



Republic of Sierra Leone
Ministry of Agriculture and Food Security

Sierra Leone **Seed Roadmap** For Rice, Cassava, Maize, and Soybean **2024 – 2028**





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Abbreviation and acronyms

AATF	African Agricultural Technology Foundation
AfDB	African Development Bank
AfricaRice	Africa Rice Center
AGRA	Alliance for a Green Revolution in Africa
BASICS II	Building an Economically Sustainable Cassava Seed System, Phase 2
BMGF	Bill and Melinda Gates Foundation
CAADP	Comprehensive Africa Agriculture Development Program
CSA	Climate Smart Agriculture
CSE	Cassava Seed Entrepreneur
EU	The European Union
FAO	Food and Agriculture Organization of the United Nations
FSRP	Food Systems Resilience Programme
GAP	good agricultural practices
GAFS	Global Food Security
GDP	gross domestic product
GoSL	Government of Sierra Leone
GST	Goods and services tax
IFAD	International Fund for Agricultural Development
IGR	Internally generated revenue
IITA	International Institute of Tropical Agriculture
IsDB	Islamic Development Bank
MAFS	Ministry of Agriculture and Food Security
MEDA	Mennonite Economic Development Associates
mt	Metric tonne
NaFRA	National Fertilizer and Regulation Agency
NAFFSL	National Federation of Farmers in Sierra Leone
NAIP	National Agriculture Investment Plan
NAT	National Agricultural Transformation (Plan)
NSADP	national sustainable agricultural development
NGO	non-government organization
OPV	open pollinated varieties
RAIC	Rice Agro-Industrial Cluster Project
RRVCDP	Regional Rice Value Chain Development Project
SAA	Sasakawa Africa Association
SAH	semi-autotrophic hydroponics technology
SMP	Seed Multiplication Programme

SCADeP	Smallholder Commercialization and Agribusiness Development Project
SLeCAD	Sierra Leone Chambers of Agribusiness Development
SLARI	Sierra Leone Agricultural Research Institute
SLARiS	Sierra Leone Agri-Business Rice Value Chain Support Project
SLeSCA	Sierra Leone Seed Certification Agency
TAAT	Technologies for African Agricultural Transformation
TOT)	Training of trainer
UNICEF	United Nations Children's Fund
WB	World Bank
WFP	World Food Program

Foreword

Since His Excellency, President Dr. Julius Maada Bio assumed office in 2018, we have recorded remarkable progress in every area of our national life.

President Bio has made agriculture a top priority in his manifesto, “Feed Salone,” because of the importance of the agricultural sector to Sierra Leone’s economic growth and development. As a major provider of raw materials for the manufacturing and industrial sector, agriculture plays a crucial part in Sierra Leone’s industrial and food security transformation.

This body of work builds on one of the seven pillars of the Feed Salone strategy, i.e., seed and input systems. Other pillars are mechanization and irrigation; aggregation, processing, and market linkages; access to agricultural finance; agriculture technologies (AgTech) and climate smart agriculture (CSA); and empowering women and youth.

The ultimate goal of the Feed Salone strategy is to increase food production to the level needed to feed the country’s growing population. Feed Salone is projected to contribute to the growth of the agricultural sector, particularly in the areas of seed and input systems through the integration of public and commercial institutions, with an emphasis on the crucial role of research and extension.

In developing the seed road map, major contributions were received from the Seed Multiplication Programme (SMP), the private sector, the National Fertilizer Regulatory Agency (NaFRA), the Sierra Leone Seed Certification Agency (SLeSCA), and the Sierra Leone Agricultural Research Institute (SLARI). In addition, international technical experts and development partners (directors general and staff of One CGIAR (IITA and AfricaRice), Bill and Melinda Gates Foundation (BMGF), African Development Bank (AfDB), Building an Economically Sustainable and Integrated Cassava Seed System, Phase 2 (BASICS-II), Technologies for African Agricultural Transformation (TAAT)-Clearinghouse and TAAT Compact Coordinators Rice, Cassava, Maize, and Soybean, as well as the Policy Enabler Compact Coordinator, Sahel Consulting, Sasakawa Africa Association (SAA), Mennonite Economic Development Associates (MEDA), and the African Agricultural Technology Foundation (AATF) provided valuable technical and financial support to the planning process of the road map.

It must be emphasized that the creation of this seed road map was a collaborative effort that involved a wide spectrum of multi-stakeholders from the agricultural industry. This was done to ensure that it incorporates all constructive views and suggestions from all key stakeholders and builds on the current achievements and strengths of the current government, while ensuring proper alignment to national and regional priorities.

Let me end by expressing my deepest gratitude to the Deputy Hon. Minister of Agriculture and Food Security, as well as to SLARI, IITA, AfricaRice, BASICS-II, Sahel Consulting, TAAT, SAA, and AGRA.

Dr. Henry Musa Kpaka

Minister of Agriculture and Food Security

Republic of Sierra Leone

Acknowledgment

Partnerships are the bedrock of any successful initiative, and the development of the Seed Road Map being a key pillar of FEED SALONE which is one of the BIG-FIVE priorities of the Government of Sierra Leone aiming at boosting food security in the country is no exception. It is gratifying to note that the Seed Business Summit convened by the Ministry of Agriculture and Food Security in collaboration with other ministries, technical partners and donors produced a blueprint that will ensure an effective seed system within the value chains of prioritized crops, namely rice, cassava, maize, and soybean. On behalf of the Minister of Agriculture and Food Security, I have the honor to acknowledge and thank the following institutions for their profound and invaluable contribution to the development of the Seed Road Map for Sierra Leone:

Sister Ministries of the Government of Sierra Leone, Office of the Presidential Initiative on Climate Change, Renewable Energy & Food Security; Various private sector players in the agri-input sector, National Federation of Farmers in Sierra Leone (NAFSL), Universities (Njala University, Ernest Bai Koroma University), NGOs (CARE and AIDE-Sierra Leone), United Nation Agencies (WFP and FAO); AfricaRice and IITA of the One CGIAR and associated programs (Building an Economically Sustainable and Integrated Cassava Seed System - BASICS, and Technologies for African Agricultural Transformation - TAAT); key projects under the Ministry of Agriculture and Food Security (Food System Resilience Project -FSRP, Sierra Leone Agribusiness and Rice Value Chain Support - SLARIS, Agriculture Value Chain Development Project - AVCDP, Smallholder Commercialization and Agribusiness Development Project - SCADEP, etc.); Sierra Leone Agricultural Research Institute, Sierra Leone Seed Certification Agency, Seed Multiplication Programme (SMP), National Fertilizer Regulatory Agency (NaFRA), Sierra Leone Chamber of Agribusiness Development (SLeCAD), key donors (BMGF and AfDB); Sahel Consulting, Sasakawa Africa Association (SAA), Mennonite Economic Development Associates (MEDA), and the African Agricultural Technology Foundation (AATF), as well as the media.

We are most grateful for your remarkable contributions. Special thanks go to the IITA BASICS project funded by BMGF and TAAT funded by AfDB and BMGF for funding the summit.

Prof. Abdulai Jalloh,
Director General, SLARI.

