



MINISTRY OF  
**FOOD & AGRICULTURE**  
REPUBLIC OF GHANA

# **DEVELOPED CONCEPT NOTES UNDER GHANA'S NATIONAL RICE DEVELOPMENT STRATEGY 2 (NRDS II)**

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## 1. Concept Note on Fertilizer Marketing, Distribution and Usage

1. Title (Full name):	Sustainable agricultural production through efficient and safe use of fertilizers
2. Project Location:	Nationwide
3. Implementing Agencies:	Ministry of Food and Agriculture (MoFA), Research (Council for Scientific and Industrial Research-Soil Research Institute (CSIR-SRI)
4. Beneficiaries:	Agricultural Extension Officers
5. Target Group:	Farmers
6. Type of project:	1. Grant 2. Technical Coop./Assistance, 3. National budget, 4. Private Sector
7. Field of support:	1. Extension & Training, 2. Capacity Building
8. Suggested Funding sources:	National Budget, and other Development Partners (DPs)
9. Budget (USD):	3,500,000.00
10. Duration of the project:	5 years
11. Background /Justification:	Many farmers in Ghana misuse fertilizers due to limited knowledge, leading to low yields and declining soil fertility particularly from the blanket application of NPK 15:15:15 across diverse rice ecologies. This inefficiency

results in economic losses and environmental risks. Targeted capacity building will equip farmers, including women, youth, and persons with disabilities (PWDs), with skills for the efficient and safe use of both organic and inorganic fertilizers. Promoting alternatives like biochar and lime will enhance soil health, reduce dependence on imported fertilizers, and support Ghana's shift toward climate-smart agriculture in alignment with national development goals and the Sustainable Development Goals (SDGs) particularly those related to zero hunger, climate action, and poverty reduction.

12. Goal and objective:	<b>Overall objective: To strengthen farmers' capacity for efficient and safe fertilizer use to boost yields, soil health, and climate resilience</b>	
	<b>Specific Objectives</b>	<b>Output</b>
	1. To improve farmers' access to soil testing services	1.1 Agricultural Extension Agents (AEAs) knowledge on soil testing improved
		1.2 Farmers' access to soil testing services enhanced
	2. To build capacity of farmers on safe and efficient fertilizer use through participatory demonstrations	2.1 AEAs practical knowledge on efficient and safe fertilizer use improved
		2.2 Farmers' practical knowledge on efficient and safe use of fertilizers improved
	3. To promote commercialization and participation in the carbon market	3.1 Farmers' knowledge on biochar production improved
		3.2 Adoption of biochar and lime use by farmers up-scaled and emission of greenhouse gases from rice fields reduced
13. Activities:	<b>Specific Objective 1: To improve farmers' access to soil testing services</b>	
	<b>Output: 1.1 AEAs knowledge on soil testing improved</b>	

1-1-1. Develop (or revise) a standard soil testing training manual for AEAs
1-1-2. Procure 430 soil testing kits
<b>Output: 1.2 Farmers' access to soil testing services enhanced</b>
1-2-1. Conduct training on soil testing for 450 AEAs, Irrigation Scheme Officers and Lead Farmers
1-2-2. Sensitize farmers on targeted fertilization using results from soil test
1-2-3. Develop and implement a digital advisory service on recommended fertilizer blends and approved brands.
1-2-3. Monitor implementation and provide technical backstopping
<b>Specific Objective 2: To build capacity of farmers on safe and efficient fertilizer use through participatory demonstrations</b>
<b>Output: 2.1 AEAs practical knowledge on efficient and safe fertilizer use increased</b>
2-1-1. Develop (or revise) a standard training manual on efficient and safe fertilizer use
2-1-2. Conduct ToTs for 450 AEAs, Irrigation Scheme Officers and Lead Farmers
<b>Output: 2.2 Farmers' practical knowledge on efficient and safe use of fertilizers improved</b>
2-2-1. Conduct step-down training sessions and workshops for 10,450 Farmers
2-2-2. Conduct 418 on-farm participatory demonstrations targeted at 10,450 farmers
2-2-3. Sensitize 418 Agro-Input dealers on efficient and safe fertilizer handling
2-2-4. Monitor implementation and provide technical backstopping
<b>Specific Objective 3: To promote commercialization and participation in the carbon market</b>
<b>Output: 3.1 Knowledge on biochar production increased</b>

	3-1-1. Develop (or revise) standard training manual on biochar production
	3-1-2. Conduct training workshop on biochar production for 450 AEAs, Irrigation Scheme Officers and Lead farmers
	<b>Output: 3.2 Adoption of biochar and lime use by farmers up-scaled and emission of greenhouse gases from rice fields reduced</b>
	3-2-1. Conduct step-down training workshop on biochar production and use for 10,450 farmers
	3-2-2. Facilitate a carbon credit off-setting for biochar usage by rice farmers
	3-2-3. Monitor implementation and provide technical backstopping
14. Expected Impact:	<ol style="list-style-type: none"> <li>1. Improved food security</li> <li>2. Enhanced soil fertility management</li> <li>3. Safer fertilizer use for farmers and input dealers</li> <li>4. Reduced dependence on fertilizer imports</li> <li>5. Strengthened environmental sustainability</li> </ol>

