FEDERAL REPUBLIC OF NIGERIA

FEDERAL MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT (FMARD)

NATIONAL RICE DEVELOPMENT STRATEGY II

2020-2030

SECOND EDITION

Foreword

Rice is an important crop for the attainment of food and nutrition security in Nigeria because it is now a major staple food in the country. Although rice is cultivated in most parts of the country, local production has not been able to meet demand due to rapid population growth, urbanization and change in consumer preferences in the last decade. The high cost of rice importation has led the Federal Government of Nigeria to strongly encourage domestic production by providing the enabling environment for the development of a vibrant rice sector that attracts local and foreign investments.

A top priority for the Nigerian Government and key rice stakeholders is increasing domestic rice production to meet the national demand. Significant resources from both the public and private sectors have been devoted to developing the rice sub-sector in the last decade. Though significant progress was made, the local production still is not sufficient to meet the country's demand. This has made it an important issue that needs to be strategically tackled if the nation must attain its self-sufficiency goal.

To mitigate the constraints in the rice sector in Nigeria, meetings and dialogue between government and key stakeholders in the industry were organized. This birthed the first National Rice Development Strategy I (NRDS I) which was implemented from 2010-2018. This resulted in most of the improvements in the sector today. There was significant reduction in importation of milled rice, increased productivity as well as different programmes to support the rice value chain.

The NRDS II was designed within the framework of sustainable development. It has taken into consideration current and future trends as well as challenges in the sector and provided mitigation strategies. The NRDS II is a 10-year strategic plan that would guide the rice sub sector to achieve competitiveness in both the domestic and regional markets. We are optimistic that the implementation of the NRDS II which will commence from 2021 to 2030, will rapidly transform the rice sector and surpass the self-sufficiency goal.

I wish to express my appreciation to the members of the Rice Task Force Team for their commitment and hard work in developing the NRDS II document. This has charted a new course for the rice sector over the next decade in Nigeria.

My final appeal is for all partners and stakeholders to synergize all our actions and plans for the achievement of the desired outcome by the year 2030.

Muhammed Sabo NANONO
Honourable Minister
Federal Ministry of Agriculture and Rural Development
Nigeria

Contents

Acronyms and Abbreviations

ABP	Anchor Borrower Programme
ACSS	Agricultural Credit Support Scheme
ADP	Agricultural Development Programme
AfDB	Africa Development Bank
AGRA	Alliance for Green Revolution in Africa
AR	AfricaRice Centre
APP	Agricultural Promotion Policy
ATA	Agricultural Transformation Agenda
ATASP	Agricultural Transformation Agenda Support Programme
BOA	Bank of Agriculture
BS	Breeder Seed
CACS	Commercial Agricultural Credit Scheme
CARD	Coalition for African Rice Development
CBN	Central Bank of Nigeria
CARI	Competitive Africa Rice Initiative
CBSS	Community Based Seed System
CS	Certified Seed
DB	Development Bank
DPs	Development Partners
EGS	Early Generation Seed
FDA	Federal Department of Agriculture
FMARD	Federal Ministry of Agriculture and Rural Development
FMITI	Federal Ministry of Industry, Trade and Investment
FMST	Federal Ministry of Science and Technology
FMWR	Federal Ministry of Water Resources
FS	Foundation Seed
GA	Green Alternative
GAP	Good Agricultural Practice
GATS	Genetic Access and Transfer Scheme
GHGs	Green House Gases
GAC	Grain Aggregation Center
GES	Growth Enhancement Scheme
GIZ	Deutsche Gesellschaft fur Internationale Zusammenarbeit
IDP	Interest Draw Back
IFAD	International Fund for Agricultural Development
IP	Intellectual Property
IRM	Integrated Rice Mill
JICA	Japan International Cooperation Agency
MT	Metric Ton
NAFDAC	National Agency for Food and Drug Control
NAIC	Nigeria Agricultural Insurance Corporation
NALDA	National Agricultural Land Development Agency
NASC	National Agricultural Seed Council
NASS	National Assembly
NBS	National Bureau of Statistics
NCAM	National Center for Agricultural Mechanization
NCRI	National Cereals Research Institute
NEPAD	New Partnership for Africa Development
NGO	Non-Governmental Organization
NIRSAL	Nigeria Incentive-Based Risk Sharing System for Agricultural Lending
NRDS	National Rice Development Strategy
MIS	Market Information System
PBR	Plant Breeder Rights
PPP	Public Private Partnership
PHL	Post-Harvest Losses
PRIDAN	Paddy Rice Dealers Association of Nigeria
PVR	Plant Varietal Rights
RIFAN	Rice Farmers Association of Nigeria
RIMAN	Rice Millers Association of Nigeria
RIPAN	Rice Processors Association of Nigeria

RTA	Rice Transformation Agenda
RVC	Rice Value Chain
SEEDAN	Seed Entrepreneurs Dealers Association of Nigeria
SHF	Small Holder Farmers
SRP	Sustainable Rice Platform
SON	Standard Organization of Nigeria
TETFUND	Tertiary Education Trust Fund
USAID	United State of America International Development
VCD	Value Chain Development
WUA	Water Users Association

Executive Summary

Nigeria is a member of the Coalition for African Rice Development (CARD), an initiative jointly started by the Japan International Cooperation Agency (JICA), Alliance for a Green Revolution in Africa (AGRA) and New Partnership for Africa Development (NEPAD) with the objective of doubling rice production in Sub-Saharan Africa from 2008-2018. Under the CARD phase 1 Nigeria formulated her National Rice Development Strategy 1 which was later upgraded to the Rice Transformation Agenda Action Plan (RTA-AP) and implemented from 2012 –2015.As a result of the implementation of the RTA-AP the national paddy rice production rose by 7 million metric tons (MT) in 2014 and the nation reached 65% rice self-sufficiency by 2015. This trajectory continued with the Agricultural Promotion Policy (APP) or Green Alternative (GA) 2016-2020. Nigeria was able to double its paddy production by the end of CARD phase 1 in 2018. The goal of NRDS-1 was to increase Nigeria rice production from about 6.0 million tons paddy in 2008 to 12.85 million tons by the year 2018 which was achieved and exceeded. Three strategic priorities were identified and implemented during the NRDS 1. These were:

Priority 1: Improvement of Post-harvest Handling and Processing

Priority 2: Increase Land Development and Irrigation

Priority 3: Improvement in Seed Development and Other Production Inputs.

In addition to these three priorities, the Nigeria NRDS-1 identified four (4) components of the overall strategy that it pursued in order to substantially increase rice production within the 10 years namely;

a. Processing and Marketing

b. Land Development, Irrigation Development and Paddy Production

c. Seed Development; and

d. Rice Production Inputs Supply Development.

As a member of the CARD phase II (2019-2030), Nigeria's quest to achieving rice self-sufficiency is being pursued through the R-I-C-E approach that is Resilience, Industrialization, Competitiveness and Empowerment. The goal of the CARD 11 is to further double member countries paddy production by 2030. As part of the implementation of CARD phase 11, Nigeria has developed a new National Rice Development Strategy II (NRDS II). The NRDS II is a 10-year (2020 – 2030) plan that provides the purpose and direction for the development of the rice sub sector to achieve government's goal of self – sufficiency in rice production, food and nutrition security, employment creation and wealth generation. The aim of the NRDS II is to further double production and produce surplus for the West African markets.

Based on the above, the NRDS-II identified the following objectives

a) Sustain incremental paddy production.
b) Improve the seed systems and strengthen its function
c) Increase the use of mechanization in rice production and processing to reduce drudgery, increase efficiency and reduce production costs
d) Sustain the expansion in the domestic milling and processing of rice

e) Increase access to finance across the value chain and finally
f) Enhance better coordination, monitoring, and evaluation of progress in the sector.

Therefore, the following targets were set to be achieved by 2030.

Paddy production doubled to 34million metric tons. For Nigeria, future output beyond 20-25 million MT of paddy per annum from current production area and with one crop per year remain uncertain except over 50% of all rice farmers are able to cultivate at least two crops per year either from fully irrigated surface or from rain fed lowland with alternative water supply system. Therefore, rain fed lowland area with supplementary irrigation would be increased from 450,000ha to 1.2 million ha and irrigated area with full water control would be doubled to 1.5 million ha.

To enhance resilience of production, eight (8) climate smart varieties adapted or tolerant to floods, drought, salinity, and heat as well as pest and diseases are to be developed. Two (2) hybrid rice varieties are also expected to be developed.

By 2030 it is expected that 66.6 MT of breeder, 5,327.3MT foundation and 426,184 MT of certified seeds would be produced and 80% of rice farmers would be using certified seeds. Both material and human resources of the institutions responsible for the seed system would be improved and strengthened to achieve the set targets.

Improve mechanization to ensure that 50% of rice farmers have access to modern machinery for production, reduce harvest and post-harvest losses by 50%. Develop mechanization business models that work for small holder farmers and reduce inappropriate use of mechanization.

Enhance the quality of domestic milled rice to improve its market competitiveness. Organize 60% of small to medium scale millers into clusters for effective interventions to upgrade their machinery and equipment and capacity building. Improve the milling efficiency of integrated millers and small-scale millers by 65% and 60% respectively. Increase small/ medium scale millers' access to finance by 50%. Training of millers on food safety standards, grading, packaging, and branding. Increase national paddy aggregation by 60%.

Clustering of farmers and processors to improve access to markets and financial services by 50%. Support rice farmers and processors to achieve 40% financial access for machinery acquisition.

A robust monitoring and evaluation framework has been designed for the effective and efficient implementation of the NRDS II to achieve its strategic goals. Policy recommendations on key issues to aid its implementation were also made.

It is envisaged that Nigeria would have achieved the CARD II target of doubling its paddy production and achieving full self–sufficiency and even exporting rice to other African countries by the end of the project in 2030.

Twenty-five (25) million people are expected to benefit from the implementation of the NRDS II. The project is also expected to contribute to the country's achievement of the following Sustainable Development Goals (SDGs); no poverty (SDG 1), zero hunger (SDG 2), gender equality (SDG 5), decent work and economic growth (SDG 8), climate action (SDG 13) and partnership for the goals (SDG 17).

Introduction

The first phase of the National Rice Development Strategy (NRDS I) was implemented in Nigeria between 2008 and 2018 and the period coincided with the Federal Government Agricultural initiative and development strategy called the Agricultural Transformation Agenda (ATA) program which was aimed at productivity improvement, promoting efficiency, wealth, and employment generation along the value chains of some key commodities. One of such commodities that benefited from the ATA program was rice, implemented from 2011 to 2015 with the broad objective of raising the total national rice output to achieve complete import substitution for rice by 2015 but later revised to 2017. Before the commencement of Rice Transformation Agenda (RTA), the Federal Government of Nigeria implemented between 2001 and 2007 the Presidential Initiative on Rice which had similar objectives of increasing domestic rice production to reduce the growing importation of rice and to reduce the huge foreign exchange burden on the government. The Federal Ministry of Agricultural and Rural Development (FMARD) launched the Agricultural Promotion Policy (APP) or Green Alternative (GA) from 2016-2020. The APP had the goal of stimulating local production, economic diversification by building upon the achievements of previous Government's initiatives.

The consistency of the Federal Government of Nigeria's policy direction in the rice sub-sector over two decades is by far the most important factor responsible for the progress made so far. All previous Government policies and programs laid the foundation upon which successive administrations built upon, from Presidential Initiative on Rice, through RTA and the APP. There have been unmistakable upward trends and growing synergy between government, private sector participants and development partners' efforts. With these policies came a whole range of simple innovations like registration and creation of a national rice farmer's database used for the growth enhancement scheme (GES) also known as the electronic wallet (Government partial subsidy on input, free seeds, and 2 bags of fertilizer per ha support). The implementation was not perfect, but it created the awareness and demonstrational effect of quality seeds and fertilizer in many farmer's fields and since then many rice farmers demand only quality seeds and quality fertilizer inputs. This had multiplier effects on the many registered seeds companies who have started working hard in making quality seeds of popular varieties available to rice farmers. Although the seed system is still not perfect, there is far less concerns today about farmer's access to quality seeds or problem of seed adulteration than it was in 2014 or 2015. RTA implementation reached about 7 million rice farmers with about 102,703 MT of improved rice seeds and about 653,639 MT of fertilizer, raising average farm yields to about 4.0 MT/ha. The national paddy rice production grew to about 65% sufficiency by 2015. The opening up of the fertilizer market through a high demand pull between 2011 and 2015 drew market response by private sector participants resulting in higher volume of fertilizer manufactured locally. Also, the Federal Government's agreement with the government of Morocco to supply fertilizer to local fertilizer blenders has made fertilizer more available to farmers. In recent times, the efforts of the Central Bank of Nigeria (CBN) Anchor Borrowers Program (ABP) and Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL) programs have also ensured that paddy production is sustained by facilitating easy access to credit.

The acquisition of 15-20 integrated rice mills by Government and the concession arrangements for individuals to own and run the mills on Public Private Partnership (PPP) aided to increase the national milling capacity to above one million MT of finished rice per year. Though the national milling capacity remained low between 2014-2016 due mainly to the fact that all the new mills were challenged by teething problems such as inadequate paddy supply, low electric power supply and low technical capacity to manage integrated mills, all that has changed between 2015 and 2019 as demand for finished rice grew in response to population growth. In addition to the integrated mills, the Federal Ministry of Agricultural and Rural Development (FMARD) purchased and sold modern small mills of between 20 – 50 tons capacities and de-stoners to improve technology and quality of product of cottage millers. These actions of Government had the combined effect of opening up the space for more private sector participation as many additional integrated rice mills have been installed and running, many more medium and low scale millers have taken up rice processing business with better packaging and de-stoning. These Government actions at encouraging both the Rice Processors Association of Nigeria (RIPAN) that are mainly integrated rice millers as well as cottage and small-scale millers have paid off and have taken the national milling capacity from about 3.3 million MT in 2010 (mainly from cottage millers then), to well above 6.5 million MT of finished rice by 2019, amounting to a doubling of the national milling capacity within 10 years. Also, population growth ensured that there is still a gap between national demand and supply nexus which is estimated to be 500,000MT based on the 200 million population estimate and a per capita rice consumption of 35 kg.

Furthermore, the effort of Government aimed at creating the enabling environment, bringing technology to bear on production, strengthening the seeds and market systems as well as improving on the functionality of the entire rice value chain, is its collaboration with international development partners in implementing loan and grant projects that has contributed so much to the current rice success story in Nigeria. Such projects as the World Bank funded Fadama-3 Additional Financing (WB-Fadama-3 AF), Agro-processing Productivity Enhancement and Livelihoods Improvement Support Project (APPEALS), the Africa Development Bank funded Agricultural Transformation Agenda Support Program phase 1 (AfDB-ATASP-1), the International Funds for Agricultural Development funded Value Chain Development (IFAD-VCDP), the German (GIZ) Competitive Africa Rice Initiative (CARI), Japan International Cooperation Agency (JICA) and United States Agency for International Development among others have all contributed to the development of the rice sector in the country.

Just as it was the aim of the NRDS I to double Sub-Saharan Africa rice production from 14 million MT to 28 million MT between 2008 and 2018, the CARD- NRDS II seeks same objective of doubling rice production in Sub-Saharan Africa from 28 million MT to 56 million MT between 2020 and 2030. Within the same period Nigeria National paddy demand will more than double to from about 16 million MT in 2020 to about 34 million MT (or about 20 million MT of finished rice) to attain sustainable self-sufficiency based on her expected population growth and urbanization rate which are the strongest determinant of changing consumption pattern.

