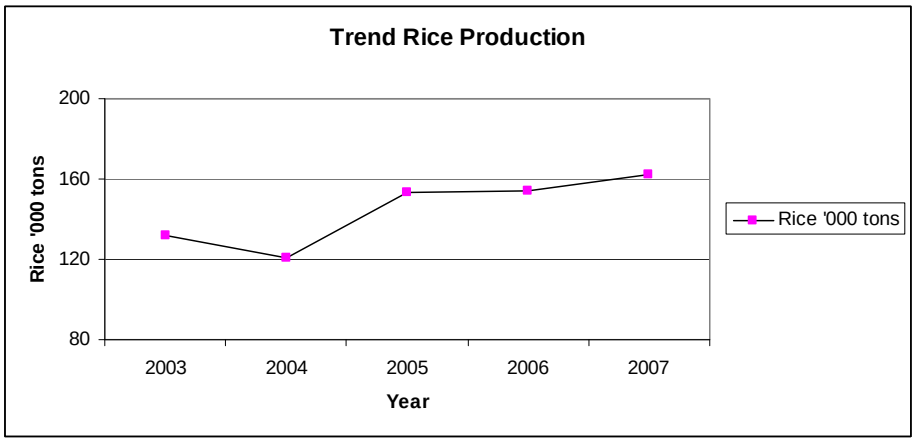
Currently, rice is grown in over 75% of the African countries, with a total population close to 800 million people. Rice is the main staple food of the populations in Cape Verde, Comoros, Gambia, Guinea, Guinea-Bissau, Liberia, Madagascar, Egypt, Reunion, Senegal and Sierra Leone. It is also an important food of the populations in Côte d'Ivoire, Mali, Mauritania, Niger, Nigeria, and Tanzania. In addition, rice has become an important food security factor in Angola, Benin, Burkina Faso, Chad, Ghana and Uganda

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 (DRS) with the help of Chinese experts.

Growth of Uganda's Rice Sector



Today rice is grown mainly by small scale farmers almost through out the country, but also with large scale farmers in few places. Total production is estimated at 165,000metric tones. Total rice consumption is estimated at 225,000metric tones. Population growth rate is 3.2% thus the demand for rice is expected to rise. Uganda adopted NERICA 1, 4 and 10 varieties in addition to the old lowland varieties. Since the introduction of upland rice in 2002, rice farming has grown from 4,000 farmers to over 35,000. From the earlier releases of three upland rice varieties in Uganda in 2002 courtesy of the Rock feller support farmers were able to reap $9 million (14.9 billion) in 2005. In the process, the country has seen rice imports drop between 2005 and 2008. This trend of events according to the National Agricultural Research Organization (NARO) saved the country about $30 million (Ug. Shs. 50.4 billion) in foreign exchange earnings. Most rice in Uganda is grown in Eastern Uganda followed by Western Uganda due to the presence of lowland with high moisture content throughout the growing season. Government of Uganda intends to increase rice production to cater for the ever increasing demand.

2.0 REVIEW OF THE NATIONAL RICE SECTOR

2.1 Status of Rice in National Policies

Agriculture is the main stay of Uganda's economy, contributing 42% of GDP, over 85% of export earnings, and providing employment for over 80% of the population, 90% of them live in the rural areas (Anon, 2004). Food crop production is predominant in the sector, contributing approximately 50% of agricultural GDP in 2002/03, while cash crops, livestock, fisheries and forestry provided 17, 16, 12 and 14 % respectively. The bulk of agricultural output comes from about 4.5 million small-scale

subsistence households, 80% of whom, in average, each owns about 2ha of land and produces a number of different food and cash crops besides herding some livestock (UBOS, 2004).
Agricultural production is also still predominantly rain-fed, non-market oriented, and based on rudimentary technologies and environmentally unsound practices. Resultantly, the country's agricultural products are often of low volumes, poor quality and are costly to assemble for sustainable market supply. In addition, the farmers are not organized in accessing inputs and marketing their produce efficiently, thereby incurring high production and marketing costs that affect the profitability of their enterprises.

Since agricultural sector embraces such a large proportion of the country's population, the Government of Uganda (GoU) recognized the role of the sector in poverty eradication and is therefore implementing a *Poverty Eradication Action Plan* (PEAP), as the key national development agenda for a few decades to come (MFPED, 2000). The poverty focus envisages modern farming as the lead strategy to enable the poor raise their incomes and improve livelihoods. In order to meet this challenge, the Government has developed the *Plan for the Modernisation of Agriculture* (PMA) as a strategic framework within PEAP that provides for the transformation of the predominantly subsistence agriculture into a market-oriented sector of the national economy (MAAIF and MFPED, 2000). The strategy is designed to create an environment for promoting investments in profitable arable agriculture, livestock farming, and utilization of fisheries, forestry and other natural resources, while generating gainful employment in all sectors of the economy.
The Ministry of Agriculture Animal Industry and Fisheries also recently demarcated the country into *Agricultural* Zones, each with specific production features that differ from the other. The intention, through this arrangement, is for each zone to undertake a set of agricultural enterprises where it has the best comparative advantage, and thus cause rapid economic growth and reduce household poverty. Analysis of the ranking of enterprises by zones, as conducted by NAADS (NAADS, 2004), shows that rice growing as an enterprise now ranks high in many of these zones.

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 225,000metric tones. Consumption per capita is about 8Kg. Total production is estimated at 165,000metric tonnes leaving a deficit of 60,000 metric tones. The total population of Uganda is 28 million with annual growth rate of 3.2% (UBOS estimates) indicating that rice consumption is likely to increase.

2.3 Typology and number of Rice Farmers, Processor and Traders

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

About 15 % Medium scale farmers with acreage of 2 – 6hectares producing rice most of which using practices similar to small scale farmers and a few using non-motorized tools such as line markers. The major difference between medium and small scale is the acreage.

About 5% rice farmers are large scale with land under cultivation over 6 hectares. Among the large scale farmers are rice schemes with acreage of over 1,000 hectares.

