

THE REPUBLIC OF UGANDA

MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY AND FISHERIES

UGANDA NATIONAL RICE DEVELOPMENT STRATEGY (2020 – 2030)

FINAL DRAFT

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FOREWORD

Rice is one of the most important cereal food crops in the world. Uganda' rice consumption is increasing at a rate of 4% per annum and currently, demand exceeds local production and this is largely due to rising urbanization, change in consumption preferences and increase in population. Rice is highly relevant in achieving Uganda's Vision 2040 because of its potential to significantly contribute to import substitution, agro-industrialization, household incomes, food security, export earnings, women and youth employment, and the development of other related value chains. Rice has become an important food crop for the urban community and a cash crop for the rural population.

Uganda has formulated the second 10-Year National Rice Development Strategy (NRDS II, 2020-2030). The NRDS is the Rice policy framework that guides investments along the entire rice value chain in Uganda. The strategy is aligned to the third Agriculture Sector Strategic Plan (ASSP III,2020/21-2024/25), and the third National Development Plan (NDP III, 2020-2025), and is further aligned to the East Africa Rice Development Strategy (ERDS) and the second framework of the Coalition for Africa Rice Development (CARD). The NRDS II will guide rice value chain investments to make Uganda rice selfsufficient by raising the productivity and quality standards of rice grains. Under the strategy, rice production is expected to double from the current 246,000MTs (2018) of un-milled rice to at least 663,000 MTs by 2030. My Ministry is committed to support the implementation of this strategy.

I would like to thank all stakeholders; state and non-state actors who have contributed to the formulation of this strategy. I wish to applaud the rice stakeholders under the leadership of the Rice Steering Committee for assembling and supporting the task team and the multi-institutional task force that reviewed and guided the strategy to completion. Particular thanks go to the Coalition for Africa Rice Development (CARD) Secretariat; Japan International Cooperation Agency (JICA); AfricaRice; International Food Policy Research Institute (IFPRI); Rikolto; Consultants; and Development Partners for the various support rendered to the strategy development process.

I thank the political leadership in Uganda for the continuous support to the Agricultural sector growth, and in particular, the rice sub-sector development.

For God and My Country

Hon. Frank K. Tumwebaze (MP)

Minister of Agriculture, Animal Industry and Fisheries

LIST OF ACRYNOMNS AND ABBREVIATIONS

AEATREC	Agricultural Engineering and Appropriate Technology Research Centre
EARDS	East Africa Rice Development Strategy
ACCE	Area-based Commodity Cooperative Enterprise
ACDP	Agriculture Cluster Development Project
AfricaRice	Africa Rice Center
AGRA	Alliance for Green Revolution in Africa
ATAAS	Agricultural Technology and Agribusiness Advisory Services
ASSP	Agriculture Sector Strategic Plan
CARD	Coalition for African Rice Development
CET	Common External Tariff
CGIAR	Consultative Group on International Agricultural Research
COVID	Corona Virus Disease
DEA	Department of Environmental Affairs
DRC	Democratic Republic of Congo
DWD	Directorate of Water Development
EAC	East African Community
EPRC	Economic Policy Research Center
ESIA	Environment and Social Impact Assessment
ESMP	Environment and Social Management Plan
FAO	Food and Agriculture Organization of the United Nations.
FIP	Framework Implementation Plan
GDP	Gross Domestic Product
GoU	Government of Uganda
Ha/ha	Hectare
HICD	Human and Institutional Capacity Development
ICT	Information Communication Technology
IFDC	International Fertilizer Development Center
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
IRRI	International Rice Research Institute
JICA	Japan International Cooperation Agency
Kg	Kilogram
LG	Local Government
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries

MDA	Ministries, Departments and Agencies
M&E	Monitoring and Evaluation
MEL	Monitoring, Evaluation and Learning
MoFPED	Ministry of Finance, Planning and Economic Development
MLHURD	Ministry of Lands, Housing and Urban Development
MoICT	Ministry of Information, Communication and Technology
MoWT	Ministry of Works and Transport
MWE	Ministry of Water and Environment
MT	Metric Tones
MTIC	Ministry of Trade, Industry and Cooperatives
NAADS	National Agricultural Advisory Services
NaCRRI	National Crop Resources Research Institute
NARO	National Agricultural Research Organization
NARS	National Agricultural Research System
NAP	National Agricultural Policy
NDP	National Development Plan
NEMA	National Environment Management Authority
NERICA	New Rice for Africa
NGO	Non-Governmental Organization
NRDS	National Rice Development Strategy
NRP	National Rice Platform
PRiDe	Promotion of Rice Development
PSFU	Private Sector Foundation Uganda
QDS	Quality Declared Seed
RAU	Rice Association of Uganda
RMCU	Rice Millers Council of Uganda
RPO	Rural Producer Organization
RIS	Rice Industry Secretariat
RSC	Rice Steering Committee
RTC	Rice Technical Committee
RRISA	Rice Research and Innovation Strategy for Africa
SRP	Sustainable Rice Platform
SSA	Sub Saharan Africa
UBOS	Uganda Bureau of Statistics
UEPB	Uganda Export Promotion Board
UGX	Uganda Shilling
UIRI	Uganda Industrial Research Institute
UNBS	Uganda National Bureau of Standards
UNRDS	Uganda National Rice Development Strategy
URA	Uganda Revenue Authority

USD	United States Dollars
USDA	United States Department of Agriculture
WForP	Water for Production
WFP	World Food Program

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EXECUTIVE SUMMARY

This National Rice Development Strategy (NRDS) is a follow on to the first ten (10) year NRDS implemented between the period - 2008-2018. The Strategy will guide rice industry development in Uganda to contribute to the realization of the country's aspirations articulated in Uganda's Vision 2040, the third Agriculture Sector Strategic Plan (ASSP III, 2020/21-2024/25), the third National Development Plan (NDP III, 2020/21-2024/25) and Agro-Industrialization Program. This Strategy is further aligned to the East Africa Rice Development Strategy (ERDS) and the second framework of the Coalition for Africa Rice Development (CARD) that is mobilizing rice producing stakeholders in 32 African states to double rice production in the continent from the current 28 million MTs (2018) to 56 million MT by 2030.

The second National Rice Development Strategy (NRDS II, 2020-2030) has been informed by the progress made, challenges encountered, and lessons learned from implementing NRDS I. The NRDS II comes into effect at a time when the country and the world battled COVID-19 pandemic that has posed enormous socio-economic challenges. In light of this, the new strategic direction articulated in this Strategy is to transform the current rice sector into a more "self-sufficient, competitive and sustainable sector". The Strategy has set key objectives, interventions, and targets transforming the rice industry.

The Strategy has been designed to focus on five (5) strategic objectives namely: (i) To increase rice production, productivity and profitability, (ii) To improve post-harvest handling and value addition (iii) To improve access to rice markets (iv) To promote sustainable natural resource management for rice production, and (v) To strengthen coordination of actors in the rice industry. These strategic objectives will be operationalized under four (4) principles:- (a) Resilience, (b) Industry, (c) Competitiveness and (d) Empowerment, collectively known as **RICE.**

The strategy will result in increasing rice production in Uganda from the current 247,000 MT (2022) of un-milled rice to 663,000 MT (2030), and will be implemented using a mix of approaches but with a strengthened monitoring, evaluation and learning mechanism to track resultant outputs. This Strategy is puts emphasis on increasing productivity and quality of rice.

The Strategy has spelt out implementation centers of the different intervention areas for the different stakeholders with respect to their mandates in

Agriculture. The different implementers indicated herein, are from Ministries, Departments and Agencies, non-state actors, academia, private sector, input dealers, farmers, processors and rice traders, among others.

A multi-stakeholder committee- the Rice Steering Committee will lead the coordination of all actors during the implementation of the NRDS II. The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) shall serve as the Chair of the Committee and the Department of Crop Production shall host the Secretariat of the Committee and other institutions for NRDS II implementation coordination.

The CARD Secretariat, which is a consultative group of participating bilateral and multilateral donors and African institutions promoting rice growing in Africa continent is expected to continue providing technical guidance in implementation of NRDS II in collaboration with other regional and continental actors to improve rice self-sufficiency in Africa and Uganda in particular.

The implementation of the Strategy will require direct investments worth two hundred billion shillings annually from various actors, making a total of approximately one and half trillion shillings over implementation period (up to 2030). The Strategy also envisages that the rice industry will generate income, employment and promote import substitution. The combined effect of which will exceed the investment cost by 100%.

1.0 INTRODUCTION

1.1 Background

Rice is one of the world's most important food crop and will remain so in the foreseeable future. It is a staple food for four billion people. It provides up to 27% of the calories consumed in low- and middleincome countries¹. In Sub-Saharan Africa (SSA), Rice is the second most important source of calories after maize. Its consumption continues to grow rapidly and is projected to reach 34.9 million tons (of milled rice) annually by 2025 because of urbanization, growth in population and income². Uganda's rice consumption increases by 4% annually³, Currently, demand exceeds local production.

In 2008, the Government of Uganda (GoU) through the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), designed a 10-Year National Rice Development Strategy (NRDS: 2008 – 2018). Its overall goal was to make Uganda self-sufficient in rice by ensuring that domestic production meets domestic demand (consumption). The stated goal was to increase the quantity of milled rice produced and marketed from 106,700 MT in 2008 to 443,800 MT in 2018 (MAAIF, 2008) which would have made the country more than self-sufficient given the current level of aggregate consumption. The Strategy identified several challenges within the industry which were categorized into policy and institutional, guality and production. The challenges were to be addressed through 3 main objectives, namely, (i) strengthening the policy and institutional framework for promoting rice, (ii) increasing rice production, and (iii) increasing the quality of rice on the market. Achieving the three objectives was expected to lead to rice self-sufficiency. Since then, substantial progress has been made towards attaining the three objectives, but the country is not yet selfsufficient.

In 2017, the self-sufficiency ratio stood at 63%. Currently, domestic production and consumption of milled rice are about 166,000 MT and

¹ International Rice Research Institute et al. (2016)

² Africa Rice Center (2018a); Alliance for a Green Revolution in Africa (2019)

³ Rutsaert et al. (2013)

247,000 MT, respectively, giving a self-sufficiency ratio of 67%⁴. Per capita consumption of milled rice is roughly 5.6 kg per annum.

There is need to consolidate the achievements of NRDS 1(2008 -2018) and intensify efforts towards achieving self-sufficiency. However, an even loftier goal that encapsulates self-sufficiency is to strive towards a more competitive rice industry with resilient, equitable and self-sustaining value chains. After all, self-sufficiency in food markets characterized by complements and substitutes is a practical matter rather than just a matter of arithmetic. As shown above, self-sufficiency ratio is the ratio of domestic production to domestic consumption. Domestic consumption can roughly be calculated as domestic production plus imports minus exports. Practically, a country that imports rice can only be truly self-sufficient if it is able to produce enough rice that can favorably compete (both in price and quality) with imported rice or substitute it (the imported rice) should the global market conditions like the 2008 food crisis or the more recent COVID-19 global pandemic make imported rice scarce. Likewise, if the country exports rice, self-sufficiency requires exported rice to be surplus rice of acceptable quality, meaning that it also can be consumed domestically should conditions such as a poor harvest dictate.

Figures 1 to 4 show trends in Uganda's production, acreage, exports, and imports. Production has increased consistently from 2016 alongside a decline in acreage, indicating a probable increase in productivity. Yield varies by rice ecology and agroecological zone. At aggregate level, yields increased from an average of 2.49 MT/ha in 2014 to 2.53 MT/ha in 2018⁵. Exports increased in 2017 but slightly declined in quantity in 2018. The country has been a net importer of rice since 2014, with imports drastically increasing from 2015.