The overall goal of the NRDS phase II is to double rice production to meet with growing national demand (which is estimated to grow at between 5-10% annually) within a period of 10 years (2020 to 2030). To get Nigeria prepared for the development of the NRDS II, a multi stakeholder task

force team was formed by FMARD to develop the document. A 2-day preliminary NRDS development workshop was held in Abuja from 12-13 March 2019. This was followed by two working weeks for the development of the NRDS II. A general appraisal of the recent development in the rice sub-sector was done through presentations leading to the definition of priority areas for NRDS-II and the formation of thematic working groups to examine closely the identified priority areas. More work has been done in yet smaller expert groups to refine the key objectives to be achieved in each aspect earmarked as priority area for NRDS phase 2. The product of these different levels of consultation are summarized in reports of thematic groups addressing:

- What effort is needed to increase domestic paddy production and increasing the volume held in storage or buffer stock over the next decade (2020-2030). This includes plans to increase the area currently under irrigated production, particularly area under supplementary water supply suitable for at least two crop cycles per year
- Strategy to improve the functioning of the seed sector and the seed chain which needs continuous strengthening
- Strategy to improve the mechanization of rice production and processing operations found to be the greatest strategy to reducing production cost and enhancing quality of both paddy and finished rice
- Domestic rice processing has grown but this needs further expansion as well as strengthening the marketing systems for paddy & finished rice
- What should be done about persistent low access to credit and financial services by rice value chain actors
- Greater efforts would be required in the coordination, monitoring and reporting of future developments in the rice sub-sector and there should be data gathering across rice related projects across the various projects.

On the 4th of March 2020, a validation workshop was organized and was attended by over 25 representatives of the major rice stakeholders and development partners to examine the first draft of the NRSD II, and their comments, suggestions and recommendations have been taken on board in the final document.

Priority Areas and Approach

To achieve the overall goal of the NRDS phase II, the approach would be to increase efficiency along the rice value chain, as well as improve the quality and competitiveness of rice products and services in the subsector so that Nigeria does not only attain complete import substitution targets but also have a surplus in the buffer for export by 2030. The use of mechanization for production and processing will enhance productivity, quality, and efficiency, just as the use of quality seeds of improved varieties and good agricultural practice (GAP) will also impact positively on productivity, quality of output, and overall efficiency. Improving access to finance for agribusiness along the value chain will no doubt increase the quality of services and products. As a result, the NRDS II approach that focuses on improving efficiency and quality is the combination of the different strategies and interventions employed to drive the key priority areas below:

Priority Areas;

1. Sustainable increase in paddy production and storage.
2. Sustained production and improved access to quality seed of improved varieties.
3. Increase access and use of mechanization equipment and tools in rice production and processing.
4. Upgrade the Processing and marketing of Nigerian rice.
5. Improve access to credit and financial services for all value chain actors.
6. Strengthening the rice desk of FMARD for monitoring and evaluation.

Several other segments in the value chain could also be the focus but if these priority areas are adequately planned and implemented, then the objective could be achieved within the specified time of this strategy.

Priority One: Sustainable Increase in Paddy Production and Storage

1.0 Paddy Rice Production

Over the past few years, Nigeria has demonstrated a capacity to significantly increase paddy production. However, despite the annual increases in production, self-sufficiency in milled rice is yet to be attained due to mainly population growth which keeps increasing by 2.5-3.0% per annum[1] and changes in consumers preferences influenced largely by growth in urbanization. Various programs and projects have been initiated by governments at various levels, private sector, and donor agencies to support the development of the rice sector, contribute to increased productivity, promotion of resource use efficiency and sustainability of the overall production of Nigerian rice.

Goal: *The goal of priority 1 is to markedly increase on a sustainable basis, the volume of paddy produced, stored-up and marketed in Nigeria to meet the widening annual national demand and surpluses for export in the long run and to improve the livelihoods of rice dependent households in Nigeria, (improve food security and income for rice households).*

Objectives: The following objectives will be pursued to achieve the results needed to attain a sustainable increase in productivity and to address the potential challenges/ bottlenecks impeding progress in the priority area:

- Bring more of Nigeria's potential rice area into cultivation (less than 60% is currently cultivated) through land development and make more rice land available.
- Enhance the productivity of existing cultivated areas through increased adoption of Good Agricultural Practices (GAP) for sustainable rice production and closing the yield gaps existing between farmers.
- Enhance farmers' access to quality agro-inputs and their optimal use at a realistic cost.
- Promote the adoption and use of climate-smart technologies and practices that reduce greenhouse gas emissions from rice fields and increases the resilience or adaptation to climate change impact.
- To promote the adoption of global sustainable rice platform (SRP) standards to mitigate the negative impact on the biophysical and social environment of rice production.
- Increase the rice area (ha) under irrigation (from current less than 1million ha to 2.7 million ha) particularly area under supplementary water supply to attain 2 cropping per year
- Advocate for and promote policy change that affects bullet point 1-5 above.

1.1 Land Development

The land is the primary source for rice cultivation and its development and sustainability needs to be given utmost attention.

i. ***Current Situation***

- Cultivable land is estimated at 4.234 million hectares which are made up of rain-fed uplands

[1] www.worldometers.Info/world-population/Nigeria

30%, rain-fed lowlands 52%, irrigated lowlands 17% and mangroves 1%.

- Land holding is highly fragmented usually betwee1-2 ha per household.
- Insufficient area developed with irrigation structures and a low percentage of farmers accessing irrigation facilities/ good water control.
- Less than 30% of all rice farmers can access supplementary water supply for two crop cycles per year.
- Irrigation carried out mainly through tube wells, wash bores and open water sources

ii. ***Projections***

The proposed projection under this strategy will be to gradually reduce the cultivation of rain-fed upland ecology for rice due to competition with other upland crops and increase massively newly developed rain fed lowlands and fully irrigated ecology due to their robustness for sustainable productivity increase as follows:

- Rain fed ecology 15% (to be reduced by 50% from 1.3 mil ha to 650,000ha only), rain fed lowland with a supplementary water supply and at least two crops per year increased to 28% (i.e., from 450,000 ha to 1.2 million ha).
- Increase or double the percentage irrigated rice area with full water control from 17% to 35% during the next 10 years (i.e., from about 720,000 ha to 1.5 million ha).

iii. ***Challenges/ Bottlenecks***

Some of the challenges/bottlenecks, which tend to impede land development include:

- Family land ownership and their fragmentation within communities.
- Bureaucracy in accessing land titles.
- Individual holdings usually between 1-2 hectares.
- Too much focus on the development of expensive fully irrigated areas with attendant huge cost rather than exploring other sources of supplementary water supply like groundwater, rainwater harvesting in earthen dams, river diversion into rice fields, etc.

iv. ***Measures to Mitigate the Challenges (proposed concrete actions)***

Short-term (within 1-2 years)

- Organize smallholder farmers into clusters.
- Governments at all levels should clear farm land and make it available to rice farmers
- Promote the establishment of specialized land agricultural land clearing companies by the private sector
- Reform land-use laws and initiate good land tenure policies that give rights of access to clusters of farmers in a contiguous area.
- Simplify the process of acquiring land titles- State Governors could mandate commissioners of land to give and sign a certificate of occupancy C of O.

- Organize geo-cooperatives through extension services structures.

Long-term (>5 years)

- Review the 1978 land use act.
- Establish agricultural land and mechanization development bank.
- Digitalize all farmland resources and build a central databank for their management.
- Enact a law to make farmland acceptable collateral in agribusiness loans.

v. ***Outcome of Mitigation***

- Easy access to farmland (large expanse of land available to clustered groups of farmers).

vi. ***The Relevant Organizations at the Nigeria Side***

- State Governments and Local Government Areas.
- Federal Ministry of Agricultural and Rural Development (FMARD).
- Rice Farmers Association
- Bank of Agricultural (BOA).
- Central Bank of Nigeria (CBN)/ NIRSAL.
- National and State Houses of Assemblies.

1.2 Productivity Enhancement

Rice farming is currently characterized by low average farm yield usually between 2.5-4.0 t/ha as the national average; this has persisted since the sixties[2]. In addition, there is high variability in yields and huge yield gaps ranging from 1-4 tons/ ha between average and below-average farmers' yields. The farmers' traditional practices of poor land preparation, of broadcasting seeds rather than transplanting, low-quality inputs e.g., seeds and fertilizers, poor water management, low fertilization application, etc. are partly responsible for low productivity.

i. ***Current Situation***

- Low productivity usually between 2.5 - 4.0t/ha.
- Low input use especially fertilizers.
- Poor quality of inputs.
- Poor market linkage to the input supply.
- Slow technology dissemination.
- Slow adoption rate.
- Traditional system of planting by broadcasting.
- Low financial capacity of farmers to increase farmland and purchase the required inputs.

[2] Africa Rice Center(AfricaRice). 2014. Africa Rice Trends 2001-2010. Cotonou Benin: Pp 108

ii. ***Projections***

- Step down GAP for a Sustainable Rice Production capacity training to 12million rice farmers in 10 years.
- Increase average yield to 4.0t/ha for rain fed upland, 6.0t/ha for rain fed lowland, and 7.5t/ha for irrigated ecology through introduction of new high yielding climate smart rice varieties.

iii. ***Challenges/ Bottlenecks***

- Availability of poor-quality inputs in the market (seeds, fertilizer, agrochemicals).
- Low knowledge and lack of adherence to good agricultural practices (GAP).
- Poor market regulatory control and standardization of inputs by supervisory agencies.
- Low financial capacity of the farmers.

iv. ***Measures to Mitigate Challenges***

Short-term (1-2 years)

- Build capacity of Extension agent (84,000) and farmers (12million) on Good Agricultural Practices (GAP) and sustainable rice production (SRP).
- Establish demonstration farms that show Good Agricultural Practices (GAP) for sustainable rice production.
- Increase the number of extension agents (Government and private sector).

Long-team (>5 years)

- Enact laws on adulteration and production of fake inputs with stringent punishments.
- Increase extension: farmer ratio.
- Use of private extension agents.
- Use of e-extension.
- Use of technology (weather, soil and yield monitoring tools, drones).

v. ***Outcome of Mitigation***

- Increased average yield in all ecologies (as mentioned in section 1.2. ii above).

vi. ***Relevant Organizations at the Nigeria side***

- State Government and Local Government.
- Federal Ministry of Agricultural and Rural Development (FMARD).
- Rice Farmers Association of Nigeria (RIFAN and others).
- Non-Governmental Organizations (NGOs) and Private Sector.

1.3 Input Supply

One of the major constraints to rice production is the challenge of input supply. Usually, inputs

are supplied late either because of unavailability, inaccessibility or unaffordability. High quality inputs need to be available on time and in enough quantity. There is a general low input use and un-coordinated market linkage which result in untimely application.

i. ***Current Situation***

- Low supply of agro-inputs at the village centres.
- High cost of agro-inputs
- Poor handling and application methods (timing, quantity, and misapplication).
- Low input use, particularly fertilizer.
- Poor quality of inputs available in the market.
- Late supply due to lack of village kiosks.

ii. ***Projections***

- Establish a quality standard for agro-Inputs.
- Enact a law on traceability and put a stringent punishment for dealers on sub-standard inputs.
- Increase national average fertilizer utilization (particularly N fertilization per ha. 60kgN to 100kg N/Ha and 45kgP and 45kgK).
- Strengthening the inputs dealer association to deliver their mandate.

iii. ***Challenges/bottlenecks***

- Low quality of agro-inputs in the market.
- In-appropriate application methods.
- Lack of effective monitoring mechanism.
- Low national average of quantity of fertilizer utilized per ha.
- Non-availability (late supply), inaccessibility (points of sales usually very far from the village), and unaffordability (high market price).

iii. ***Measures to Mitigate Challenges***

Short-term (within 1- 2 years)

- Capacity building on GAP (timeliness/recommended dosage) for 12 million rice farmers.
- Train extension workers (84000 extension agents (EAs), 1 EA to 300 farmers/ year in 10 years)
- Put in place effective monitoring mechanism for quality of inputs

Long-term (>5 years)

- Enact law on the quality of agro-inputs.
- Empower supervisory agencies with the enabling laws to apprehend and prosecute offenders.
- Application of technology for traceability.

iv. ***Outcome of Mitigation***

- Better plant health.
- Increase productivity.
- Enactment and operation of enabling laws.

v. ***Relevant Organizations at the Nigeria Side***

- Federal Ministry of Agricultural and Rural Development (FMARD).
- National Agency for Food and Drug Administration (NAFDAC).
- Standard Organization of Nigeria (SON).
- Private Sector.
- National Assembly.

1.4 Environmental Factors

Climate change issues have taken the front burner in agricultural production in the last couple of years. Climate change as it relates to biotic and abiotic factors is taken seriously as it affects crop productivity and environmental sustainability. Greater attention needed to be paid to the issue of resilience, new varieties that are flood and drought tolerant need to be developed and promoted. New technologies to reduce input and water use need to be researched and promoted for adoption. Also rice cultivation is likely going to be a major contributor to global environmental change through multiple pathways. Rice cultivation withdraws a huge portion of available fresh water for irrigation, contributes to deforestation, air pollution through emissions of Green House Gases (GHGs) such as methane, nitrous oxide and carbon dioxide from bush burning particularly in the rain fed upland ecosystems, fertilizer utilization and decomposition of organic matter under flooded conditions in rice fields. As the need to increase productivity increases, so will the use of mineral fertilizer, particularly Nitrogen fertilizer, a major source of methane and other GHGs. In Nigeria, average fertilizer inputs rate in rice production are low compared with global average Nitrogen fertilization in rice systems, but this may change rapidly with the pressure for increased productivity. Also, area with full irrigation facilities or opportunity for continuous flooding is less than 20% of cultivable area or less that 7% of irrigable rice area in Nigeria. However, moving forward, rice production systems in Nigeria needs to aim at long term strategies that promotes environmental sustainability by initiating practices and programs that encourage adaptation and resilience to the impact of global climate change in the long term.

i. ***Current Situation***

- Increase in incidence of flooding and drought.
- Increase in crop failure.
- More incidence of pests and disease occurrences.
- Herdsmen/farmers clash as a result of water shortage.

ii. ***Projections***

- Promote resource efficiency and sustainability both on-farm and throughout the rice value chain.
- Application of technology for accurate weather forecasting, soil testing, integrated pest management (IPM).
- Developing more lowlands to increase rice production while reducing the pressure and deforestation on the uplands ecologies.
- Promote new production systems and practices that curtail increased utilization of Nitrogen fertilizer and encourage the utilization of both mineral and organic fertilizers.
- Promoting new production practices that reduce methane and Nitrous oxide emission from flooded lowland areas, reduce carbon dioxide emission from biomass burning in the upland and rain fed lowland ecosystems and generally reduce deforestation through decreasing the utilization of rain-fed uplands for rice cultivation.
- Breed ecology specific varieties.

iii. ***Challenges***

- Unavailability of new varieties that are adapted to floods, drought, and other vagaries of weather
- Inadequate funding of research institutions for the development of new high yielding climate smart rice varieties.
- Low level awareness by farmers on production technologies to mitigate effect of climate change.
- Non-functional extension service.

iv. ***Measures to mitigate challenges***

- Adequate funding of research institutions to develop high yielding varieties that are adapted to flood, drought, and other biotic and abiotic stresses.
- Create awareness among farmers and other stakeholders on existing technologies for the mitigation of the effect of climate change.
- Promote the adoption of the Sustainable Rice Platform (SRP) modules for environmentally sustainable rice production.
- Promotion of innovations and digital technologies to mitigate the effect of climate on rice production.
- Improvement of the agricultural extension service to be more efficient and effective.

v. ***Outcome of mitigation***

- New climate smart varieties developed
- Resilience of rice varieties developed
- Sustainable rice production enhanced
- Increased rice productivity and production.

vi. ***Relevant Organizations***

- FMARD
- States and Local Governments
- Research Institutions

- International Donor Agencies
- Farmers Associations

1.5 Socio-Economic Issues

The farming population is ageing and there is no replacement due to the unattractiveness of the traditional techniques which tend to deter youth from taking to farming as a profession. Also, women who are engaged in agriculture need to be empowered with simple mechanical tools that reduce drudgery and improve efficiency. Farmer's inability to form clusters or form cooperatives tends to reduce their bargaining power. Recent studies show that only about 30% of Nigerian rice farmers belong to a cooperative society[3].

i. ***Current Situation***

- Depleting and ageing farmer population.
- Low attractiveness of farming to youth.
- Farmers and processors not properly organized into clusters
- Limited female participation in rice farming and low access to landed property
- Low access to labour saving technologies particularly for women stakeholders
- Lack of simple machinery and equipment for production and processing

ii. ***Projections***

- Increase the number of youth participating in farming through capacity building (500,000 short terms and 1,500,000 youth in the long term.
- Increase the number of women participating in various activities along the value chain through capacity building to upgrade their knowledge and use of technology (500,000 in the short term and 1,500,000 women in the long term.
- Increase number of farmers/processors organized into clusters to improve access to markets, financial services, and Government intervention along the value chain.
- Increase number of farmers/processors using modern machinery and equipment.

iii. ***Challenges/ Bottlenecks***

- Low level of mechanization along the rice value chain makes rice farming unattractive to women and youth.
- Low income generated from rice farming due to high production cost.
- Poor infrastructural development (roads, power, and portable water)
- Fragmented land holdings that slow down commercial rice farming.
- Un-coordinated rice value chain.