Currently there are 591 operational rice mills. The rudimentary poor performing engelbergs account for 77.5%, milltops constitute 20.8% and medium to large scale are 1.7%. The small rice milling cottage factories using engelbergs and milltops mill 95% of the paddy produced in the country significantly contributing to persistent low quality and market value which is non- competition in the current liberated market economy.

Trading of rice in Uganda is completely under the private sector. Most of the trading is done by middle men who buy threshed rice from the farmers at the farm. The price of rice varies from place to place between UShs.1500= per kg to UShs. 2,500= per kg of locally produced rice. This rice is usually packed in 50 and 100kg bags. Some medium and large scale processors however process, package and brand their rice thereby fetching higher market prices ranging from UShs. 2500= to UShs 7500= per Kg.

2.4 Gender and Youth Dimensions of Rice Production, Processing and Trading

Women play a major role in rice production in the country including, field opening, planting, weeding, harvesting, bird scaring and other agronomic activities on farm processing and marketing. Sometimes due to gender imbalance, the proceeds from rice sales do not trickle down to the women who have labored in the production process.

Youth are less involved in rice production and this causes a danger to future production and food security. Most of the youth prefer to seek jobs in urban areas.

2.5 Comparative Advantage of Domestic Rice Production

Domestic rice production is increasing and local and regional demand is also increasing. The current demand for rice in Uganda is over 225,000metric tonnes of which only 165,000metric tones are locally produced creating a deficit of 60,000MT.

East African countries (Rwanda, Kenya, Tanzania, Uganda and Burundi) import over 700,000 metric tonnes of rice per year. Rice production would therefore provide an import substitution of about $150 million worth of rice every year to Uganda if it can double its production. This covers for only 15% of rice imports in East Africa.

3.0 CHALLENGES AND OPPORTUNITIES FACING THE NATIONAL RICE SECTOR DEVELOPMENT

3.1 Human and Institutional Capacity

Challenges

- Poor policies on agro-inputs and agricultural finance and poor implementation of policies on soil and water management
- Farmer groups are still weak and often collapse after accessing agricultural finance facility
- Low funding to rice research
- There is general lack of motivation and limited facilitation for district extension staff.
- Many district extension staff lack specialized knowledge in rice production.
- Limited staff in development of rice sub-sector. MAAIF has only about 5 staff members directly working on rice and about 7 other staff members and 10 district extension staff who occasionally deal with rice issues. These few staff are scattered in the various agencies of MAAIF. In addition to these staff are other MAAIF staff within the MAAIF structure, MWE structure and MTTI structure, Office of the Vice President and other organizations whose duties overlap into promotion of rice production during implementation of certain strategies.

Estimated No. of Staff dealing with rice in MAAIF and MAAIF Projects

MAAIF Dept. / Agency	Full Time	Part Time
Rice Industry Secretariat and Dept. of Crop Production & Marketing	02 *(Program Officer and Assistant Program Officer)*	03 *(Secretary to Steering Committee, Senior Agricultural Officer Cash crops and Senior Agricultural officer Food security)*
Dept. of Farm Development	01*(Senior Agricultural Officer-Watershed Management/Project Coordinator SIADP)*	01 *(Agricultural Engineer/ Potential Irrigation Engineer)*
NaCRRI under NARO	02 *(Researchers)*	07 *(Researchers)* 08 *(Technicians)*
AETREC under NARO	01*(Engineers/Researchers)*	02*(Technicians)*
ZARDC		04 (Abii, Mukono, Bulindi & Ngetta)
District Extension Staff /NAADS	3	60
Total	**10**	**85**

In addition there are four (4) Japanese Experts currently participating in rice value chain.

Opportunities

- Establishment of the Rice Industry Secretariat in 2008 with a National Rice Steering Committee, Technical Committee and working groups. The RIS coordinates efforts rice stakeholder's.
- New linkages to development partners such as CARD member countries, AGRA, WARDA, FARA, FAO, JICA.
- There is high demand and adoption of rice as a major enterprise for food security and for income.
- There is high regional demand for rice.
- Rice has a potential of attracting many researchers

3.2 Farmers

Challenges

- Land Tenure System
  - High cost of land rent for rice farming
  - Lack of collateral for agricultural finance due lack of land titles
- Inadequate knowledge on rice farming
- Labour intensity in rice farming
- Lack of capital for rice farming
- High 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 rain patterns
- Poor quality and expensive seed
- The late delivery of seeds and other inputs has led to reduced production and slow multiplication of the rice seed
- There is difficulty in mobilizing the farmers for training/ farmer field schools
- Lack of enough equipment within the districts to cultivate bigger plots.
- Rice varieties such as NERICA 4 are very difficult to thresh and require a lot of energy if some one is doing it manually.
- Poor/ Lack of storage facilities
- Poor book keeping and financial management by farmers
- Lack of drying facilities like tarpaulin or drying yard, some farmers dry the rice on the ground and this reduces the quality of rice.
- Poor road infrastructure especially in areas of paddy rice growing thus affecting marketing.
- Fluctuating prices

Opportunities

- Land reform/ land Act 1995 is being revised

- Strategies for training Agricultural officers and farmers in rice production have been developed by MAAIF
- Rice has been identified as a strategic crop for poverty alleviation by the GoU and development partners. Thus interventions for improved rice production have a high potential of being supported.

3.3 Rice Processors

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
- Low Quantity at rice mills affecting the duration of rice mill operation in a year
- Low quality of rice received at rice mills
- Lack of electricity in some rural places thus affecting adoption of electric rice processing machines.
- Poor road infrastructure especially in areas of paddy rice growing thus affecting marketing.
- Public –private partnerships i.e. in fabrication of some parts

Opportunities

- Increasing market for rice due to increasing population
- Availability of machinery at wide range of prices
- Credit availability by local banks
- Rice has been identified as strategic crop for poverty alleviation by the GoU and development partners. Thus interventions for improved rice processing have a high potential of being supported.