⁴ Calculated from data contained in the USDA (2020) Production, Supply and Distribution (PSD) dataset on grains and pulses.

⁵ Calculated from FAO data contained in the FAOSTAT database



Figure 1. Rice production, 2014-2018

Source: MAAIF Statistical Abstract 2017/18



Figure 2. Rice area planted, 2014-2018

Source: MAAIF Statistical Abstract 2017/18



Figure 3. Rice Exports, 2014-2018

Source: MAAIF Statistical Abstract 2017/18



Figure 4. Rice imports, 2010-2017

Source: Uganda Revenue Authority

It is against this backdrop that the Government, through MAAIF, has formulated the second 10-Year NRDS (NRDS II: 2020 – 2030). The NRDS II comes on the heels of the formulation of the third 5 -Year Agriculture Sector Strategic Plan which is predicated on the third 5-Year National Development Plan. The ASSP III identifies rice as a priority commodity and as such, the NRDS II draws upon the ASSP III, although the interventions and implementation framework of the latter are defined over a shorter time horizon. Rice remains highly relevant to achieving Uganda's Vision 2040 because of its potential to significantly contribute to import substitution, agro-industrialization, household incomes, food security, export earnings, women and youth employment, and the development of other value chains, as explained below.

Import substitution: Import substitution is a government strategy that aims to increase domestic production to essentially replace imports and hence save foreign exchange. As seen earlier, Uganda's rice import bill has grown tremendously over the last couple of years. In 2017, imports of whole grain milled rice, broken rice, and paddy (rough) rice were USD 25.54 million, USD 41.07 million and USD 52.70 million, respectively, for a total of USD 119.17 million⁶. This situation can be reversed given that Uganda is comparatively rich in rice ecologies and therefore has the potential to achieve self-sufficiency. There is a huge domestic market for rice, but there is need to address quality issues to reduce competition from better quality imported rice. Once the domestic market is satisfied, the sub-sector should build the capacity to compete in regional and international markets.

A recent study undertaken by the African Development Bank-funded Continental Investment Plan for accelerating Rice Self-Sufficiency in Africa (CIPRiSSA) project⁷ estimates that to attain rice self-sufficiency by 2025, Uganda should invest about **95 million USD** in **Seed production and distribution, Fertilizer procurement and distribution, Irrigation for 2,304 ha, Post-harvest handling and marketing, Mechanization, Technology transfer and capacity building** between 2018 and 2025. Every dollar invested would

⁶ Uganda Revenue Authority (2017)

⁷ Africa Rice Center (2018b)

generate a net benefit of \$1.35. The net present value of these investments is \$47.58 million, and the investments would remain profitable provided the rate of return on alternative investments in the country is less than 61.82%.

With the above investments, 79,496 households would benefit, total rice acreage would increase by 147,972 ha and paddy production would increase to 426,580 tons in 2025. The estimated gross domestic value added (monetary contribution to the economy in real terms) would be \$109.88 million and net welfare gain would be \$84.51 million. The investments would create 17,907 jobs in direct employment.

Agro-industrialization: Agro-industrialization is indispensable to developing a lucrative agribusiness sector. It comprises three changes⁸: (a) changes in technology, products and market structure, (b) institutional and organizational change in the relationships between farms and firms, for instance, vertical integration and contract-based procurement, and (c) growth of commercial input provision, off-farm agro-processing, and distribution of farm commodities. NDP III states "Agro-industrialization that programme aims to increase commercialization of and competitiveness agricultural production and agro processing". Key results include: increasing export value of selected agricultural commodities, increasing the agricultural sector growth rate, increasing labor productivity in the agroindustrial value chain, creating jobs in agro-industry, and increasing the proportion of households that are food secure".

The rice sub-sector has a huge potential to contribute to agroindustrialization. A lot of technological change is going on with application of modern climate-smart rice varieties. A total of 17 varieties have been released by NARO since 2002. Additionally, rice cultivation generally lends itself well to mechanization of all major farm activities including land preparation, irrigation, weeding, harvesting, threshing, drying and handling. Milling capacity has grown tremendously; currently, there are 1,060 millers in total and installed milling capacity is in excess, and according to a report from the Rice Millers Council of Uganda (RMCU). And according to this RMCU report, all domestic

⁸ Barrett et al. (2001)

production can be milled within 34 days⁹. Investments in single-stage mills are currently estimated at USD eight million, and investments in stand-alone medium and large mills are worth about USD 20 million. Several large-scale farms have integrated investments to include milling services with total investments of about USD 120 million. In addition, the rice sub-sector can greatly contribute to agro-industrialization by taking advantage of the geographical distribution of paddy production and processing to create rice hubs that could efficiently and competitively supply rice to regional export markets. Rice produced in Eastern Uganda could be specifically targeted to the Kenyan market, that produced in Northern Uganda exported to South Sudan, and that from Central and Western Uganda exported to DR Congo. This kind of zoning would help create specialized rice hubs to improve the organization of rice production and marketing.

Household income: Rice is expected to significantly improve household incomes because of the profitability of rice-related enterprises. The average net income from rice production is estimated at UGX. 2,200,000 per Ha of which lowland rice farmers in Eastern Uganda earn up the highest income from rice. Farmers who mill rice can earn about UGX 3,000,000¹⁰ per ha per season. The net income obtained by millers from milling 100 kg of paddy of the Kaiso variety using single-stage and multi-stage mills is UGX 120,000 and UGX 170,720, respectively¹¹.

Household and national food security: Rice is increasingly substituting other food crops in the diets of many Ugandans. It's year-round availability on the market and the convenience associated with its preparation and consumption have made it suitable to the changing lifestyles of urban consumers. As Uganda's population grows and more people migrate from rural to urban areas, it is imperative to increase local production at a rate higher than the rising demand. Related to food security is the potential of rice to become one of the food relief commodities of choice during periods of transitory food insecurity. It has a long shelf life, high calorie content, and can be efficiently transported in bulk. A standard World Food Programme (WFP) food

⁹ Rice Millers Council of Uganda (2018)

¹⁰ ACDP Baseline

¹¹ IFDC Report and JICA Report of Market Survey

basket for an adult that is completely dependent on food aid consists of, among other things, 400 grams per day of rice or cereal flour or bulgur. Rice is seen as being important to supporting Uganda's refugee policy and complementing maize and other cereals in the food aid basket.

Export earnings: Rice is one of the most traded commodities within East Africa. In 2017, Uganda exported 27,000 tons of rice to the Democratic Republic of Congo, 15,000 tons to South Sudan, 2,270 tons to Kenya and about 960 tons to Rwanda¹². As shown in Figure 3, the total value of exports was USD 26.96 million. With improvements in productivity and quality, Uganda can become a net exporter of rice in the region. Kenya, currently the largest importer of rice in the region, imports 75 percent of its total rice consumption, most of which comes from Pakistan. Uganda's rice sub-sector should be supported to exploit these regional markets through the regional rice hubs proposed here in support of agro-industrialization.

Women and youth employment: The rice sub-sector continues to be a source of livelihood for the youths (18-35 years) and women; about 40% of rice farmers are women¹³. They are heavily involved in different activities in rice value chains especially post-harvest handling – cleaning rice and drying it (women), transportation of threshed rice (youth), application of fertilizers/chemicals (youth) and provision of key support services along the value chain (loading/offloading rice, cleaning mill premises, weighing, packaging, retailing among others)¹⁴. Supporting rice sub-sector development would therefore contribute to alleviating youth unemployment, currently estimated at 13 percent¹⁵ and one of the highest in Sub-Saharan Africa.

Links with other value chains

Rice value chains are strongly linked with other value chains and are important in crop-livestock integration. For instance, rice straw and rice bran are animal fodder in rice-producing areas. Also, rice husks are

¹² Kilimo Trust (2018)

¹³ ACDP Internal Reports, 2021

¹⁴ Barungi and Odokonyero (2016)

¹⁵ Uganda Bureau of Statistics (2018)

used in making, among other things, briquettes for energy and biochar for improving soil physical properties. Conversely, other value chains provide critical inputs into rice value chains, e.g., manure from animal product value chains. This integration leads to increased productivity of rice-based and other farming systems.

1.2 Global, Continental and Regional Context of the Rice Industry

Globally, China, India, Pakistan, Vietnam and Thailand are the leading producers of rice, contributing up to 240 million metric tons of the worlds' total milled rice production¹⁶. In Africa, about three quarters of the countries are involved in rice production with Nigeria being the leading producer¹⁷. Rice production in Africa has increased over the years reaching about 28 million MT in 2021.¹⁸ Consumption of rice also increased tremendously and remains higher than the increase in production hence a rice deficit in Africa.

The East African region comprising of Uganda, Kenya, Tanzania, Rwanda, Burundi, and South Sudan has grown its local production of rice to about 3.5 million MT (paddy) hence reducing rice imports. Tanzania is the major player in increased production of rice with a current domestic production of more than 2.7 million MT. The increase in production in the region has improved regional trade and with Democratic Republic of Congo expected to join the East African Community (EAC) political bloc, rice production and trade will be further boosted. In addition, the EAC countries trade with other African countries and Asian countries under bi-lateral and multi-lateral trade agreements is significant.

1.3 Status of the National Rice Industry

Uganda's rice industry can be characterized by rice production ecologies, rice varieties, rice industry structure, policy and institutional environment, and factors critical to demand and supply, as detailed below.

¹⁶ Muthayya *et al.,* (2014)

¹⁷ Atera *et al.* (2018) and IRRI (2017)

¹⁸ Report by CARD Secretariat (2021).

1.3.1 Overview of Rice Production and Consumption

There has been an increase in the production and consumption of rice in Uganda. Over 90% of the area under rice production in Uganda is rain fed and the remaining portion is under irrigation.¹⁹ Unfortunately, consumption is not being met by domestic production. This has led to a demand and supply gap in rice production and thus the deficit being met by imports. It has resulted into widening of the government's expenditure due to the many millions of dollars spent on the importation of rice.²⁰

Over the years several efforts have been put in place to narrow the imports and associated expenditure. These efforts include a high adoption of New Rice for Africa (NERICA) varieties into the country, rehabilitation of irrigation schemes, technology development and dissemination, high growth of the rice milling industry and improved coordination among other interventions implemented by stakeholders under the National Rice Development Strategy framework. These efforts have resulted in an increase in rice production from 110,000 Metric tons in 2008 to about 170,000 Metric tons of milled rice in 2018 (the end of the NRDS I) as shown in Figure 1, and the production is projected to be increasing by 9% on a yearly basis²¹. This is the unmilled equivalent of 177,000 MT (2008) to 245,000 MT (2018).

Most of this growth however has been attained by area expansion and not intensification hence local rice production fluctuates due to challenges such as drought, poor quality seed and poor agronomic practices due to lack of machinery and high labor costs. FAO observes that Uganda has the lowest productivity in the East African region but the second largest producer of rice²². This suggests that the country has untapped potential and could do better if productivity is improved. However, the problem extends beyond low yields to post-harvest losses with 60% being associated with late harvesting.

¹⁹ Van Oort (2017)

²⁰ Kijima (2015)

²¹ Computations from FAOSTAT and MAAIF Statistical Abstracts (2022)

²² FAO (2014)



Figure 5. Consumption and Production (milled) of rice (MT) in Uganda

1.3.2 Rice Ecologies

Rice production ecologies in Uganda are classified into three broad categories: rainfed upland, rainfed lowland and irrigated production areas. Rainfed upland covers 50,000 Ha, rainfed lowland covers 60,000 Ha while irrigated lowland covers 6,000 Ha.