[3] Akinbode S.O (2013). Access to credit implication to sustainable rice production in Nigeria. Journal of sustainable Development in Africa. 15(1):13-30

iv. ***Measures to Mitigate Challenges***

Short-term (within 1-2 years)

- Increase in mechanization services and technology to reduce the incidence of drudgery and costs of production.
- Rehabilitate infrastructure to generate more income in rice farming.
- Promotion of digital technology and ICT to improve efficiency and attract youth into agriculture.

Long-term (>5 years)

- Upgrade infrastructure and develop new ones (rural roads, power).
- Enact laws to unbundle land acquisition and ownership to promote commercial rice farming.

v. ***Outcome of Mitigation***

- Increased population of empowered youth and women in farming and other agribusinesses.
- Increased access to and use of technology along the value chain.
- Increased rice production.
- Increased income and improve standard of living for all stakeholders including women and youth.

1.6 Government Policy

The policies of the government in recent times are geared towards promoting private sector participation in rice sub - sector development, by providing an enabling environment. The national agricultural policy[4] aims to;

i) Attain food security
ii) Increase nutrition
iii) Generate employment and income
iv) Increase production and productivity
v) Expand export and reduce food import

The Federal Government has therefore, supported the establishment of integrated rice mills (IRM) through a public-private partnership model to enhance the quality of milled rice. Small-scale processors were also empowered through the provision of modern rice mills, colour sorters, par boilers, dryers and de-stoners to improve the quality of Nigerian milled rice. The producers are being supported by FMARD with power tillers, motorized weeders and sprayers, reapers, mini combine harvesters and other equipment.

The Government has also signed a memorandum of understanding with the Moroccan Government that grants the state-owned OCP market access in Nigeria to promote local fertilizer blending and

[4] Federal Ministry of Agriculture and Rural Development (FMARD). 2010. Blueprint on Agriculture and Rural Development

marketing. The Central Bank of Nigeria through the Anchor Borrowers' Program and NIRSAL have tried to reach out to rice farmers by providing easy access to short-term credit while insuring the credit against losses. Farmers are also encouraged and facilitated by Government to form clusters to facilitate credit and market access and reduce the cost of transactions for many partners and actors, e.g., reduce the cost of paddy aggregation for the IRMs. However, the cost of fertilizer input is still high as well as the cost of transplanting, two elements of production cost that each account for between 15 to 30 % (combined 30 to 60%) of the total cost of production per hectare. Fertilizer inputs would require a form of embedded subsidies at the level of the manufacturers to reduce the market prices. Also, rice specific fertilizer could be formulated as a strategy to reducing the cost of fertilization and to reduce losses through volatilization into the atmosphere. Transplanting operations need urgent mechanization attention. Cottage rice processing which currently supplies over 50% of total finished rice in Nigeria, needs urgent policy intervention to upgrade the processing knowledge and technologies utilized in that sector while promoting standardization and food safety issue along the chain. All the above would require enabling policy that ease access to credit at a single-digit cost and favourable moratorium policies.

i. ***Current Situation***

- Lack of inclusive policies.
- Lack of policy consistency.
- Lack of monitoring and evaluation of government policies and interventions.

ii. ***Projections***

- Increase advocacy for more inclusive policies for rice development.
- Strengthen the Rice Desk in the FMARD for robust policy analyses, monitoring, and reporting on policy and other policy-related development in the sub-sector.

iii. ***Challenges/ Bottlenecks***

- Non-involvement of rice stakeholders in policy formulation.
- Weak monitoring and evaluation of interventions.
- Lack of synergy and policy coordination among different stakeholders.
- Lack of confidence in the system among value chain actors due to policy inconsistency and policy unpredictability.
- Non-inclusion of a broad range of actors in policy formulation and reviews.

iv. ***Measures to Mitigate Challenges***

- Policies on rice to be formulated through dialogue with actors in the value chain.
- Opening up the space and inclusion of all national and international development partners active in the sub-sector in policy advocacy and dialogue toward inclusive policy formulation.

v. ***Outcome of Mitigation***

- Robust and inclusive policies created.

- Confidence among actors/ stakeholders in the value chain created.
- Joint evaluation or review of policy direction by stakeholders.
- Strong monitoring and evaluation of government policies for effective implementation.

1.7 Irrigation

Irrigation development and rehabilitation of existing ones to boost production and promote resilience against climate change is an important priority of this strategy. There are potentially about 4.234 million hectares of cultivable rice land in Nigeria and only about 720,000 hectares are currently installed with some form of irrigation facilities and just about 60% of this figure have full water control features which include a water head or dam while others have partial or seasonal water control systems. However, about a 2.2million hectares currently classified as rain-fed lowlands could be transformed into full irrigated areas with potential for 2 to 3 crops cycle per year. This would bring to total irrigated areas of about 2.75 million hectares. Currently, there are 27 dams across the country with a total capacity to irrigate 550,000 hectares of rice farms. Irrigated lowland has the highest yield potential of between 6-9t/ha therefore, investment in irrigation facilities and clustering farmers to form water users association (WUA) for better management of the facilities needs to be promoted. Increasing irrigated surface from half a million to about 2 million hectares alone and with an average yield of 4-5 ha t/ha could give an output of 8-10 million tons of paddy per crop cycle and in two cycles per year about 16 -20 million tons of paddy per year. These investments to transform rain fed lowland into the irrigated areas with full or partial water control features so that farmers have access to water for 2 crops cycle per annum holds the key to Nigeria's self-sufficiency in sustainable paddy production in the face of increasing population. Policies that would facilitate the enabling environment for Public-Private Sector Partnership investment in developing additional irrigation facilities are urgently needed. In addition, attention needs to be given to reducing rice production in rain fed upland ecologies which will reduce deforestation, encourage biodiversity, and stabilize the upland systems around the lowland ecosystems.

i. ***Current Situation***

- Availability of 27 irrigation dams across the country, with 550,000 ha with full water control structures.
- Dilapidated facilities.
- Insecurity at irrigation sites.

ii. ***Projections***

- Increase irrigated facilities to cover about 2.7 million land area and by 40% giving rise to a land area of 1,000,000 ha under irrigation in the short term and by 60% with a land area of 1,500,000 ha in the long term.

iii. ***Challenges/bottlenecks***

- Abandonment of irrigation facilities/projects.
- Poor management of resources for irrigation development.

- Absence of private sector participation in dam and irrigation infrastructure development.
- Inadequate human capital development to manage the facilities.

iv. ***Measures to Mitigate Challenges***

Short-term (within 1-2 years)

- Resuscitate and rehabilitate existing irrigation facilities by the federal and state governments.
- World Bank TRIMMING and ATASP to be extended to all irrigation projects.
- Establish special funding for irrigation development.

Long-term (>5 years)

- Concession of all irrigation facilities across the country.
- License private investors to develop dams for irrigation.

v. ***Outcome of Mitigation***

- Existing irrigation facilities rehabilitated.
- All-year-round rice farming.
- Additional 750,000 ha of full irrigation infrastructure developed.
- Additional 1,200,000 ha of rain fed lowland developed with a supplementary water supply and 2 cycles of rice per year.

vi. ***Relevant Organizations at the Nigerian Side***

- Federal Ministry of Agriculture and Rural Development (FMARD).
- Federal Ministry of Water Resources (FMWR).
- Federal Ministry of Finance, Budget and National Planning.
- Central Bank of Nigeria (CBN).
- Development Banks (DB).
- Private investors.

Priority Two: Sustained Production and Improved Access to Quality Seed of Improved Rice Varieties

2.0 Seed Production and Systems Strengthening

The challenge of getting quality seed across to farmers has been a recurring challenge over the years. This strategy, therefore, places greater emphasis on seed system development. Rice seeds are multiplied and distributed under the formal and informal systems. The National Cereal Research Institute (NCRI) is saddled with the responsibility of producing breeder seed. Foundation seeds and certified seeds are produced by licensed private seed companies and community-based organizations. The government agency responsible for seed inspection and certification is the National Agricultural Seed Council (NASC) under the Federal Ministry of Agriculture and Rural Development (FMARD). In recent years, the number of seeds companies has grown from about 71 in 2012 to close to 314 seed companies currently, which are specialized in the production of certified seeds. Most of the existing seeds companies rely mainly on out-grower schemes with local farmers who themselves are scarcely adequately trained in seed production technology and also do not have proper storage facilities. The quality of such seed becomes sub-standard having been produced and stored under sub-optimal conditions. Farmers themselves are not motivated to buying seed for the same reason and secondly, due to the peculiar nature of the rice plant being over 95% self-pollinated and remains true type without any significant loss in genetic integrity throughout 3 production cycles, farmers tend to resort to re-using their saved grains from the previous harvest as seeds. These grains used as seeds do not perform optimally due to loss in gradual vigour and contamination through different sources. However, it should be noted that there are several challenges along the seed value chain, which if tackled logically could lead to developing the rice sector of Nigeria. Some of the challenges and concrete ways to mitigate them are listed below.

Goal: *The goal of priority 2 is the development of the rice seed sector to improve access to quality seed and increase efficiency in both the demand and supply sides of the seeds chain.*

Objectives: The following objectives shall be carried out to achieve the desired results;

- To develop national human resources for breeding through capacity building for 20 new rice breeders and 350 new seed technicians within 10 years.
- To improve the infrastructure/ facilities at some key national research institutions (NCRI and the any University of Agriculture) and build institutional capacity for sustainable production and distribution of breeder (BS) and foundation (FS) seeds to meet national annual demands.
- Enact and promote enabling laws (Intellectual Property Right) to protect both New Plant Varieties (PVP) and Plant Breeders Rights (PBR).
- To initiate the development and wide adoption of high yielding and climate-smart rice varieties including hybrid rice (that are resistant or tolerant to current stresses like flood, drought, heat, cold, salinity, pest and diseases).
- Promote the utilization of certified seeds (CS) of improved rice varieties, including hybrid rice to improve productivity and mitigate the negative impact of climate change.
- Develop seed business network and market models to improve access to quality rice seed by

individual farmers or cooperatives (a partnership of seed companies, RIFAN/ farmers associations, and NGOs).

- Improve the seeds certification and the entire governance process of the rice seed sector.
- Advocate for and promote policy change that affects the bullet points above.

2.1 Production of Breeder Seeds

2.1.1 Human Resources

i. ***Current Situation***

- Insufficient number of rice breeders (only 4).in NCRI which is the only institution with mandate for the genetic improvement of rice.
- Limited incentive for the few available breeders.
- Limited property rights for breeders.

ii. ***Projections***

Short-term (within 1-2 years)

- 10 Rice breeders need to be recruited at NCRI by 2025.

Long term (>5 years)

- 20 Rice breeders need to be recruited by NCRI by 2030.

iii. ***Challenges/ Bottlenecks***

- Irregular recruitment due to inconsistency in the government policies of employment.
- Poor remuneration for the breeders.
- Lack of private sector participation in breeding.
- Limited involvement of the Universities (particularly Universities of Agriculture).
- The length of time needed to develop a variety.
- Dis-interest in choosing plant breeding as a course of study in the Universities.

iv. ***Measures to Mitigate the Challenges***

Short term (within 1-2 years)

- Recruit at least, 5 breeders.
- Generate the interest of undergraduates of agriculture to choose breeding as a course.

Long term (>5 years)

- Establish policy on private sector rice seed breeding.

v. ***Outcome of mitigation***

- 30 more breeders recruited into NCRI.
- More involvement of private sector in new rice variety development
- Availability of more breeders in the Universities.

vi. ***Relevant Organizations at the Nigeria Side***

- FMARD/NCRI/DPs/Universities/Private companies.

2.1.2 Technicians

i. ***Current Situations***

- Inadequately skilled technicians for early generation seed development in NCRI and Universities.

ii. ***Projections***

- 15 and 25 skilled BS and FS technicians to be recruited into NCRI in the short and long term respectively and 300 FS technicians trained for other seeds companies by 2030.

iii. ***Challenges/ Bottlenecks***

- Limited funding for training and re-training.
- Limited involvement of Universities of Agriculture.
- Limited involvement of the private sector.

iv. ***Measures to Mitigate Challenges***

- More funding in the budget dedicated to human capacity building.
- Adequate budgetary allocation for technical capacity development.
- More involvement of the private sector in breeding activities.

v. ***Outcome of Mitigation***

- 60 technicians recruited and trained.
- Re-training of available technicians.

vi. ***Relevant Organization at the Nigeria Side***

- FMARD/ NCRI/ DPs/ Universities / NASC/ NASS.

2.1.3 Infrastructure/Equipment

2.1.3.1 Land Development

i. ***Current Situations***

- Inadequate well-developed land for breeder seed production at NCRI.

ii. ***Projections***

- Acquisition/development of 10.34ha and 16.65ha of land in the short and long term respectively.

iii. ***Challenges/bottlenecks***

- Inadequate budgetary allocation for land acquisition and development.

iv. ***Measures to Mitigate Challenges***

- The government needs to provide the necessary funding to acquire and develop more land for breeder seed production at NCRI.
- Introduce incentives to motivate increased private sector involvement in plant breeding.
- Plant varietal protection (PVP) law that grants privates sector intellectual property (IP) rights

over their developed material and gets royalties on their material should urgently be enacted.

v. ***Outcome of Mitigation***

- 27 ha of land developed for early generation seed production at NCRI.