3.4 Rice Traders

Challenges

- Low Quality of processed rice
- Low Prices

Opportunities

- The demand for food /rice in Uganda is increasing thus the price of rice is likely to keep increasing
- High regional demand for rice in East Africa and high demand for seed in Africa

3.5 Rice input dealers

Challenges

Input acquisition:

- Expensive transportation
- Inadequate capital for doing meaningful business
- Low quality seed affecting performance of inputs

Input distribution and marketing:

- Low market for inputs due to lack of capital by rice farmers,
- Farmers' inadequate knowledge on value of improved seed and, use and management of inputs

Opportunities

- Government policy indicates the need to combat soil degradation in most areas of Uganda
- Vast research has been done on soil health and more research is being undertaken

3.6 Lessons Learnt

- Rice is a potential crop for hunger and poverty reduction.
- There is high potential in rice research
- The national extension system can accommodate technology dissemination for rice development
- There is still much effort required in developing rice interventions as rice is new crop in most areas of Uganda though it has been grown in the country since the 1940's.
- There is need for more effort in institutional and stakeholder linkages in order to share experiences and strategies for developing the rice sub-sector.

3.7 Justification of the NRDS

The challenges and opportunities presented therefore provides a basis for the need for a development strategy for the rice sub-sector.

4.0 PRIORITY AREAS AND APPROACHES

4.1 Rice Ecologies and National Production Potential

	Rice Ecology	Current (2008) Production (ha)	Ecological Challenges	Ecological Opportunities
1	Rainfed Lowland Commonly grown varieties are K5 and K85. New demanded varieties include NERICA	65,000	• Unreliable rainfall • Environmental Impact on Wetlands • Limited land • Prone to floods during heavy rains • Poor road infrastructure	• Availability of water in rainy season • Crop diversification can be practiced • Highly Suitable for new high yielding NERICA rice varieties with a productivity of about 1.5 - 2tonnes/ha
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 • Pests and disease	• Highly productive producing 1.8 - 2.2 tonnes /ha • Irrigation is a major component under consideration by the GoU
3	Upland NERICA upland rice is the most grown	40,000	• Water stress/drought • Soil erosion reducing soil fertility • Rice competes with other food crops such as maize, beans, bananas	• Highland ecosystem is suitable for the new high yielding NERICA rice varieties./ Productivity is about 1.5 – 2.0 tonnes/ha • Availability of land

4.2 Policies and Institutional Challenges and Opportunities

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, Agricultural Financing by private financial institutions
- Modernization of agriculture is a key element of current government policy thus rice interventions could get priority as rice is a key crop for poverty and huger reduction

- The existence of a Rice Industry Secretariat avails a platform for strengthening institutional linkages

Challenges

- Agricultural development institutions have limited facilities and facilitation including low capacity laboratories, understaffing in MAAIF and its agencies
- Poor policy on agricultural financing and agricultural inputs
- Though Agricultural Institutional linkages are strong, linkages for rice production are still weak

5.0 VISION AND SCOPE OF THE NATIONAL RICE DEVELOPMENT STRATEGY

5.1 Goal

To increase household food security and reduce household poverty in Uganda through increased production of high quality rice.

5.2 Major Objective

- To increase rice production and improve value addition in order to hve sufficient rice for domestic consumption and export

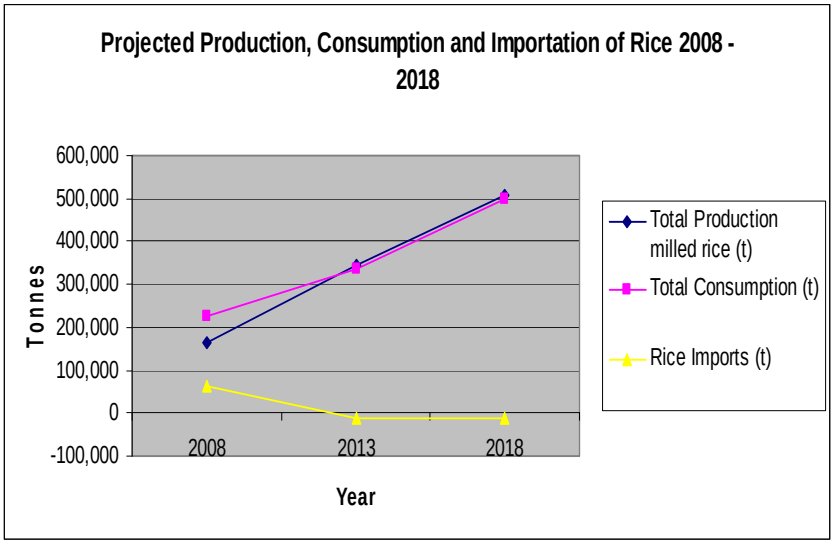
5.3 Specific Objectives

- Strengthen institutions for rice production
- To improve production, multiplication and dissemination of certified rice seed
- To minimize post harvest losses through improved post harvest handling and processing technologies
- To improve research, technology dissemination and capacity building in the rice sub-sector
- To increase sustainable utilization of fertilizers , other agro-inputs and farm resources for maximum rice yield
- To improve and increase sustainable water use and management in rice production
- To enhance mechanization of the rice sub-sector in order to minimize cost of labour
- To increase agricultural finance to rice production
- To ensure environmentally sustainable modern rice cultivation techniques

5.3 Estimated Rice Production, Consumption and Imports

Year	Rain-fed upland			Rain-fed Lowland			Irrigated			Total		
	Area (ha)	Yield (t/ha)	Production (t)	Area (ha)	Paddy Yield (t/ha)	Production (t)	Area (ha)	Paddy Yield (t/ha)	Production	Area (ha)	Average Paddy Yield (t/ha)	Production (t)
2008	40,000	1.8 – 2.2	80,000	65,000	2.2 - 2.6	156,000	5,000	2.8-3.2	15,000	110,000	2.3	251,000
2013	80,000	2.0 – 2.4	176,000	105,000	2.8-3.2	315,000	10,000	3.8-4.2	40,000	195,000	2.72	531,000
2018	100,000	2.2 – 2.6	240,000	125,000	3.2-3.6	425,000	15,000	4.0-4.4	63,000	240,000	3.3	728,000