1.0 Executive Summary

Agriculture is the backbone of Sierra Leone's economic and social development, accounting for more than 54% of the country's gross domestic product (GDP) and creating jobs and wealth, particularly in rural areas. However, Sierra Leone has yet to reap the full benefits of agriculture due to low productivity, which has forced the country to import basic staples such as rice, maize, and soybean, all of which can be grown in the country. Sierra Leone, for example, imported \$200 million of rice annually to meet local demand. If the population trajectory continues, doing nothing will worsen the situation and increase demand for key staples by 2050. The Sierra Leone government recognizes this risk and has developed a strategy known as Feed Salone to mitigate the risks that lie ahead. The Feed Salone strategy recognizes the seed system as a strong anchor that will propel Sierra Leone's agriculture's present and future, but details on how to build a sustainable seed system, what investment is needed, who the critical actors to be mobilized are, what capacities—both human and infrastructural—are required, and so on are lacking. These questions are answered in this roadmap for an economically sustainable seed system. The roadmap was created at a summit convened by the Sierra Leone government, with funding from IITA, Building an Economically Sustainable Cassava Seed System, Phase 2 Project (BASICS-II), Sasakawa Africa Association (SAA), Technologies for African Agricultural Transformation (TAAT) Program, and Sahel Consulting. Major components are breeding, foundation seed companies, commercial and certified seed producers, quality assurance and certification, monitoring, evaluation and learning, capacity building, and so on. According to this roadmap, approximately **US\$151 million** in funding will be required to establish an economically sustainable seed system that will drive Sierra Leone's agricultural transformation for the seed sector. This sum will be used to construct seed system infrastructure as well as human resources. The investment will be used to establish/incubate a network of seed entrepreneurs, resulting in the creation of jobs and wealth in the seed ecosystem. It recognizes the importance of the Sierra Leone Agricultural Research Institute (SLARI), the Sierra Leone Seed Certification Agency (SLeSCA), the National Fertilizer Regulatory Agency (NaFRA), the National Federation of Farmers of Sierra Leone (NAFFSL), and the Seed Multiplication Programme (SMP), and ensures that a portion of the investment is used to revitalize these institutions. Finally, the investment will go toward the development of breeder, foundation, and certified seeds, which will put an end to decades of seed importation and assist the country in achieving food and nutritional security as well as food sovereignty.



2.0 Introduction

Economic importance of agriculture: The Sierra Leone economy is predominantly agriculture-based, with the sector providing about 54.5% of jobs for the population. In the rural areas, well over 80% of the people get their livelihood from subsistence farming. In 2021, the sector contributed about 57.4% of GDP and about 28% of exports. The country is endowed with human capital and natural conditions to support rapid agricultural productivity growth.

Challenges: Yet, despite the given circumstances, agricultural productivity in the country has stagnated over the years, with an average annual growth rate of about 3.9% over the last 14 years. Cultivation of the country's main staple, rice, is largely smallholder-based and relies on rainfed systems. Irrigated rice accounts for less than 4% of total rice production. Land preparation, planting, and harvesting are also done mainly by hand, thus limiting cultivation and ultimately production. Because of the subsistence nature of farming in the country, with less than a 2% rate of mechanization, only about 15% of arable land is under cultivation.

Furthermore, farmers' adoption of improved technologies and good agronomic practices is low, as the pipeline that links research, release, and adoption of agricultural technologies remains broken. The use of fertilizer and other agrochemicals is suboptimal. As a result, the yield of most crops in the country is below attainable potential. For instance, the estimate for rice yield has ranged between 1.27 and 2.1 metric tons per hectare (mt ha⁻¹) over the past 6 years, well below the regional average. Yield for cassava is also well below its potential, ranging from 15.7 to 21.3 mt ha⁻¹ between 2017 and 2021.

Consequently, Sierra Leone is a net importer of food, with an import basket consisting of many items that can be produced locally, such as rice, onions, eggs, and dairy products. Food import accounts for about 32% of merchandise import. The estimate for the average annual import bill for rice alone has grown steadily over the past 6 years and now stands above US\$200 million. Exports of cash crops, mainly cocoa, coffee and oil palm, have grown steadily post-war, but they were not enough to offset the importation of other food items.

The slow growth in agriculture threatens the country's food security situation and has wide ramifications for the economy and people's well-being. Food import bills put pressure on the limited reserves of the country and ultimately create a balance of payment issues, which is reflected in the continued depreciation of the Leones. Job creation in rural areas is also slow when growth of agriculture output stagnates. A World Food Programme study estimated that, as of April 2022, 1.1 million people (13.4% of the population) are facing acute hunger, while 2 million are experiencing chronic hunger.

Policy and strategic frameworks: For more than a decade now, in response to the dire need of the country to address local food production challenges and to address the Malabo Commitments, the Government of Sierra Leone (GoSL) has engaged in tremendous efforts to develop the sector and maximize the benefits realized both at the macro and micro levels. Given the level of emphasis placed on consolidating all investments made in agriculture, the GoSL developed strategic planning documents, including the National Sustainable Agricultural Development Plan 2010–2030 (NSADP), which serves as a contribution of Sierra Leone to the Comprehensive Africa Agriculture Development Program (CAADP), with the objective of improving agricultural productivity; the GoSL National Agricultural Transformation Plan 2023 (GoSL NAT-2023) with the objective of ensuring sustainable and diversified production of food including crops and animals, on a scale sufficient to feed the growing population; and the National Agricultural Investment Plan of 2022 (GoSL NAIP -2022). The new mandate is a government flagship program tagged *Feed Salone* with pillars (mechanization and irrigation, seed and input systems, aggregation, processing, and market linkages, access to agricultural finance, agriculture technologies (AgTech) and climate smart agriculture (CSA), and empowering women and youth from 2023 to 2028.

These planning documents have been helpful guides for all agricultural investments in the country, ensuring that investments are directed to meet the urgent and prevailing needs of the country. In addition to these plans, policies have been developed to provide a framework for improving the various areas of the sector. Some of these policies include the National Seed Policy, National Fertilizer Policy, National Agricultural Extension Policy, Gender in Agriculture Policy,

National Rice Policy, and many others. In 2020/2021, TAAT also supported a country assessment study by The African Seed Access Index (TASAI) to appraise the structure and performance of the seed sector in Sierra Leone. Findings from this assessment indicated, among other challenges, the low availability of basic and foundation seeds for major crops, including rice. The Sierra Leone Agriculture Delivery Compact provides an opportunity for the country to set a bold transformative agenda to boost productivity growth and reduce poverty.

Current donor support: In line with these plans and policies, the Ministry of Agriculture and Food Security has designed and executed several projects with funding support from multilateral agencies and development partners, including the Global Food Security (GAFS), the African Development Bank (AfDB), the World Bank (WB), the European Union (EU), the International Fund for Agricultural Development (IFAD), the Islamic Development Bank (IsDB), and the United Nations. Currently, five projects have been implemented in the past 3 years, valued at over US\$ 360 million, with two being funded by the AfDB: the Sierra Leone Agribusiness and Rice Value Chain Support Project (SLARIS), (US\$11 million) and the Rice Agro-Industrial Cluster Project (RAIC), (US\$ 42 million). The Dakar-2 Country Compact is estimated at US\$410 million.

The agricultural landscape: Sierra Leone has more than 5.4 million hectares of arable land, which include mangroves, inland valley swamps, riverine grasslands, and well-drained uplands that are suitable for growing rice, cassava, maize, soybean, and other crops. However, this rich arable resource is underutilized with total area under cultivation at only about 10% of the fertile and diverse lands. Limitations to domestic production continue to exist as a result of insufficient access to quality seeds (owing to the absence of a formal seed system). Although poor access to quality seeds of improved varieties is a prime factor hindering productivity, there are other limiting constraints: (i) limited access to fertilizer, pesticides, and mechanization services; (ii) low use of improved production technologies; and (iii) low access to affordable finance.