## 2. Concept Note on Seed System

1. Title (Full name):	Enhance Foundation and Certified Seed Production Under Irrigation
2. Project Location:	Gollinga, Botanga, Tono irrigation schemes
3. Implementing Agencies:	MoFA, Ghana Irrigation Development Authority (GIDA)
4. Beneficiaries:	Research Institutions, Registered seed producers and out-growers
5. Target Group:	Foundation and certified seed producers enterprises
6. Type of project:	1. Grant 2. R&D 3. National budget 4. Private sector
7. Field of support:	1. R & D 2. Production 3. Infrastructure
8. Suggested Funding sources:	1. Government of Ghana (GoG) 2. Development Partners (DPs) 3. Private sector
9. Budget (USD):	3,500,000.00
10. Duration of the project:	3 years
11. Background /Justification:	Seed is the cornerstone of agricultural productivity and food security. In Ghana, the quality, availability, and timely access to foundation and certified seeds are central to the success of national food systems. Despite

advances in seed sector reforms, the supply of foundation and certified seeds remains inadequate due to erratic rainfall patterns and climate change impacts. Foundation seed production, led by research institutions and certified seed production, largely undertaken by registered producers and seed companies, require reliable irrigation to meet strict quality standards and production timelines. However, both systems currently rely heavily on rain-fed cultivation, leading to delays, crop failure, and lower germination rates. To bridge this gap, this project seeks to develop irrigation infrastructure specifically targeted at foundation and certified seed production zones, thereby boosting Ghana’s seed sovereignty, improving productivity, and ensuring resilience in the face of climate variability.

12. Goal and objective:	Overall objective: To improve the availability, quality, and reliability of foundation and certified seed through sustainable irrigation infrastructure development	
	<b>Specific Objectives</b>	<b>Output</b>
	1. To establish seed production sites under irrigation for foundation and certified seeds	1.1 At least 3 irrigation sites identified at priority seed production sites
		1.2 Foundation seed production area under irrigation increased by 100 hectares.
		1.3 Certified seed production area under irrigation increased by 2000 hectares
	2. To enhance the capacity of public and private seed producers in modern irrigation and water management practices	2.1 100 seed producers and 20 institutional staff trained in irrigation management and seed production
		2.2 Two production cycles annually achieved at all supported sites

	3. To promote sustainable, climate-resilient seed production systems through improved infrastructure and institutional support.	3.1 Improved seed production infrastructure 3.2 Strengthened institutional support for seed production
13. Activities	<p><b>Specific Objective 1 To establish seed production sites under irrigation for foundation and certified seeds</b></p> <p><b>Output 1.1 At least 3 irrigation sites identified at priority seed production sites</b></p> <p>1-1-1. Assess water availability and quality at potential sites</p> <p>1-1-2. Evaluate soil suitability and crop water requirements.</p> <p><b>Output 1.2 Foundation seed production area under irrigation increased by 100 hectares</b></p> <p>1-2-1. Prepare the land for foundation seed production</p> <p>1-2-2 Procure 2,500kg of breeder seed</p> <p>1-2-3. Implement best management practices for seed production, including crop monitoring and pest management</p> <p>1-2-4. Monitor soil moisture levels and adjust irrigation accordingly</p> <p>1-2-5 Train farmers and farm workers on efficient irrigation practices.</p> <p>1-2-6. Track progress in expanding foundation seed production area under irrigation</p> <p>1-2-7. Monitor yields and seed quality to assess the impact of irrigation</p> <p>1-2-8. Evaluate the effectiveness of irrigation systems and identify areas for improvement</p> <p><b>Output 1.3 Certified seed production area under irrigation increased by 2000 hectares</b></p>	

1-3-1. Train farmers on efficient irrigation practices and crop management.
1-3-2. Provide technical support on irrigation system operation and maintenance
1-3-3. Establish demonstration plots to showcase best practices
1-3-4. Implement quality control measures to maintain seed quality
1-3-5. Monitor crop health and yields to assess the impact of irrigation
1-3-6. Develop and implement irrigation schedules to optimize water use
1-3-7. Promote water-saving technologies and practices
1-3-8. Track progress in expanding certified seed production area under irrigation.
1-3-9. Monitor yields, seed quality, and water use efficiency
1-3-10. Evaluate the impact of irrigation on seed production and farmer livelihoods.
<b>Specific Objective 2: To enhance the capacity of public and private seed producers in modern irrigation and water management practices</b>
<b>Outputs 2.1 100 seed producers and 20 institutional staff trained in irrigation management and quality seed production</b>
2-1-1. Train 100 seed producers on irrigation management, maintenance, and climate-smart practices.
2-1-2. Establish seed demonstrations and organize field days for seed producers to build their capacity
2-1-3. Establish water user associations to manage and sustain infrastructure.
2-1-4. Facilitate knowledge sharing among seed producers, researchers, and irrigation experts
2-1-5. Establish a network of seed producers and irrigation professionals to promote collaboration and information exchange

	2-1-6. Evaluate the impact of training and technical assistance on seed producers' knowledge and practices
	<b>Output 2.2 Two production cycles annually achieved at all supported sites</b>
	2-2-1. Conduct regular monitoring of irrigation system adoption and water use efficiency
	<b>Specific Objective 3: To promote sustainable, climate-resilient seed production systems through improved infrastructure and institutional support.</b>
	<b>Output 3.1 Improved seed production infrastructure</b>
	3-1-1. Equip seed testing laboratories for enhanced seed quality assurance
	3-1-2. Improve seed storage and handling facilities to maintain seed quality
	<b>Output 3.2: Strengthened institutional support for seed production</b>
	3-2-1. Establish partnerships with smallholder farmers, seed producers, and research institutions
	3-2-2. Establish seed multiplication programs to increase availability of improved seeds
	3-2-3. Develop seed distribution networks to reach smallholder farmers
	3-2-4. Provide training and capacity-building programs for seed producers and farmers
	3-2-5. Develop and disseminate climate-resilient seed production guidelines and best practices
	3-2-6. Establish a monitoring system to track seed production, distribution, and adoption
14. Expected Impact:	<ol style="list-style-type: none"> <li>1. Increased National Seed Security and Self-Sufficiency</li> <li>2. Enhanced Agricultural Productivity and Yields</li> <li>3. Climate Resilience in Seed Production Systems</li> <li>4. Sustainable Livelihoods and Income Growth for Seed Producers</li> <li>5. Improved Food and Nutrition Security</li> </ol>