Year	Production, Consumption and importation of rice				
	Total Production milled rice (t)	Population (million)	Consumption (t)	Total Consumption (t)	Rice Imports (t)
2008	163,150	28	8	224,000	60,850
2013	345,150	32.8	10.2	334,560	-10,590
2018	509,600	38.4	13	499,200	-10,400



(Estimates in the NRDS 2nd Draft, May 2009 made by comparison of Data from Facts and Figures for Agricultural Sector 2008 by MAAIF, JICA (2007) Final Report on The Study on Poverty Eradication through Sustainable Irrigation Project in Eastern Uganda, Volume I, Technical Stakeholders Meeting for Development of NRDS, March 2009, estimates by NARO and Revision of Technical Stakeholders Meeting for Development of NRDS agreed data, April 2009 and edited by Rice Steering Committee in May 2009)

5.4 Estimated Number of Researchers, Technicians and Extension Workers in 2008 and targets in Future

	Agricultural researchers with MSc or Ph D			**Research Technicians**			**Extension Workers/NAADS** *spend about 5 -10 hours a week on rice promotion*		
	Total	Rice Specialists (Fulltime)	Rice Specialists (Part time)	Total	Rice Specialists (Fulltime)	Rice Specialists (Part time)	Total	Rice Specialists (Fulltime)	Rice Specialists (Part time)
2008	09	02	07	10	00	10	63	--------	63
2013	20	06	14	20	06	14	80	60	20
2018	30	09	21	30	09	21	160	120	40

There are two (2) Japanese Experts involved in rice research

The projections were generated based on the number of districts (60 districts by 2013) which are projected to have large area of rice thus requiring a full time extension staff. By 2018, rice production will be done with increased intensity and technology thus requiring more specialized staff at sub-county level. And with increasing demand for research in rice the number of technicians and researchers is also expected to grow.

5.5 Financial and Human Resource Commitment by the Government

MAAIF Development and Strategic Investment Plan (DSIP) 2009/10 -2013/14 identifies rice production as a major strategic intervention for food security and poverty reduction and, has committed over UShs. 300 million directly to rice production. This excludes other indirect interventions.

In addition to about 10 fulltime technical personnel in its various agencies to deal with rice promotion, Government has committed funds to train personnel in rice research, irrigation, farmer trainings, training of district extension and ministry staff and the private sector.

5.6 Governance of NRDS

Governance of the NRDS will be by the Government of the Republic of Uganda through its responsible ministry -Ministry of Agriculture Animal Industry and Fisheries (MAAIF).

The Ministry of Agriculture has a Rice Industry Secretariat (RIS) which will be the responsible agency for planning and implementing the NRDS. The RIS is headed by a Steering Committee for Development of the Rice Industry which has executive powers to coordinate the efforts of stakeholders in Rice Development Programmes in Uganda. The Steering Committee is composed of representatives of key stakeholders whose operational mandate and activities affects rice production in Uganda. Current members of the steering committee include: Permanent Secretary of MAAIF as Chairperson, Commissioner, Crop Production and Marketing as Secretary, Representative of the Office of the Vice President, FAO Representative in Uganda, JICA Representative in Uganda, 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, Representative PMA Development Partners and Representative of Uganda Farmers Association(UNFFE), Permanent Secretary Ministry of Tourism, Trade and Industry.

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 technical working groups which are technical in a specific issue of concern.

5.7 National Stakeholders and Linkages to Transboundary / Regional Initiatives and Partnership Building

National Stakeholders and Linkages

MAAIF

MAAIF has 2 directorates (Animal Crop, and Fisheries) and 5 Semi-Automous Agencies including National Agricultural Research Organization (NARO), National Agricultural Advisory Service (NAADS), Cotton Development Organization (CDO), Uganda Coffee Development Authority (UCDA), and Diary Development Authority (DDA)

Other Stakeholders

The Steering Committee, Technical Committee and Technical working groups comprise of representatives from all stakeholders in rice sub-sector in Uganda including seed producers, researchers, agricultural extension officers and rice farmers, Processors, Traders, Academia Non-Government Organizations and International Development Partners. All these groups of people are involved in dialogue concerning rice promotion. The challenge however that is some stakeholders have not yet become active participants in the dialogue.

Regional Linkages

Uganda is a member of Coalition for African Rice Development (CARD). MAAIF is in close linkage with WARDA, IRRI and NARO of several African nations. Uganda is a member of the East African Community (EAC) and NRDS is in line with Articles of 105- 110 of the EAC Treaty. Uganda is also a