2.1 Evidence of previous interventions by TAAT, BASICS, and AGRA

TAAT's previous interventions in Sierra Leone: The Technologies for African Agricultural Transformation (TAAT) assisted with rice and cassava production in 2021/2022. TAAT supplied 1.5 tons of breeder and 30 tons of foundation rice seeds for further multiplication by the Sierra Leone Agricultural Research Institute (SLARI) and the private sector, respectively. This support engaged SLARI, the private sector, and the Sierra Leone Seed Certification Agency (SLeSCA) to advance hands-on seed multiplication and quality control practices and capacity development.

Furthermore, the TAAT Rice Compact supported the Sierra Leone Agri-Business Rice Value Chain Support (SLARIS) Project, which closely worked in partnership with the IsDB-Regional Rice Value Chain Development Project (RRVCDP) with 101.52 tons of certified seed being distributed to 1,692 farmers. The paddy yields of these farmers increased by 25-30% compared with those who used local or old varieties, with 2,225,000 Leones as net revenue per hectare. An e-register was established with 13,851 households and their locations and communities captured. Through the Special Emergency Assistant Facility (SEAF), 57 metric tons (mt) of rice seed and 10 mt of maize seed in the 2021/2022 cropping season were delivered.

From 2018 to 2021, the TAAT Cassava Compact equipped SLARI's laboratory at Njala with solar power and provided training on semi autotrophic hydroponics (SAH) technology to the staff to maintain the laboratory and produce cassava seed using the technology. The Compact supported seven cassava processing communities to establish seed farms of SLICASS 7, an improved variety; established demonstrations on GAP; and revitalized the processing facilities belonging to community associations engaged in processing cassava into *gari*, high-quality cassava flour, and other value-added products. It ensured that seed growers were linked to farmers selling cassava roots to the processing facilities. The Compact also established an e-register of cassava value chain actors in the country and developed partnerships for scaling cassava technologies.

The contribution of BASICS II: The Building an Economically Sustainable Cassava Seed System, Phase 2 (BASICS-II) project jointly provided funds for the first seed business summit in Sierra Leone that brought all the seed actors to a roundtable to chart a roadmap for the country. Furthermore, in the last 3 years, the BASICS-II project has developed a model (BASICS model) that connects actors in the seed value chain, while ensuring a constant supply of improved disease-free varieties to farmers and, at the same time, guaranteeing sustainability and shared economic prosperity among the seed actors. In Nigeria and Tanzania, the BASICS model has led to the establishment of more than 1,000 seed entrepreneurs, doubled cassava yield, and created wealth among cassava farmers. The BASICS-II project is working closely with SLARI to implement the model in Sierra Leone. The project built the capacity of SLARI's staff in early-generation seed production and supported resource mobilization for the seed system.

Support of AGRA for Sierra Leone's seed system assessment: AGRA significantly contributed to the agricultural sector with funding support for increased seed production to enhance productivity and capacity-building training in both short and long terms (MScs and PhDs). AGRA also supported the GoSL in carrying out the assessment of the seed system (Figure 1). Figure 2 depicts the components of a functional seed system, and Figure 3 shows what the Centre of Excellence for Seed Systems in Africa can offer to strengthen the Sierra Leonean seed system.

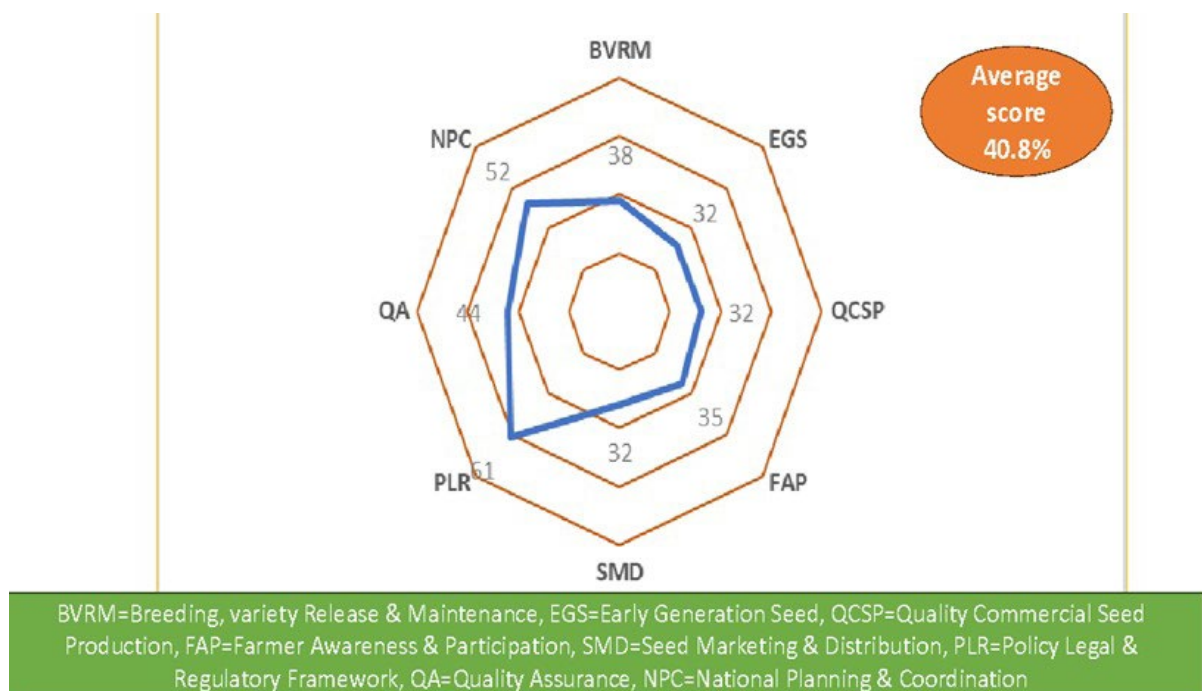


Figure 1: Chart from the assessment of the Sierra Leonean seed system



Figure 2: Components of a functional seed system



Figure 3: What the Centre of Excellence for Seed Systems in Africa (CESSA) can offer to strengthen the Sierra Leonean seed system.

3.0 Rationale of the Summit

As a result of the constraints highlighted, Sierra Leonean farmers cannot compete in the global market. To realize the desired agricultural transformation with seed as an entry point, Sierra Leone held wide consultations with multiple stakeholders to identify major challenges, develop solutions, and advocate for more investments. The seed summit was in response to the urgent need to change the agricultural narrative. It pulled policymakers, international financial institutions, scientists, the private sector, and farmer organizations to a roundtable discussion to broker investments for Sierra Leone's agricultural transformation (Figure 4).



Figure 4: Opening of the Seed Business Summit



4.0 Goal and Objectives

Goal: To support the realization of an agricultural revolution for Sierra Leone through the establishment of an economically sustainable seed system for its priority crops—rice, cassava, maize and soybean.

Objectives:

The specific objectives of the seed summit were to

- develop a seed system road map for Sierra Leone;
- raise awareness on the role of quality seeds in agricultural transformation;
- share best practices in building sustainable rice, cassava, maize, and soybean seed systems and TAAT/ BASICS-II/AGRA value propositions to achieve government goals; and
- advocate for more investments in sustainable rice, cassava, maize, and soybean seed systems for economic prosperity, including job creation and gaining access to affordable foods.