2.1.3.2 Procurement of Cold Room/Green House/Screen House/Gene Bank

i. ***Current Situation***

- Lack of Gene Banks.
- Limited number of non-functional screen houses, greenhouses, cold rooms.

ii. ***Projections***

- Provide at least one each of the listed items both short and long term.

iii. ***Challenges/ Bottlenecks***

- No budgetary allocation for the provision of the listed infrastructure.
- Lack of private investment/ collaboration.
- Unstable power supply.

iv. ***Mitigation of Challenges***

- Budgetary allocation to provide infrastructure.
- Private sector collaboration.
- Installation of solar power.

v. ***Outcome of Mitigation***

- Screen house, greenhouse, cold room, and gene bank provided.

vi. ***Relevant Organization***

- FMARD/ NCRI/ TENTFUND/ DPs/ Universities.

2.1.3.3 Irrigation Facility

i. ***Current Situation***

- Lack of irrigation facilities in NCRI for all-year-round breeder seeds production.

ii. ***Projections***

- Provide tube wells and pumping machines in the short term.
- Build micro dams in the long term.

iii. ***Challenges/ Bottlenecks***

- Lack of funding for facility development.
- Lack of private sector investment.

iv. ***Mitigation of Challenges***

- Budgetary allocation for the development of tube wells and micro dams.
- Private sector/DPs collaboration.

2.1.3.4 Intellectual Propriety Right (IPR)/Plant Variety Protection Rights (PVP)

i. ***Current Situation***

- Absence of intellectual property rights (IPR) for breeders.

ii. ***Projections***

- Introduce legislation for the protection of plant breeding rights.
- Attract increased investments in plant breeding.
- Implement a licensing policy for Genetic Access and Transfers, e.g. The Genetic Access and Transfer Scheme (GATS).

iii. ***Challenges/Bottlenecks***

- No adequate compensation for varietal development.
- Lack of protection for newly developed plant varieties.

iv. ***Mitigation of Challenges***

Short-term (within 1-2 years)

- Implement 20% ownership for varietal development.

Long-term (>5 years)

- Introduce a licensing policy for Genetic Access and Transfer.
- Government to liberalize seed development by encouraging independent seed research companies to develop and commercialize seed technologies as obtained in developed agricultural nations like China and the United States of America (USA).
- Enact legislation for Intellectual Property Right for the protection of New Plant Varieties (PVP) and Plant Breeders Rights (PBR).

v. ***Outcome of Mitigation***

- Diversity of Breeders: Increase in the number of breeders in both the private and public sectors.
- Breeder Seed Quality enhanced leading to increased patronage.
- Increased private sector investments in plant breeding.
- New rice varieties developed.

vi. ***Relevant Organizations at the Nigeria Side***

- FMARD/ NCRI/ NASC/ Private Sector/ National Assembly.

2.1.4 Breeder Seed Patronage

i. ***Current Situation***

- Lack of sustainable Breeder seed production by designated research and private licensed breeding companies.
- There is a low link to the patronage of breeder seed by seeds companies even when the breeder seeds are available.

ii. ***Projections***

- NCRI/AfricaRice Centre and Private Breeders to produce between 25.7 Mt and 41.3 Mt of Breeder seeds during 2020 to 2025 and between 45.5 Mt and 66.6 Mt during 2026 to 2030 in line with the national demand for paddy rice.
- Increase the patronage of breeder seeds by 20% and 50% in the short and long term

respectively.

iii. ***Challenges/ Bottlenecks***

- The absence of an adequate early generation seed (EGS) demands forecasting system.

iv. ***Mitigation of the Challenges***

- Seed companies need to acquire breeder seeds from NASC.
- Re-introduction of the yearly seed planning meeting.

v. ***Outcome of Mitigation***

- Enhanced planning for breeder seed production.

vi. ***Relevant Organizations at the Nigeria Side***

- FMARD/ NASC
- NCRI/ AFRICARICE.
- Private seed companies /Universities.

2.1.5 Breeder Seed Production Training/Manual

i. ***Current Situation***

- Lack of capacity building on breeders' seeds production technology and training manuals. If the knowledge is available, it is not often updated.

ii. ***Projection***

- Conduct capacity building on BS production technologies for the technicians.
- Production and distribution of training manuals (1000 and 2000 copies) on breeder seed production in the short and long term respectively.

iii. ***Challenges/ Bottlenecks***

- Importance has not been attached to the use of manuals for seed production training
- There is no funding for manual productions.

iv. ***Mitigation of Challenges***

- Breeders need to be funded to produce and distribute manuals to the seed companies for awareness creation on the need to re inject breeder seed periodically into the systems.

v. ***Outcome of Mitigation***

- Availability of breeder seed production manuals.

vi. ***Relevant Organizations at the Nigeria Side***

- FMARD/NCRI/NASC/DPs/Private seed companies/SEDAN.

2.1.6 Production of Climate Smart Varieties

Climate-smart varieties that will be resilient to climate change need to be developed.

i. ***Current Situations***

- There is a slow development of climate-smart varieties such as drought resistance, flood-tolerant, salinity, and heat tolerance.
- Presently there are only two flood tolerant varieties.
- No hybrid rice varieties.

ii. ***Projections***

- Two climate-smart varieties responding to each stress (flood, drought, salinity, heat) developed in the long term.

iii. ***Challenges/ Bottlenecks***

- Lack of defined budget for breeder seed development.

iv. ***Mitigation of Challenges***

- Need to set out defined budget for breeding of smart varieties.

v. ***Outcome of Mitigation***

- Minimum of well adopted two varieties of each developed.
- Two hybrid varieties developed.

2.2 Production of Foundation Seeds

Foundation seeds are produced by licensed private companies under the supervision of the National Agricultural Seed Council (NASC).

2.2.1 Producers

i. ***Current Situation***

- Only 6 private companies, NCRI and AfricaRice Centre are licensed by NASC to produce FS.
- Lack of sustainable foundation seed production by designated companies and even when available there is low patronage to advance these to certified seeds by seeds companies.

ii. ***Projections***

- License 10 and 20 companies in the short and long term respectively to produce FS.
- Increase the production of foundation seeds annually by 1700 tons to 2700 tons during the mid-term (2020 to 2025) and between 3000 to 5300 tons during 2026 to 2030.
- Increase the availability and uptake of foundation seed by seeds licensed companies.

iii. ***Challenges/ Bottlenecks***

- Shortage of human resources and lack of capacity development of existing ones in FS production.
- Lack of manuals on FS production.

iv. ***Mitigation of Challenges***

- Companies need to employ and train more technicians in FS production.
- Production manuals on FS production.

v. ***Outcome of Mitigation***

- More skilled technicians available for FS production.

vi. ***Relevant Organizations at the Nigeria Side***

- FMARD/NCRI/NASC/DPs/Private companies/SEEDAN.

2.2.2 Out-Growers

i. ***Current Situation***

- Lack of skilled out-growers for FS production.

ii. ***Projections***

- Need to build the capacity of 1000 and 2000 smart seed out-growers, (with particular focus on youth seed entrepreneurs) in the short and long term respectively.

iii. ***Challenges/ Bottlenecks***

- Limited breeder seeds were available to be multiplied to FS.
- Lack of defined contract farming system.
- Weak cooperative laws.

iv. ***Mitigation of Challenges***

- More breeder seeds to be made available to the seed companies.
- Enact laws on contract farming.

v. ***Outcome of Mitigation***

- More foundation seed made available to certified seed producers.

2.3 Production of Certified Seeds

Certified seeds (CS) are seeds available to the farmer for grain production. Certified seeds are also accessible to the various states Agricultural Development Programs (ADPs), RIFAN, and other farmers associations and NGOs for final distribution to individual rice farmers or cooperatives. Private seed companies also market their seeds to rice growers through the agro-dealer network. The challenges to accessing quality CS is enormous and this has persisted over the years which has negatively impacted rice sector development. This strategy aims to promote timely and sufficient availability, accessibility, and affordability of quality seeds of improved varieties to the Nigerian farmers. However, to achieve the objective, certain challenges need to be addressed as listed below.

i. ***Current Situations***

- There are 314 seed companies accredited by NASC to produce certified seeds.
- Most of the seed companies use out-growers to produce seed which they off-take at the end of the harvest.
- The community-based seed production system is very weak.

ii. ***Projection***

- Accredit more seed companies for CS production.
- Give full legal backing to community seed production.
- Enact enabling laws on contract farming.

iii. ***Challenges/ Bottlenecks***

- Low patronage of CS.
- Poor quality of CS in the system.
- Side selling of seeds by out-growers.
- Ineffective contractual agreement.
- Poor public sector recognition of the Community Based Seed System (CBSS).
- Poor traceability system for seed.

iv. ***Mitigation of Challenges***

- Increase patronage by 30% and 50% in the short and long term respectively.
- The appropriate sanctions for seed companies that deal on sub-standard seeds.
- Introduction and use of hybrid rice variety to increase production.
- Adoption and utilization of a community-based seed system (CBSS) to encourage the production of large quantities of quality seeds within easy reach of farmers.
- States governments to be encouraged to provide effective seed storage facilities in order to enhance farmers access to quality seeds at all times
- Strengthen NASC for effective traceability.

v. ***Outcome of Mitigation***

- Improved quality of CS in the system.
- Patronage of CS by farmers improved.

vi. ***Relevant Organization at the Nigeria Side***

- FMARD/NASC.
- SEEDAN/Seed companies.

2.4 Seed Certification and Quality Control

The government agency responsible for the inspection and certification of paddy seed is the National Agricultural Seed Council (NASC) under the Federal Ministry of Agriculture and Rural Development (FMARD). NASC has 6 laboratories spread across the country, however, these laboratories cannot perform their statutory function due to obsolete equipment and inadequately trained personnel. Listed below are some of the challenges of NASC and proposed mitigation actions.

i. ***Current Situations***

- All seeds traded within the country must undergo seed certification.
- NASC has 6 regional poorly equipped laboratories.
- NASC has one central seed testing laboratory and one molecular laboratory in FCT.
- Operate visual inspection.

ii. ***Projection***

- Migration from visual to diagnostic certification.
- Enable third party seed certification and e-certification.

iii. ***Challenges/ Bottlenecks***

- Inadequate number and qualified seed analysts.
- Poorly equipped regional laboratories.
- Obsolete equipment in the regional offices.
- Unstable power supply to power laboratory equipment.

iv. ***Measures to Mitigate Challenges***

- Need to employ and train seed analysts and also to build the capacity of the existing staff.
- Development of descriptor for traded rice varieties.
- Introduction of a third-party seed certification system e-certification to cope with insufficient personnel.

v. ***Outcome of Mitigation***

- More trained personnel.
- Availability of quality seed in the system.
- Confidence building among the farmers.

vi. ***Relevant Organization at the Nigeria Side***

- FMARD/NASC/SEEDAN/Seed companies.

Priority Three: Increase Access and Use of Mechanization Equipment and Tools in Rice Production and Processing

An assessment of the status of the use of mechanization in both farm and post-harvest operations in the rice system in Nigeria reveals a plethora of challenges that range from purely technical, to operational and policy-related issues, resulting in a very low percentage of farmers who have access or can afford the use of mechanical equipment in the rice production systems in Nigeria. Over several decades, successive national and state governments have tried to change the narrative by the uncoordinated importation of agricultural equipment to improve mechanization, decrease drudgery and increase efficiency in farm and post farm operations. Reasons for failures of such initiatives could be due to the following reasons: complete absence or inadequate maintenance culture, poor local adaptation plans, misapplication of machinery, poor business models, and business environment to make the mechanical equipment function sustainably. The production of machines, the growth in population, and market growth for agricultural machinery have remained low (less than 10%) in sub-Sahara Africa, including Nigeria due to similar factors. However, for sustainable development of mechanization in rice farming and post-harvest handling in Nigeria, several mechanisms that combine improved access to machinery, improved operational modalities, improved access to financial services with improving business models and environment must be put in place, as well as policies that drive same.

***Goal**: The goal of priority 3 is to increase access to mechanization equipment and tools to enhance quality and increase efficiency in rice farming and processing.*

Objectives: The following objectives shall be pursued to achieve the desired results;

- Rapid adoption and utilization of appropriate cost-effective machinery or equipment like mechanical soil tillers, planters, transplanters, harvesters, dryers, etc., to reduce drudgery in all rice farming and processing operations.
- Improve accessibility and affordability of machines used for rice cultivation and processing by establishing a private sector lead domestic manufacturing/ assemblage plants and through the business incubation arm of the National Centre for Agricultural Mechanization (NCAM).
- Improve access to credit and government subsidies to increase acquisition of mechanization equipment, machinery, and tools by users.
- Capacity building for operators and repairers of machines to increase the number of skilled handlers of machines to attain operational efficiency.
- Organize farmers in clusters for easy acquisition, use efficiency, and enhanced profitability of mechanization equipment and tools.
- Develop business models for practicable and sustainable mechanization amongst smallholder farmers.
- Enact mechanization policies and programs that address and fine-tune all the areas of concerns above.
- Advocate for and promote policy change that affects the bullet point above.

3.1 Higher Efficiency through Mechanization

Over the past few years, paddy production and rice processing have witnessed a few bottlenecks that need to be addressed, some of which include the following:

i. ***Current Situation***

- High incidence of drudgery along the value chain (production and processing.
- Misapplication of machinery.
- High costs of needed machinery and equipment
- Lack of skilled manpower for the operation and maintenance of the machinery
- Poor or lack of business models for sustainable utilization of agricultural machinery.

ii. ***Projections***

- Mechanization of 20-30% of rice farm operations by 2030.

iii. ***Challenges/ Bottlenecks***

The challenges are further broken down into five closely related areas;

- Availability of appropriate tools and equipment.
- Affordability of such mechanical equipment.
- Adaptability and functionality.
- Availability of the required skills and Materials and course.
- Policy.

3.1.1 Availability of Appropriate Tools and Equipment

- Lack of appropriate manufacturing infrastructure, where they exist, they are moribund and obsolete.
- Tools and machinery are obsolete and malfunctioning hence needs for modern tools and machinery.
- Lack of locally fabricated simple and cost-effective machinery.

3.1.2 Affordability of Mechanical Equipment

- High cost of both imported and internally adapted mechanical equipment and tools.
- Poor access to finance to purchase or access to the machines through government interventions, NGOs (or organized cooperative), that is grant/ loan.

3.1.3 Adaptability and Functionality

- Lack of knowledge about the appropriate machine to use (selection of appropriate machines).
- Low successful adaptation and poor functionality of adapted prototypes.
- Fabricated machines do not deliver the expected result.

3.1.4 Availability of the Required Skills and Materials

- Lack of appropriate tools and machinery.
- Lack of adequate operational, usage, and maintenance skills.
- Scarce key personnel to carry out maintenance and repair.

3.1.5 Current Policy Challenges

- Low awareness or low prioritization of the importance and advantages of mechanization at the level of policymakers.
- Non-existence of clear policies for mechanization on rice production.

iv. ***Measures to Mitigate the Challenges***

Short-term (within 1-2 years)

- Agricultural machinery manufacturers and Fabricators should regularly organize workshops, field days, and exhibitions where their wares can be displayed and demonstrated to the farmers/Processors/marketers.
- The capacity of the end-users and operators of the machines and the equipment should be built to improve the operational, maintenance, and repair skills.
- Government should extend their intervention to machinery by given Subsidies to equipment and tools fabricators to make equipment available to the end-users which will consequently increase the volume of sale of fabricators.