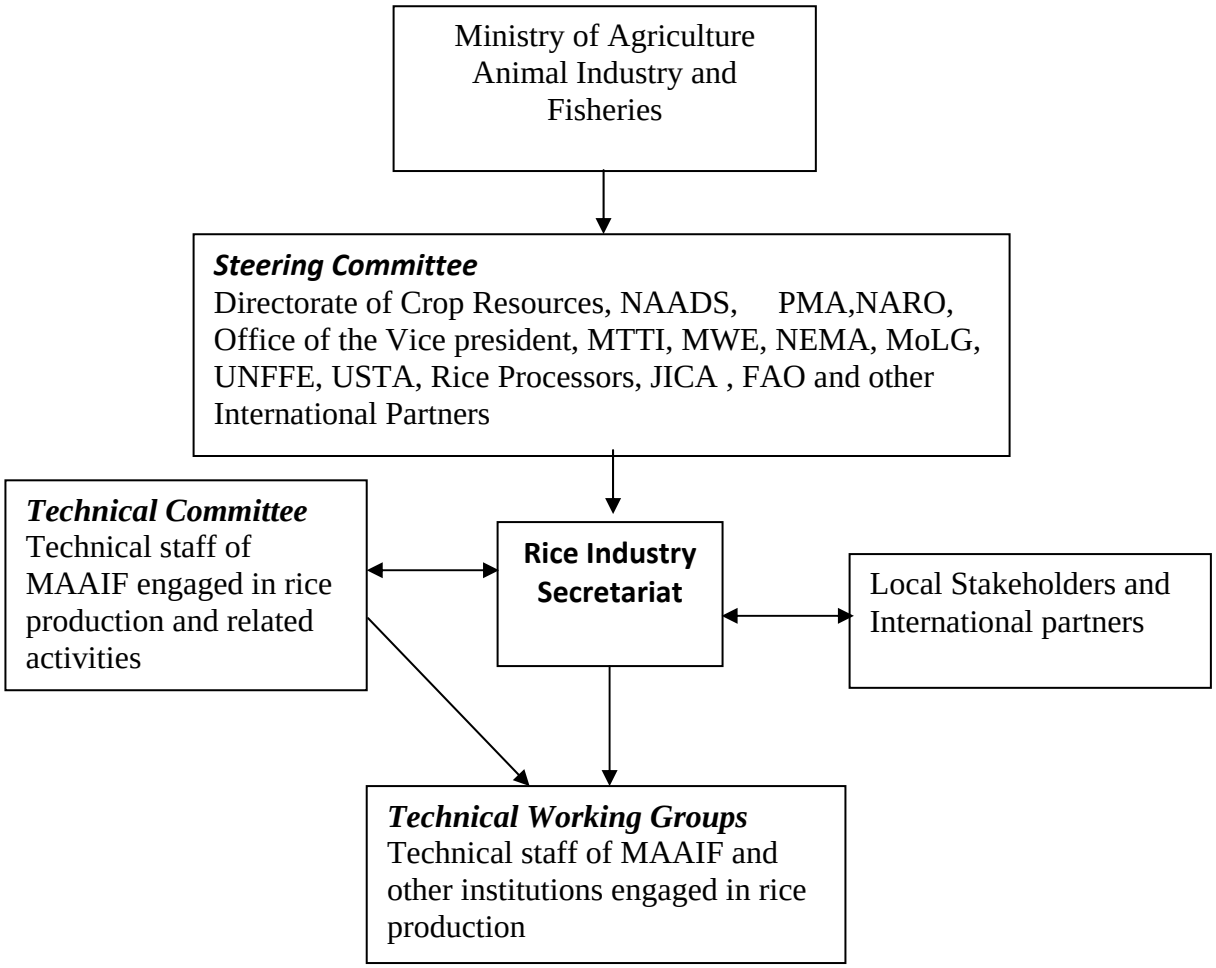
member of Common market for East and Southern Africa (COMESA), African Union (AU) and other regional Associations.

Uganda is also a member east African Community, Common Market for East and Southern Africa, United Nations Organization(UN), African Union, South to South Cooperation with Asian countries. It has close linkages with of FAO, WFP, IFPRI, AGRA, JICA, African Development Bank and World Bank among others. Uganda is also a signatory to the International Rice Treaty

5.8 Key Interventions

- Strengthen the Institutional Framework
- Research, Technology Dissemination and Capacity Building
- Improve Irrigation and Water Management
- Seed Production, Multiplication and Dissemination of Certified Seed
- Increase Utilization of Agro-Inputs and Sustainable Soil Management
- Post harvest Handling, Processing and Marketing
- Mechanization
- Access to Agricultural Finance
- Policy Development
- Environmental Conservation

5.9 Implementation Framework



The Implementation of the NRDS will by the MAAIF. The responsible Agency of MAAIF will be the Rice Industry Secretariat which is headed by the National Rice Steering Committee. The Chairperson of the Rice Steering Committee is the Permanent Secretary, MAAIF and the General Secretary is the Commissioner for Crop Production and Marketing.

Rapid multiplication of improved rice seed will be by NaCRRI, a department of NARO. Research and technology development will also be spearheaded by NARO. Existing efforts will be strengthened alongside the new ones.

Technology dissemination will be through NAADS and other existing MAAIF departments that are line with particular interventions for example Irrigation development will be spearheaded by department of Farm Development. The NAADS will also work with existing private sector extension system especially where they have proven technical competence such as post rice processing. In

implementing irrigation and water management strategies consultations shall be made with Ministry of Water and Environment (MWE) in addition to other stakeholders. MWE through its agency of National Environment Management Authority (NEMA) has a representative on the National rice Steering Committee.

Through NAADS and in collaboration with Ministry of Tourism, Trade and Industry (MTTI), farmer groups will also be strengthened to take advantage of the processing and marketing opportunities. MTTI has a representative on the National rice Steering Committee.

The Strategies will be implemented using various approaches tailoring each approach to the needs for example small scale farmers different from large scale, conventional different from conservation tillage, e.t.c.

6.0 STRATEGIES OF THE NRDS

6.1 Strengthen the Institutional Framework

MAAIF will be the lead agency in implementing strategies for rice production. MAAIF and all other rice stakeholders are represented in a National Rice Steering Committee. A technical committee provides technical advice to the steering committee. The Rice Industry Secretariat (RIS) implements the policies developed by the Steering committee.

The strategies for Strengthening the Institutional Framework for increased and improved rice production include the following:

Challenge/Situation

- Weak policies on promotion of rice production
- Limited facilities in Institutions responsible for rice promotion
- Limited Capacity of Rice Stakeholders and limited support from other stakeholders institution support to rice

Strategies

Strategies	Targeted Output	Activities	Verifiable Indicators	Targets	
				2013	2018
Develop a database	Rice database in place	Data Needs Assessment survey among stakeholders	Data available		
		Rice surveys and meetings	Survey reports		
Reinforce policy dialogue	Policy dialogue reinforced	Hold stakeholders fora's per year	% of stakeholders participating	90	99
		Needs Assessment of stakeholders	% efficiency of the needs assessment being		

			representative of the actual needs No. and type of stakeholders assessed		
Capacity building for Agricultural Officers	Agricultural Officers trained	Training staff in rice production	No. of staff trained	30	60
Improve facilities in rice development institutions	Facilities and logistics provided to rice promotion staff	Provision of facilities and logistics	% of total No. and type of required facilities that are actually provided	60	80

6.2 Seed Production, Multiplication and Dissemination of Certified Seed

Rice seed is on high demand in Uganda. This demand is even further increased by bulk orders for rice seed from Uganda by other African nations.
Uganda is involved in rice seed research including rice varietal development, trial and dissemination. This is done by a department under NARO, the National Crop Resources Research Institute (NaCRRI). NaCRRI works in close collaboration with International partners such as WARDA, IRRI, IITA and JICA. Currently there is NERICA rice Promotion Project at NaCRRI which is carrying out variety trial and production of breeder and foundation seed for NERICA 1, 4 and 10.