Upland rice production has a huge potential as 70% of arable land in Uganda is suitable for upland rice production.²³ On the other hand, according to the Ministry of Water and Environment Report (2011)²⁴, the potential area for lowland rice (both irrigated and rainfed) is about 570,000 Ha.²⁵

With these resources, Uganda has the potential to meet her rice selfsufficiency, which requires only 200,000 Ha of upland area and 100,000 Ha of lowland area (18% of lowland area).

1.3.3 Rice Varieties

Through research, eleven (11) upland rice and five (5) irrigated varieties were released between 1990 and 2020. The upland varieties were NP-2, NP-3 and UK-2 released in 1995; and NERICA-4, NARIC-1 and NARIC-2 released in 2002; then later Namche-1, Namche-2, Namche-3, Namche-4, Namche-5 and Namche-6 released in 2013.

²³ Total arable land in Uganda where rice can be grown is 6,900,000 ha (including area currently covered by other crops).

²⁴ MWE (2011)

²⁵ Rain-fed lowland rice is adapted to marshy swamps that covers about 567,000 ha

Further, five improved rice varieties targeting irrigated production ecologies, including, AGORO, OKILE, WITA-9, NERICA-6, and KOMBOKA were released in 2014.

1.3.4 Rice Farmers

The rice sub-sector currently employs over 350,000 small-to mediumscale farmers, 18 large scale farmers and many support service providers. Rice is cultivated throughout Uganda, but mostly in the eastern and northern parts of the country and is grown mainly by smallholder farmers (80%) cultivating less than one Ha of land using simple tools.²⁶ The major rice producing districts include Apac, Lira, Amuru, Gulu, Oyam, Kitgum and Pader in the Northern region; Pallisa, Tororo, Bugiri, Bugweri, Jinja and Mayuge in the Eastern; and Kamwenge, Hoima, Kibaale, Masindi, Kabarole, Rukungiri, and Kanugu districts in Western Uganda .²⁷ Upland rice varieties are being cultivated by farmers almost all over the country, while lowland varieties are commonly grown in the Eastern and Western Uganda because these areas have many lowland areas with suitable climate.²⁸

1.3.5 Rice Millers

In 2012, it was estimated that there were 645 rice millers in the country, 74 percent of whom also performed trading both in paddy and milled rice²⁹. However, since then the number of rice milling companies has been increasing and reducing as well. As of 2016, there were more than 1,000 rice millers³⁰, and whereas in 2020, the total number of rice milling companies was estimated at about 673³¹. Of these, 18 and 10 were medium and large-scale millers respectively. There is surplus milling capacity in the country, and the estimated milling stands at only 59 percent of the actual milling capacity of the installed machines. This low milling rate is mainly due to inadequate rice production in the country.

²⁶ MAFAP (2013)

²⁷See Annex -1 for a complete list

²⁸ AfricaRice (2016) and MAAIF (2019)

²⁹ Tokida et al. (2014); Kikuchi et al. (2016a)

 ³⁰ Rice Industry Secretariat internal reports between 2016 and 2018
³¹ Kilimo Trust, CARI-EA Project (2020) Insights on Status of Rice Milling in East African Community: Kenya, Tanzania and Uganda. Funded by USAID

The majority of rice mills are Single-stage mills, which often produce relatively low-quality white rice characterized by a high percentage of broken rice and presence of stone/soil particles, leading to low returns to this group of millers and other actors in the value chain, especially the rice farmers.

Most small-scale millers simply provide milling services, while medium and large-scale millers are integrated backward into paddy production and forward into wholesale operations. Millers that do not operate rice farms procure paddy from farmers through agents (brokers), who earn a commission for their services.

1.3.6 Rice Marketing

Trading of rice in Uganda is controlled by the private sector and the total rice consumed in the country comes from two sources - domestic production and imports. The number of wholesalers and retailers (collectively known as traders) operating in major public markets countrywide is over 4,193.³² Sixty percent of the rice produced in the country is sold directly to middlemen, while the remaining 40% is consumed by households with portions retained as seed for the next planting season.

Trading of rice is still at a lower level in Uganda with low quantities for exports. Informal trade in rice across borders in Uganda is on the rise with rice being the second most traded commodity in the region³³.

Uganda mainly imports rice from Tanzania, Vietnam, Pakistan and Thailand to meet the deficit in domestic supply³⁴. Majority of the rice (65%) imported is broken rice, which is relatively cheap. However, there are also cases whereby imported rice is re-exported to the neighboring countries and this has been possible because of the low tariffs within the East African Community.³⁵

A greater proportion of the rice marketed is not branded, making product traceability difficult, yet this is very key in collecting feedback

³² As of 2013.

³³ According to FEWSNet and Kilimo Trust Trade Reports of 2018

³⁴ Muthee (2017).

³⁵ According to the East Africa Cross Border Trade Bulletin, Uganda imported approximately 8,829 metric tons of rice from Tanzania and exported about 6,662 metric tons of rice to South Sudan in 2018.

from customers. One of the reasons why rice markets do not function or perform efficiently is poor infrastructure and weak institutions³⁶. Further, marketing is affected by the high transaction costs incurred by producers to the processing centers, which consumes over one quarter of the farm gate price³⁷.

1.3.7 Policy and Institutional Environment

Several policies and institutions have made the industry relatively wellorganized and coordinated. Over the past decade, the roadmap for development of the industry was articulated in the first 10-Year NRDS (2008 – 2018). The formulation of the NRDS1 was accelerated by African countries including Uganda forming the Coalition for African Rice Development (CARD) after TICAD IV³⁸ declaration to support African countries to double rice production in order to increase food security as one of the strategies to reduce hunger and poverty in the continent. The NRDS was produced and aligned to the Agriculture Sector Strategic Plans (ASSPs) and National Development Plan I and II and, consequently Uganda's Vision 2040.

The current NRDS II is aligned to ASSP, Agro-industrialization program and NDP III. Further, the existence of policies such as the Seed policy, Extension policy, Fertilizer policy, and the associated regulations that support private sector investments have stimulated a lot of private sector interest in the industry. Rice standards were reviewed and upgraded to meet East African Standards. Easy-to-follow versions of the rice standards and simple extension messages to guide rice farmers and millers in attaining the different rice grades stipulated in the standards have been provided.

The industry has seen considerable improvement in organizational support for its growth. Three industry associations (Rice Association of Uganda, Rice Millers Council of Uganda, and Rice Business Sector Association) are in place. The Rice Steering Committee, the East African Community Regional Rice Platform, the Coalition for African Rice Development (CARD) and a host of other organizations are involved in coordinating efforts to grow the industry.

³⁶ Kijima (2011)

³⁷ MAFAP (2013)

³⁸ Tokyo International Convention on Development

However, there have been some unfavorable aspects of the business and policy environment. The EAC Customs Union's Common External Tariff (CET) on rice was initially set at 75 percent or \$200/MT, whichever is higher, to protect and boost domestic rice production. It was later revised to \$345/MT and has since 2014 been frequently altered by member countries at various times. Uncertainty in the implementation of this tariff is a hindrance to the development of the industry. The adhoc tax waivers and exemptions given to some Ugandan rice importers have been viewed by a section of rice farmers, domestic millers and a group of rice importers as having created an unfavorable business and policy environment. They have served as a disincentive to increased participation in markets and are reported to have caused several small-scale trading companies and individuals to exit the industry.³⁹

1.3.8 Consumer Preferences and Degree of Product Differentiation

Rice exhibits a relatively wide range of physical and chemical characteristics that influence consumer acceptance. Examples of physical characteristics include impurities, proportion of broken and whole grains, grain shape, chalkiness, and lightness, while chemical characteristics (closely associated with cooking attributes) include stickiness, cooking time, pasting properties and water uptake.

Consumer preferences for milled rice in Uganda is complex and is influenced by physical qualities, organoleptic attributes, and cooking properties. Generally, Ugandan consumers in the high paying markets want white rice that has at least 85% head rice or whole grain, is free from foreign matter and stones, is white and glittering, is fresh and tasty with good aroma is not sticky after cooking, is easy to cook and swells after cooking⁴⁰.

Uganda's locally produced 'SUPA rice' is the most preferred for its taste and aroma and thus the most consumed in Kampala. This is followed by 'Kaiso' because of its cooking property of expanding when cooked⁴¹.

 ³⁹ Karugaba and Kiwuuwa (2019) and Mbabazi (2019) estimate about some 57 small-scale trading companies and 400 individuals exited the industry in 2019
⁴⁰ Kilimo Trust (2021)

⁴¹ Kilimo Trust (2018)

Kaiso is a collection of rice varieties which expand upon cooking, medium grain in size and non-aromatic. Kaiso now includes irrigated varieties: K5, K23, K64, K85, K264 and upland varieties NamChe1-6 and WITA-9, most of which are sold as commingled rice. The many rice varieties and brands on the Ugandan market therefore provide for existence of several different market segments (niches).

1.3.9 Rice Supply and Demand Factors

This Strategy draws upon relevant empirical evidence on the factors that affect rice production, supply, and demand, for which specific policies and other interventions can be formulated to catalyze industry development. The basic inputs in rice production in Uganda are land, labor, water, and seed. Increasing farm size and seed application rate have been seen to significantly increase rice yields. For instance, a study in Northern Uganda⁴² shows that increasing rice acreage by 10% would increase yield by almost 7% on average, while increasing the seed application rate by 10% would increase yield by 3.1%; Labor is a major cost factor in that, an increase in the cost of farm labor by 10% would increase the cost of producing paddy by 5% on average. Fertilizers and herbicides are vital too but are hardly used; they are applied to only 10 and 13 percent, respectively, of rice plots countrywide and only 6% of the plots receive both types of chemicals applied to them yet increasing the use of nitrogen fertilizer by 1 kg/ha would increase rice yield by about 17 kg/ha, which would significantly increase farmers' profits.

There are some inefficiencies in rice production. For instance, farmers in northern Uganda were found to be inefficient in rice production. To achieve maximum efficiency from the output perspective, they need to increase rice production by 22%. And from the cost perspective, they should reduce their total production costs by 41% on average. These can be achieved through greater farm mechanization (e.g. use of oxploughs) and by improving their access to input and output markets.

At present, there is no solid empirical evidence on factors influencing consumer demand for rice in Uganda. Nonetheless, consumer demand for domestic rice is likely influenced by household income, price of

⁴² Okello et al (2019)

domestic rice, prices of imported rice and other food commodities such as maize, wheat, milk, meat, fruits and vegetables, socio-demographic factors and government policies such as taxation of imported rice. The issue of paramount concern to the industry that adversely affects consumer demand for locally produced rice is that of market shocks occasioned by abrupt tax exemptions on imported milled rice. If Ugandan consumers preferred local rice to imported rice, demand for, and hence the price of local rice would not fall significantly if tariffs on imported rice were removed. However, demand for local rice falls whenever taxes on imported rice are waived or reduced implying that local rice production is not competitive.

Lastly, the rice industry has also been affected by the ongoing COVID-19 global pandemic although its impacts on the industry are yet to be fully understood. Over 80% of rice produced in Uganda goes through food supply chains, some of which are export supply chains, and over 60% of it is consumed in urban areas. Minimizing disruptions to rice supply chains due to the COVID-19 pandemic would be an imperative strategy to the industry. The closure of hotels, restaurants, and institutions such as schools, and the loss of jobs and consequently incomes may have reduced demand for rice (if rice is in fact income elastic). The impacts of the pandemic on prices of foods that complement or substitute for rice in the diets of Ugandans are important. In terms of trade, any restriction on exports by the world's major rice exporters could cause a spike in world and domestic prices followed by significant price volatility. Therefore, the COVID-19 shock calls for an even sharper focus on strengthening Uganda's comparative advantage in rice and improving the competitiveness of the industry to achieve rice self-sufficiency and gain a greater share of the regional market.