5.0 Outputs

The forum elevated the voices of value chain actors impacted by the rice, cassava, maize, and soybean seed systems by sharing success stories from the global south on increasing the availability of climate-adaptive, improved, and disease-free seeds to improve farmers' livelihoods. It provided an opportunity to share seed development experiences from the Democratic Republic of Congo (DRC), Nigeria, Tanzania, etc. and the value propositions of TAAT, BASICS-II and AGRA for scaling and replicability to other African countries where rice, cassava, maize and soybean play significant roles in both income generation and food security. Specific outputs were:

1. A roadmap charted to channel investments to boost the supply of quality seeds of climate-smart and market-preferred varieties to respond to the growing needs of food and industry
2. Increased awareness of the economic importance of seed systems (rice, cassava, maize, and soybean) in transforming the agricultural sector in Sierra Leone
3. Improved seed sector policy environment to attract private sector investment in the seed sector

6.0 Participants

National stakeholders: The minister and deputies and senior staff of the Ministry of Agriculture and Food Security (MAFS); the Office of the Presidential Initiative on Climate Change, Renewable Energy and Food Security; Sierra Leone Agricultural Research Institute; Sierra Leone Seed Certification Agency; Seed Multiplication Programme (SMP); National Fertilizer Regulatory Agency; Sierra Leone Chambers of Agribusiness Development (SLeCAD); technical and financial partners; the private sector (seed and fertilizer, service providers, National Federation of Farmers in Sierra Leone, Njala University, Ernest Bai Koroma University, NGOs (CARE and AIDE-Sierra Leone); United Nations agencies (World Food Programme [WFP], and Food and Agriculture Organization [FAO]). Others are staff members of donor-funded projects such as the West African Food System Resilience Project, Sierra Leone (FSRP); the Sierra Leone Agribusiness and Rice Value Chain Support Project (SLARIS); the Sierra Leone Regional Rice Value Chain Development Project (SLRRVDP); the Agriculture Value Chain Development Project (AVCDP); and the Smallholder Commercialization and Agribusiness Development Project (SCADEP).

International technical experts and development partners: The directors general and staff of One CGIAR (IITA and AfricaRice); the Bill and Melinda Gates Foundation (BMGF); AGRA; the TAAT-Clearinghouse and BASICS-II; TAAT Compact Coordinators (Rice, Maize, Soybean, and Cassava)

and the Policy Enabler Compact Coordinator; Sahel Consulting; Sasakawa Africa Association (SAA); Mennonite Economic Development Associates (MEDA); African Agricultural Technology Foundation (AATF); the media; and the private sector (Figure 5).



Figure 5: A cross section of participants at the opening of the summit

7.0 The Seed Road Map

During the interactive break-out sessions that characterized day 2 of the Seed Summit, stakeholders brainstormed and set a 5-year projection of the quantities of seed required in Sierra Leone for four major strategic crops (rice, cassava, maize, and soybean). The projections took cognizance of the quest for agricultural transformation espoused in the National Agricultural Transformation Plan 2023 (NAT-2023) and the aspirations and commitments of African governments at the Dakar 2 Summit. Appreciating that achieving the seed projection targets set was ambitious, stakeholders elaborated on current and potential seed production challenges while also highlighting pertinent interventions for mitigating the challenges in a detailed seed road map structured in four parts that capture the following commodities: soybean, maize, rice, and cassava. These commodities have been recognized as Africa's strategic crops by the AfDB.

7.1 Summary of the Road Map for Rice Seed Production

Background

In Sierra Leone, the dependency rate on rice is very high, with a per capita consumption of 182 kg (0.182 metric ton [mt]) of rice per year. A steady increase in rice cultivation has occurred over the years mainly due to land expansion rather than to productivity increase. The increase in rice production, however, has not been sufficient to meet basic demand, thus creating a deficit in the country's rice supply chain. Annual rice consumption in the country is estimated at 1,092 million mt with a total of 712,092 mt produced each year. The supply gap of 381,908 mt is covered through heavy importation of rice. Rice is the largest component of the country's agricultural sector, both in terms of the population engaged in its production and food security and consequently its contribution to the agricultural GDP (FAO, 2004). Arable land under cultivation in Sierra Leone is about 5,400,000 hectares

(Agyen-Sampong *et al.*, 1994).

The population of the country as of 2023 is estimated at 8.1 million with a growth rate of 2.2%. This increase in population also means an increase in the demand and dependency on rice across the country. Local rice production accounts for 60% of the rice consumed, with imported rice salvaging the 40% deficit. To attain rice self-sufficiency by 2030, this road map assumes local production to cover 60% of consumption in 2023, going to 65% in 2024, 70% in 2025, 75% in 2026, 82% in 2027, 89% in 2028, 96% on 2029, and 100% in 2030.

The Sierra Leone national rice requirement for consumption (milled and paddy):

- With a population of 8,100,000 and per capita consumption of 0.182 mt, **Target:** 1,474, 200 mt milled rice by 2023 (this will reduce importation by 50%).
- Milled rice required = $8,100,000 \times 0.182 \text{ mt} = 1,474,200 \text{ mt}$.
- Paddy equivalent with a milled yield ratio of 0.6.
- 2,457,000 mt paddy rice - with a milling rate of 0.6 is required to obtain 1,474,200 mt of milled rice ($1,474,200 \text{ mt} / 0.6 = 2,457,000 \text{ mt}$).
- 60% of the national requirement is covered by local production in 2023. Hence: $0.6 \times 1,474,200 \text{ mt} = 884,520 \text{ mt}$.
- Therefore, 884,520 mt of milled rice consumed is produced locally.

1,474,200 mt of paddy rice with a milling rate of 0.6 will give 884,520 mt milled rice ($884,520 / 0.6$) (Table 7.1.1).

Table 7.1.1: Rice Requirement for Consumption (Milled and Paddy)

Year	Projected population (growth rate, 2.2%)	Per-capita consumption (Kg)	National requirement for milled rice (mt)	Local production of rice		Import requirement (mt)
				Milled rice (mt) (paddy)	Paddy rice equivalent of milled rice (mt)	
2023	8,100,000	182	1,474,200	884,520	1,474,200	589,680
2024	8,278,200	182	1,506,632.40	979,311.06	1,632,185	527,321.34
2025	8,460,320.40	182	1,539,778.31	1,077,844.82	1,796,408	461,933.49
2026	8,646,447.45	182	1,573,653.44	1,180,240.08	1,967,067	393,413.36
2027	8,836,669.29	182	1,608,273.81	1,318,784.53	2,197,974	289,489.29
2028	9,031,076.02	182	1,643,655.84	1,462,853.69	2,438,089	180,802.14
2029	9,229,759.69	182	1,679,816.26	1,612,623.61	2,687,706	67,192.65
2030	9,432,814.40	182	1,716,772.22	1,716,772.22	2,861,287	0.00

The key assumptions on seed requirement for paddy for rice self-sufficiency:

1. **Certified seeds needed to produce** 1,474,200 mt of paddy rice (60% of national requirement).
 - Under rainfed conditions, 0.001 mt of rice seed will yield 0.02 mt of paddy.
 - Since 1,474,200 mt of paddy is needed to account for 60% of national consumption.
 - Hence, certified seeds needed to produce 1,474,200 mt paddy rice = 29,484 mt. ($0.02 \times 1,474,200 = 29,484 \text{ mt}$).

2. Foundation seeds required to produce 29,484mt of certified seeds.

- Given that 0.001 mt of rice seed when planted will produce 0.02 mt seeds.
- Therefore, $0.02\text{MT} \times 29,484 \text{ mt} = 590 \text{ mt}$.
- So, we need 590 mt of foundation seeds to produce 29,484 mt of certified seeds.