Long team (>5 years)

- Provision of clear and dynamic policies to mechanize rice production.
- Provision of standard/modern infrastructures for Agricultural Equipment and tools and refurbishment of moribund and obsolete infrastructures, facilities, and machinery.

v. ***Results (Outputs) of Mitigations***

- Policy to create an enabling environment for rice mechanization
- Efficient and effective agricultural machinery available.
- Farmers well informed on the available and effective machinery.
- Skilled operators and good management of agricultural machinery are impacted.
- Necessary equipment available and affordable for farmer's access and use (planters, transplanters, harvesters etc.).

vi. ***Relevant Organizations***

- Ministries/Private Sectors/Agencies/DPS.
- Federal Ministry of Agricultura and Rural Development (FMARD).
- Federal Ministry of Science and Technology (FMST).
- Research Institutes (NCAM, Universities).
- Regional and state government agencies like PRODA.
- Private sector players.
- Financial Institutions/ Funding agencies.

3.2 Reduce Inappropriate Mechanization

The most common agricultural machinery imported into Nigeria and with a good market is the heavy-duty type 4-wheel tractors of 60 HP. They are suitable for coupling a 3-disc plough, 7 disk harrow and 3-ton trailer and are most adapted to the upland production system. These types of

heavy machines are usually deployed for all farm operations irrespective of soil type and operation but are not well adapted to lowland environments.

i. ***Current Situation***

- Misapplication of machinery.
- No regulation in the importation and introduction of machines.
- Inadequate training on operational and maintenance aspects.
- Inadequate supply of new generation operators/ handlers.
- Destruction of the environment resulting from the wrong application.

ii. ***Measures to Mitigate Challenges***

Short-term (within 1- 2 years)

- Skills of operators built.
- Regulation in the importation of machinery into the country to ensure that only standard and suitable ones are imported
- NCAM strengthened to evaluate all agricultural equipment produced in the country and adapt imported ones to suit local conditions.
- Encourage a new generation of operators.

Long-term (>5 years)

- Funding of research institutions to develop simple, appropriate, cost-effective, and intermediary machines.
- Identification and selection of farmers/ processors for special government intervention.

iii. ***Outcome of Mitigation***

- Robust mechanization practices developed with proper utilization of machines according to design.
- Increased number of skilled handlers of machines to attain operational efficiency.
- Easy access to agricultural mechanization due to the availability of operators and machines.

3.3 Technology

i. ***Current Situation***

- Tractors - 5000 functional (6,500 serviceable), (MECA 2018).
- Grossly inadequate tractors, planters, combine harvesters and conditioning machines.

ii. ***Projections***

- Government intervention on the procurement of about 5000 tractors.
- Public Private Partnerships (PPP) between FMARD/BOA/NAMEL to increase access to agricultural mechanization equipment at 20% down payment.

iii. ***Challenges/ Bottlenecks***

- Inadequate mechanization equipment.
- High cost of funds to acquire mechanization equipment.
- Poor funding of seed development technologies.

iv. ***Measures to Mitigate Challenges***

Short-term (within 1- 2 years)

- Repair the existing serviceable tractors and make them functional.
- Utilize the PPP arrangement between FMARD/BOA/NAMEL) to access agricultural mechanization equipment at a 20% down payment.
- Simplify access to the Commercial Agricultural Credit Scheme (CACS) fund to enable farmers' cooperatives to access farm mechanization loans under the NIRSAL Credit Guarantee.

Long-term (>5 years)

- Effective implementation of the Green Imperative mechanization program.
- Create agricultural land and mechanization financing bank.

v. ***Outcome of Mitigation***

- Easy access to agricultural mechanization and higher yield.

vi. ***Relevant Organizations at the Nigeria Side***

- Federal Ministry of Agricultural and Rural Development (FMARD).
- Federal Ministry of Science and Technology (FMST).
- Research Institutes (NCAM, Universities).
- Regional and state government agencies like PRODA, etc.
- Private sector players.
- Financial Institutions/ Funding agencies (BOA, BOI, NIRSAL, NAMEL, Commercial Banks, Insurance Companies.

Priority Four: Upgrade the Processing and Marketing of Nigeria Rice

The appraisal report at the beginning of the Rice Transformation Agenda Program of the Federal Government of Nigeria (2011-2015), which also coincided with the implementation of the NRDS I in Nigeria, cited the National Bureau of Statistics (NBS, 2010) which estimated Nigerian total annul rice demand at 5.2 million MT while local rice production was estimated at 3.3 million MT. As a result, one of the objectives of RTA was to increase local rice production to close the demand gap of 1.9 million MT and the expected closing of the gap by 2015. At a conservative annual growth rate in local demand between 3% (rate of population change) and 5% (rate of change in population and urbanization, the two key drivers of changes in rice demand put together), by 2015, the total annual rice demand would be between 6.0 to 6.5 million MT. Therefore, the actual national demand gap expected to have been closed in 2015 was 3.2 million MT of finished rice. Following the same rate of change in population and urbanization, by 2020, the estimated annual national demand stands at between 6.8 and 7.8 million MT of rice. On the supply side, in 2010, there was only one integrated rice mill in Nigeria which also closed down at about 2010-2011, meaning the estimated 3.3 national supply capacity in 2010 was almost 100% sourced from small scale cottage rice millers scattered in clusters across the Country. By the end of 2019 in a period of 10 to 12 years, there are now over 70 fully integrated rice mills in Nigeria at different stages of installation and operation, with a minimum of 10,000MT and 15,000 MT per annum and with a total install capacity of over 2 million MT of finished rice, although none is producing at up to 70% installed capacity.

Goal: *The goal of priority 4 is to enhance the quality and market competitiveness of domestic rice; to increase on a sustainable basis, the volume of finished rice produced, stored, and marketed domestically to meet annual national demand and surpluses for export in the long run.*

Objectives: The following objectives shall be carried out to achieve the desired results;

- Capacity building for major actors of micro, small and medium scale enterprises (Cottage milling level) to upgrade their knowledge on modern parboiling /milling to improve product quality and increase milling efficiency.
- Capacity building for managers, operators, and repairers of machines of integrated rice mills (large scale millers) to upgrade their knowledge and increase the number of skilled handlers of machines and overcome the shortfall of quality technical staff in that sector.
- Capacity building for major actors on quality standards (farmers to produce quality paddy, the processor on SON quality standards, aggregators on drying and value addition, etc.) to strengthen the supply of high-quality paddy from farm gate to the mills.
- Upgrade technologies for micro and medium scale enterprises (Cottage milling) by the introduction of improved (milling, de-stoning, drying, Colour sorting, Grading, etc.) machines to improve product quality, increase efficiency and enhance market competitiveness.
- Increase access to improved and affordable post-harvest machinery (threshing, milling, drying, de-stoning, grading colour sorting, etc.) through capacity building of indigenous fabricators or the establishments of private sector lead manufacturing/ assemblage entities.
- Improve national aggregation and storage capacity for paddy and finished rice through the provision of Government-subsidized aggregation facilities in major rice-producing Local

Government Areas (LGAs).

- Organize farmers into clusters for easy access to paddy and finished rice aggregation centres and enhanced profitability of use of mechanization equipment and tools.
- Advocate for and promote policy change that affects the bullet points above.

4.1 Processing and Marketing

Four priority areas are identified in the area of processing and marketing:

1. Post-harvest handling and management.
2. Processing (parboiling and milling).
3. Quality standards through mechanization.
4. Product marketing.

4.1.1 Post-Harvest Handling and Management

i. ***Current Situation***

- The majority of farmers (12million rice farmers) still harvest rice using traditional techniques and methods.
- 15% of produce is lost to poor harvest and post-harvest practices on the farm.
- 80-85% of farmers do not have access to post-harvest machinery and services.
- Poor/inadequate storage facilities.
- Inadequate pre-cleaning, drying, winnowing, and storage facilities. For example, only 25 government-owned grain aggregation centres (GACs) in 9 states in Nigeria and only 17 of them are functional and poorly equipped.
- Poor rural infrastructure e.g., poor rural roads network, poor power supply, drying facilities, storage facilities.
- Limited technical know-how on processing, particularly at cottage micros enterprises.
- Poor handling during transportation.

ii. ***Projections***

- Train at least 20-30% of the farmers on improved postharvest practices by 2025 and 40-50% by 2030.
- Reduction of post-harvest losses by 50%.
- 40-50% of farmers have access to modern postharvest machinery by 2030.
- Make available at least one grain aggregation centre (GAC) in each rice production Local Government Area (LGA) of the country as well to establish community warehouses in rice-producing communities.
- Provision of more infrastructure: regular power supply, good roads networks, drying and storage facilities.

iii. ***Challenges/ Bottlenecks***

- Poor postharvest technologies.

- Lack of access to appropriate harvest and post-harvest machinery like rice reapers, rice threshers, simple combine harvesters, dryers, winnowers, etc.
- Lack of capacity of farmers to utilize these machinery and high cost of the machinery.
- Absence of maintenance and repair culture by operators/farmers owners.
- Limited access to finance to procure and run post-harvest handling equipment service centres
- High interest rate on credit when available.
- Poor quality machines.
- Inadequate number of storage facilities.
- High cost of establishing and running modern grain aggregation centres.
- Absence of farmers clusters to cater adequately for many farmers' needs.
- Gross deficit in relevant infrastructural provision.

iv. ***Measures to Mitigate Challenges***

Short-term (within 1-2 years)

- Sensitization, demonstration, and capacity building of farmers/extension officers on modern harvest, postharvest and processing technologies.
- Support farmer groups to access single digit credit for post-harvest machinery acquisition
- Setup of postharvest machinery hiring and service centres.
- Provision of subsidies on postharvest equipment such as reapers, motorized mini threshers, winnower, and hand harvesters.
- Provision of bulk grain storage facilities and on farm paddy drying equipment by states governments.
- Capacity building for local fabricators and NCAM on fabrication and maintain these machineries.
- Improve access to finance to acquire and run post-harvest /processing equipment hiring and leasing centres
- Clustering of farmers to ease access to finance and machinery services.

Long-term (> 5 years)

- Establishment of GACs in all rice production clusters across the country by the Federal and states governments as well as private organizations / individuals
- Introduction of ICT and other digital technology in paddy aggregation.
- Provision of adequate infrastructures

v. ***Outcome of Mitigation***

- Reduction in post-harvest losses.
- 40% of farmers groups have access to finance to purchase machinery by 2030.
- Increased access to improved post-harvest machinery.
- Increased number of skilled fabricators of postharvest machinery.
- Relevant and adequate infrastructure provided.

vi. ***Relevant Organizations at the Nigeria Side***

- FMARD/Development partners /NGOs.

- Financial institutions, BOA, BOI.
- Research Institutions, e.g., NCAM, NCRI, AfricaRice Centre.
- Private sector, PRIDAN.
- Government at all levels.

4.1.2 Processing (Parboiling and Milling)

i. ***Current Situation***

- Low recovery rate (an average of 60% milling efficiency for the IRM, and 50% for small and medium millers) of milling machines.
- Limited knowledge and experience sharing amongst mill operators.
- Below 50% utilization of installed milling capacity.
- Low number of improved small-scale parboiling equipment.
- Low number of skilled fabricators in parboiling technology.
- Limited expansion due to limited access to finance.
- Small-scale cottage mills using obsolete machinery scattered across the country.
- Low conversion of milled rice to other rice products.
- Little or no value addition after milled rice (product diversification/value addition).

ii. ***Projections***

- Achieve 65% milling efficiency for IRM and 60% for small and medium millers by 2030.
- Increase in the number of skilled technical manpower for operation and maintenance of mills by 2030.
- 75% utilization of milling capacity by 2030.
- Increased number of trained small-scale par boilers by 2025.
- Increased number of trained local fabricators on parboiling technology equipment by 2025.
- Increased access to finance for mills by 2030.
- Organize at least 40% of small scales millers into production clusters by 2025.
- Training small millers on food safety, standards, grading, and branding.
- Efficient use of rice by-products e.g., bran and husk by 2030.
- Increase in variety of products from after milled rice by 2030.

iii. ***Challenges/ Bottlenecks***

- Poor quality of paddy from farmers who haven't been trained. i.e., mixed up varieties, high moisture content, and impurities.
- High cost of operation due to power outage, most millers depend on alternative sources of energy like diesel generators, etc., which increases milling cost.
- Low number of trained milling operators.
- Spare parts of machines are not readily available.
- Lack of adequate quantity of paddy to process all year round.
- Local par boilers/processors have limited access to finance to expand their operations and produce more.

- Inadequate capacity building for fabricators of small-scale par boilers.
- High interest rates charged by commercial banks.
- Small scale mills owners associations are not organized.
- Wastage of milled rice by-products.
- Only small-scale value addition after milled rice is produced.

iv. ***Measures to Mitigate Challenges***

Short-term (within 1-2 years)

- Capacity building for farmers to produce quality paddy for the processors, aggregators, and producers to strengthen the supply chain mechanism from farm gate to the mill.
- Capacity building for operators and encouraging youth to be trained in milling operation.
- Training of operators and youth on machine maintenance and linkage to spare parts markets.
- Improved access to finance for millers to source/aggregate larger quantity of paddy locally.
- Increased access to finance for local par boilers/processors to upgrade their machinery and equipment to expand their operations and adopt new parboiling techniques.
- Identify and organize small-scale mills owners/ operators into cooperatives, build their capacity, upgrade mills to modern rice mills and link them to improved milling machines.
- CBN should create better incentives for commercial banks to lend to processors.
- NCAM to identify more fabricators and build their capacity to fabricate better parboiling and processing equipment.
- Identify sustainable uses of milled rice by-products, like bran for animal feed, husk to generate power for par boilers, briquettes etc. and train women and youth on the use of these bye products to generate income.
- Training of women and youth on value addition. e.g., rice flour, rice drinks, noodles etc.

Long-term (>5 years)

- Continuous training of operators and youth on machine maintenance and linkage to spare parts markets.
- Identify and organize small-scale mills, build their capacity, upgrade milling technologies to modern rice mills and link them to improved milling machines.
- Improved infrastructure on a sustainable basis e.g., energy, water, access road in milling clusters.
- Introduction of digital technologies in tracking and monitoring contracted farmers to ensure they adhere to best practices and repay their loans.
- Identify efficient and sustainable use of milled rice by-products, like bran for animal feed, husk to generate power for par boilers, brackets, etc., and train women and youth on the use of these bye products to generate income.
- Heavier sanctions and restrictions on smugglers of processing machines.

v. ***Outcome of Mitigation***

- Enhanced milling efficiency as a result of the use of better-quality paddy

- Timely supply of quality paddy to mills because of better record-keeping by the mills and contract farmers.
- Cost of operation reduced because of adequate provision of infrastructure
- Increase in qualified mill operators who can also maintain the machines.
- An increase in paddy off-take increased utilization of the milling capacity.
- Increased patronage on locally milled rice.
- Increased production of milled rice, creation of job opportunities for youth and women.
- Increased number of local fabricators of parboiling and processing equipment.
- Increase in production and expansion for rice processors.
- Improvement in the quality of milled rice.
- More efficient and innovative use of milled rice by-products.
- Diversification of products from rice and creation of employment.

vi. ***Relevant Organizations at the Nigeria Side***

- FMARD, DPs, RIPAN.
- NCAM, RIPAN, PRIDAN.
- Financial Institutions.
- Other private sector operators.