### 3. Concept Note on Equipment Access and Maintenance

1. Title (Full name):	Establishment and Rehabilitation of Agricultural Mechanisation Training Centers
2. Project Location:	Atebubu and Somanya for Rehabilitation, Northern and Central Regions for Setting up new Ultra Modern Training Centre
3. Implementing Agencies:	MoFA, Metropolitan, Municipal and District Assemblies (MMDAs), Universities
4. Beneficiaries:	Agricultural machinery operators, mechanics, technicians, farmers
5. Target Group:	Youth, women, machinery operators/ mechanics, technicians
6. Type of project:	1. Grant 2. National Budget 3. Private sector.
7. Field of support:	1. Infrastructure 2. Capacity Building
8. Suggested Funding sources	GoG and DPs
9. Budget (USD)	100,000,000.00
10. Duration of the project:	5 years
11. Background /Justification	Over the years, Government's efforts to improve access to mechanization by the importation of mass agricultural machinery and equipment to support Agricultural Mechanization Services Enterprise Centres (AMSECs)/farmers under subsidized and concessionary terms have been challenged by several factors such as poor handling and operation leading to frequent breakdowns as a result of low skill and technical know-how, unavailability of spare

parts and high cost of maintenance and repair. The limited knowledge of machinery operators greatly affects the performance of the machinery and equipment thus rendering such capital intensive investment unproductive after a few years of use. The situation further gets worsen by the engagement of mechanics and technicians who have limited technical expertise in the repair and maintenance of these machinery and equipment. The lack of formal training centres with the requisite infrastructure and equipment for developing mechanisation capacities of operators and mechanics has contributed to the undeveloped human resource capacity in the operation and maintenance of these machinery and equipment. To sustain Governments future investments in mechanization such as the establishment of Farmer Services Centres (FSC) initiative under the Feed Ghana Programme (FGP), which seeks to provide mechanisation services access to farmers, there is need to establish ultra modern mechanisation training centres and rehabilitate existing centres to provide formal training programmes for machinery operators and mechanics as well as to serve as certification and licensing centres for the operation and management of agricultural machinery and equipment in Ghana.

12. Goal and objective:	<b>Overall objective:</b>	
	<b>To establish ultra modern mechanisation training hubs and rehabilitate existing centers for development of requisite human capacity in handling, operation and maintenance of agricultural machinery and equipment</b>	
	<b>Specific Objectives</b>	<b>Output</b>
1. To set up ultra modern agricultural mechanisation training centers and rehabilitate existing centers for youth (including women), operators, mechanics and	1.1 Two (2) ultra modern Agricultural Mechanisation training centers for youth, operators, mechanics and technicians established	
	1.2 Two (2) existing Agricultural Mechanisation centers for youth (including women), operators, mechanics and technicians rehabilitated	

	technicians	
	2. To mount tailored training programmes for agricultural machinery operators, farmers, mechanics and technicians in correct tillage operations and other ancillary practices as well as repairs and maintenance annually	2.1 Tailored training programmes for 1000 agricultural machinery operators and farmers in correct tillage and other ancillary practices mounted annually 2.2 Training programmes for 500 mechanics and technicians on repair and maintenance of various agricultural machinery and equipment conducted annually
13. Activities:	<b>Specific Objective 1 : To set up ultra modern agricultural mechanisation training centers and rehabilitate existing centers for youth (including women), operators, mechanics and technicians</b>	
	<b>Outputs 1.1: Two (2) ultra modern Agricultural Mechanisation training centers for youth (including women), operators, mechanics and technicians established</b>	
	1-1-1. Identify and secure land for establishing the training center	
	1-1-2. Design and construct training center including machine shop and demonstration fields	
	1-1-3. Procure various machinery, equipment and tools for training	
	1-1-4. Identify and recruit personnel to manage the center	
	<b>Output 1.2: Two (2) existing Agricultural Mechanisation centers for youth (including women), operators, mechanics and technicians rehabilitated</b>	
	1-2-1. Identify two (2) existing training centers for rehabilitation	
	1-2-2. Rehabilitate existing training center infrastructure	

1-3-3. Procure various machinery, equipment and tools for training
1-4-4. Augment personnel to manage the center
<b>Specific Objective 2 : To mount tailored training programmes for agricultural machinery operators, farmers, mechanics and technicians in correct tillage operations and other ancillary practices as well as repairs and maintenance annually</b>
<b>Outputs 2.1: Tailored training programmes for 1000 agricultural machinery operators and farmers in correct tillage and other ancillary practices mounted annually</b>
2-1-1. Recruit resource persons for training
2-1-2. Develop training modules
2-1-3. Mobilize youth (including women) and existing machine operators for training
2-1-4. Train youth (including women) and existing machine operators
2-1-5. Certify and license youth (including women) and existing machine operators
2-1-6. Provide support to trainees for work place learning experience on farms (Attachment)
2-1-7. Conduct monitoring and evaluation
<b>Outputs 2.2: Training programmes for 500 mechanics and technicians on repair and maintenance of various agricultural machinery and equipment conducted annually</b>
2-2-1. Identify and recruit resource persons for training
2-2-2. Develop training modules
2-2-3. Mobilize youth (including women), mechanics and technicians for training
2-2-4. Train youth (including women), mechanics and technicians
2-2-5. Certify and license youth (including women), mechanics and technicians