NaCRRI produces foundation seed for seed multiplication. This is usually done by selecting private seed companies to multiply the foundation seed. The Seed certification unit of MAAIF/NaCRRI certifies the released varieties and the multiplied foundation seed. More foundation seed is multiplied through the private sector which also has to be certified before sale to farmers.
The government does effectively monitor multiplication of the first foundation seed but has challenges of further monitoring multiplication of larger quantities of seed and illegal importation of unreleased rice varieties amidst the high demand for rice 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.

Through NaCRRI and Rice Projects MAAIF has trained several farmers in rice seed production. At NaCRRI over 20 trainings with over 527 farmers have been conducted. 1 PHD and 2MSc. in rice seed production have been carried out in addition to short term trainings obtained NaCRRI. by technicians.

Current Challenges

- High demand for rice seed
- Fake Seed (variety mixing, a lot foreign material) and several unreleased varieties illegally imported from neighboring countries
- Limited facilities for rice research and limited financial support to rice research
- Inadequate capacity by private sector to multiply and disseminate seed

Seed System

Seed Type	Responsible Institutions	Required Quantity	Location/ Institution
Breeder Seed	NaCRRI. Breeder seed was obtained from IRRI, WARDA (incase of NERICA rice) and other sources	01MT of Rice seed (100Kg of each rice variety can be obtained)	NaCRRI, Namulonge
Foundation seed (Produced and maintained by NaCRRI)	NaCRRI multiplies the breeder seed to obtain Foundation Seed The seed obtained has undergone variety trial and multiplication to produce foundation seed	2000 MT of NERICA seed is available for multiplication	NaCRRI and ZARDI's
Certified Seed	NaCRRI distributes foundation seed for a selected variety to Seed Companies for seed multiplication.	10,000 MT	Seed Certification Services Centre
	Farmers purchase certified seed from public institutions which have purchased seed from seed companies	50,000 MT	Seed Certification Services Centre

Strategies for ensuring sustainable supply of Seed

Strategies	Targeted Output	Activities	Verifiable Indicators	Targets	
				2013	2018
Genetic resources developed and maintained	Varietal release mechanisms improved	Improving facilities for trial and release of high yielding varieties including laboratories and field equipment	% trials the laboratories and field equipment can handle	80%	90%
		Improving physical infrastructure for seed certification	% efficiency of seed testing materials	80%	90%
		Providing logistics for seed certification process	% of total requirements by seed inspectors that are actually provided	80%	90%
		Training the private	% efficiency of seed testing	80%	90%

		sector in multiplying multiplication of foundation seed	materials and facilities		
Capacity building in seed production and certification	Researchers trained in seed production and certification	Training Researchers and technicians in seed production and certification	No. of researchers and technicians in genetic development and maintenance	Ph D and MSc (20) Technicians (20)	Ph D and MSc (30) Technicians (30)
	Agricultural Officers and Farmers trained in quality seed production and multiplication	Training Agricultural Officers(AO's), private sector and rice farmers in seed multiplication	% of AO's and rice farmers trained in seed multiplication	AO's (80%) Farmers (60%)	AO's (90%) Farmers (80%)

6.3 Research, Technology Dissemination and Capacity Building

Rice research and technology is spearheaded by MAAIF under its agency NARO. NARO has a crop research department (NaCRRI), Agro-machinery research centre (AETRI), Soil research centre (NARL) and several research centers responsible for technology generation and testing in the different regions of the country. Currently research on rice is taking place in all fields but is limited due to lack of incentives such as research grants. NERICA rice Promotion Project and the SIAD project are among the current rice projects in which technology is being generated through research and capacity building is done for agricultural officers from the districts and a few from MAAIF and other rice promoting central government agencies.

There are several important research issues in rice production among which includes the following:

- Rice varieties and Suitability of rice varieties
- Genetic resource conservation
- Soil fertility and Natural resource Management in Rice agro-ecosystems
- Water Management
- Improved low cost drying sun drying technologies and milling moisture content for local varieties
- 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.
- Effective Technology dissemination techniques

The strategies for improving Research, Technology Dissemination and Capacity Building for rice production include the following:

Challenge/Situation

- Generation of relevant acceptable technology
- Adoption and dissemination

Strategies

This shall be incorporated in the National Agricultural Research Systems Framework

	Strategies	Targeted Output	Activities	Verifiable Indicators	2013	2018
1	Increase and improve Research and Technology generation	Research and Technology generation improved	Stakeholder needs assessment surveys	% of farmers assessed	60	80
			Farmers participation in research	% of farmers views from needs assessment catered for in research	60	80
			Provide grants to research in rice production	Amount of grant fund available Impact of the researches on rice production	….	….
2	Increase access and adoption of knowledge and technologies	Access and adoption of knowledge and technologies increased	Training farmers	% of rice farmers trained	60	80
			Training Agricultural Officers (AO's)	% of AO's in rice producing areas trained	80	99
			Provide facilities and logistics to AO's	% of facilities needed for extension work availed	80	90
			Develop study materials including Videos, charts, books and other suitable formats	Type and No. of suitable formats developed	…	…

6.4 Fertilizer Marketing and Distribution, and Sustainable Soil Management

There is rapid nutrient depletion of soils all over Uganda hence decreasing productivity. Fertilizer use is a key strategy that agricultural stakeholders in Uganda are expecting to greatly increase production. Currently fertilizer imports are not taxed.