3. Breeder seeds needed to produce 590 mt of foundation seeds.

- $0.02\text{MT} \times 590 \text{ mt} = 11.8 \text{ mt}$.
- Hence, 11.8 mt of breeder seeds is needed to produce 590 mt of foundation seeds.

The table below shows the seed requirement to produce the rice requirement for consumption.

Table 7.1.2: Seed Requirement to Produce Rice Requirement for Consumption

Year	Local production (milled) (mt)	Paddy (mt)	Certified seed (mt)	Foundation seed (mt)	Breeder seed (mt)
2023	884,520	1,474,200	29,484	590	11.8
2024	979,311	1,632,185	32,644	653	13.1
2025	1,077,845	1,796,408	35,928	719	14.4
2026	1,180,240	1,967,067	39,341	787	15.7
2027	1,318,785	2,197,974	43,959	879	17.6
2028	1,462,854	2,438,089	48,762	975	19.5
2029	1,612,624	2,687,706	53,754	1,075	21.5
2030	1,716,772	2,861,287	57,226	1,145	22.9

The estimated budget to support the rice seed sector development is found below in **Table 7.1.3**

Table 7.1.3: Estimated Budget to Support Rice Seed Sector Development

Priority area	Budget for 5 years (US\$)	% of total budget
Breeding/breeder seed production	3,970,000	5
Foundation seed production (including 10 mini-harvesters)	2,470,000	3
Certified seed production and distribution (including equipment for land preparation, harvesting, drying, processing/conditioning, and storage)	60,000,000	71
Quality assurance and seed certification	3,960,000	5
Advocacy, outreach, and communication	4,082,000	5
Extension and advisory service	3,820,000	5
Capacity strengthening	3,900,000	5
Monitoring, evaluation, accountability, and learning	2,700,000	3
Grand total	84,902,000	

7.2 Summary of the Road Map for Cassava Seed Production

Background

Cassava is the second most important staple crop that provide food and nutrition security in Sierra Leone. It is an emergent cash crop for urban consumption, a source of raw materials for industry, and a foreign exchange earner. Its foliage provides a rich and cheap source of protein in human diets and livestock feed. The peel is increasingly used in feed production. However, the potential of this root crop to support sufficient affordable food in the country has not been fully realized. Yields for cassava are at a national average of 19 t ha⁻¹ but these have remained well below the potential of 40 t ha⁻¹ in spite of the availability of suitable agroecologies and high-yielding, climate-resilient cassava varieties.

One of the principal factors responsible for the yield gap in Sierra Leone is the absence of a formal seed system that has frustrated the diffusion among farmers of improved varieties that can yield 40 t ha⁻¹.

To address this challenge, the GoSL aims to establish an economically sustainable cassava seed system that would ensure the dissemination of quality assured seeds of improved varieties—breeder, foundation, and certified seeds—to farmers. The government's target as documented in the Feed Salone strategy is to cultivate a pipeline of improved varieties that will cover 50,000 hectares in 5 years.

Achieving this goal is daunting and requires expertise both from national and international partners. Consequently, Sierra Leone, in collaboration with IITA, BASICS-II partners (Sahel Capital, Sasakawa Africa Association, and MEDA), and TAAT held a seed business summit to draw a road map that will help realize these targets.

Key assumptions

Although the "Feed Salone" strategy document set a target of 50,000 hectares of improved cassava production, cassava seed experts proposed that a target of 10% of the overall goal (i.e., 5,000 hectares worth of seed) would be more realistic to create a sustainable market and to avoid precipitating a glut and market disruption in the seed system.

- Each hectare requires 10,000 cuttings. The 5,000 hectares will require 50,000,000 cuttings or 10,000,000 stems (assuming five cuttings per stem).
- Assuming that farmers only need fresh stems every 3 years, then the requirement in terms of stems is 3,333,333, which will require 333 hectares to achieve the target (3,333,333 stems divided by 10,000).
- Assuming that each cassava seed entrepreneur (CSE) has a 1 ha seed farm, then we need 333 CSEs.
- The CSEs will need foundation seeds – 3,333,000 cuttings or 666,000 stems to produce certified seeds. (A stem gives five cuttings.)
- Foundation seeds are produced at 20,000 stems ha⁻¹. So, 33 hectares of foundation seed production will require 660,000 cuttings of breeder stems or 132,000 stems of breeder seed.
- If breeder seed is produced at 20,000 stems ha⁻¹, then 6.6 hectares of breeder seed production will require 20,000 SAH plantlets ha⁻¹ or 132,000 SAH plants.

Seed demand in Sierra Leone for the next 5-years

Based on the assumptions above, Sierra Leone would require 50 million of certified stems in the next few years to transform its cassava seed sector. To achieve that goal, the country needs to establish SAH facilities that will produce 132,000 plantlets of breeder seeds to be fed into the foundation seed pipeline (Table 7.2.1).

Table 7.2.1. Cassava Seed Demand from 2024/2025 to 2029/2030 Growing Season

	Years				
	2024/2025	2025/2026	2026/2027	2028/2029	2029/2030
Projection (%)	10	+15	+20	+30	+25
	10	25	45	75	100
Type of seed					
Certified seed (cuttings)	5,000,000	12,500,000	22,500,000	37,500,000	50,000,000
Foundation seed (cuttings)	333,000	832,500	1,498,500	2,497,500	3,330,000
Breeder seed (plantlets)	13,200	33,000	59,400	99,000	132,000

Current cassava seed production ecosystem

At the moment, the cassava seed system in Sierra Leone is generally informal, with no active private sector actors in the breeder and foundation seed sector. SLARI is the major player producing both breeder, foundation, and certified seeds mostly through out-growers. Some farmers grow cassava for root production but they also sell stems mostly to NGOs and large-scale farmers. There is little role for SLeSCA in cassava seed production, which raises doubts on the quality of stems being sold by the cassava root producers. Table 7.2.2 below shows the seed actors in Sierra Leone and their seed production performance.

Table 7.2.2. Cassava Seed Multiplication System

Category	Organization/Companies	Production capacity (ha)	Actual production (ha) 2022/2023
Breeder seed actors	SLARI	5	4.1
Foundation seed actors	SLARI	100	18
Informal actors selling stems	MedTula	-	-
	SierraTec Secure	100	12
	KYLE Agricultural Consulting	80	40
	Moawoma Rural Women Company	25	25
	Mami Bani	50	50
	Sierra Bo Gari	500	260
	Ogoo Farm Farmers Dev Enterprises	20	3
	Yormatah Youth Farmers	-	-
	Muania Women Cooperative	35	35
	WaYADI Organization	30	10

Rapid assessment of the enabling environment

The cassava seed sector in Sierra Leone is challenged by several constraints that include low capacity/staff strength, especially at premier institutions responsible for cassava breeding and quality control. For instance, SLARI has only one breeder and SLeSCA is understaffed in terms of seed inspectors. These constraints undermine the effectiveness of government actors (SLARI and SLeSCA) to play their active roles in the seed ecosystem. A clear example is the long turnaround in breeding new varieties (Table 7.2.3).