	2-2-6. Provide start up basic tools/equipment to trainees
	2-2-7. Conduct monitoring and evaluation
14. Expected Impact:	<ol style="list-style-type: none"> <li>1. Improved food security</li> <li>2. Sustainable agriculture mechanisation for enhanced rice productivity</li> <li>3. Job creation in the rice value chain</li> </ol>

#### 4. Concept Note on Irrigation and Water Control

1. Title (Full name):	Rehabilitation and Development of Irrigation/Inland Valley Sites for Improved Rice Seed and Paddy Production In Ghana
2. Project Location:	Nationwide
3. Implementing Agencies:	MoFA, GIDA, MMDAs, Private Sector
4. Beneficiaries	Farmers (Commercial/ Small holder), Seed Producers, Golinga, Libga and Bontanga Irrigation Schemes.
5. Target Group	Rice Seed and Paddy farmers
6. Type of project:	1. Grant 2. Loan 3. GoG 4. DPs
7. Field of support:	1. Policy 2. Capacity Building 3. Infrastructure
8. Suggested Funding sources	GoG, DPs, Private Sector
9. Budget (USD)	548,000,000.00
10. Duration of the project:	3-5 years

11. Background /Justification:	<p>Rice production serves as a key driver of economic growth and helps to improve food security. Irrigation development is key to improving rice production (quantity and quality). This is essential because, irrigation enables farmers to cultivate crops throughout the year, and thereby increasing cropping cycles leading to increased yield, reducing poverty, and enhancing food security. Due to inadequate investments for the development of irrigation facilities, the realization of Ghana’s rice production potential has been hindered. Additionally, facilities in existing irrigation schemes have deteriorated and need attention to ensure their integrity. As a result, rice production (paddy and seed) is largely dependent on rainfall ecologies (largely one production cycle per year). This subjects the rice production sub-sector to erratic weather conditions, and hence impacting productivity and yields negatively. In 2024, the entire crop production sub-sector in Ghana experienced severe dry spell situation. Rainfall amounts and distribution was erratic countrywide with production areas in the transitional and savannah agroecological zones being the hardest hit. This resulted in drastic reduction (40%-60%) in yields, productivity and absolute crop failure in some situations. Harnessing the potential of irrigation sites/valleys, while rehabilitating dilapidated public irrigation schemes, as well as the development of new irrigation schemes would lead to increased rice production contributing to the achievement of self sufficiency in rice production for Ghana.</p>	
12. Goal and objective:	Overall objective: To Increase rice seed and paddy production through the development of potential valleys and the provision of modern irrigation infrastructure.	
	Specific Objectives	Output

	<p>1. To identify and map potential inland valleys and irrigation sites, and undertake feasibility, ESIA, and design studies for their development</p> <p>2 To rehabilitate and expand existing public irrigation schemes (Golinga, Libga, and Bontanga), and develop identified inland valleys and irrigation sites into viable schemes</p>	<p>1.1 35,000ha potential (inland valleys -30,000ha and existing/new irrigation schemes - 5,000ha) sites identified and mapped out for development within 3 months.</p> <p>1.2 Feasibility including alternative energy solutions (solar), design study reports and ESIA prepared and submitted for implementation within 6 months.</p> <p>2.1 Three (3) public irrigation schemes rehabilitated (Golinga, Bontanga and Libga - 365ha) and their Irrigable areas (330ha) expanded within 12 months.</p> <p>2.2 Potential valleys and existing/ newly identified potential irrigation sites (30,500ha) developed into viable irrigation schemes within 36 months.</p>
13. Activities	<p><b>Specific Objective 1: To identify and map potential inland valleys and irrigation sites, and undertake feasibility, ESIA, and design studies for their development</b></p> <p><b>Output 1.1: 35,000ha potential (inland valleys -30,000ha and existing/new irrigation schemes - 5,000ha) sites identified and mapped out for development within 3 months.</b></p> <p>1-1-1. Conduct desk studies and review of potential valleys, broken-down schemes and new irrigation sites.</p> <p>1-1-2. Identify and map out potential valleys, broken-down existing schemes and new irrigation sites.</p> <p>1-1-3. Undertake field assessment to identify and map out all potential sites (Inland valleys, existing / newly</p>	

identified sites).
1-1-4. Carry out community sensitisation and engagement with direct project beneficiaries in all the cases.
1-1-5. Prepare and submit consolidated assesement/pre-feasibility report in all the above situations for review.
<b>Output 1.2: Feasibility, ESIA and design studies report prepared and submitted within 6 months</b>
1-2-1. Recruit consultants to carry out feasibility and engineering design studies, and for the supervision of project.
1-2-2. Carry out topographic survey
1-2-3. Carry out soil and Water studies
1-2-4. Carry out financial and economic analysis of the project
1-2-5. Carry out hydrological and other related engineering studies as may be required
1-2-6. Carry out Environmental and Social Impact Assessment (ESIA)
1-2-7: Prepare and submit feasibility including solar, engineering design studies and ESIA reports
<b>Specific Objective 2: To rehabilitate and expand existing public irrigation schemes (Golinga, Libga, and Bontanga), and develop identified inland valleys and irrigation sites into viable schemes</b>
<b>Output 2.1: Three (3) puplic irrigation schemes rehabilitated (Golinga, Bontanga and Libga - 365ha) and their Irrigable areas (330ha) expanded with 12 months.</b>