1.3.10 Conditions of Entry into the Rice Business

The rice industry employs about 350,000 small-to medium-scale farmers, 18 large scale farmers, more than 670 millers and more than 10,000 support service providers including traders and those providing services in mechanization, loading, packaging, transportation, and finance. In the next 5 years, efforts to agro-industrialize the sub-sector are expected to increase the profitability of the value chain and hence

attract more people into employment and income generation in the sector.

Conditions of market entry pertain to unfavorable factors or fixed costs that potential entrants face, unlike incumbents, and which act as barriers to entry. There are no significant barriers to entry into any segment of rice value chains hence there has been a significant increase in the number of value chain actors. However, entry into rice production and marketing will likely be impeded by two factors: (a) if smallholder rice cultivation in wetlands, a conducive ecology for rice, is restricted, and (b) if tax waivers and exemptions on imported rice remain in place.

1.4 Achievements and Lessons Learnt Since 2008

The second National Rice Development Strategy is relevant for transitioning Uganda from a high import dependent country to a relatively self-sufficient country by increasing domestic rice production. The NRDSII is building on the Achievements and lessons learnt from NRDS I which was formulated in 2008 and implemented until 2020 under the National Development Plans (NDP) I and NDP 2.

1.4.1 Key Achievements under the NRDS I

i. Enhancement of rice production

Annual rice (paddy) production has increased from 170,000 tons in 2008 to approximately 245,000 tons in 2018⁴³. Productivity increased from 2.49 t/ha to 2.53 t/ha and area increased by 3.4%⁴⁴; The increase in area is due to more sub-counties and districts taking up upland rice across the whole country and also entry of more medium and large-scale producers especially in Northern Uganda.

ii. Seed production, multiplication and distribution

There are currently 21 rice seed varieties, eleven (11) of which were released between 2013 and 2018. Some of the 21 varieties are NERICA 1, NERICA 4, NERICA 6, NERICA 10, WITA 9, SUPA, Africa 1, Africa 2, NARIC 1, NARIC 2, NP2, NP 3, UK2, NAMCHE 1,

⁴³ MAAIF Statistical Abstract (2018)

⁴⁴ FAO Statistics (2019)

NAMCHE 2, NAMCHE 3 and NAMCHE 4. Among these varieties, the Government of Uganda promotes cultivation of NERICA 1, NERICA 4, NERICA 10, NAMCHE 1, NAMCHE 2, NAMCHE 3 and NAMCHE 4 under rain fed upland environments. The research, development and commercialization activities of these varieties were supported by the National Agricultural Research Organization (NARO), International Rice Research Institute (IRRI), Africa Rice Centre, International Institute of Tropical Agriculture (IITA), Sasakawa Global 2000, Japan International Cooperation Agency (JICA) under the PRiDe Project, Alliance for a Green Revolution in Africa (AGRA) and, the World Bank (under the ATAAS project).

In support of the seed production and other activities, approximately \$380,000 worth of machinery and equipment (vehicles, water level gauges, moisture meters, testing husker, grain sorting machines to actors spread in over 40 rice growing districts) were procured and supplied under the PRiDe 1 project over the past seven years.

iii. Irrigation and water resource management

With funding from the African Development Bank (AfDB); Agoro, Olweny, Mubuku and Doho Irrigation Schemes have been rehabilitated and transferred to farmers for management. Rehabilitation of Mubuku and Doho irrigation schemes is of special importance as they are key drivers in the production of quality rice seed (Mubuku) and demonstration of rice production through flood irrigation (Doho). In addition, the Islamic Development Bank is supporting Development of Kitumbezi, Igogero and Naigombwa swamps in Bugiri and Bugweri districts into functional Irrigation schemes under Enhancing National Food Security through Increased Rice Production (ENRP) project. A comprehensive study has also been carried out to develop more sites (Bulambuli), Matanda including Atari (Kanungu), Rwengaaju (Kabarole) and Acomai (Bukedea). Also, ten other studies have been initiated by the GoU/AfDB Farm Income Enhancement and Forest Conservation (FIEFOC) project II and the Agricultural Cluster Development Project (ACDP) funded by the World Bank to support the development of other irrigation schemes in future. Resources have been identified and committed to these studies for infrastructure development.

iv. Mechanization of rice production and postharvest value chains

Farmers' access to mechanization services has improved partly due to increased private sector investment in mechanization service provision, concerted effort made by MAAIF and her Agencies. For instance, Bongomin and Mukusu Motors Ltd are private sector partners contributing to increasing farmer access to mechanization services particularly at land preparation, planting and harvesting chain levels in Eastern Uganda. These efforts have resulted into increased use of mechanization in rice production and postharvest management. In particular:

- 1. Number of tractors and its implements in use by farmers have increased to 560 in the countryside.
- 2. Combine harvesters in operation are about 42 in total mainly in Eastern and Northern Uganda.
- 3. Number of motorized rice threshers has increased to 65 units mainly in eastern and northern regions of the country. There has been reduction in quantitative post-harvest losses from 21% in 2015 to currently 15.3%. This has been achieved through efforts such as the introduction and use of threshers and drying yards and/or tarpaulins.
- 4. Improved sun drying method for paddy has been widely adopted by rice farmers mainly in northern and eastern regions of the country.

v. Marketing of rice

The promotion of collective marketing is being done by MAAIF, District Local Governments and other development partners. There have also been community-led efforts by farmers to develop their own joint marketing structures. On provision of market information: communication and technology platforms have made it comparatively easy for farmers and traders to access market information. This can be as easy as an SMS (Short Message Service) received by mobile phone. FIT Uganda in particular has been very active in this sector, developing an SMS-based market information system (MIS). The Eastern Africa Grain Council (EAGC) and Uganda Grain Traders Association (UGTA) have a web-based market information system covering the East African region. However, there are number of other actors active in this field.

vi. Institutions and enabling environment

In order to provide an enabling environment to the rice sub-sector, the following achievements have so far been made. The policy institutions have developed/reviewed/established:

- The National Seed Policy launched in 2018.
- The National Fertiliser Policy launched in 2017.
- The National Agricultural Extension Strategy launched in 2016.
- The rice standards and harmonized across East Africa.
- The Rice Industry Secretariat at MAAIF and is functional.

1.4.2 Lessons Learnt from NRDS I

1. There has been increased use of mechanization in rice production and PHH. However, the application of FG in promoting this mechanization equipment is not a sustainable strategy. An entrepreneurship approach based on agro-machinery hire service scheme provides a better alternative.

2. Government has established institutional structures to improve coordination of rice industry actors including a National Rice Steering Committee, Technical Committee and a Rice Industry Secretariat however, there are still challenges in environment and trade policies among others. This calls for harmonization of Government rice related policies by adoption and scaling up the Program-based approach to planning, implementation and monitoring of Government Programs.

3. Positive steps have been taken to improve rice value chain actor's coordination at national level through the RSC, RTC and RIS. However, there were observed challenges in coordination of the private sector. This calls for formation of an Apex body by the Private Sector to coordinate the different private sector associations to better work with the Government. Additionally, due to expansion in rice growing areas across the country, lower level coordination structures should be established.

4. Government has put in place a friendly lending environment by reducing the Central Bank interest rates (10%) to reduce the cost of

credits from financial institutions. Further, government has left the market forces to determine the lending rates to be provided by the respective financial institutions. However, the financial institutions have taken this as an advantage to keep interest rates very high thus making the cost of credit expensive. There are key segments in the rice value chain that require capital support for increased production, productivity, processing and value addition however capital is inaccessible. This has reduced Uganda's rice sector competitiveness in the region. There is hence need for innovative financing solutions by scaling out the use of subsidies (such as e-voucher programs), matching grants and microcredit or SACCOs under NRDS II.

5.There is increased number of rice milling plants up to farming communities. Most of these rice milling plants have old and rudimentary englebergs and mill tops type of rice mills without any quality enhancement equipment. Some of the rice milling plants are located in unhygienic environments where food factory is not supposed to be located thus exposing rice products to contamination by pathogens. This practice has contributed to less safe quality milled rice in the market. The establishment of these mills is not regulated thus further aggravating the issues of low-quality rice. In order to address these issues, the NRDS II should develop and implement a regulatory system for establishment, management and supervision of rice milling factories.

6.There has been good effort to generate agricultural statistics including that of rice annually. However, the indicators generated for rice are inadequate and not in real time (seasonally) to meet the needs of data users and other stakeholders. Further, often times, dissemination is limited to national and regional levels only. This affects proper planning at various levels. In order to address this, the NRDS II should strengthen annual statistical data generation and dissemination processes for policy decisions.

7.Efforts have been made to support farmers to access quality rice seeds of improved varieties. The adoption of the varieties has however been low as most of the varieties do not adequately address organoleptic and cooking attributes required by rice consumers. The NRDS II should support research to develop healthy (low glycemic, high in zinc) varieties with preferred organoleptic and cooking attributes (like taste, aroma, stickiness, cooking time) as well as physical qualities (e.g. size and shape) required by consumers. This will enhance competitiveness of the Ugandan bred rice.

8. There has been an increase in rice mills in the country. However, most of the mills are operating below the recommended milling capacity. This is due to low supply of paddy from farmers who do not have any contractual obligation from millers. Like-wise millers lack own farms to produce enough paddy for own milling. There is need to adopt innovative models that will guarantee supply of paddy for milling. Promotion of rice nucleus farmer and out-grower schemes is recommended to address the rice production, supply and quality challenges.

9.There is declining soil fertility which is affecting production, productivity and profitability of rice industry. In NRDS-I, there was limited use of fertilizers to address soil fertility improvements. This is reflected in the significant yield gap in the research stations and farmers' fields. In NRDS-II, rice-based climate adapted soil fertility management practices including use of low cost organic and inorganic fertilizers will be scaled up. A good starting point is to scale up the subsidy approach piloted by the ACDP project.

10. There have been efforts to control pests and diseases including breeding for resistance. However, there are new and emerging rice diseases such as bacterial leaf streak and narrow leaf spot that require attention. NRDS-II should further support research and strengthen farm level efforts to control these pests and diseases.

11.There is increasing investment by public and private sector in rehabilitation and construction of new irrigation infrastructure which has expanded the area under irrigation from 5,000 to 11,000 Ha. This irrigated area is still very small. The infrastructure is not used efficiently due to poor water management and poor operation and maintenance. NRDS II will maximize this opportunity created by irrigation infrastructure by improving farmer knowledge, water management, protection of water catchment areas, promoting SLM and infrastructure maintenance. Furthermore, NRDS II should ensure coordination and governance of these schemes and securing tenure of community wetland rice cultivators.

12.During the implementation of the NRDS-I, the challenge of climate change posed a big risk manifested mainly in the form of droughts and floods. Government programs such as agro-insurance scheme are good initiatives to mitigate the impacts of climate change. However, awareness about the scheme is low among small holder farmers and value chain actors. Moreover, rice production practices and technologies in use in most cases require adaptation to the impacts of climate change. Therefore, in NRDS-II, more efforts should be put on promoting the adoption of climate smart technologies in line with the Sustainable Rice Platform (SRP) standards. Additionally, the agro-insurance consortium should be strengthened to reach out to the value chain actors.

13. There has been significant effort towards the integration of women and youth in all segments of the rice value chain. However, structural issues such as culture and traditional beliefs remain stumbling blocks to full integration. For instance, land tenure limiting women from accessing land in irrigation schemes and sharing returns from sales of rice among these marginalized groups to benefit from their efforts. NRDS-II should promote broad approaches to enable vulnerable groups (women, youth, elderly, etc.) benefit from rice industry.