Challenge/Situation

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

Estimated Fertilizer Requirements

Strategies

The strategies for improving Fertilizer Marketing and Distribution, and Sustainable Soil Management increased and improved rice production include the following:

	Strategies	Targeted Out put	Activities	Verifiable Indicators	Targets	
					2013	2018
1	Availability of fertilizer at the required time in the required place in the required quantities and quality	Policy on fertilizer developed	Develop a policy on fertilizer usage and soil management	% of farmers accessing quality fertilizer	50	
			Awareness of stakeholders on the fertilizer and soil management policy	% of total No. and type of stakeholders informed Extent of awareness	80	90%
		Farmers able to access fertilizers	Fertilizers available at parish level	% of parishes that have readily accessible fertilizer within two days from when the farmer demands it	80	90%
		Required Quality of fertilizer ensured before dissemination	Improving the facilities at the fertilizer certification institutions	% of efficiency of equipment in testing purity of fertilizers including quantities and timeliness	..	..
			Support to research in soil management	% of soils assessed of all land used in rice production	60	80
		Cost of fertilizer reduced to make it more affordable	Improving fertilizer warehousing at seaport and transport and to Uganda	% reduction in wholesale cost of fertilizers		
			Private –public partnerships in fertilizer provision for poor small scale farmers	% of farmers that can afford optimal fertilizer usage	60	80
			Training Agricultural Officers(AO's) and Assistant AO's(AAO's) in efficient Fertilizer usage	% of AO's and AAO's for rice production trained in efficient fertilizer usage	80	90%
			Training farmers in efficient fertilizer usage	% of farmers trained in efficient fertilizer usage	60	80

6.5 Improve Irrigation and Water Management

Currently there is a pilot project known as Sustainable Irrigated Agricultural Development Project (SIADP) is carrying out small scale rice irrigation in Eastern Uganda. There is also little rice irrigation in old government irrigation schemes comprised of dilapidated infrastructure.

One of the greatest opportunities to Uganda's irrigation strategy is the presence of sufficient water for rice production because of the several streams, rivers and lakes in Uganda. There is however still a challenge of sustainable harnessing of this water.

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

Challenge/Situation

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

Strategies

	Strategies	Targeted Output	Activities	Verifiable Indicators	Targets	
					2013	2018
1	Refurbishment of current irrigation infrastructure	Current irrigation infrastructure rehabilitated	Repair irrigation infrastructure	% improvement in irrigation efficiency compared to the manufacture capacity	80%	90%
			Redesign some sections of current infrastructure to improve irrigation efficiency	% improvement of irrigation efficiency of irrigation equipment	80%	90%
		Maintenance framework for all current and new irrigation facilities established	Effective maintenance and operation	% Rate of depreciation visa-vis manufacturers projected rate	80%	90%
			Private–public partnership in management of the irrigation infrastructure for example maintenance fees can be collected through farmer groups.	% of water users in a water management group/partnership % water use efficiency due to partnerships	80% 60	80%
2	Set up new irrigation infrastructure	Irrigation infrastructure increased	New irrigation infrastructure set up	% of potentially irrigatable land that is irrigated	60	80%
	Policy for Water for Agricultural production	Policy produced	Policy development	Policy available	01 policy	Policy and Policy statements
3	Collaboration between water use and management Stakeholders	Collaboration between water use and management Stakeholders increased	Strengthen policy on water use, access and Management	Impact of policy on water use		
			Training of farmers in water management and water catchment management	No. of farmer groups trained		
			Joint coordination in developing water use projects	No. of projects jointly coordinated	….	…

6.6 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. Aflotoxin 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 contribute 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, 100% of the farmers dry the paddy using open sun drying method. The paddy is spread on bare ground or tarpaulin to dry in open sun. The drying thickness is usually about 10mm 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 dried to the right moisture content. The paddy supplied to the rice milling plants is usually of low quality. All the millers indicated that most of the paddy supplied is in most cases 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.

The opportunities and strength include:

1) Farmers have seen tangible benefits in the rice enterprise and are willing to expand its production.
2) Government has the backing of increasing rice production in the country.
3) Soon AEATREC together with other partners will start a study to establish the Status of entire Rice Processing Industry in Uganda. This study will cover identification of constraints from farm to rice processing, performance of current technologies from farm to rice mills especially the small rice milling plants, consumer and market requirements.

MAAIF and its agencies have made several outstanding initiatives in the last ten (10) years including initiatives by AETREC which is an Institution under NARO which include:

JICA has trained two scientists from Agricultural Engineering and Appropriate Technology Research Center (AEATREC) in post-harvest handling and processing of rice.

1) JICA in partnership with AEATREC is building rice millers' training unit in Namalere. The training unit will be used for training rice millers and mill operators in modern method of milling rice and training of extension staff in post harvest handling and general processing of rice.
2) AEATREC and SG-2000 have adopted 2 designs of motorized threshers.
3) AEATREC 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.
4) AEATREC in partnership with JICA and SG-2000 has conducted a study to establish the "Status of Rice Milling Industry in Uganda".
5) AEATREC is conducting a study on socio-economic constraints and consumer/market requirements of rice in Northern Uganda.

Other initiatives include training farmers in post harvest handling of rice through the various MAAIF projects and Extension programmes.