4.1.3 Quality Standards through Mechanization

i. ***Current Situation***

- Paddy moisture content above the range of 12-14%.
- 97% of paddy in Nigeria are below the paddy grading standards standard (JICA [5]2017).
- Little or no awareness of the paddy grading standards.
- Mixture of varieties.
- High level of impurities.
- Low quality of locally milled rice.

ii. ***Projections***

- Train 35% of farmers on appropriate drying methods of their paddy to the required moisture content by 2025.
- At least 40% of stakeholders (farmers, millers, and aggregators) are aware and trained on paddy grading standards by 2025.
- The capacity of all ADPs and 60% of aggregation centres staff built, equipped with laboratories or tools for paddy quality check by 2025.
- At least 60-70% of farmers have access to modern postharvest machinery by 2030.
- Quality to be improved to international standards.

iii. ***Challenges/ Bottlenecks***

- Lack of knowledge on paddy grading standards.

[5]JICA (2017) Enforcement of Standard on Paddy Quality and Development of Milled Rice Quality Standards.

- Farmers and stakeholders do not use the national standards to grade paddy.
- Paddy grading tools and knowledge of stakeholders are limited.
- Limited access to certified seeds.
- Poor post-harvest practices.
- Poor quality paddy.
- Low access to modern processing technologies (parboiling).
- Lack of access to milling machinery.

iv. ***Measures to Mitigate Challenges***

Short-term (within 1-2 years)

- Train extension officers/aggregators on simple paddy quality checks and standards.
- Sensitization of the relevant rice stakeholders (farmers, millers, extension officers, aggregators) on paddy grading standards developed by JICA/FMARD/SON.
- Capacity building for stakeholders on the simple paddy quality check and standards recommended by SON in the paddy grading manual developed in conjunction with JICA and FMARD.

Long-term (>5 years)

- Policy for investment in seed research both by government and private sector and increased production and promotion of improved varieties to give good milling quality.
- Sensitization and training of farmers groups on the best practices and use of available harvest and post-harvest machinery.
- Dissemination of modern processing technologies.
- Improved access to modern milling machinery.

v. ***Outcome of Mitigation***

- Production of quality paddy for better quality milled rice.
- Increase in quality paddy supplied to rice mills.
- Increase in high yielding varieties and their availability, affordability, and accessibility.
- Quality paddy is supplied to off-takers.
- Good quality milled rice of international standard produced

vi. Relevant Organizations at the Nigeria Side

- FMARD, DPs, PRIDAN, SON/ NCRI/NASC/ Research institutes/Seed companies.

4.1.4 Product Marketing

i. Current Situation

- Market prices fluctuate between mills.
- Different mills have their way of conducting business e.g., some mills prefer to deal directly with farmers, others with aggregators.
- Smuggling of paddy and milled rice into the country via land borders.

- High patronage of foreign rice.
- Limited use of ICT in the marketing of milled rice.
- Poor packaging and branding.

ii. Projections

- Standard grading for milled rice in Nigeria by 2030.
- A significant percentage of rice consumed within the country to be locally produced by 2030.
- Deploying ICT tools for marketing milled rice and other rice products e.g., rice flour by 2030.
- All processed in Nigeria rice to be well packaged and branded.

iii. Challenges/ Bottlenecks

- Disorganized marketing system (no standard price for milled rice in the country).
- Side selling from farmers, no storage facilities, few aggregation centres, limited supervision, and training from millers to ensure they recover their investment.
- Smuggling of paddy and milled rice from neighbouring countries also affects the market price of locally milled rice.
- Some urban consumers do not trust the quality of made in Nigeria rice.
- Most mills and small-scale marketers of other rice products seldom incorporate ICT in marketing.
- Poor packaging and branding.
- Lack of modern branding and packaging technologies.
- High cost of packaging materials.

iv. Measures to Mitigate Challenges

Short-term (within 1-2 years)

- Empowering the price control department in the Federal Ministry of Trade and Investment to enforce price control based on the quality standards that will reflect the interest of processors, marketers, and consumers.
- Lobby for a contract farming bill which will ensure contract farming arrangements between producers and processors become a law.
- Stricter enforcement, tracking, and monitoring of imported or smuggled paddy or milled rice into the country.
- Government policy to promote patronage of made in Nigeria rice.
- Sensitization and training for cooked rice vendors on the proper preparation of Nigerian rice e.g., Caterers for the school feeding program.
- Sensitization on the benefits of the use of ICT in marketing rice products and training on the use of ICT tools in marketing.
- Sensitization on the importance of using quality packaging material.
- Availability of infrastructure (particularly power).

Long term (>5 years)

- Sensitization on the benefits of the use of ICT in marketing rice products and training on the use of ICT tools in marketing.
- Sensitization on the importance of using quality packaging material.
- Availability of infrastructure (power, roads, portable water).

v. Outcome of Mitigation

- Better price regulation and structure for paddy and milled rice.
- The sustainable business relationship between processors, aggregators, and producers.
- More local paddy sourcing and patronage of locally milled rice.
- More sales as a result of wider coverage through ICT.
- More quality packaging and branded rice available.

vi. Relevant Organizations at the Nigeria Side

- Federal Ministry of Industry, Trade and Investment (FMITI), FMARD, RIPAN. RIFAN/ Customs/ Private sector/ DPs/ NOA/ SON.

Priority Five: Improve Access to Credit and Use of Financial Services

All segments of the rice value chain require access to adequate financing to attain competitiveness and enhance efficiency. Three areas are identified as priority areas that require urgent improvement to increase efficiency in financial services access across the chain and these are:

i. Increase access to credit and finance for all value chain actors at all segments of the chain.
ii Improve the business environment and business models for the marketing of rice/rice products.
ii. Improve Information sharing/ dissemination through deployment of ICT.

5.1 Increase Access to Credit and Financial Services for Rice Value Chain Actors

The general observation is that actors along the rice value chain from input distribution to production to processing and product marketing and distribution all have very low access to credit for their businesses. Commercial banks are very reluctant in lending to agribusiness which is partly due to the high risk associated with farming and agribusiness ventures. The Federal Government of Nigeria has initiated several programs like the Nigeria Agricultural Insurance Corporation (NAIC) and recently the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL) with 75 billion Naira capital base to de-risk the agricultural sector. These initiatives, however, have limited success in increasing access to credit for the sector. In the last five years, the only soft credit scheme available to rice farmers has been the "Anchor Borrowers Program" (ABP) of the Central Bank of Nigeria. However, less than 10% of rice farmers (less than a 1.2million) and less than 1% of all rice value chain actors in Nigeria have had access to it. For sustainable paddy and milled rice of import quality production in Nigeria, greater access to financial services by all value chain actors must be in place in the next decade. A robust strategy with risk management, the de-risking mechanism is needed across the rice value chain. This can only come with long-term enforceable policies that ensure all stakeholders fulfil their parts and also ensures each segment of the value chain is adequately supported.

Goal: *To improve access to credit for all rice value chain actors through the creation of a rice fund or the streamlining of existing sources of funding to attain sustainable self-sufficiency in the rice sub-sector*.

Objectives: The objectives to achieve in the rice sub-sector financing both in the short (2-5 years) and long term (6-10 years) are as follows:

- To reduce the lending rate for rice agribusiness to between 6-9% in the short-run (2020 -2025) and 1-5% interest rate in the long run (2026-2030).
- Increase access to credit for 50% of all rice value chain actors in the short run and 80% of value chain actors in the long run (2026-2030).
- Develop lending business models that ensure bullet points 1 and 2 above are well managed, scalable, and sustainable.
- Develop special lending and credit models for stakeholders to access mechanization equipment for paddy production and processing of finished rice.

- Improve the rice business environment nationally and prepare the sector for exports business after it attains self-sufficiency.
- The FMARD to work with relevant stakeholders to formulate the relevant policies to address all the above points (i.e., reduce the high cost of lending, improve access to credit for rice agribusinesses and promote functional lending business models that are scalable and sustainable).

i. ***Current Situation***

- Availability of Commercial Agricultural Credit Scheme (CACS) N500billion.
- Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL) N75 billion.
- Agricultural Credit Support Scheme (ACSS) - N50 billion.
- Small and Medium Enterprises Credit Guarantee Scheme (SMECGS) - N200 billion.
- Interest Drawback Programme (IDP) 75% of all interest paid on loan by Agribusiness companies.
- Presidential Rice Initiative - N14billion.
- ABP (Anchor Borrowers Program) - N40 billion.
- Special Rice Intervention fund - N60billion.
- With all these existing credit sources mentioned above, the cost of credit is very high, access to credit is limited or completely inaccessible.

ii. ***Projections***

Short-term (within 1-2 years)

- Creation of a rice sector development fund that is focused entirely on servicing the need of the rice value chain actors. Revisits the rice levy funds with the CBN which is left unspent for the sector.
- FMARD to lobby CBN to raise the existing portfolios by 50% across the board.
- CBN and partners to streamline all procedures for accessing agricultural loans with simplified conditions.
- Integrate Commercial Banks into mainstream agribusiness financing on-balance sheet under CBN Credit Guarantee run by NIRSAL.

Long-term (>5 years)

- 3.5 trillion (USD10 billion) agribusiness portfolio set aside in CBN and managed by relevant institutions; like BOA and the NIRSAL Microfinance bank who are specifically set for agribusiness financing across all the value chain.

iii. ***Challenges/ Bottlenecks***

- The high cost of credit (>20% in commercial banks) makes credit inaccessible to agribusinesses, especially smallholder farmers (SHFs) and primary production.
- Lack of feasible and replicable business models that simplify access to credit at low cost.
- Limited insurance support for all segments of the value chain.
- Proliferation and politicization of funding sources and the release of credit to agribusiness.

- Delays in the disbursement of credit or untimeliness in accessing credit for agricultural value chains are often unmatched with the appropriate calendar.
- Weak Supervision and weak risk management along the rice value chain.
- No Guaranteed market for finished products.

iv. ***Measures to Mitigate Challenges***

Short-term (within 1-2 years)

- Develop business models that make credit easily accessible, scalable, and at a single-digit cost, including business models that permits private sector investments in irrigation development.
- Ensuring that government agencies established either to de-risk or provide insurance for the Agricultural sectors are focused on such tasks, which does not seem to be the current case for NIRSAL and NAIC.
- Ensure timely disbursement of loans, robust monitoring of the application, and risk management.
- Strengthen the Federal Government Credit Guarantee institution (NIRSAL) by increasing its credit guarantee cap from current N2 billion to N10 billion, to cover more credit for value chain actors who get access to financing.
- Streamline all procedures for accessing agricultural loans with simplified conditions.
- Creating a single agricultural funding portfolio at the CBN to work with Agricultural development institutions like BOA, NIRSAL/ NIRSAL Microfinance bank, and Insurance companies lead by NAIC to manage the financing of agribusiness in Nigeria.
- Integrate Commercial Banks into mainstream agribusiness financing on-balance sheet under CBN Credit Guarantee run by NIRSAL.
- Policies that identify sustainable sources of credit and ensure long term financing of the rice value chain.

Lon- term (>5 years)

- Expanding agricultural insurance portfolios of the private insurance companies through government special seed fund support.
- Setting aside harmonized N3.5 trillion (USD10 billion) agribusiness portfolio in CBN and managed by relevant institutions; NIRSAL Microfinance bank and BOA, who are specifically set for agribusiness financing across all the value chain.
- Restructuring and capitalizing NIRSAL to be able to cover USD10 Billion agribusiness credit risk (maximum), restructuring and recapitalizing NAIC to act as re-insurance to all agribusiness Insurance portfolios of commercial insurance companies.
- Reactivation of commodity board integrated with effective farmers' cooperatives to ensure guaranteed minimum price annually.
- Restructuring and recapitalizing BOA to the tune of USD10 Billion (min) to operate on a large scale.

- Integrating commercial banks into agribusiness financing through leveraging on set aside funds like the CRR and other on-balance sheet funding, through the bankers committee involvement in the implementation structures of the NRDS.

v. ***Outcome of Mitigation***

- Simplified process of accessing financing by agribusiness actors.
- Reduced cost of funds and greater joint risks management by stakeholders.
- Policies that ensure long term sustainability of credit sources and better management.
- Achieve a minimum of 50% access to financing across the value chain in 2030.

vi. **Relevant Organizations at the Nigeria Side**

- CBN, FMARD, BOA, NIRSAL, NAIC, Bankers Committee and DPs, Private sector.

5.2 Improve Business Environment

i. Current Situation

- Currently, the situation is where banks and investors have difficulty in loan repayment, loan documentation (agreements, Credit guarantee, etc.), and making access to finance by rice farmers difficult.
- Too many bottlenecks: Full collateral required, tax clearance certificates, title documents, pay-up of shared capital, etc.

ii. Projections

- Achieving a 1-5 % lending interest rate for all agribusinesses.

iii. Challenges/bottlenecks

- High cost of funding: 21-35% per annum interest rate.
- Lack of Collateral issues.
- Poor infrastructures.

iv. Measures to Mitigate Challenges

Short-term (within 1-2 years)

- Banks to leverage on CRR with CBN and reduce the rate to single digit 7 - 9% to complement the several CBN Intervention schemes.
- NIRSAL to provide CRG.
- Provide adequate Infrastructure.

Long-term (>5 years)

- Agricultural land mapping.
- Introduction of digital technologies to simplify procedures for accessing financial services.

v. Outcome of Mitigation

- The conducive business environment for sustainable agribusiness financing enhanced
- Easy access to agribusiness loans for rice value chain actors across the entire value chain.

vi. Relevant Organizations at the Nigeria Side

- FMARD, BOA, NIRSAL, CBN, Commercial Banks, Insurance companies, Development Banks, and Private Sector etc.

5.3 Improve Information Sharing/Dissemination

i. ***Current Situation***

- Inadequate verifiable real-time information on the rice value chain to ease loan disbursement.

ii. ***Projections***

- Establishment of Market Information Services (MIS) that is tied with Financial Service Information (FSI).

iii. ***Challenges/bottlenecks***

- Insufficient funding of data collection along the rice value chain.
- Inadequate capacity to collect and analyse value chain data appropriately.

iv. ***Measures to Mitigate Challenges***

Short-term (within 1-2 years)

- Line budget for data generation and collection for FMARD Rice desk.
- Build the capacity of the M&E staff of FMARD to properly carry out functions of real-time data collection across the rice value chain.

Long-term (>5 years)

- FMARD should reactivate the data management unit to develop a central data bank on all commodity value chains.

v. ***Outcome of Mitigation***

- Reliable data base on the rice value chain developed.
- Evidence based policy interventions and programmes in the sector.
- Increased private sector investment.

vi. ***Relevant Organizations at the Nigeria Side***

- Federal Ministry of Agriculture and Rural Development.
- Federal Ministry of Water Resources.
- National Bureau of Statistics.
- Central Bank of Nigeria.
- NIRSAL, NCE, BOA, DPs, NGOs.
- Other Private Sector Partners.