2.0 RATIONALE FOR NRDS II DEVELOPMENT

2.1 Uganda's Policy and National Economic Priorities

Uganda's Vision 2040 is, "A transformed Ugandan society from a peasant to a modern and prosperous Country within 30 years", from 2010. This involves changing from a predominantly low income to a competitive upper middle-income country within 30 years. And the vision of the National Agricultural Policy (NAP) is "A Competitive, Profitable and Sustainable Agricultural Sector.

The proposed NRDS II interventions will achieve Uganda's national vision and the NAP Vision. The Vision 2040 is attained through the National Development Plans. NRDS II will be implemented during the third NDP (2020 - 2025) and its implementation framework, the Agroindustralization. The NRDS II interventions focus on re-organizing and supporting the entire rice value chain to create a viable rice industry and ensuring the marketing of domestic rice so that the industry is economically sustainable in the short, medium and long-term.

Uganda's rice industry in recent past encountered a challenge with environmental issues, and hence, the NRDS II provides strategies on natural resource management to involve interventions such as the Environment Impact Assessments (EIA); Land Use Planning and promotion of new and appropriate technologies for the wetland ecosystem; and promotion of complementary livelihoods options among others in response to the National Wetlands Policy (1995) and the National Environment Management Act (2019). Further, the strategy targets to reduce rain-fed lowland rice production areas and increase irrigated and upland rice production acreages in order to conserve the environment.

2.2 Challenges affecting the Rice Industry

About 10% of rural households survive on the rice value chain. Unfortunately, there are challenges that have persisted for some time and without tackling them, the industry could collapse and the rural farmers engaged in rice production, the rice milling, storage and transportation industry actors could lose their livelihoods. The NRDS II therefore serves as an implementation strategy of Government Policy related to rice and for elimination of the following challenges that are interrelated.

1.Limited use of modern inputs by various value chain actors including modern rice varieties, packaging materials, fertilizer, and other agrochemicals. Addressing this challenge requires huge public investments in agricultural research, extension and supporting production and marketing infrastructures. Unfortunately, these investments remain critically low for Uganda because of the government's steep budget constraints.

2. Low quality of inputs (seed and fertilizer) and final product (milled rice). Counterfeit (fake) seed is pervasive in the market. The industry is concerned about importation of seed by some private companies without following proper procedures. And despite assurances from MAAIF in 2018 that the practice would be stopped, it seems to have continued unabated.

3. Limited and inappropriate mechanization in rice cultivation, postharvest handling and processing. Most of the rice value chain operation in Uganda are largely carried out using rudimentary technologies that are outdated, inefficient and contribute to lose, and low-quality rice on the market.

4. Lack of affordable and efficient private services such as labor and machine hire services (to ease the drudgery associated with rice cultivation, post-harvest handling and marketing), soil testing services, and transportation services.

5. Limited information, knowledge, and skills among value chain agents' pertinent to optimal and sustainable utilization of resources in rice production and marketing. This is a cross-cutting challenge that greatly constrains the ability to address other pressing challenges. The underlying cause appears to be a lack of innovative approaches to providing information and imparting knowledge and skills in certain groups of value chain agents.

6. Lack of appropriate infrastructures such as all-weather roads, constant energy supply, rice storage facilities, machinery workshops, drying yards, (small-scale) irrigation and drainage structures and
information and communication technology platforms that could support financial transactions and access to market information.

7. Weak farmer organizations because of the low level of commitment of their members and capitalization. This is probably caused by the way the organizations are formed; they are usually formed at the behest of government and non-government programs seeking to deliver services, rather than through the initiative of their members in response to what the members perceive as common interests and mutual benefits, such as access to input supplies and markets.

8. Lack of innovative financing models that address credit and insurance needs of rice value chain agents. The unobservable nature of cash flows and the inadequacy of assets (collateral) of some value chain agents have led to their exclusion from participating in conventional credit markets. The low inherent demand for insurance due to low farm incomes and the fact that a single event such as a severe storm adversely affects many farmers in a given (the so-called covariant nature of risk in agriculture) makes the provision of agricultural insurance unattractive to insurers. These challenges call for innovative models of providing credit and insurance to rice value chain agents.

9. Climate Change: The increasing effects of climate change manifested by floods, droughts, extreme temperatures and emergence of new crop pests and diseases are a threat to the rice industry.

10. Land Fragmentation: Although the land is vast, the high population growth poses a challenge of land fragmentation and land degradation.

11. Emerging human diseases: Uganda has experienced a number of emerging diseases such as COVID-19 and Ebola. Their containment measures have disrupted the rice supply chains and the productivity of entire rice industry.

12. Inconsistent policy implementation. Consequently, the industry has seen cases such as arbitrary tax waivers and exemptions on imported rice and controversies regarding government's stance on rice cultivation in wetlands.

13. Weak institutional coordination of activities in the rice industry. Although there is substantial commitment from stakeholders to grow the industry including presence of a Rice Steering and Technical Committee, and a secretariat for the above committee's (Rice Industry Secretariat), there is are still challenges of several industry associations and limited support toward production of rice data that can inform policy decisions among others. The Rice Industry Secretariat is also deficient in human resources and capacity to operate efficiently.

14. Lack of adequate data and statistics to guide planning for the rice industry. This can be partly attributed to weak systems for program monitoring, evaluation, learning and impact assessment. The reverse is also true. The result is poor program planning, implementation, and performance.

15. Weak systems for program monitoring, evaluation, and learning (MEL) and impact assessment. This is attributed to low levels of staffing and capacity challenges. Scaling up staffing and re-tooling existing ones is necessary.

2.3 Strengths and Opportunities for developing the Rice Industry

The following strengths and opportunities exist in Uganda and can be harnessed for agricultural development and more especially the rice industry development.

i) Availability of suitable land: There are vast tracts of lowland with high moisture content in Eastern and Northern Uganda for swamp rice, as well as expansive land suitable for upland rice production.

ii) Several favorable policies: Uganda adopted a National Fertilizer Policy and completed impact assessments of available fertilizers with regards to quality hence promoting fertilizer use, and the Seed policy in place. Further, rice is one of the key commodities in Uganda's policies and economic frameworks.

iii) Improved rice varieties: New upland and lowland rice varieties have been developed/ introduced.

iv) Seed Production: Uganda has met her goals for the production of breeder and foundation Seed growers and farmers have been trained and empowered to multiply and take up quality seed respectively.

v) Irrigation Infrastructure development: Four irrigation schemes have been rehabilitated covering a total of 2,450 Ha contributing to a total of 11,000 Ha under irrigation. Further several schemes are under feasibility study, design and construction.

Vi) Catchment wide management approach to environmental conservation. Catchment Management Plans (CMPs) were developed and disseminated by MWE. This has contributed to conservation of fragile ecosystem hence reducing conflict between rice development and environment conservation.

vii) The Rice Institutional Framework. A multisectoral approach has led to increased cooperation across government sectors as well as encouraged the private sector to participate in rice value chain activities.

viii) Growing demand for rice. There is increasing domestic and regional demand for rice as a result of several factors that include emerging middle class, urbanization, youthful population and low energy demand for cooking. Further, the market and trade policies support increased domestic rice production. The EAC integration and the intra-regional trade promotion are vital for Uganda's rice Industry growth.

ix) Regional and continental rice frameworks. Uganda subscribes to regional and continental rice development frameworks such as the East Africa Rice Development Strategy (ERDS), Rice Research and Innovation Strategy for Africa (RRISA), and Coalition for African Rice Development (CARD). This is an opportunity for strengthening trade, research and other investments.

x) Existence of untapped rice ecologies. Uganda has expansive favorable rice ecologies across the country which provide room for increased rice cultivation.

xi) Increasing demand for specialty rice varieties and nutritious rice products. The increase in rice consumption has come with different consumer preferences. This is an opportunity for further investment.

xii) Increasing demand for safe and sustainable products. This new interest in safe and sustainable products including rice is an opportunity to invest in developing and promoting new and innovative technologies (bio-degradable agro-chemicals, urea fertilizer pellets, etc.) which are environmentally responsive.

xiii) A drive towards agro-industrialization. Uganda's agro-industrialization agenda provides an opportunity for increased investment in improving the competitiveness of rice industry.

xiv) Developments in ICT. There are advances in development of ICT in Uganda. This provides an opportunity to address challenges along the rice value chain; thereby improving research, training, production, processing and marketing.

3.0 OBJECTIVES OF NRDS II

3.1 Vision

A Competitive, Sustainable and Inclusive Rice Industry.

3.2 Goal

To improve competitiveness of Uganda's rice industry for food selfsufficiency and improved livelihoods of rice value chain actors.

3.3 NRDS Objectives

The objectives of the NRDS are:

i. To increase rice production, productivity and profitability.

ii.To improve harvest, post-harvest handling and value addition.

iii.To improve access to rice markets.

iv.To promote sustainable natural resource management for rice production.

v.To strengthen coordination of actors in the rice industry.

3.4 Guiding Principles

The principles guiding implementation of the NRDS are: Resilience, Industry, Competitiveness and Empowerment (RICE).

Resilience: The strategy will ensure environmental conservation as well as support for access to technologies by farmers to respond to environmental, climate change social and economic shocks. These technologies should largely be in form of capital assets that are long lasting such as seed multiplication fields, irrigation schemes, farming, post-harvest handling machinery and stores. A total of 2,000 rice processing parishes will be established with all the required rice production and processing capital assets.

Industry: The development of the rice industry will require traceability of the rice product through clear marketing chains from the farm, through the processors to the market. The strategy will ensure that all actors are registered and form coordinated value chains of farmer groups linked to registered rice processing companies and to registered rice marketing companies. Hence, the NRDS II will target to establish about 200 rice industries or consortiums spread across 2,000 sub-counties.

Competitiveness: The strategy shall promote quality management in all the interventions in production, processing, post-harvest handling, marketing, and institutional development.

Empowerment: The strategy shall ensure that the interventions cater for the vulnerable, including poor, male headed households, women, youth and girls. Advocacy shall be made to ensure equity in most rice programs and projects with at least 30% of the beneficiaries being women, at least 30% being men, and at least 30% being youth. Further, advocacy will be carried out to ensure that at least 10% of funding for most rice projects and programs is set apart for households with a total income or expenditure of households under abject poverty (with reference to MAAIF/ UBOS/ SDGs indicators for extreme poverty).