Table 7.2.3. Current State of Cassava Seed Certification Capacity

Seed Quality Control	Qty
Number of breeders (public)	1
Number of breeders (private)	0
Number of seed inspectors for all crops at Sierra Leone Seed Certification Agency (SLeSCA)	15
Number of seed breeders (private)	0
Frequency of yearly meeting of the Variety Release Committee	2
Number of new varieties released in the last 2 years	0
Number of new varieties released in the last 5 years	0
Volume of seeds imported in the last year	None
Average time taken to release a variety	7
Price of certified seed [price/bundle of 50 stems (each stem 1 M long)]	US\$1.70

Urgent action proposed for the cassava seed sector

To establish a viable and economically sustainable cassava seed system, there is an urgent need to address the gaps and challenges constraining the realization of the full potential of cassava (Table 7.2.4.).

Immediate actions are needed in addressing seed production and distribution bottlenecks, as well as certification and quality control measures. Other areas include capacity building, business development for early-generation seed (EGS) entities, nurturing of commercial CSEs, advocacy, and scaling.

Table 7.2.4. Proposed Actions for Cassava Seed System Improvement

Seed sector area	Challenge/gap	Proposed actions	Partners responsible
Seed production	1. Poor weed control	Research on appropriate weed control in cassava	IITA, SLARI, Njala University, etc., chemical companies
	2. Sparse number of breeders and limited varieties in the breeding pipeline	1. Training and capacity building for breeders	IITA, universities
		2. Funding of SLARI to breed varieties that meet consumer preferences and are adapted to emerging climate change	Government and SLARI Internally Generated Revenue (IGR)

Seed sector area	Challenge/gap	Proposed actions	Partners responsible
	3. Limited SAH seed multiplication facility	Acquire more SAH multiplication facilities	Government and private sector
	4. No structured formal seed system	Establish a structured seed system that involves breeder, foundation and certified seed producers using the BASICS model	IITA, MEDA, Sahel, SAA
Seed distribution	1. Poor infrastructure	1. Government needs to address infrastructure gap	Government
	2. Poor handling of cassava stems	Capacity building of cassava producers and distributors	IITA, MEDA, Sahel, SLARI and SAA
Seed certification and quality control	1. Low capacity for inspection and certification	1. Task SLeSCA to prioritize cassava certification	SLeSCA
		2. Capacity building for SLeSCA inspectors	SLeSCA
		3. Acquire more diagnostic tools to support inspection and certification	Government and SLeSCA
	2. Lack of certification and seed sector governance	Decentralization of seed certification process to allow private seed inspectors to complement SLeSCA staff	SLeSCA
Seed distribution and market development	Poor market for cassava stems	1. Create more awareness and sensitization	MEDA, Sahel, SAA, SLARI and IITA
		2. Establish demos and demand creation trials	MEDA, Sahel, SAA, and SLARI
		3. Capacity building for CSEs in advertising, marketing, record keeping, groups and associations, etc.	MEDA, Sahel, SAA, and SLARI

Budget for the development of the cassava seed sector in Sierra Leone

The estimated total budget to develop the cassava seed system in Sierra Leone is US\$40.0 million (Table 7.2.5). This is broken down into the following: US\$8.0 million will be required for cassava breeders to develop and multiply new varieties that meet enduser preferences and produce breeder seed for sale to foundation seed producers. Commercial foundation seed production using the combination of SAH technology and field method through a public-private partnership arrangement by SLARI requires a budget of US\$4.0 million. A total of US\$8.0 million is estimated for developing the national capacity to produce certified seeds of cassava. Quality assurance, in which SLeSCA has an important role to play, and advocacy, outreach, and communication need an estimated budget of US\$2.8 million each. US\$3.2 million is needed for extension and advisory services, US\$8.0 million for capacity strengthening and US\$3.2 million for monitoring, evaluation, accountability, and learning.

Table 7.2.5: Estimated Budget to Support Cassava Seed Sector Development

Broad seed system thematic area	Budget 5-Year (US\$ million)	% of total budget
Breeding	8	20
Foundation seed production	4	10
Certified seed production	8	20
Quality assurance	2.8	7
Advocacy, outreach, and communication	2.8	7
Extension and advisory services	3.2	8
Capacity strengthening	8	20
Monitoring, evaluation, accountability and learning	3.2	8
Grand total	40	100

7.3 Summary of the Road Map for Maize Seed Production

Background

The preamble of the maize seed road map development: The seed quantity projections were done based on targets given by MAFS, Sierra Leone for the 5-year period. The total target land area for the production of maize is projected at 45,000 ha. This document envisages that the area for maize production will grow at an arithmetic progression beginning with 3,000 ha in 2024; 6,000 ha in 2025; 9,000 ha in 2026; 12,000 ha in 2027; and 15,000 ha in 2028 (Table 7.3.1).

Table 7.3.1: Projected Grain Production of Open Pollinated Varieties (OPV) from 2024 to 2029 Growing Season

	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	Total
Grain production (ha)	3,000	6,000	9,000	12,000	15,000	45,000
Cost of production (US\$*)	2,400,000	4,800,000	7,200,000	9,600,000	12,000,000	36,000,000

*Assumption: US\$800.00 to grow 1 ha of OPV maize.

- Certified maize seed production using OPV seeds was first calculated using these target benchmarks. The seed rate used at this stage was 25 kg ha⁻¹ and yield was estimated to be 2.5 t ha⁻¹. Thus, for the first year (2023/2024), the total weight of certified seed required = 3000 ha × 25 kg = 75 mt (Table 7.3.2).
- For foundation seed, the expected yield per hectare was estimated at 2.5 t ha⁻¹ Land area for foundation seed production = 30 ha. Total weight of foundation seed required = 30 ha × 25 kg = 750 kg.
- For breeder seed, the expected yield per hectare was estimated at 2.0 t ha⁻¹ Land area required for breeder seed production = 0.375 ha. Total weight of seed required = 0.375 ha × 25 kg = 9.375 kg 10 kg breeder seed. Similar procedures were used to estimate for the other years.

- Maize seed quantity projections in terms of yield using hybrids can be higher than estimates provided beforehand.

Table 7.3.2: Maize OPV Seed Quantity Projections

Maize grain projection (ha)	3,000	6,000	9,000	12,000	15,000	45,000		
	Seed demand for the year							
Class of seed	2023/ 2024	2024/ 2025	2025/ 2026	2026/ 2027	2028/ 2029	Total (mt)	Projected production and processing cost (US\$)	Assumed cost of production (US\$/mt)
Certified seed (mt)	75	150	225	300	375	1,125	731,250	650
Foundation seed (mt)	0.75	1.5	2.25	3.0	3.75	11.25	8,100	720
Breeder seed (mt)	0.01	0.02	0.025	0.04	0.047	0.142	1,065	7,500
Total							740,415	

Table 7.3.3: Estimated Budget to Support Maize Seed Sector Development (2024 – 2028)

Summary of Budget		
Priority area	Estimated cost (US\$)	Proportion of total (%)
Maize breeding	2,300,000.00	15.49
Seed production	5,469,750.00	36.84
Certification and quality assurance	607,500.00	4.09
Extension and advisory services	304,000.00	2.05
Advocacy and communication	294,000.00	19.80
Monitoring, evaluation, and learning	750,000.00	5.05
Total	12,371,250.00	
Management and supervision	1,855,687.50	12.50
Contingency	618,562.50	4.17
Grand total	14,845,500.00	100.00

7.4 Summary of the Road Map for Soybean Seed Production

Background

The target for total soybean seed production from 2023 to 2029 is 47,000 mt while the total quantity of soybean seeds available in the country in the same year is quite small: 0.36 mt of certified seed, 0.6 mt of foundation seed, and 0.315 mt of breeder seed (Table 7.4.1). This small amount is attributed to very little demand for soybean seeds, a rather small market. With the government making soybean a priority crop to be used mainly as livestock feed and as source of protein for school feeding programs, it is assumed that demand for soybean seeds will increase. Starting with the aforementioned seed quantity and assuming that soybean is planted at 50 kg ha⁻¹ and yields 1,000 kg ha⁻¹ of good quality seed, total seed production through 2029 would be about 1,200 mt or 2.6% of the target. An alternative scenario was considered: that of adding 10 mt of imported breeder seed that could be purchased from seed companies in Nigeria or Uganda. Using the same assumptions as in the original scenario, total seed production through 2029 would be about 12,000 mt or about 26% of the target.