2-1-1. Review feasibility studies and designs for rehabilitation and expansion of 3 public schemes
2-1-2. Recruit contractors to carry out rehabilitation and construction
2-1-3. Implement actions contained in the environment regulatory instruments ( EPA permits, GRM, RAP etc)
2-1-4. Carry out actual rehabilitation of 3 dams/reservoirs
2-1-5. Carry out the rehabilitation of the headworks, canals and regulatory structures
2-1-6. Rehabilitate the existing irrigable areas.
2-1-7. Expand the irrigable area to meet the potential of each scheme.
2-1-8. Form WUAs and build capacity of farmers in Irrigation Water Use
<b>Outputs 2.2: Potential valleys and existing/ newly identified potential irrigation sites (30,500ha) developed into viable irrigation schemes within 36 months.</b>
2-2-1. Review feasibility studies and designs for the development of valleys and new irrigation schemes.
2-2-2. Recruit contractors to carry out the development of valleys and new Irrigation schemes.
2-2-3. Construct simple Water Harvesting and Regulatory Structures (WHRS) for valleys
2-2-4. Carry out the development of the potential irrigable area within the valleys.
2-2-5. Carry out the development of new irrigation schemes by constructing reservoirs.

	2-2-6. Construct the headworks, canals and regulatory structures.
	2-2-7. Develop the potential irrigable area for new irrigation schemes.
	2-2-8. Implement actions contained in the environment regulatory instruments (EPA permits, RAP, GRM etc) while doing construction.
	2-2-9. Construct one (1), 13m by 25m concrete drying floor per 500Ha Rice Seed/Paddy cropping area = 61No. Drying floors for 30,500 ha.
14. Expected Impact:	<ol style="list-style-type: none"> <li>1. National Rice production and productivity increase</li> <li>2. Food security improved</li> <li>3. Increase in farmers income</li> <li>4. Reduction in Import bill</li> </ol>

## 5. Concept Note on Research, Technology Development and Transfer

1. Title (Full name):	Development and maintenance of varieties for increased rice production
2. Project Location:	CSIR-Crops Research Institute (CRI) (Fumesua), CSIR-Savannah Agricultural Research Institute (SARI) (Nyankpala) and University of Ghana (SIREC-Kpong)
3. Implementing Agencies	CSIR-CRI, CSIR-SARI and University of Ghana
4. Beneficiaries	Research Stations
5. Target Group	Rice scientists and technicians, Seed companies and Certified Seed growers
6. Type of project:	<ol style="list-style-type: none"> <li>1. Grant</li> <li>2. R&amp;D</li> <li>3. Technical Coop./Assistance</li> <li>4. National budget</li> <li>5. DPs</li> </ol>
7. Field of support:	<ol style="list-style-type: none"> <li>1. Policy</li> <li>2. R&amp;D</li> <li>3. Production</li> <li>4. Quality Control</li> <li>5. Capacity Building</li> <li>6. Infrastructure</li> </ol>
8. Suggested Funding sources:	GoG and DPs
9. Budget (USD):	4,000,000.00

10. Duration of the project:	5 years	
11. Background /Justification:	Rice has become a major staple in Ghana. Consumption has exceeded production in the past years and this has brought production deficit. Most rice varieties in Ghana are Jasmine-styled with similar average potential yield. Thus, there is the need to develop new, high-yielding, climate-smart varieties that can increase genetic gain on farmers' field. Also, most existing rice varieties have purity issues over time, and thus, there is the need to maintain their purity in order to improve on the quality of certified seed farmers use. To increase rice production, the amount of breeder seed produced should be increased to meet Ghana's rice self-sufficiency by 2028.	
12. Goal and objective:	<b>Overall objective: To produce and maintain climate-resilient rice varieties</b>	
	<b>Specific Objectives</b>	<b>Output</b>
	1. Develop and maintain climate-smart, high-quality rice varieties through purification of Early Generation Seed (EGS) to increase rice production.	1.1 At least three (3) new varieties released
		1.2 At least eight (8) existing varieties are purified and maintained
	2. To develop state-of-the-art nucleus and breeder seed fields for seed production and varietal maintenance.	2.1 At least 1.5 ha each of nucleus and breeder seed fields established for the three major research institutions
		2.2 At least 2.0 MT breeder seed produced in each of the three institutions by 2028
3. To provide laboratory equipment and cold storage rooms for varietal maintenance and storage	3.1 At least two rice research laboratories created and equipped with modern equipment	
	3.2 At least 5 scientists and technicians trained	
13. Activities	<b>Specific Objective 1: Develop and maintain climate-smart, high-quality rice varieties through purification of</b>	