Priority Six: Strengthening the Rice Desk of the Federal Ministry of Agriculture to Coordinate Policy and Outcomes of Government and Other Interventions in the Rice Sector

Although during the last decade, huge public capital and private sector investment have been committed into the rice sub-sector, that today it remains one of the fastest-growing sub-sectors of the Nigerian economy, achieving complete import substitution remain a challenge. Successive governments have in the past and present initiated different programs that focused on improving the local production of rice and improving the functionality of the entire rice sector including investments in the development of irrigation facilities, indirect subsidies on inputs like the e-wallet. Programs like the Presidential Initiative on Rice, Rice Transformation Agenda, and more recently the CBN Anchor Borrowers Program implementation for the rice sector, were all directed at stimulating rapid growth in productivity, increasing efficiency in the sector, and attracting private sector participation. However, such initiatives continue to lack reliable data and some form of central coordination for better outcome data generation, analysis and use for evidence-based policy guidance.

The National Rice Development Strategy one and two (NRDS I & II) are facilitated by the Coalition for African Rice Development (CARD), an initiative of a consultative group of development partners and international institutions engaged in rice research and development and led by the JICA, AGRA, NEPAD and others in partnership with the Nigeria Government (represented by the Federal Ministry of Agriculture and Rural Development (FMARD). The first phase of CARD-NRDS was implemented from 2008 to 2018 with a singular objective of doubling rice production in Africa particularly in CARD countries which included Nigeria from 14 million to 28 million MT within 10 years. This second phase of CARD-NRDS is designed as a multi-level development investment strategy with the broad objective of to further double paddy production the following specific goals;

1. Address identified dominant challenges persisting at the different segments of the Nigeria rice value chain.
2. To improve the basic functionality of the various segments.
3. To increase capacity, attain efficiency and overall system sustainability.

Sustainability of the entire system being the goal of any value chain development. The weak inter-connections or linkages between the segments of the Nigeria rice sector is also given the required attention in this second phase from seed systems development and strengthening, to increasing paddy production and local processing of finished rice of import quality, to increasing the use of mechanization in all operations along the chain to improve the efficiency as well as the need to provide value chain actors sustainable access to and use of financial cum market services. To initiate the CARD-NARDS II in Nigeria, a multi stakeholder national task force team set up by FMARD reviewed the state of the sector in relation with current Federal Government of Nigeria objective to attain complete import substitution for rice and prepared the background to the formation of thematic groups that reviewed the prevailing sub-sectorial challenges in Nigeria rice sector. Based on these thematic groups appraisal of the current situation and their

recommendations to improving the current conditions to rapidly transform the rice value chain in Nigeria, setting targets and timelines to removing the challenges and unleashing the various opportunities in the different segments of the rice sector, as well as build the capacity for the continuous assessment of the strength and weakness of different segments of the Nigeria Rice Value Chain. Setting up a robust national monitoring and evaluation system is therefore, adjudged indispensable to the attainment of success of the NRDS II.

The NRDS II is a national planning tool with the overall goal of improving, on a sustainable basis, the functionality of the different segments of the rice sector by eliminating the bottlenecks in the chain, improving the efficiency along the chain while maintaining self-sufficiency at national level both of paddy and high-quality finished rice. A sectorial or national development strategy must be measurable, adequately reported with evidence-based data, and such information made available to stakeholders under the progress in the different sub-sectors. Historically and until recently, the Nigeria national rice productivity improvement planning is replete with evidence of lack of proper coordination, ineffective monitoring, and evaluation and therefore, poor documentation, poor reporting of progress and poor benchmarking of sectorial improvement. A stock-taking of the different international donor sponsored and Nigeria government loan-based projects from different multilateral financial organizations as well as the Nigeria Federal and States Government efforts (e.g., the Rice Transformation Agenda- RTA) that were directed at Nigerian rice sector development in the last ten years shows about 5 key such donor-driven and loan-based project were nationally implemented namely;

1. USAID MARKETS II and III Projects,
2. The Competitive Africa Rice Initiative (GIZ-CARI),
3. The World Bank-Nigeria FADAMA II and FADAMA III Additional Financing loan project,
4. The AfDB-Nigeria Agricultural Transformation Agenda Support Program (AfDB-ATASP-1) loan project, and
5. IFAD-Nigeria Value Chain Development Project (IFAD-VCDP).

That are reported individually to have contributed or contributed enormously to the development of Nigeria rice sector but whose positive outcomes and impact are neither ever monitored nor evaluated nor reported as contributing nationally to the sector. This is another justification yet for NRDS II to be more deliberate at coordination, monitoring and reporting of the various efforts made at the national level in the development of the rice sector.

The NRDS II is a national strategic framework that focuses on rice sector development by jointly responding to the questions:

i. Where are we now in the development of the sector?
ii. Where do we want to go or be in the next ten years?
iii. What needs to be done (some urgently, i.e., in 1-3 years, and others to be done over 5-10 years period) to get to the expected destination?
iv. What should be the main outcome and impact areas?
v. How do we assess our performance in the identified priority sub-sectors over the period?

The detailed work breakdown structure is presented below in the following outcomes. These are;

Outcome 1: Increased rice productivity and volume of domestic production.

Outcome 2: Improved functioning of the seed sector and strengthening the seed chain.

Outcome 3: Increased use of mechanization in rice production and processing.

Outcome 4: Increased domestic processing, strengthen market systems for paddy and finished rice and enhanced competitiveness

Outcome 5: Improve access to credit and financial services across the value chain.

Outcome 6: Robust coordination, monitoring, and reporting of rice-related projects across the various projects and levels of governments in Nigeria.

Goal: *The goal of Priority 6, therefore, is to improve the general coordination, monitoring, evaluation, and adequate reporting of the progress made by the various efforts, programs, and initiatives by different stakeholders at national and sub-national levels in the above 5 priority areas toward Nigeria rice sector development.*

Objectives: The objectives to pursue in this section to ensure Nigeria achieve a sustainable increase in rice production and achieve complete import substitution are as follows;

- Strengthen the Rice Desk Office (normally CARD-NRDS Focal Point) under the Cereals Division of the Federal Department of Agriculture with the capacity to coordinate and report on the progress of NRDS II.
- Recruit 2-3 data staff in NRDS II focal office, build their capacity and provide relevant ICT equipment for the task.
- Develop robust relevant monitoring tools to track progress in the different priority areas earmarked for NRDS II.
- Carry out periodic stakeholder's engagements or annual stakeholders' dialogues to jointly review progress made by different programs, projects, initiatives, by governments, the private sector and development partners in rice sector development.
- Carry out annual or periodic data and other information gathering exercises (interviews, surveys, stakeholder engagement) on the sector.
- Collate, analyse, and synthesize the data and make such information available to stakeholders to order their progress in the sub-sector.
- Formulate policy documents, advisory notes, and such relevant documents to aid governments in the planning and implementation of activities in rice sector development.

6.1 Targeted Direct and Indirect Beneficiaries Group

The interventions and development of the rice sector will directly benefit about 12 million Nigerian small scale rice farmers, about 15 medium-to-large companies involved in large scale commercial farming and employing about 25,000 staff, about 70-100 medium to large scale integrated rice millers and about 15,000 small cottage rice processors across the country. In addition, indirect beneficiaries extend across 314 seed companies, 6 international and local fertilizer manufacturing and blending companies, several other agro-inputs manufacturers and distribution companies and

of course, other intermediate actors involved in the distribution and marketing of rice and rice related products.

The total beneficiary number, which includes those living in the producers and processors households, is estimated to be above 25 million. It is also estimated that 40% of the total farming and processing households are either women or women-headed households. The rice sub-sector, therefore, presents a huge opportunity to create a quick impact on the Federal Government's plan to lift 100 million people out of poverty in 10 years.

6.2 Establishment of a Robust NRDS Monitoring and Evaluation Component under the Federal Ministry of Agriculture and Rural Development

One of the major drawbacks in a national development plan is the absence of concrete evidence-based data for both the planning and measurement of the progress attained in the different sub-sectors of the economy. The rice sub-sector is no exception to this dearth of national data as a basis for future planning, resulting in the estimation of all figures from land area cultivated, to the number of rice farmers, average yields, etc. Secondly, as indicated, the Federal and States Governments in Nigeria have always initiated one form or the other special interventions in the rice sector in addition to loan and grant projects specific to rice obtained from multilateral donors (like FADAMA II AF, MARKETS I and II ATASP-1, VCDP, FAO rice projects across the country, CARI) and several development partners loan on rice which impact have not been properly documented in the last three decades.

The NRDS I probably missed a good opportunity to lay a foundation for generating, analysing and employing evidence-based data for the future planning and development of the Nigeria rice sub-sector. Therefore, for NRSD II implementation, it is recommended that a very strong coordination unit that takes oversight of the entire rice value chain, working with all partners involved in the development of the sector, be established at the Federal Ministry of Agriculture and Rural Development (FMARD) under the Rice Value Chain Desk Office. The Desk Officer is usually the Focal Point of CARD in the country and is responsible for the coordination of the NRDS. The NRDS Coordination unit whose role comprises over sighting of all activities in the sub-sector, directing rice policy advocacy and dialogues with relevant partners, data generation, monitoring and evaluation and reporting, as well as organizing stakeholder dialogues on emergent issues would be directly managed by the Desk Officer. One of the development partners or a combination of them would be solicited to fund the running of this office. The FMARD could also allocate a small annual budget to the office.

Apart from the Desk Officer, other requirements of the office would be two staff that are highly competent in data gathering from different sources, data analysis, and reporting. Additional hands may be required from time to time during annual surveys which the Desk officer could train already existing staff in the office to fill the gap.

6.3 Harnessing Partners'/Stakeholders Contribution to the Different Outcomes

The NRDS II is not a project in itself but a collective of all the various efforts deployed at the national and states levels towards developing the rice sector across different Federal and State

Ministries, agencies and parastatals including Agriculture, Water Resources, NASC, CBN, BOI, BOA, NIRSAL, etc.) and across different development agencies and partners (JICA, GIZ, USAID, etc.) with projects working on rice, across different multilateral funding organizations (WB, AfDB, IFAD, FAO, AGRA, BMGF, IsDB etc.) funding rice sector, across research to development organizations (AfricaRice Centre, NCRI, NCAM, etc.), across private sector contributions (Large farms e.g., OLAM, Coscharis farms, Processors like RIPAN (IRM), RIMAN (Cottage to medium scale millers), across financial and credit institutions. The responsibility of the NRDS II coordination unit will be to work across all partners to generate information related to the 5 outcomes outlined as well as annually generate, process information or analyse and make available the relevant evidence-based information from the different stakeholders and partners as a nationally consolidated data for the rice sector.

6.4 Joint Annual Multi-Stakeholder Review of the Rice Sub-Sector

Harnessing the various contributions of numerous international and national development partners and donor communities who work on rice and rice related sectorial development would require a joint stakeholders review of the rice sector comprising of various governments and donors projects that are rice focused including representative of the Federal Ministry of Agriculture and Rural Development, Ministry of Finance, Ministry of Trade and Industry, Ministry of Water Resources, representative of the CBN, NBS, NASC, International and National Research Institutions that focus on rice. This would sometimes require periodic or annual stakeholder dialogues, engagement for buying into broad complementary objectives cum the joint review of progress in the different priority areas, as well as co-definition of policy direction and joint policy advocacy and engagement with policymakers.

Finally, the successful establishment, take-off, and implementation of the national rice development strategy clearing house or coordination unit will be one of the greatest achievements of the NRDS II due to the multiplier effects that effective coordination is likely to create across the sector and in the national economy. Therefore, it deserves the support of government and all development partners to function as anticipated.

Monitoring &Evaluation Result Framework, Targets and Indicators

Annexe 1. Nigeria NRDS Key Performance Indicators (Intermediate Outcomes)

S/N	NRDS 2020-2030 KPI	Unit	Appraisal Baseline & Target		Mid Term Targets/ Achievement 2025			End of Term Targets 2030		
			Baseline	Target 2020	Y1 -TD targets	Ach	% Ach	Y1 -TD targets	Ach	% Ach
1	**Sustainable Increase in Paddy Production and Storage**									
1.1	No of beneficiaries (farmers, processors, etc. directly & positively impacted.	No. (mil)	12.00	13.00	18.50	-	-	25.00		
1.2	Qty of paddy produced annually and added to the national paddy market.	MMT paddy	14.20	17.20	25.50	-	-	34.00	-	-
1.3	Newly developed rain fed lowlands (increase area under productions).	Mil ha	0.45mha	0.55	1.50	-	-	2.50		
1.4	Increased rain fed Lowland area with supplementary water supply for 2 crops/year & increase fully irrigated rice area with full water control (Area under production).	Mil ha RFl SWS	0.45mha	0.54	1.04	-	-	1.50	-	-
		Mil ha Full Irrign.	0.75	0.85	1.0	-	-	1.50	-	-
1.5	Productivity Enhancement (Ave. yield).	ton/ ha RF_UPL	2.00	3.00	4.00	-	-	5.50	-	-
		ton/ ha RFLLSwS	3.00	4.00	5.00	-	-	6.00	-	-
		ton/ ha Full Irrign.	5.00	6.00	7.00	-	-	8.00	6.00	-
2	**Seed Production and Seed Systems Strengthening**									
2.1	**Breeder Seeds Production**									
2.1.1	Qty of breeder seeds (BS) produced annually/ accessed by seeds companies to advance to FS.	Qty. (MT)	21.2	26	41.3	-	-	67	-	-
2.1.2	Qty of BS bought by seed companies annually for FS production at midterm and in 10 years.	Qty. (MT)	?	26.0	41.3	-	-	67	-	-
	No. of climate-smart variety was developed and released each to address i). drought, ii) flood, iii) heat, and iv) Salinity.	No. of new variety	?	1/ stress	2	-	-	8	-	-

S/N	NRDS 2020-2030 KPI	Unit	Appraisal Baseline & Target		Mid Term Targets/ Achievement 2025			End of Term Targets 2030		
			Baseline	Target 2020	Y1 -TD targets	Ach	% Ach	Y1 -TD targets	Ach	% Ach
2.2	**Foundation Seeds Production**									
2.2.1	Qty of Foundation seeds (FS) produced annually and accessed by seeds companies to advance to CS at midterm and in 10yrs.	MT/ year	1600	2053.9	3308	-	-	5237		
2.2.2	Number of seed companies focusing on rice FS production annually	No. of comp	?	3	5	-	-	10	-	-
2.2.3	Percentage of farmers planting quality seeds of recommended improved varieties (20,40, 60 -80% at Mid-term & end).	No. (Mil) farmers	2.4	4.8	7.2	-	-	12	-	-
3	**Increase Access to and Use of Mechanization Equipment/Tools in Rice Production and Processing**									
3.1	**Higher Efficiency Through Mechanization**									
3.1.1	No. of farmers with improved access to mechanization equipment	No. (mil)	500,000	800,000	1.8	-	-	3.6	-	-
3.1.2	No. of domestically fabricated/maintained adapted machinery.	No. (mil) of fabricated	?	500	2500	-	-	500,000	-	-
4	**Priority: Upgrade the Processing and Marketing of Nigeria Rice**									
4.1.1	No. of small scales cottage millers (60%) clustered in production units to improve rice quality and enhance efficiency.	No. of Millers	?	500	5000	-	-	12,000	-	-
4.1.2	Increased share of supply of rice of import quality produced in Nigeria from clustered cottage millers (70% of paddy & finished rice production projection).	MMT Finished rice	?	5.5	8.9	-	-	14.3	-	-