The conclusion is that soybean can be produced in quantities needed to supply the livestock industry in the country and that, by 2029 or 2030, there will be enough soybean grains available when the road map is implemented. Using the first scenario, total grain production (assuming an average grain yield of 1.5 t ha⁻¹) would be 18,000 mt by 2030; using the alternative scenario, the total grains produced would be 192,000 mt. These two scenarios provide the range of possibilities available. Both scenarios will have a similar road map but with very different scales of investment by the government, development partners, and the private sector. Table 7.4.2 shows the breakdown of the estimated budget (US\$10,000,000) needed to support soybean seed sector development.

The main components of the action plan include:

- 1. Capacity building:** What is needed is improving farmers' capacity in all aspects of growing climate-smart soybeans (land preparation, weed control, soil health and fertility, production, harvesting, grain and seed handling, and storage). Soybean farmers are the foundation of the road map and the youth and women must be given the highest priority. Farm families will be given extensive training on the home use of soybeans, especially for children 5 years and younger and for pregnant and lactating women.
- 2. Poultry production:** An efficient poultry production value chain that uses soybean cake as its main source of protein must be established as the main driver of demand for soybean grains. In addition, government policies that favor local production of vegetable oils and poultry will be required.
- 3. Government institutions:** The strengthening of all human and infrastructure capacity of government institutions dealing with seeds and of private seed companies is required.
- 4. Cooperation with maize:** The road map for the maize seed system should work together with the soybean program as they go together in the field in a crop rotation system. They are also combined as the two main ingredients in poultry feed.
- 5. Private sector-led:** The private sector will lead all four components previously identified, except for the government taking charge of the production of breeder seeds and the development of rural infrastructure. These will require financing through either low-interest loans or grants.
- 6. Knowledge exchange:** During the first 5 years, the maize and soybean teams will travel to Nigeria and/or Ghana to exchange experiences and knowledge with their more developed maize and soybean industry counterparts.

Table 7.4.1: Soybean Seed Demand Estimates from 2024 to 2028

New proposal with importation of 10 mt of breeder seed in 2024					
	Seed demand for the year				
Type of seed	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Certified seed (mt)	0.36	12	126.4	4400	6400*
Foundation seed (mt)	0.6	6.32	220	320	420
Breeder seed (mt)	0.316	11	16	21	26

*The figure 6,400 t of certified seeds in 2027/2028 represents 13% of total soybean seed planted (48,000 t).

Table 7.4.2: Estimated Budget to Support Soybean Seed Sector Development

Category	Estimated cost (US\$)	Percentage
Breeder seeds	1,400,000	14
Foundation seeds	1,200,000	12
Certified seeds	2,000,000	20
Quality assurance	600,000	6
Certification	700,000	7
Monitoring and evaluation	500,000	5
Advocacy and communication	700,000	7
Extension and advisory	900,000	9
Capacity building	2,000,000	20
Total (US \$)	10,000,000	100

8.0 Investment

Funding support of US\$150,554,000 would be required to fully implement the seed sector development of the four priority crops (rice, cassava, maize, and soybean) in Sierra Leone. This sum whose breakdown is stated in Tables 8.1.1 (rice), 8.1.2 (cassava), 8.1.3 (maize), and 8.1.4 (soybean) will be used to construct seed system infrastructure and enhance human resources. The investment will be used to establish/incubate a network of seed entrepreneurs, resulting in the creation of jobs and wealth in the seed ecosystem. The vital role the Sierra Leone Agricultural Research Institute (SLARI), the Sierra Leone Seed Certification Agency (SLeSCA), the National Fertilizer Regulatory Agency (NaFRA), the National Federation of Farmers of Sierra Leone (NAFFSL), and the Seed Multiplication Programme (SMP), will play in developing sustainable seed systems in Sierra Leone is recognized and this road map ensures that a portion of the investment is used to revitalize these institutions. Finally, the investment will go toward the development of breeder, foundation, and certified seeds, which will put an end to decades of seed importation and assist the country in achieving food and nutritional security as well as food sovereignty.

The funding support will be sourced from the government of Sierra Leone or donors (BMGF, USAID, GIZ, Irish Aid, European Union, etc.), development partners (FAO, United Nations Development Programme [UNDP], WFP, United Nations Children's Fund [UNICEF], and others) or international finance institutions (IFIs) such as AfDB, WB, IsDB, etc.

Scientists from One CGIAR can provide technical assistance/support to the government of Sierra Leone to access funding, especially from development partners.

Table 8.1.1: Estimated Budget to Support Rice Seed Sector Development

Priority area	Activities	Targets	Budget for 5 years (US\$)
Breeding including breeder seed production	Installation of a cold room for seed storage at SLARI-RARC	One cold room installed at SLARI	1,200,000
	Construction of fully equipped screenhouse for breeding	Two screenhouses to be used as nursery facilities	70,000
	Cell biology lab equipment	Assorted equipment for the cell biology lab	400,000
	Procurement of additional tractors	Four tractors	400,000
	Procurement of equipment (threshers/winnowers/dryers/power tillers for mangrove terrain)	Lump sum amount for the purchase of tractor implements	200,000
	Installation of borehole for supplementary irrigation and irrigation infrastructure	Two boreholes with associated irrigation equipment and ground leveling where necessary.	500,000
	Operational support for breeder seed production (includes inputs, labor, consumables, etc.)	Lump sum budget to get agro-inputs and other consumables needed for breeder seed crops	1,200,000
Subtotal			3,970,000
Foundation seed production (including mini harvesters)	Operational budget support for agri-inputs	Lump sum budget to secure agro-inputs and other operational requirements	1,000,000

Priority area	Activities	Targets	Budget for 5 years (US\$)
	Procurement of additional tractors	Five tractors	500,000
	Procurement of equipment (threshers/winnowers/dryers)	Purchase of assorted tractor-drawn equipment and other relevant tools/equipment	200,000
	Construction and rehabilitation of storage facility	Two new storage facilities to be constructed and one to be rehabilitated	150,000
	Purchase of additional vehicles	Two vehicles to be procured to ease mobility	80,000
	Purchase of motorcycles	10 motorcycles to ease the movement of staff	40000
	Establishment of seed processing center	Two fully equipped seed processing centers to be established	300,000
	Mini harvesters	10 mini harvesters to be procured	200,000
Subtotal			2,470,000
Certified seed production and distribution (including equipment for land preparation, harvesting, drying, processing/conditioning, and storage)	Allocation of a dedicated fund to facilitate access to credit targeted at seed production	The lump sum budget will be used to set up a fund that will provide low-cost credit to private sector players involved in seed production and trading that will be managed through a sustainable model jointly by a commercial bank and the government	60,000,000
Subtotal			60,000,000
Quality assurance and seed certification	Recruitment of seed inspectors	Forty additional seed inspectors to be recruited and maintained at SLeSCA	300,000
	Recruitment of additional seed analysts	20 additional seed analysts at SLeSCA	100,000
	Procurement of vehicles	Five additional motor vehicles to be procured	200,000
	Procurement of motorcycles	Fifteen motorcycles procured	160,000
	Satellite seed testing unit at regional level	Three seed testing units installed and equipped	300,000
	Operational support for seed inspection and quality assurance (including digital tools)	Support for operational costs for seed inspection including the procurement of a digital system and tablets for digital verification	3,000,000
Subtotal			3,960,000