Early Generation Seed (EGS) to increase rice production.
<b>Output 1.1: At least two new varieties released</b>
1-1-1. collect/import rice germplasm
1-1-2. Select and establish parental lines
1-1-3. Perform emasculation and crossing
1-1-4. Establish F1 population and perform hybridity testing
1-1-5. Grow populations from F2 to F5
1-1-6. Genotype materials using molecular markers to identify desirable traits
1-1-7. Perform field trials and start processes for release of new varieties
<b>Output 1.2: At least eight (8) existing varieties are purified and maintained</b>
1-2-1. Identify varieties to be maintained
1-2-2. Establish fields for maintaining the identified varieties
1-2-3. Select lines for next generation
1-2-4. Repeat process until lines are purified
1-2-5. Store purified seed as pure NS and BS
1-2-6. Monitor the establishment and maintenance of the varieties
<b>Specific Objective 2: To develop state-of-the-art nucleus and breeder seed fields for production and variety maintenance</b>
<b>Output 2.1: At least 2.5 ha each of nucleus and breeder seed fields created and BS produced for the three major research institutions</b>
2-1-1. Select suitable site

	2-1-2. Select and contract a suitable contractor for creation of NS and BS fields
	2-1-3. Monitor progress of work
	<b>Output 2.2: At least 2.0 MT breeder seed produced in each of the three institutions by 2028</b>
	2-2-1. Produce breeder seed on 2.0 ha field in each of the three major institutions
	2-2-2. Package and store breeder seed in the three major institutions
	<b>Specific Objective 3: To provide laboratory equipment and cold storage rooms for varietal maintenance and storage</b>
	<b>Output 3.1: At least two rice research laboratories created and equipped with modern equipment</b>
	3-1-1. Construct/rehabilitate a standard laboratory for rice research
	3-1-2. Equip laboratories with equipment for rice research
	<b>Output 3.2: At least 5 scientists and technicians trained</b>
	3-2-1. Organize training for laboratory staff
14. Expected Impact:	<ol style="list-style-type: none"> <li>1. Increased food security</li> <li>2. National rice production increased</li> <li>3. Increased farmer-income</li> </ol>

## 6. Concept Note on Harvesting, Post-Harvest and Marketing

1. Title (Full name):	Enhancing Ghana Rice Quality through Upgraded Milling Centres
2. Project Location:	50 Major Rice Producing Districts in 10 Regions
3. Implementing Agencies	MoFA, Ministry of Trade and Agribusiness (MoTAI), Ghana Standards Authority (GSA), Food and Drugs Authority (FDA), CSIR-Food Research Institute (FRI)
4. Beneficiaries	Rice processors (small to medium-scale), Aggregators, Women and youth in the rice value chain, aligning with NRDS II's gender-inclusive targets (40% women, 10% youth, 10% PWDs)
5. Target Group	Small to medium-scale rice processors, particularly women and youth, to enhance their participation in the rice value chain. Aggregators
6. Type of project:	<ol style="list-style-type: none"> <li>1. Grant</li> <li>2. R&amp;D</li> <li>3. Technical Coop./Assistance</li> <li>4. GoG</li> <li>5. Private sector</li> </ol>
7. Field of support:	<p>Marketing</p> <p>Post-harvest</p> <p>Quality Control</p> <p>Infrastructure</p>
8. Suggested Funding sources:	GoG, DPs, Private sector and Financial institutions

9. Budget (USD):	68,000,000.00	
10. Duration of the project:	5 years	
11. Background /Justification	<p>Ghana's rice sector is pivotal for food security and economic development, with the National Rice Development Strategy (NRDS) II aiming to achieve self-sufficiency by 2028, targeting 3,312,282 metric tons of paddy rice production and 2,209,292 metric tons of milled rice. Currently, Ghana's production is at 51.3% sufficiency (as at 2023). However, challenges persist, including:</p> <ol style="list-style-type: none"> <li>1. Inadequate milling capacity due to outdated or low-standard milling centres, contributing to reliance on imported rice.</li> <li>2. High post-harvest losses due to inadequate storage and processing infrastructure, estimated at 12-30%.</li> <li>3. Limited market access for smallholder farmers due to fragmented aggregation systems, affecting competitiveness.</li> <li>4. Quality control issues that hinder meeting national and international standards.</li> </ol> <p>The NRDS II identifies infrastructure development, particularly milling and aggregation centres, as a priority to address these gaps. This project focuses on modernizing existing milling and aggregation centres across Ghana to enhance processing efficiency, reduce post-harvest losses, improve rice quality, and facilitate market access for smallholder farmers and processors.</p>	
12. Goal and objective:	<b>Overall objective: To enhance the efficiency and competitiveness of Ghana's rice value chain by upgrading existing milling and aggregation centres</b>	
	<b>Specific Objectives</b>	<b>Output</b>

1. To increase the capacity for processing and storage of rice to meet national and international standards	1.1 50 standard milling and aggregation centres equipped with modern processing equipment, capable of processing at least 100 metric tons of rice per day constructed and operationalised, meeting national Standards and FDA requirement
	1.2 Standardized training curriculum and materials on Good Storage Practices (GSP), Good Warehouse Practices (GWP), Good Hygiene Practices (GHP), Integrated Pest Management (IPM) for storage, paddy quality assessment, and inventory management developed and disseminated.
	1.3 At least 5000 farmers, FBO leaders, aggregator staff, miller staff, and warehouse managers trained in GSP and quality control.
	1.4 At least 50% of center operators and managers are women, youth and PWDs, with documented increases in their participation in the rice value chain as a result of targeted training programs.
2. To establish and/or upgrade existing post-harvest storage facilities (e.g., silos, warehouses) in strategic rice aggregation hubs	2.1 At least 50 new, standard storage facilities (silos/warehouses) constructed/installed in 50 key rice production zones.
	2.2 At least 50 existing, suitable storage facilities rehabilitated and upgraded to meet modern standards.
	2.3 Appropriate handling equipment (e.g., cleaners, moisture meters, bag stitchers, small conveyors) procured and installed at new/upgraded facilities