3.5 Targets for NRDS II Goal

Table 1. Self-Sufficiency, Livelihood and Savings on Uganda's Forex

Area (Ha)	Domestic Production (milled rice, MT)	Total Consumption (Milled rice, MT)	Self - sufficiency	Forex Saved through Local Production
191,000	432,000	449,280	96%	900 million USD

Table 2. Targets for Area, Production and Productivity Increase

		2020						2030		
Ecolo gy	Area (Ha)	Yield (MT/H a)	Seas ons per year	Total (MT, un- mille d)	Total (MT, mille d)	Area (Ha)	Yield (MT/H a)	Seas ons per year	Total (MT, un- mille d)	Total (MT, mille d)
Uplan d	50,0 00	1.3	1	65,0 00	43,0 00	160, 000	2.4	1	384, 000	250, 000
Lowla nd	60,0 00	2.7	1	162, 000	106, 000	00	00	00	00	00
Irrigat ed	5,00 0	3.1	1.3	20,0 00	13,0 000	31,0 00	4.5	2	279, 000	182, 000
Total	115, 000	2.4	1.1	247, 000	162, 000	191, 000	3.3	1.5	663, 000	432, 000

Table 3. Targets for the Objectives of NRDS II

Strategic Objective		Indictor	Baseline	Target	
1: Increase	rice	Area increase (Ha)	115,000	191,000	
production,		Increase in yield	2.4 MT/Ha x 1.1	3.3 x 1.5 seasons	
productivity	and		seasons		
profitability.		Increase in farm net	UGX 3,700,000 per	UGX 6,700,000	
		profitability from sale of	Ha per season x 1.1	per Ha per season	
		un-milled rice	seasons = 4,000,000	x 1.5 seasons =	
			per year	10,000,000 per	
				year	
		Number of farmers and	300,000 households	500,000	
		technicians employed	(50% of the HH is	households (50%	
		in the inputs supply and	engaged = $600,000$	of the HH is	
		production chain	persons)	engaged =	
				1,000,000	
				persons)	
2: Improve	post-	Reduction in	15.3%	10%	
harvest handlin	g and	quantitative post-			
value addition.		harvest losses of			
		paddy			

	Reduction in the	49% broken	35%
	percentage of broken	(61% whole grain)	(65% whole grain)
	rice (increase	(e., e., e., e.e. g. a)	(00/0
	wholegrain)		
	Reduction in the	0.8%	0.4%
	percentage of foreign	(mille el vie e)	
	matter (especially	(milied rice)	(milied rice)
	stones) in milled rice		
	Number of persons	100,000 persons	200,000 persons
	employed in rice post-	employed	employed
	harvest handling,		
	milling and storage		
3: Increase access to	Quality and price of	Lower quality and	Quality and price
rice markets.	local rice compared to	price compared to	equivalent to
	imported rice	imported rice	imported rice
	Maintain the share of	Above 5%	Above 5%
	Uganda's milled rice in		
	each of the major		
	export markets (Kenya,		
	DRC, and S. Sudan)		
	Number of retail	1,000,000 retail	2,000,000 retail
	traders and	traders and	traders and
	wholesalers employed	wholesalers	wholesalers
	in rice trade	employed	employed
4. Promote	Watershed/ Land Use	Zonal Catchment	Plans developed/
Sustainable natural	Plans developed	Plans are in place	integrated up to
resource			sub-county and
Management for			parish level
Rice Production	EIAs and ESMPs	Mainly large-scale	Large and medium
		lowland projects	scale lowland
			projects
			(above 100 Ha)
	Sustainable Practices	Varieties exist but low	More varieties &
	(e.g. varieties, proper	uptake	high uptake (over
	soil & water		80%)
	conservation)	Proper Soil & Water	
		Conservation (SWC)	SW&C adopted by
		mainly in large	tarmers in both
		irrigation schemes	schemes and
			outside schemes

	Build capacity of rice value chain actors on environment conservation and climate change adaptation in rice cultivation	Various farmers and other value chain actors in various sub- counties	farmers and other value chain actors in 1000 sub- counties
5: Strengthen coordination of actors in the rice industry.	FunctionalApexassociationrepresentingallprivatesectorassociations.	Several Associations with No Apex Association.	01 apex Association for private sector associations legally registered.
	NumberofRiceregulatoryframeworks(Acts,Bye-laws,ordinancesandregulations)	National level policies	Community level policies, regulations.
	Appraisal/ development support and evaluation of rice projects/ programs	Strong at project review/development support appraisal but weak at project/ program evaluation	Strong Project Program Appraisal / development support and strong project/ program evaluation
Cross Cutting Issues in the Rice Value Chain	Men, women, Youth access inputs and share benefits from rice production	Men and women are benefiting; but few youths have resources to farm	At least 30% men, 30% women, 30% youth
	Advocating for at least 10% of all funding in all rice interventions to be directly allocated for households living in abject poverty (refer to MAAIF/ UBOS/ SDGs indicators for extreme poverty or household accessing less than ¹ / ₄ acre for rice farming).	Advocacy for the poor and vulnerable but not necessarily for the extremely poor	About 10% of all funding in all rice interventions for the extremely poor

4.0 STRATEGIC INTERVENTIONS AND ACTIONS OF NRDS II

The NRDS II has five (5) strategic objectives. Each strategic objective will be addressed through a set of interventions that will be implemented by different stakeholders. The outcomes of the interventions may be direct or indirect, and also, the benefits of a given intervention may cut across more than one strategic objective. Hence, overall, the strategy has fifteen (15) strategic interventions and outlined below.

4.1 Strategy to Increase Rice production, Productivity and Profitability

Uganda averagely produces 230,000 MT of rice annually. Most of the rice is produced under lowland and upland rain-fed ecosystems and a little under irrigated systems. Rice farm productivity is still low with rice yield in Uganda at 2.2 MT/ha compared to the 4.4 MT/ha world-wide average. Given that Uganda is a high producer of upland rice, the ideal rice yield should be 3.0MT/Ha.

About 86% of rice farmers use improved rice seed, 6% use inorganic fertilizers, 1% use organic fertilizers, 1% use mechanization, and most are known to apply herbicides in their farms. And, only about 4.4% of rice plots are under irrigation technology. These challenges cause an average of 32% crop damage and have kept local rice production at an average productivity of 2.3 t/ha among rainfed lowland rice and 1.9 t/ha among upland ecologies. Solving these challenges will result in an average rice production of 2.4 MT/ha. This targeted rice production average of 2.4 MTs/Ha is lower than what NRDS 1 achieved (of 2.53MTs/Ha).

These problems and challenges will be addressed broadly through construction of more irrigation schemes; increased awareness creation and use of modern technologies in rice production that tackle issues of seed, fertilizer use, drudgery/mechanization, pests and diseases including birds, among other interventions detailed in the table below which shows the Interventions to improve domestic rice production, productivity and profitability. Table 4. Elaboration of strategic objective, interventions and actions to Increase Rice Production, Productivity and Profitability

Strategic	Strategic		Strategic actions
Objective	Interventions		
Increase	1.1 Develop	1.1.1	Strengthen research to
rice	technologies for		generate market oriented
production,	increasing rice		appropriate technologies.
productivity	productivity	1.1.2	Disseminate technologies
and			through research & training.
profitability		1.1.3	Strengthen research-
			extension linkage to
			disseminate technologies.
		1.1.4	Invest in research
			infrastructure/ facilities for
			technology generation,
			building capacity of
			researchers & regional
			collaboration.
		1.1.5	Collaborate with private
			sector on hybrid rice
			research.
		1.1.6	Build resilience in research
			such as seed business and
			soil testing business, for
			research to generate funds.
	1.2 Increase	1.2.1	Support local multiplication of
	access to seed,		quality seed.
	fertilizers,	1.2.2	Support farmers to access
	pesticides,		quality seed.
	herbicides, on-	1.2.3	Strengthen certification and
	tarm post-		regulation of agro-inputs
	harvest and		dealers.
	other inputs.		

1.3 Improve	1.3.1 Provide appropriate
access to	machinery for farming and
appropriate and	harvesting.
efficient	1.3.2 Provide appropriate
mechanization	machinery & equipment for on-farm
technologies	post-harvest handling.
1.4 Increase	1.4.1 Rehabilitate existing and
small, medium	establish new rice irrigation
and large-scale	schemes.
irrigation	1.4.2 Support soil and water
facilities for rice	management in informal
production.	schemes.
	1.4.3 Strengthen Irrigation Water
	User Associations (IWUA's)

4.2 Strategy to Improve Rice Post-Harvest Handling and Value Addition

Uganda's rice milling industry is unique in that the rice mills are in excess and generally operate at about half their capacity. However, most of these mills are small scale, do not have de-stoners and driers resulting in low quality broken rice with foreign matter and largely is Grade 3 and ungraded clean rice.

Most rice of the rice in Uganda is harvested in June to August (for season 1) and October to January (for season 2). And most of the postharvest operations including harvesting, threshing and winnowing are done manually. Most households (99%) carry out harvesting manually, and farmers stack the straws with the grain in the field for 1 - 3 days before threshing. 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. Threshing is then done manually by beating, trampling or shaking bundles of the rice crop (97%).

Drying of rice is conducted by sun drying and is the most common method of drying threshed rice by farmers. All households dry rice on a clean surface most especially mats. About 5.2% of the farmers dry rice on concrete ground. This kind of drying on clean surfaces is a clear success and growth of Uganda's rice industry training programs and technology dissemination programs.

All rice farmers clean their dry paddy through winnowing. Most farmers (97%) practice manual winnowing and 3% use motorized winnowers, most of which are in Bukedi sub-region. Rice producing households store un-milled rice for a short time before milling; and only about 29% store rice a little longer. After milling, most households retain some milled rice for household consumption. The households store un-milled and milled rice in sacks or open drums, and about 11% store their rice in a traditionally constructed barn, while about 1% store rice in hermetic bags.

The existing practices in rice post-harvest handling result in postharvest losses of up to 16% on average and up to 22% in Teso subregion. The common causes of the post-harvest losses in rice include spillage during the process of threshing (19%), transporting and storing rice (34%); poor drying due to bad weather (24%) and the grain being eaten by animals and birds during field stacking and drying (23%). Further, the poor milling practices result in low grade rice. The NRDS II proposes to further improve rice post-harvest handling using the Interventions below:

Strategic	Strategic	Strategic Actions		
Objective	Interventions			
Improve Rice	2.1 Develop and	2.1.1	Assess current status,	
Post-Harvest	disseminate		local capacity and	
Handling and	context specific		prepare an action plan	
Value Addition	post-harvest		for increasing local	
	technologies and		production of post-	
	regulatory		harvest equipment.	
	frameworks	2.1.2	Conduct adaptive	
			participatory research	
			for prototypes and local	

Table 5. Elaboration of strategic objective, interventions and actions to Improve Rice Post-Harvest Handling and Value Addition

			fabrication and
			assembly of selected
			technologies.
2.2	Improve	2.2.1	Provide equipment for
access	to		post-harvest handling,
modern	post-		agro-processing and
harvest			value addition in
manage	ment,		collaboration with the
storage	and		private sector.
primary		2.2.2	Foster collaborations to
processi	ng		provide incentives and
technolo	gies		financing to attract the
			private sector for
			sustainable local
			production and supply
			of rice PHH equipment.
		2.2.3	Disseminate
			knowledge and skills on
			post-harvest handling
			practices.
		2.2.4	Develop value added
			products for diversified
			use of rice and manage
			the wastes.

4.3 Strategy to Increase Access to Rice Markets

Rice farmers mainly sell rice after milling and a few farmers (31%) sell un-milled rice in a state which fetches less profit. Most of the rice is sold to local traders including millers (75%) and consumers in the community (12%). The average rice production at farm level in Uganda is averagely 2.3 t/ha (1,500Kg of milled rice) among rainfed lowland rice and 1.9 t/ha (1,200 Kg of un-milled rice). About 76% of the rice is sold off, 13% consumed by the households, and 11% stored for future use or sale. Only few farmers can wait for prices to increase before selling rice. Most of these farmers are in Acholi and Busoga subregions. The country is also a net-importer of about 110,000 MT of milled rice yearly, an equivalent of 170,000MT (un-milled). This represents 34% of local rice consumption. The highest quantities of imported rice are clean, whole, non-aromatic, and medium sticky. Without taxation, the imported rice costs the same as locally produced rice. Hence any policy measure (s) that eliminate taxation of rice imports affects pricing of locally produced rice. Whereas Uganda is a net importer, the country exports rice to Kenya, DRC, and South Sudan and at the prevailing local market prices which can rise in the export market due to the associated logistical costs.

Since Uganda's rice is generally less competitive, NRDS II targets to increase marketability of local rice in the local and international market with the strategies below:

Strategic	Strategic	Strategic Action	
Objective	Interventions		
Increase	3.1 Regulate rice	3.1.1 Promote pack	aging,
Access to Rice	trade	branding	and
Markets		traceability	of
		domestic	and
		imported rice	
		3.1.2 Stabilize	and
		harmonize the	rice
		trade, import	and
		export policy po	sitions
		3.1.3 Support	the
		functioning of	the
		private sector	apex
		association.	