Challenge/Situation

- 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 through out the year.
- Low Prices for locally produced rice resulting from low quality(stony, broken)

Strategies

	Strategies	**Targeted Output**	**Activities**	**Verifiable Indicators**	**Targets**	
					2013	**2018**
1	Capacity building for Agricultural Officers, Technicians , Artisans and Farmers	Training centres equipped	Strengthen rice millers training unit at AETREC to post harvest rice technology development centre	Capacity of workshops to facilitate designing and fabrication of post harvest equipment Capacity to train millers extension and farmers	High capacity	Very high capacity
		AO's, technicians a, artisans and farmers trained	Training AO's, Technicians, Artisans and farmers in post harvest handling and processing	No. of personnel trained	At least 01 AO trained rice producing *district*	At least 01 AAO trained rice producing *sub-county*
2	Adoption of better Postharvest handling and processing techniques and equipment	Post harvest handling and processing equipment disseminated	Dissemination of Post harvest handing and processing equipment and materials on the open markets Avail medium size rice milling technologies	% of paddy rice that is released on the market with high quality	80%	90%
		Market information on equipment and rice standards availed	Availing market information on rice quality and standards, and processing equipment	Level of awareness of farmers about market information on rice quality and standards, and processing machinery/equipment	80%	90%
		Availability rice processing equipment near the farmers	Mobile threshers and rice mills	% of rice milled within a few week s after harvest	80%	90%

4	Ensure adequate supply of rice to rice mills	Rice production increased	Increasing production of rice	Quantity of rice produced		
5	Branding and identifying market niche that give high prices	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 high quality milled rice availed on the market (stone free, no other foreign materials, less than 10% broken rice)	80%	90%
			Promote packaging and branding	% of locally produced rice branded and packaged nicely	80%	90%
			Information dissemination on prices	% of farmers and traders aware of the average consumer market price	80%	90%

6.7 Access to and Maintenance Agricultural Equipment

Over the years the government has provided farmers with free rudimentary tools and others at a highly subsidized price. Currently the government is promoting adoption of Agricultural machinery and Equipment through providing farmers with machinery and equipment at subsidized prices. Most farmers can still not afford to pay their share capital and the government cannot incur a higher cost to avoid mismanagement of the equipment and ensure rational in resource distribution across the national population.

The equipment strategy fronted by the government through MAAIF is to majorly provide 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.

The strategies for improving Access to and Maintenance Agricultural Equipment for rice include the following:

Challenge/Situation

- In addition the methods of utilization of equipment often result into high cost of production due to small acreage of land which results in tractors making so many turns.
- Low use of machinery yet rice is labour intensive to high cost of purchase and hire
- Low utilization of available machinery and Poor maintenance
- NAADS is also involved in dissemination of tractors and implements for to some farmers ion Uganda.

Strategies

	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, irrigation and post harvest acquired	Public –private partnership in acquisition of machinery and equipment by farmers	% of farmers who obtained equipment and machinery that meet their farming needs Type of equipment and machinery % of labour cost efficiency saved by machine acquisition	50% 50%	80% …….
			Availing farmers with information on access of machinery and equipment and cost of utilization and maintenance	% awareness of farmers on access of required equipment and machinery and cost	60%	80
2	Efficient utilization and maintenance of machinery and equipment	Efficient utilization and maintenance of machinery and equipment	Assessment surveys should be made on farmers capability to manage and utilize the machinery before dissemination	% of farmers assessed before dissemination of equipment and machinery	60%	80
			Training farmers, technicians and artisans in use, management and fabrication of machinery	% efficiency in utilization and maintenance of equipment	80%	90%

6.8 Access to Agricultural Finance

Agriculture allocation in Uganda is less than 4% of the National budget. Rice is now becoming a priority crop to complement the traditional cash crops including coffee, cotton, tea and cocoa in addition to food crops which have been very important in hunger and poverty reduction in Uganda.

The strategies for improving Access to Agricultural Finance for rice include the following:

Challenge/Situation

- High interest rates on loans in Uganda of 22 -30%
- Low funding for rice interventions from government and development partners
- Mismanagement of agricultural finance
- Lack of collateral by farmers

Strategies

	Strategies	Targeted Output	Specific Interventions	Verifiable Indicators	Targets	
					2013	2018
1	Improve Policies on agricultural finance	Policies on Agricultural finance improved	Develop policy on Agricultural Finance	Policy on Agricultural Finance	Policy present	Policy improved
			Introduction of an agricultural loan financing scheme	Interest rate of loans for rice production	Less than 20%	Less than 10%
			Lobby for more direct prioritization of agriculture in financial and macro-economic policy environment	% of national budget should match the % contribution of agriculture to poverty eradication	Agriculture should cater for 20% as suggested by CADP	Agriculture should cater for 20% as suggested by CADP
			Lobby for prioritization of rice in agricultural sector policy	% of funds availed compared to budgeted(not considering budget ceiling)	80	……..
			Lobbying government and development partners such as CARD partners to relinquish more funds for rice interventions	% of funds availed compared to budgeted(not considering budget ceiling)	At least 80% of the budget for rice interventions funded	At least 80% of the budget funded
			Training of farmers in investment and management of agricultural finance	% No. of rice farmers trained	60	80
3	Reforms in land tenure and property ownership in Uganda	Land reform	Advocate for land tenure reform	Reforms in the land policies		

6.9 Policy Development

Challenge/Situation

- Required Policies for Rice
- Competing sectors of the economy that are of higher priority than agriculture on the national budget

Strategies

	Strategies	Targeted Output	Activity	Verifiable Indicators	Targets	
					2013	2018
1	Develop relevant policies for promotion of rice production	Policy on rice production developed Agricultural policies developed	Policies on the following need to been developed or improved: • Agro-inputs and soil management • Agricultural Finance • Post harvest handling, value addition and marketing • Irrigation and water use • Mechanization • Develop a rice/pulses policy	Policies developed Policies implemented and stakeholder awareness of policies	• Rice policy • Policy on Fertilizers • Policy on Agricultural Finance • Irrigation and Water for Agricultural Production Policy	Other priority agricultural/ rice related policies
2	Strengthen institutional linkages and participation of stakeholders		Hold Stakeholder fora's	% No. and type of stakeholders involved of all stakeholders	80%	90%
			Carry out Surveys on Socio-Economic impacts of rice production	Survey reports % of households/ stakeholder groups surveyed	At least 1 report 80%	At least 2 reports 90%

6.10 Environmental Conservation

Uganda has laws and policies for safe guarding the Environment. Most rice interventions in place have undergone basic EIA. The responsible agency however (NEMA) does not have enough capacity to track the activities of small holder farmers. The NRDS will cater for carrying out more substantial Environmental Impact Assessments for rice interventions.

7.0 CONCLUSION

Implementation of the NRDS will facilitate Uganda to more than double rice production in ten years. This will result in food security and poverty reduction.

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