		2.4 Post-harvest losses decrease below 10% due to the successful implementation of best practices in handling and quality control
	3. To facilitate market access for smallholder farmers and processors, supporting the target of 50 functional aggregation centres by 2030	3.1 Increased Market Access for Smallholder Farmers
		3.2 Functional Aggregation Centers Established
13. Activities:	<b>Specific Objective 1. To increase the capacity for processing and storage of rice to meet national and international standards</b>	
	<b>Outputs 1.1: 50 standard milling and aggregation centres equipped with modern processing equipment, capable of processing at least 100 metric tons of rice per day constructed and operationalised, meeting National Standards and FDA requirement</b>	
	1-1-1. Conduct assessments of existing milling centres in major rice-producing districts (Northern, Upper East, Volta, Bono East, Oti, Ashanti, Eastern, Central) to identify upgrade needs and feasibility.	
	1-1-2. Develop detailed upgrade plans for the centres, including specifications for modern processing equipment (e.g., milling machines, graders, moisture meters) and storage facilities with controlled temperature and humidity.	
	1-1-3. Procure modern processing equipment and other appropriate accessories (e.g., moisture meters, weighing scales), ensuring compliance with Ghana Standards and ISO requirements, in collaboration with GSA and FDA. (\$5,000,000)	
	1-1-4. Upgrade and equip the centres, operationalizing them to process at least 100 metric tons of rice per day, with certification from GSA and licensing by the FDA for compliance.	

<b>Output 1.2. Standardized training curriculum and materials on Good Storage Practices (GSP), Good Warehouse Practices (GWP), Good Hygiene Practices (GHP), integrated pest management (IPM) for storage, paddy quality assessment, and inventory management developed and disseminated.</b>
1-2-1. Conduct a detailed training needs assessment (TNA) for target groups.
1-2-2. Adapt/develop training modules based on TNA and best practices.
1-2-3. Produce training materials (manuals, visual aids, etc.).
1-2-4. Develop standard operating procedures (SOPs) for post-harvest handling and quality control at upgraded milling and aggregation centres, based on industry best practices, including GSP, GWP, GHP, IPM, and inventory management.
<b>Output 1.3. At least 5000 farmers, FBO leaders, aggregator staff, miller staff, and warehouse managers trained in GSP and quality control.</b>
1-3-1. Identify and train a pool of master trainers/facilitators.
1-3-2. Organize and conduct training workshops and practical demonstrations for 5,000 farmers, FBO leaders, aggregator staff, miller staff, and warehouse managers on post-harvest handling and quality control, targeting at least 50% women, youth and PWDs participation, using SOPs developed.
1-3-3. Implement a monitoring system for training effectiveness.
<b>Output 1.4 At least 50% of center operators and managers are women, youth and PWDs, with documented increases in their participation in the rice value chain as a result of targeted training programs.</b>
1-4-1. Develop targeted training programs for women, youth and PWDs on the operation and management of upgraded milling and aggregation centres.
1-4-2. Implement mentorship and support programs to encourage women, youth and PWDs participation in the

rice value chain.
1-4-3. Monitor and report on the participation rates of women, youth and PWDs in centre operations and management, ensuring alignment with NRDS II gender targets.
<b>Specific Objective 2: To establish and/or upgrade existing post-harvest storage facilities (e.g., silos, warehouses) in strategic rice aggregation hubs</b>
<b>Output 2.1. At least 50 new, standard storage facilities (silos/warehouses) constructed/installed in 50 key rice production zones.</b>
2-1-1. Develop standardized designs and specifications for different scales/types of storage for new facilities.
2-1-2. Procure and construct at least 50 well-equipped storage facilities (silos/warehouses) in 50 key rice-producing districts.
<b>Output 2.2. At least 50 existing, suitable storage facilities rehabilitated and upgraded to meet modern standards.</b>
2-2-1 . Adapt standardized designs from Output 2.1 for upgrading 50 existing storage facilities to meet modern standards.
2-2-2. Upgrade and operationalize 50 aggregation centres with improved storage facilities and transportation logistics to ensure functionality and accessibility, including upgrades to existing storage facilities.
<b>Output 2.3. Appropriate handling equipment (e.g., cleaners, moisture meters, bag stitchers, small conveyors) procured and installed at new/upgraded facilities</b>
2-3-1. Assess equipment needs for each selected facility.
2-3-2. Procure and install specified handling and quality control equipment.
2-3-3. Provide initial training on equipment operation and maintenance.