Table 6. Elaboration of strategic objective, interventions and actions to Increase Access to Rice Market.

3.2 adherence Standards	Ensure to Rice	3.2.1 3.2.2	Reviewanddisseminatericestandards.Provide incentives foradherencetostandards.
3.3 Stu farmer m systems a capacity agribusine value chain	rengthen harketing nd build of ss of h actors	3.3.1 3.3.2	Strengthen/organize farmer producer groups to undertake marketing functions. Develop Market Information Systems for value chain actors
3.4 Market Infrastructu	Develop ure	3.4.1 3.4.2	Support rehabilitation of road chokes in rice production areas. Support development of rice hubs/ rice marketing centers.

4.4 Strategy to Promote Sustainable Natural Resource Management for Rice Production.

Rice is ecologically adapted for lowland areas. This explains why 90% of all the rice in the world is produced in lowland areas (paddy areas). Further, even upland rice varieties perform better in lowland areas, at the fringes of wetlands.

During the growing of irrigated rice, evaporation, seepage, and transpiration are the same vis-à-vis the basic consumption of water when the wetlands are under natural wetland vegetation. However, production of rice, similar to other farming activities, involves practices change in the wetland ecosystem. Some of the agriculture practices include: draining the wetlands, silting the wetland, deposit of pesticides and fertilizer residues in streams among others.

In order to reduce wetland degradation, the laws of Uganda provide for strict conservation of the wetland core area, and sustainable use of 25% of the none core area for permanent wetlands. Further, temporary wetlands may be used for farming accompanied by environmentally conservation practices.

The NRDS II seeks to ensure environmental conservation as the country's aspirations strive for sustainable development. This will be attained through the following strategic interventions and actions:

Table 7. Elaboration of strategic objective, interventions and actions to Promote Sustainable Natural Resource Management for Rice Production

Strategic	Strategic	Strategic Action
Objective	Intervention	
Promote	4.1 Support	4.1.1 Watershed and Land use
Sustainable	land	Management Plans developed.
Natural	management,	4.1.2 Undertake mapping of
Resource	environment	lowlands/wetlands and produce
Management	impact	maps/ reports for categorization of
for Rice	studies and	wetlands for strict conservation and
Production	plans for rice	partial use/ sustainable production
	promotion	and full use
		4.1.3 Support Environment Impact
		Assessments and implementation of
		Environment and Social
		Management Plans.
	4.2 Support	4.2.1 Build capacity on sustainable
	dissemination	land use in wetlands, lowlands,
	of	and uplands (training materials,
	technologies	Trainers of trainers and training
	for	farmers).
	sustainable	4.2.2 Develop and disseminate
	natural	technologies that enhance
	resource	environment conservation and
	management.	climate change adaptation in
		rice cultivation.
		4.2.3 Pilot rice-aquaculture systems.

	4.2.4 Expand	complementary
	livelihood	enterprises such as
	rice-aqua	culture.

4.5 Strategy to Strengthen Coordination of Actors in the Rice Industry

Uganda's rice industry is highly institutionally organized with a Rice Steering Committee, Technical committee and Rice secretariat. Despite this organization, the industry has in some stages had challenges in rice import tax that resulted in high importation of rice. Apart from the trade front, the sector has suffered challenges on the production front largely associated with mixed environment legislations.

Under NRDS II, the rice sub-sector will improve coordination in the industry and promote policies that enhance local poor households to benefit from rice production and also organize the farmers to better benefit from the public interventions in rice farming and marketing businesses. Secondly, under NRDS II, the rice industry will tap into the rising acceptability of actors to fund data and information generation for evidence-based planning to come up with relevant information to guide policy development. Below are interventions towards the attainment of a strengthened rice sub-sector for improved coordination, policy harmonization, strategy and program implementation.

Strategic Objective	Strategic Interventions	Strategic Action
Strengthen	5.1 Strengthen	5.1.1 Develop a rice farmer's
Coordination	coordination of	register.
of Actors in	rice institutions	

Table 8. Elaboration of strategic objective, interventions and actions to Improve Coordination of Actors in the Rice Industry

the Rice	(farmer groups,	5.1.2 Strengthen RSC, RTC,
Industry	apex	RIS, and the national and
	associations of	regional Platforms.
	farmers, millers	5.1.3 Develop institutional and
	and traders, seed	human resource capacity
	companies,	for NRDS implementation
	Technical and	institutions.
	Steering	5.1.4 Strengthen Apex
	Committee's)	associations for the
		private sector.
	5.2 Develop and	5.2.1 Harmonize policies on
	implement	rice production and the
	favorable	environment
	environment,	5.2.2 Harmonize policies on
	trade and other	rice trade and rice
	legal and	production
	regulatory	5.2.3 Review and disseminate
	framework that	guidelines to fulfil legal
	promote	and regulatory
	competitiveness	framework on
	of domestic rice	environment,
	over imported	Sustainable Land Use
	rice.	and Management, trade,
		finance, and insurance.
	5.3 Establish a	5.3.1 Conduct detailed surveys
	functional	on the rice value chain in
	monitoring,	each rice producing
	evaluation and	district.
	learning system.	5.3.2 Prepare NRDS II
		Monitoring and
		Evaluation Reports.

4.6 Strategy to address Cross-cutting Issues in the Rice Value Chain

The NRDS will address several cross-cutting issues such as gender, youth and income inequality which will be addressed by various actions

under the strategy on cross cutting issues but also environment which have been specifically assigned to strategy number five (5). It is expected that careful implementation of the actions shown below will result in strategy addressing disparities between the various vulnerable poor Ugandans, such as men, women, youth, Persons with Disabilities. Table 9. Elaboration of strategic objective, interventions and actions to address Cross Cutting Issues in the Rice Value Chain

Strategic	Strategic	Strategic Action	
Objective	Intervention		
Cross-	6.1	6.1.1 Support mobilization of men,	
cutting	Streamline	women and youth groups to join rice	
Issues in	Gender,	farming programs and projects.	
the Rice	Youth and		
Value	Persons with	6.1.2 Advocate for at least 5% of all	
Chain	Disabilities.	funding in all rice interventions for	
		allocation to persistently unemployed	
		men, women, youth and Persons with	
		Disabilities.	
	6.2 Provide	6.2.1 Register all rice farming	
	production	households living under very extreme	
	assets to the	poverty.	
	extremely	6.2.2 Provide production assets and	
	poor rice	grants to households living under very	
	farmers.	extreme poverty.	
		6.2.3 Promote smart subsidy scheme	
		among rice actors.	

5.0 NRDS II STAKEHOLDER ROLES AND COORDINATION

The NRDS II will be implemented by various stakeholders under the coordination of the Rice Steering Committee, as shown in section 5.2.1 of the NRDS II below.

5.1 Stakeholders and their Roles

The NRDS II will be implemented through collaborations involving different rice sub-sector stakeholders and will be led and coordinated by the Rice Steering Committee which is chaired by MAAIF. The Table below shows the stakeholders responsible for leading the implementation and participating in the implementation of the proposed interventions.

Strategic Interventions	Lead	Others	
	Agency		
5.1.1. Develop	NARO	NARO-ZARDI's, MAAIF	
technologies for	(NaCRRI,	UIRI, Academia (MUK,	
increasing rice	AEATREC)	KYU, GU, UCU, Busitema	
productivity		University, other	
		Universities and	
		Agricultural Colleges),	
		Private Sector, DLG's,	
		Development Partners	
5.1.2 Increase access to	MAAIF-	NAADS, Private Sector,	
seed, fertilizers,	DCR,	DLG's, Development	
pesticides, herbicides,	DAES	Partners, and CSOs such	
on-farm post-harvest		as SG2000.	
and other inputs			
5.1.3 Improve access to	MAAIF	NARO-AETREC, NAADS,	
appropriate and efficient	DAIMWAP	NGOS, CSOs Private	
mechanization		Sector, Farmer	
technologies		Organizations, DLG's,	
		Development Partners	
5.1.4 Increase small,	MAAIF	MWE, DPs, MFPED,	
medium and large-scale	DAIMWAP	NEMA, Private Sector,	
irrigation facilities for rice		Farmer Organizations,	
production.		DPs, DLG's, Development	
		Partners	

Table 10. Elaboration of stakeholder roles to Increase rice production, productivity and profitability

Table 11. Elaboration of stakeholder roles to Improve Rice Post-Harvest Handling and Value Addition

Strategic Interventions	Lead Agency	Others
5.1.5 Develop and		Academia, CGIARs,
disseminate context	NARO –	MAAIF, DLG's,
specific post-harvest	AEATREC	Development
technologies and		Partners
regulatory frameworks		
5.1.6 Improve access to	MAAIF,	NAADS, NGOS,
modern post-harvest	MTIC	CSOs, Private
management, storage and		Sector, Farmer
primary processing		Organizations,
technologies		DLG's, and
		Development
		Partners

Table 12. Elaboration of stakeholder roles to Improve Access to Rice Markets

Strategic	Lead	Others
Interventions	Agency	
5.1.7 Regulate	MAAIF-	UNBS, MAAIF-DCR, Private Sector,
rice trade	DAES,	Farmer Organizations, Seed
	NARO-	Companies, NARO, Millers, CSOs,
	AEATREC	NGOs, Academia, MAAIF-
		DAIMWAP, DLG's, and
		Development Partners.
5.1.8 Ensure	MTIC -	MAAIF-DAES, MAAIF-DCR,
adherence to	UNBS	Traders, UEPB, NGOs, CSOs, DPs,
Rice Standards		Farmer Organizations, UNFFE, Rice
		Apex Association, MFPED,
		Financial Institutions, PSFU, DLG's,
		and Development Partners.

5.1.9 Strengthen	MTIC,	MAAIF, MoLG, MFPED, Private
farmer	MAAIF	Sector, DPs, NARO-NaCRRI,
marketing		Farmer Organizations, NPA,
systems and		MLHURD, PSFU, CGIARs, NGOs,
build capacity of		CSOs, DLG's, URA, PSFU, UIA,
agribusiness of		UNBS, RSC members, Judiciary
value chain		(SG), and Development Partners.
actors		
5.1.10 Develop	MoWT,	MAAIF, MTIC, MWE, DLG's,
Market	MTIC,	Development Partners
Infrastructure	MAAIF	

Table 13. Elaboration of stakeholder roles to Promote Sustainable Natural Resource Management for Rice production

Strategic Interventions	Lead	Others
	Agency	
5.1.11 Support land	NEMA,	MAAIF
management, environment	MWE-	
impact studies and plans for rice	DEA	
promotion		
5.1.12 Support dissemination of	MAAIF,	NARO, Academia,
technologies for sustainable	MWE-	CGIARs, MWE -
natural resource management.	DEA	DWD,
		Development
		Partners

Table 14. Elaboration of stakeholder roles to Strengthen Coordination of Actors for Rice Industry Development

Strategic Interventions		Lead	Others	
			Agency	
5.1.13	Streng	gthen	MAAIF –	RSC, OPM, DLG, DPs,
coordination	of	rice	DCR, MoLG	DLG's, Development
institutions (farmer groups,			Partners	
apex associ	ations	of		
farmers, mil	llers	and		
traders, seed	compa	nies,		

Technical and Steering		
Committee's)		
5.1.14 Develop and	MAAIF -	RSC, UNBS
implement favorable	DAES	MLHURD, DLGs
environment, trade and		MWE, MGLSD, All
other legal and regulatory		Actors, DLG's,
framework that promote		Development Partners
competitiveness of		
domestic rice over		
imported rice.		
5.1.15 Establish a	MAAIF -	MAAIF, UBOS, NARO,
functional monitoring,	APD	CGIARs, Academia,
evaluation and learning		DLG's, Development
system.		Partners

Table 15. Elaboration of stakeholder roles to address Cross-cutting Issues

Strategic Intervention	Lead Agency	Others
5.1.16 Streamline Gender, Youth, Elderly and Persons with Disabilities.	MGLSD	MAAIF, CSOs, NAADS, CSOS, DLG's, Development Partners
5.1.17 Provide production assets	MGLSD,	MAAIF, CSOs,
to the extremely poor rice farmers.	MAAIF - DCR, MoLG	NAADS, CSOS, DLG's, UBOS, Development Partners

5.2 Coordination of NRDS II

Coordination of the NRDS II shall constitute a multi-stakeholder structure at national and regional levels as shown in the organogram below:

Ministry of Agriculture, Animal Industry and Fisheries

5.2.1 The Rice Steering Committee

The Rice Steering Committee (RSC) is comprised of about 15 members representing all key actors in the rice value chain. The RSC is chaired by the Permanent Secretary, MAAIF and the Secretary is the Commissioner Crop Production. The RSC shall meet at least twice every year.