S/N	NRDS 2020-2030 KPI	Unit	Appraisal Baseline & Target		Mid Term Targets/ Achievement 2025			End of Term Targets 2030		
			Baseline	Target 2020	Y1 -TD targets	Ach	% Ach	Y1 -TD targets	Ach	% Ach
5	**Improve Access and Use of Financial Services**									
5.1.1	No. of farmers in production clusters with improved access to financial services.	No. (Mil) farmers	?	1.5	6	-	-	12		
5.1.2	No of rice processors (value addition) with improved access to financial services.	No. of Millers	?	100,000	500,000			2,000,000	-	-
5.2.1	Refinement in Seed policy to move from visual to diagnostic certification and to enable 3rd party certification and e-certification.	Policy dialogue	-	-	-	-	-	-	-	-
5.2.2	Streamlining of agribusiness portfolios managed by BOA, NIRSAL/ NIRSAL Microfinance bank, NAIC, etc., specifically to operate on single-digit loans with similar conditions across all the value chains.	Policy dialogue	-	-	-	-	-	-	-	-
5.2.3	A policy that restructures and recapitalize BOA to the tune of USD10 Billion (min) to expand its operations.	Policy dialogue	-	-	-	-	-	-	-	-

*NB: Y1- TD = Year 1 to date

Annexe 2. Nigeria 2020-2030 Annual & LOPS Monitoring Tools/Performance Data 2020-2030

S/N	Priority Areas/Activities	Unit	2030 Target	2020		2021		2022		2023		2024		2025		2030		Y1 -TD targets	Y1 -TD Ach	Y1 -TD % Ach
												Mid-Term				Qtr. 2				
				Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach			
1	**Priority 1: Sustain Increase in Paddy Production and Storage**																			
1.1.1	Increase and sustain the volume of paddy production for complete import substitution.	MMT/ Annum	34 MMT																	
1.1.2	Increase land development transforms 1.2m ha RF lowlands with supplementary water supply for at least two crops per year (0.12 mi ha per year).	Mil ha/ Annum	1.2ml ha																	
1.1.3	Increase irrigated area with full water control & multiple crops increment 0.10 mil annually.	Mil ha/ Annum	2.7mil ha																	
1.2.1	Enhanced productivity (Avg, yield from 3t to 4t & from 4 to 8t/ha in RF and IRG lowlands).	Tons/ha	Avg. yield 4 & 8 ton/ha																	
1.2.2	Build capacity on GAP for Extension. Workers/Farmers to increase productivity.	No. Ext. Agents/Farmers	84,000 EAs & 12 mil Rice																	
1.3	Monitor Avg. rate of N.P & K fertilizer utilization/ha.	Qty(kg) of Fertilizer	60kg to 100kg																	
1.4	Awareness to reduce upland cultivation (reduce deforestation) & reduce GHG emission (optimal N usage/Flooding regime) as CC mitigation strategy.	No. of ToT workshops	6 WSP/6000 trainees/yr.																	
1.5	Initiate measures that increase youth participation in rice agribusiness.	No. of Youth	200,000 – 500,000 youth																	
1.6	Strengthening the rice desk of the cereals division of ministry to coordinate policy and outcomes of Govt. & other interventions in the rice sector.	M&E tools for yearly Sectorial review	10 detailed annual technical report																	
1.7	Advocacy for policies& measures that increases area (ha) of irrigated lowlands	No	10																	

S/N	Priority Areas/Activities	Unit	2030 Target	2020		2021		2022		2023		2024		2025		2030		Y1 -TD targets	Y1 -TD Ach	Y1 -TD % Ach
												Mid-Term				Qtr. 2				
				Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach			
2	**Priority 2: Seed production and Seed Systems Strengthening**																			
2.1	**Breeder Seeds Production**																			
2.1.1	Human resource development: recruit or train 10 to 20 rice breeders at NCRI and other research institutions within the next 10 years.	No. of breeders trained	20																	
2.1.2	Training of 15 to 25 skilled seed technicians on BS, FS production.	No. of seed technicians trained	25																	
2.1.3	Develop 10 to 17 ha for BS and FS multiplication plots at NCRI Badeggi.	No. of Ha	17																	
2.1.4	Establish screen houses, greenhouses, cold rooms & gene bank at NCRI to ensure production of BS and FS.	No.	2 cold room/2 gene bank/2 greenhouse																	
2.1.5	Establish 1 micro dam, tube wells and pumping machines at NCRI for BS and FS production.		Micro dam/ 100 tube wells																	
2.1.6	Increase the Qty of BS produced and patronage by 20 to 50% in the short & long term respectively.	Qty. (kg) of BS	67,000																	
2.1.7	Capacity building on BS and FS production and training manual production/distribution.	No. trained /Qty of manual	1000/yr.																	
2.1.8	Breed & release 2 climate-smart varieties each to address tolerance to i) drought, ii) flood, iii) heat and iv) salinity. 2 no hybrid varieties	No. of varieties	10 Varieties																	
2.1.9	Quantity of breeder seeds (BS) produced annually & accessed by seeds companies to advance to FS.	Ton/year	20-30t at Mid-term/ 35-60t																	

S/N	Priority Areas/Activities	Unit	2030 Target	2020		2021		2022		2023		2024		2025		2030		Y1 -TD targets
												Mid-Term				Qtr. 2		
				Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	
2.2	**Foundation Seeds Production**																	
2.2.1	Licensed seed companies focusing only on FS production.	No. of seed companies	10															
2.2.2	Capacity building for FS and CS out growers (special focus on youth).	No. of W/shops	20 WSP/1000 Trainees/yr.															
2.2.3	Accredit more seed companies for CS production with well-trained youth seed out-growers.	No. of seed companies specialized	200															
2.2.4	Quantity of foundation seeds (FS) produced annually & accessed by seeds companies to advance to CS.	Tons/year	1700t to 2700t															
2.2.5	Increased % of paddy farmers sourcing quality seeds of approved varieties from seeds companies (60-80% from midterm to 2030).	% Of rice farmers	7.2mil – 12mil															
2.2.6	Quantity of certified seeds (CS) produced annually and Qty was up taken by farmers	% Of rice farmers & Qty.	7.2mil – 12mil & 426,184MT															
3	**Priority 3: Increase Access to and Use of Mechanization Equipment & Tools in Rice Production**																	
3.1	**Higher Efficiency Through Mechanization**																	
3.1.2	Reduce drudgery by increased use of machines in rice production & post-harvest operations up to 20-30% in 10yrs.	% Increase in the use of machines	50															
3.1.3	Support farmer groups to access single digit loans for post-harvest machinery acquisition.	No. farmers access to loan/40 -50	4 mil to 6 mil															
3.1.4	Train rice farmers (20-30%) on improved postharvest practices to reduced PHL by 40-50%	No.	2.5 – 4m															
3.1.5	Increase No. of farmers with access to modern farm machinery (increase by 50%).	No.	6m															

S/N	Priority Areas/Activities	Unit	2030 Target	2020		2021		2022		2023		2024		2025		2030		Y1 -TD targets
												Mid-Term				Qtr. 2		
				Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	
3.1.6	Increase No. of small-medium processors (value addition) with access to modern postharvest machinery (increase by 50%).	No. of millers/value addition	500,000															
3.1.7	Develop business models that enable mechanization work for smallholder rice farmer (50% increase).	No. of BM & No. farmers	8-10 BM/(50% of 12m=6m farmers															
3.1.8	Develop business models that make mechanization work for smallholder rice processors (value addition increase by 50%).	No. BM/No. of processors	8-10BM/ 500,000															
3.2	**Reduce Inappropriate Mechanization**																	
3.2.1	Increased funding to research institutes (NCAM etc.) to adapt simple, appropriate, low-cost intermediary machines in rice systems.	% Allocated toward machines fabrication	15%/yr.															
3.2.2	Capacity building for local fabricators & NCAM on fabrication/maintenance of adapted machinery.	No. of fabricators trained	500/yr. = 5000															
3.2.3	Capacity building of stakeholders on sustainable management of the environment to mitigate the negative impact of mechanization on the environment.	No. of persons trained	10,000															
3.2.4	Capacity building for the new generation of machines operators/handlers to improve their operational & maintenance skills.	No. of persons trained	10,000															
3.2.5	Upgrade the machines/tools used at identified rice clusters of farmers through special government intervention (smart subsidies).	No. of clusters/ farmers	200 clusters /2million															
3.2.6	Upgrade the machines/tools used at identified rice clusters of processors through special government intervention (smart subsidies).	No. clusters/ processors	20 clusters / 200,000															
3.2.7	Facilitate easy access to the CACS & other medium SMSE funds to enable farmers' cooperatives to access farm mechanization loans under NIRSAL Credit Guarantee.	No. of Cooperatives	2000															

S/N	Priority Areas/Activities	Unit	2030 Target	2020		2021		2022		2023		2024		2025		2030		Y1 -TD targets
												Mid-Term				Qtr. 2		
				Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	
3.2.8	Increase local commercial manufacturing & distribution of adapted agricultural machines & equipment through a PPP or Govt. to Gov. guaranteed arrangement with global companies.	No./year Produced locally	500,000 Power tills															
4	**Priority 4: Upgrade the Processing & Marketing of Nigeria Rice & Rice Products**																	
	Processing and Management																	
4.1	Training workshop on processing & processors within processing clusters.	No.	6 zonal training annually															
4.2	Increase the number of skilled technicians for building, operations & maintenance of integrated rice mills.	No	1000															
4.3	Training of community youth on maintenance of agro-processing machinery.	No.	4000															
4.4	Capacity building for IRM to improve milling efficiency by 65% & 60% for small and medium millers.	% Increase	60 to 65%															
4.5	Increase number of trained local processors on improved parboiling technologies.	No.	30,000															
4.6	Increased small & medium scale millers' access to finance (40-50%).	No.	8,000 – 10,000															
4.7	Small scales cottage millers (60%) organized into production clusters.	No. of millers clustered	12,000															
4.8	Establish micro & medium processing centres to train community youth on rice processing & marketing.	No. of centres	1000															
4.9	Increased volume of domestic finished rice from clustered cottage millers by 70%.	MMT of finished rice/annum	14															
4.10	Promote efficient &environmentally friendly use of rice by-products e.g., Bran & Husk to energy source or briquettes making.	No. of training/ trainees	3/200 trainees in a year = 6,000															

S/N	Priority Areas/Activities	Unit	2030 Target	2020		2021		2022		2023		2024		2025		2030		Y1 -TD targets
												Mid-Term				Qtr. 2		
				Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	
4.11	Training of farmers/small millers on food safety, standards, grading & branding (SON standard).	No. trained	30,000															
4.12	Training of women & youth on value addition e.g., rice flour, rice drinks, confectionaries etc.	No. trained	30,000															
4.13	Increase the utilization of side products & by-products of rice through products diversification & value addition.	No. of trainees	10,000															
4.14	Increase national capacity for paddy aggregation by 60% by building, equipping of centres for paddy quality assurance.	Ton paddy aggregated	10-12MMT															
5	**Priority 5: Improve Access to & Use of Financial Services**																	
5.1	**Increase Access to Financial Services for Rice Value Chain Actors**																	
5.1.1	Clustering of farmers in production clusters to improve access to market & financial services.	No. of clusters/ farmers	200/12m															
5.1.2	Clustering of processors (value addition) to improve access to market and financial services.	No. of cluster/processor	20/200,000															
5.1.3	Simplify & streamline procedures for accessing credit by all agribusiness actors along the value chains to achieve 50% access.	No. of persons accessing credit	6m															
5.1.4	Support rice farmer groups to access single digit loans for farm machinery to achieve 40%.	No. of persons accessing credit	5m															
5.1.5	Support processors/value addition to access single digit loans for post-harvest tools/machinery.	No. of persons accessing credit	100,000															
5.1.6	Sensitization/training workshop for actors on the necessity of positive loan repayment culture.	No. trained	6,000															

S/N	Priority Areas/Activities	Unit	2030 Target	2020		2021		2022		2023		2024		2025		2030		Y1 -TD targets
												Mid-Term				Qtr. 2		
				Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	Tar	Ach	
5.2	**Improve Business Environment**																	
5.2.1	CBN to set aside about 3.5 trillion (USD 10billion) streaming agribusiness portfolio & managed by BOA, NIRSAL/NIRSAL Microfinance bank, NAIC etc. specifically set for agribusiness financing across all the value chains.	Government Policy																
5.2.2	Initiate new lending policy to rice sector that raises the existing portfolios by 50% across the board (FMARD, FMF to lobby CBN).	Government Policy																
5.2.3	Promote policies for implementation of genetic access transfer scheme (GATS).																	
5.2.4	PPP arrangement between FMARD/BOA/NAMEL to increase access to Agricultural. Mechanization equipment by 30% at 20% down payment.	No. of actors accessing	1.8mil machinery /3.6mil farms															
5.2.5	Restructuring & recapitalizing BOA to the tune of USD10 billion (min) to operate on a large scale.	Government Policy																
5.2.6	Expand Agricultural. insurance portfolios of the private insurance companies through government special seed fund support.	Government policy																
5.2.7	Restructure/Recapitalize NAIC to act as re-insurance to all agribusiness insurance portfolios of commercial insurance companies.	Government policy																
5.2.8	Restructure/capitalize NIRSAL to cover (max) USD10 billion agribusiness credit risk.	Government policy																
5.2.9	Migrate from visual to diagnostic seed certification/enable 3rd party certification & re-certification.	Government policy																
5.2.10	Policy intervention to improve availability, affordability & local adaptation of agricultural. Machines (i.e., increase in the local fabrication of simple & cost-effective machines).	Government policy																

Annexe 3. Seed Requirement for NRDS II

Year	Paddy (MT)	Land Area (ha)	Certified (MT)	Land Area (ha)	Foundation (MT)	Land Area (ha)	Breeder (MT)	Land Area (ha)
2018	10,863,638.00	2,715,910	135,795	33,948.87	1,697.4	424.4	21.2	5.30
2019	11,950,001.80	2,987,500	149,375	37,343.76	1,867.2	466.8	23.3	5.83
2020	13,145,001.98	3,286,250	164,313	41,078.13	2,053.9	513.5	25.7	6.42
2021	**14,459,502.18**	**3,614,876**	**180,744**	**45,185.94**	**2,259.3**	**564.8**	**28.2**	**7.06**
2022	15,905,452.40	3,976,363	198,818	49,704.54	2,485.2	621.3	31.1	7.77
2023	17,495,997.64	4,373,999	218,700	54,674.99	2,733.7	683.4	34.2	8.54
2024	19,245,597.40	4,811,399	240,570	60,142.49	3,007.1	751.8	37.6	9.40
2025	21,170,157.14	5,292,539	264,627	66,156.74	3,307.8	827.0	41.3	10.34
2026	23,287,172.85	5,821,793	291,090	72,772.42	3,638.6	909.7	45.5	11.37
2027	25,615,890.14	6,403,973	320,199	80,049.66	4,002.5	1,000.6	50.0	12.51
2028	28,177,479.15	7,044,370	352,218	88,054.62	4,402.7	1,100.7	55.0	13.76
2029	30,995,227.07	7,748,807	387,440	96,860.08	4,843.0	1,210.8	60.5	15.13
2030	**34,094,749.77**	**8,523,687**	**426,184**	**106,546.09**	**5,327.3**	**1,331.8**	**66.6**	**16.65**

FMARD Head Office

#1 Kapital Road,
Area 11, Garki
Abuja, FCT
Federal Republic of Nigeria

info@fmard.gov.ng