<b>Specific Objective 3: Facilitate market access for smallholder farmers and processors, supporting the target of 50 functional aggregation centres by 2030</b>
<b>Output 3.1: Increased market access for smallholder farmers</b>
3-1-1 Provide training to smallholder farmers on market requirements, quality standards, and business skills.
3-1-2 Establish partnerships between smallholder farmers and buyers, such as wholesalers, retailers, or processors.
3-1-3 Support the establishment and operation of aggregation centers, where smallholder farmers can collect, store, and sell their produce.
3-1-4 Provide smallholder farmers with access to market information, such as prices, demand, and supply trends.
3-1-5 Implement quality control measures to ensure that smallholder farmers' produce meets market standards.
3-1-6. Promote centre usage through awareness campaigns and training on marketing strategies to enhance the visibility and efficiency of rice distribution.
<b>Output 3.2: Functional aggregation centers established</b>
3-2-1. Upgrade and operationalize 50 aggregation centres with improved storage facilities and transportation logistics to ensure functionality and accessibility
3-2-2 Provide necessary equipment and tools for aggregation centers, such as weighing scales, cleaning and grading machines
3-2-3 Train staff on center management, produce handling, and quality control.
3-2-4 Support aggregation center operators with business planning, financial management, and market development
3-2-5 Establish a system to monitor and evaluate the performance of aggregation centers

14. Expected Impact:

1. Food security enhanced
2. Increased milling capacity and improved rice quality, meeting national and international standards
3. Quality of paddy rice supplied to mills improved by meeting national (GS 1122) and international standards.
4. Reduced post-harvest losses to below 10%, leading to higher incomes for farmers and processors.
5. Enhanced market access and competitiveness of Ghanaian rice in domestic and international markets
6. Increased participation of women and youth (at least 50%) in the rice value chain, contributing to employment and economic empowerment

<b>7. Concept Note on Community Mobilization, Farmer Based Organizations and Credit Management</b>	
1. Title (Full name):	Enhancing Inclusive Agricultural Finance through Innovative Financial Products and Data-Driven Systems for rice Value Chain actors
2. Project Location:	Nationwide
3. Implementing Agencies	GoG, MoFA, Ghana Incentive Based Risk Sharing System for Agricultural Lending (GIRSAL), Development Bank Ghana, DP's, Private sector
4. Beneficiaries	Rice Value Chain Actors ( FBO's )
5. Target Group	Registered FBO's and Financial institutions
6. Type of project:	<ol style="list-style-type: none"> <li>1. Grant</li> <li>2. R&amp;D</li> <li>3. Technical Coop./Assistance</li> <li>4. GoG</li> <li>5. Private sector</li> </ol>
7. Field of support:	<ol style="list-style-type: none"> <li>1. Policy</li> <li>2. Credit</li> <li>3. Capacity Building</li> </ol>
8. Suggested Funding sources:	GoG, DPs, Non Governmental Organizations (NGOs), Private sector
9. Budget (USD):	7,517,000.00
10. Duration of the project:	5 years
11. Background /Justification:	Access to financing is vital for the growth of the agricultural sector in Ghana, mainly for working capital such as

acquiring inputs (seeds, fertilizers, etc), hiring labour, and for fixed capital acquisition such as machinery and land. The limited access to financial products, slowdown expansion of farm size, impedes agricultural growth, with consequences for the macro economy. In Ghana, the financial sector players involved in agricultural financing include commercial banks, rural banks, savings and loans companies, microfinance institutions and insurance companies as well as Village Savings and Loans. Development of a data-driven framework to unlock access to finance through partnerships, linkages and capacity building will improve financial access for FBOs including women, youth, and PWDs in the rice value chain.

12. Goal and objective:	<b>Overall objective: Enhance Inclusive financing for Rice Value Chain actors</b>	
	<b>Specific Objectives</b>	<b>Output</b>
	1. Foster institutional linkages with actors to enhance access to financing	1.1 Partnership to enhance access to finance, financial literacy, Fintech, savings, credit, insurance and investment-for 35% of value chain actors achieved
	2. To advocate for the development of digital trade finance models	2.1 One inclusive digital trade finance model established.
	3. To enhance the use of digital technology integration platforms for easy access to data	3.1 Data driven decisions through effective digital technology utilization enhanced 3.2 Guidelines for data protection and management (kyc) established
13. Activities:	<b>Specific Objective 1: Foster institutional linkages with actors to enhance access to financing</b>	
	<b>Output 1.1: Partnership to enhance access to finance, financial literacy , Fintech, savings, credit, insurance and investment-for 35% of value chain actors achieved</b>	
	1-1-1. Organize meetings and workshops between actors and financial institutions	

1-1-2. Provide training and capacity building programs for actors and financial institutions
1-1-3. Build capacity of FBOs including women and youth on climate SMART credit systems (carbon credit, SRP)
<b>Specific Objective 2: Development of digital trade finance models</b>
<b>Outputs 2.1: One inclusive digital trade finance model established</b>
2-1-1. Organise advocacy programs for stakeholders around digital trade financing
2-1-2. Facilitate the establishment of AgTech platforms to link transparency, traceability and security in trade transactions
2-1-3: Build the capacity of all operational actors on commodity supply chain management to reduce the need for traditional collateral
2-1-4: Build capacity of all operational actors on liquidity and collateral management to derisk credit
<b>Specific Objective 3: Enhance digital technology integration for easy access to data</b>
<b>output 3.1: Enhanced data driven decisions through effective digital technology utilization</b>
3-1-1. Build capacity of extension officers on digital data collection tools
3-1-2. Sensitize FBOs on digital data collection and protection
3-1-3. Facilitate creation and utilization of digital platforms for easy linkages (financial institutions)
<b>Output 3.2: Guidelines for data protection and management (kyc) established</b>
3-2-1. train extension officers, financial service providers and digital service providers on secured data management and KYC compliance
3-2-2. Develop data management guideline kit and distribute to stakeholders
3-2-3. organize stakeholder consultative workshop to validate the guideline kit

14. Expected Impact:

1. Enhancement of partnership.
2. Increase income levels
3. Facilitate affordable financing
4. Enhance efficient productivity
5. Enhance rice self-sufficiency
6. Secure Food security