01. Permanent Secretary MAAIF (Chairperson)

02. Representative of the PS, Ministry of Water and Environment

03. Representative of the PS, Ministry of Local Government

04. Representative of the PS, Ministry of Trade, Industry and Cooperatives (MTIC)

05. Representatives of Development Partners Chair (Agriculture Sector)

- 06. JICA Representative in Uganda
- 07. Director General-NARO
- 08. Chairperson Rice Processors Association
- 09. Chairperson of Private Sector Rice Apex Association
- 10. Representative of Civil Society Organizations (Sasakawa Global 2000)
- 11. Representative of Uganda National Farmers Federation (UNFFE)
- 12. Representative of CGIAR (Africa Rice/ IITA/ IFPRI/IRRI)
- 13. Representative of Ministry of Finance, Planning and Economic Development (MoFPED)
- 14. Commissioner Crop Production (**Secretary**)

5.2.2 The Rice Technical Committee

The Rice Technical Committee (RTC) is comprised of 15 to 20 member's representing key Departments of Government which shall oversee the NRDS II implementation process. The committee will be chaired by Director Crop Resources, with Commissioner Crop Production as the Secretary. The RTC shall, from time to time, create working groups involving other stakeholders to enhance delivery of services. The committee shall meet at least once a quarter and specifically be constituted by:

- 01. Director Crop Resource-MAAIF
- 02. Director Agricultural Extension Services

- 03. Commissioner Crop Production and Marketing as Secretary
- 04. Commissioner Agriculture Infrastructure, Mechanization, Water for Agricultural Production
- 05. Commissioner Agricultural Extension and Skills Management
- 06. Cereals Program Team Leader, NaCRRI
- 07. Director-NEMA,
- 08. Commissioner Water for Production (MWE)
- 09. Commissioner Wetlands Management
- 10. Representative of Local Government
- 11. Commissioner, Trade or Industry
- 12. Project Coordinators of Public Sector Rice Projects
- 13. Commissioner Crop Production
- 14. Representative of Farmer Organizations (UNFFE)
- 15. Rice Industry Secretariat team in MAAIF

The leaders selected shall be adopted to participate in the Rice Steering Committee meetings. The representation can be rotational on a yearly or two-yearly basis.

5.2.3 National and Regional Platform

National Platform: The Steering Committee shall organize a National Rice Platform Meeting at least once a year. The national rice platform shall discuss issues raised from regional platforms and forward the outcome of the discussions to the Rice Technical committee. The private sector apex association shall be represented in these meetings and co-chair the meetings with Government. The private sector shall hold an apex association meeting at least once each year to discuss issues for Government's intervention and select leaders for the Apex Association in consultation with the Ministry of Trade (MTIC) and Ministry of Agriculture (MAAIF) to represent them in the Rice Steering Committee. The private sector representatives to the RSC shall be rotational for a given period determined by the private sector.

Regional Platform: There shall be 4-5 regions based on rice hubs. The Technical Committee shall organize regional rice platform meetings at least in each region within a 5-year period. A District Production Officer from one of the districts shall co-chair the meetings. The agenda shall among others always include a presentation by a farmer leader and a person from the private sector. The outcomes of the regional meetings shall be included on the agenda of the National rice platform meetings.

5.2.4 The Rice Industry Secretariat

The Rice Industry Secretariat (RIS) hosted by MAAIF shall serve as the Secretariat for the Rice Platform, Technical Committee and Steering Committee. The Head of the Secretariat is the Commissioner Crop Production. The Secretariat will be improved such that the staffing includes a Rice Program Manager, Program Officers and Assistant Program Officers, all reporting to the Head of the Secretariat.

6.0 FINANCING STRATEGY

The NRDS II shall be financed by the public and private sector with funds mobilized by the stakeholders from local and international development partners.

6.1 Funding Requirements

To achieve the NRDS II targets, two trillion shillings only (approximately 700 million US Dollars) is required over an eight-year period. Most of this funding is to be targeted towards development of water for rice production (30%), production inputs (30%) and mechanization for rice production (5%), provision of post-harvest handling equipment (9%), market infrastructure (16%), and technology generation (3%). About 2% of the budget (about forty billion shillings), will be dedicated to natural resource management and environmental conservation and lastly about ninety billion shillings (representing about 5% of the budget) will focus on grants for free provision of farming assets for the extremely poor rice farming households. These rice farming households are those with five to ten members, with total household income less than Ugx. twenty million per year and each owning land in total less than a quarter acre. It is expected that these grants will lift these households to a level playing ground with other NRDS II beneficiaries who participate in interventions that do not give direct grants or free assets to households.

The table below details the funding requirements for each intervention and the returns from this level of funding.

Strategic Interventions						Estimated Cost (million, Ushs)	Percentage of NRDS Budget
Stra [.] and	tegy 1: Inc profitabili	rease rice pro ty	duct	ion, product	ivity		
1.1 prod	Develop uctivity	technologies	for	increasing	rice	50,000	2.9

Table 16. Budget for NRDS II and Economic Returns

 1.2 Increase access to seed, fertilizers, pesticides, herbicides, on-farm post-harvest and other inputs 	500,000	29.4
 1.3 Improve access to appropriate and efficient mechanization technologies 	80,000	4.7
1.4 Increase small, medium and large-scale irrigation facilities for rice production.	500,000	29.4
Total	1,130,000	66.5
Strategy 2: Improve Rice Post-Harvest Handling and Value Addition		
2.1 Develop and disseminate context specific post- harvest technologies and regulatory frameworks	5,000	0.3
2.2 Improve access to modern post-harvest management, storage and primary processing technologies	145,000	8.5
Total	150,000	8.8
Strategy 3: Increase Access to Rice Markets		
3.1 Regulate rice trade	2,000	0.1
3.2 Ensure adherence to Rice Standards	2,000	0.1
3.3 Strengthen farmer marketing systems and build capacity of agribusiness of value chain actors	6,000	0.4
3.4 Develop Market Infrastructure	270,000	15.9
Total	280,000	16.5
Strategy 4: Promote Sustainable Natural Resource Management for Rice Production		
4.1 Support land management, environment impact studies and plans for rice promotion	20,000	1.2
4.2 Support dissemination of technologies for sustainable natural resource management.	20,000	1.2
Total	40,000	2.4
Strategy 5: Strengthen Coordination of Actors in the Rice Industry		
5.1 Strengthen coordination of rice institutions (farmer groups, apex associations of farmers, millers and traders, seed companies, Technical and Steering Committee's)	2,000	0.1
5.2 Develop and implement favorable environment, trade and other legal and regulatory framework that promote competitiveness of domestic rice over imported rice.	2,000	0.1

5.3 Establish a functional monitoring, evaluation, learning system	6,000	0.4			
Total	10,000	0.6			
Strategy 6: Addressing Cross Cutting Issues					
6.1 Streamlining Gender, Youth and Persons with Disabilities.	10,000	0.6			
6.2 Provision of production assets to the extremely poor rice farmers.	80,000	4.7			
Total	90,000	5.3			
Grand Total	1,700,000	100			
Gross returns					
Returns in 2025 – 2027 (162,000MT of milled rice x Shs. 3 million per MT x 3 years) = 1,458,000 million <i>Returns in 2028 – 2030</i> (400,000MT x Shs. 3 million per MT x 3 years) = 3,600,000 million <i>Total Gross Returns after Investment</i> 1,458,000 + 3,600,000 = 5,058,000					
Net Returns = Shs. 5,058,000 million – 1,700,000 million = 3,358,000 million Since 1USD = 3700 Ug. Shs. Forex saved = 3,358,000 million/ 3700 = 900 million USD					

6.2 Funding Sources

The NRDS II interventions will be funded by the farmers, millers, traders, the Government of Uganda and Development Partners such as Japan International Cooperation Agency (JICA), the World Bank, European Union, European and Asian States, African Development Bank, Islamic Development Bank, Embassy of the Kingdom of Netherlands, Belgium Government, United States Agency for International Development (USAID), Korean Government, Russian and Chinese Governments, CGIAR donor agencies, Civil Society

Organizations and Private Sector partners among others. The funding will be in form of Bi-lateral Trade, Exchange, Loans, Grants Technical Assistance and technical collaboration.

7.0 MONITORING AND EVALUATION

The Rice Secretariat of the Rice Steering Committee will obtain at the onset of NRDS II, comprehensive list of all rice-related projects being implemented or planned for implementation to track the indicators outlined therein outlined. In addition, the Secretariat will determine, prior to implementation, specific learning questions that will inform the monitoring and evaluation at baseline, mid-term and end-term.

The NRDS II provides high-level indicators for developing the rice industry including their baselines and targets. The cascading of indicators and relevant information at the strategic intervention and strategic action levels shall be the responsibility of individual implementing institutions.

As an important first step in Monitoring, Evaluation and Learning (MEL) and impact assessment, a stakeholder meeting will be held in the first year of the NRDS 2 implementation to guide each responsible institution on the specific learning questions, indicators, means of verification and sources of data among other details

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1	Mpigi	26	Abim
2	Jinja	27	Amolatar
3	Amuria	28	Amuru
4	Kwania	29	Zombo
5	Kabarole	30	Omoro
6	Kakumiro	31	Hoima
7	Buyende	32	Kibaale
8	Kiboga	33	Masindi
9	Luwero	34	Kamwenge
10	Mukono	35	Kanungu
11	Kayunga	36	Kyenjojo
12	Wakiso	37	Buliisa
13	Nakaseke	38	Kiryandongo
14	Buikwe	39	Ntoroko
15	Adjumani	40	Rubirizi
16	Арас	41	Kagadi
17	Arua	42	Bunyangabu
18	Gulu	43	Kikuube
19	Kitgum		
20	Lira		

Table 17. Upland rice districts in Uganda

21	Моуо	
22	Nebbi	
23	Pakwach	
24	Pader	
25	Yumbe	

Table 18. Both Upland and Lowland districts in Uganda

1	Kalungu	26	Bugweri
2	Bugiri	27	Dokolo
3	Busia	28	Koboko
4	Iganga	29	Maracha
5	Kamuli	30	Oyam
6	Kumi	31	Agago
7	Mbale	32	Alebtong
8	Pallisa	33	Lamwo
9	Butebo	34	Nwoya
10	Soroti	35	Otuke
11	Tororo	36	Kasese
12	Kaberamaido		
13	Mayuge		
14	Sironko		
15	Budaka		

16	Bukedea	
17	Butaleja	
18	Kaliro	
19	Namutumba	
20	Bulambuli	
21	Kibuku	
22	Kween	
23	Luuka	
24	Ngora	
25	Serere	

Source: MAAIF (2019). List of Rice Producing Districts prepared through a Technical Meeting on Rice Data by the Rice Desk.