Priority area	Activities	Targets	Budget for 5 years (US\$)
Advocacy, outreach, and communication	Advocacy toward eliminating goods and services tax (GST) on agricultural machinery	Engage policymakers on advocacy towards the elimination of the GST on relevant agricultural machinery	10,000
	Awareness creation and advocacy toward reforms to incentivize and enhance participation of the private sector	Advocacy meetings to chart ways for creating incentives to enhance private sector involvement	15,000
	Encourage the purchase of seeds from authorized seed producers	Advocate for reforms on the government subsidy programs as well as technical assistance in the design of a smart subsidy	10,000
	Reforms instituted towards repositioning the role of SMP and enhancing its sustainability	Consultancy to design model for reforming SMP	12,000
	Advocacy towards the establishment of an agriculture bank	Awareness creation meetings for policymakers toward setting up a seed production fund	20,000
	Development, printing, and dissemination of materials	Communication and outreach brochures and media programs developed and disseminated	15,000
	Outreach programs (education and sensitization)	Radio and TV programs as well as billboards produced	1,000,000
	Communication (ICT equipment, software, media)	Purchase of computers and software to facilitate the programs	3,000,000
Subtotal			4082000
Extension and advisory services	Recruitment of additional extension officers	Recruitment and retention of 50 additional extension staff	1,500,000
	Procurement of motor vehicles	10 motor vehicles to be used for extension	400,000
	Procurement of motorcycles	30 motorcycles	120,000
	Training of extension officers	50 extension officers trained/re-tooled	200,000
	Digital extension devices and systems secured	50 tablets for utilization in e-extension	100,000
	Operational costs for extension	Budgetary support for operations in extension	1,500,000
Subtotal			3820000

Priority area	Activities	Targets	Budget for 5 years (US\$)
Capacity strengthening	Graduate training	Training of breeders, seed analysts, field inspectors at the graduate level abroad and within Sierra Leone	1,500,000
	Refresher training of trainers in seed inspection and seed quality control	20 personnel trained through re-tooling and refresher courses	400,000
	Shared learning tours	15 personnel and private sector practitioners sponsored to attend learning tours	300,000
	Farmer training	1 per district	500,000
	Demos and field days	1 per district	1,200,000
Subtotal			3900000
Monitoring, evaluation, accountability, and learning	Operational costs for monitoring and evaluation	Operational budget support for monitoring and evaluation	1,500,000
	Mobility for Monitoring and Evaluation Division (10 vehicles)	10 vehicles to support M&E operations	400,000
	Monitoring and evaluation of field data collection studies and surveys)	Support for surveys and M&E data analysis	800,000
Subtotal (Monitoring, evaluation, accountability, and learning - MEAL)			2,700,000
Grand total			84,902,000

Table 8.1.2: Estimated Budget to Support Cassava Seed Sector Development

Priority area	Activities	Targets	5-year budget (US\$)
Breeding including breeder seed production	Hybridization (capacity development on diagnostics, infrastructure development, academic training on cassava breeding)	2000 accessions, 5 scientists trained, 1 cassava barn constructed	3,000,000
	Multilocational testing (MLTs)	5 genotypes tested in 15 on-farm locations per year	1,500,000
	Customer preferences	5000 clients	500,000
	Variety release	3 varieties released	1,000,000
	Seed multiplication	132,000 plantlets	2,000,000
Subtotal			8,000,000
Foundation seed production	Commercial foundation seed production (SLARI + PPP)	3.33 million plantlets	2,000,000
	Establishment of foundation seed multipliers	12 foundation seed multipliers	1,000,000
	Scaling up foundation seed production using innovative technology (SAH)	12 foundation seed multipliers	1,000,000
Subtotal			4,000,000
Certified seed production	Establishment of selection criteria	1 protocol	50,000
	Recruitment and training (GAP, business, certification standards, etc.)	330 farmers trained	2,200,000
	Processor-led engagement	12 private seed companies	500,000
	The roll-out of cassava business connector, cassava seed tracker	330 seed farmers connected to the market	1,000,000
	Development and strengthening of farmer associations	16 seed growers' association	1,000,000
	Development of financial services to farmers (cooperatives, etc.)	5 financial institutions	1,500,000
	Demand creation trials	32 trials per year	1,000,000
	Seed multiplication	330 farmers	750,000
Subtotal			8,000,000
Quality assurance and certification	Printing of variety catalog	1 variety catalog and other materials developed and printed	100,000
	Establishment of QA lab for SLeSCA (PCR, diagnostics, etc.)	4 laboratories	2,000,000

Priority area	Activities	Targets	5-year budget (US\$)
	Selection criteria development	1 selection criterion developed	150,000
	Development of certification guidelines		50,000
	Adapt and roll out of cassava seed tracker	Seed tracker developed	500,000
Subtotal			2,800,000
Advocacy, outreach and communication	Study visits and knowledge exchange	2 times a year	1,500,000
	Advocacy of farmers for certified seed production	50 advocacy efforts	200,000
	High-profile engagements	4 times in a year	200,000
	Media engagement – radio, TV, and print media, websites, short videos, etc.	at least 20,000 farmers reached	500,000
	Exhibitions and field days	3 times in a year	400,000
Subtotal			2,800,000
Extension and advisory services	Establishment of demos	48 demos per year	2,000,000
	Farmers' field days	32 farmers day in a year	350,000
	Development of extension materials	15 materials developed and printed	350,000
	Step down training for farmers	330 farmers trained	500,000
Subtotal			3,200,000
Capacity strengthening	Capacity building (GAP, business development, training of seed inspectors, quality assurance/ handling, certification- of foundation seeds, etc.)	20 professionals to be trained	2,000,000
	Capacity building for inspection officers on quality assurance	15 inspection officers trained	1,000,000
	Capacity development on diagnostics, infrastructure development, academic training on cassava breeding	5 scientists trained	3,000,000
	Capacity development of farmers on high-quality seed production	330 farmers trained	1,000,000
	Capacity building for third-party inspection officers	48 inspectors	1,000,000
Subtotal			8,000,000

Priority area	Activities	Targets	5-year budget (US\$)
Monitoring, evaluation, accountability, and learning	Monitoring visits	330 visits	2,000,000
	Review and planning meeting	10 meetings	350,000
	Baseline, midline and endline evaluation	3 meetings	350,000
	Bikes and vehicles for monitoring visits	2 vehicles and 16 bikes	500,000
Subtotal			3,200,000
Grand total			40,000,000

Table 8.1.3: Sierra Leone Maize Seed Roadmap Budget (2024 – 2028)

Priority area	Activity	Qty		Unit cost (US\$)	Budget (US\$)
Breeding	New varieties developed, released, and registered	10		100,000	1,000,000
	Establish maize breeding lab and equip it at SLARI	1		500,000	500,000
	Establish net-house for breeding at SLARI	3		30,000	90,000
	Establish medium-sized greenhouse with temperature control	3		30,000	90,000
	Develop 2-ha crossing block and equip it at SLARI	1		120,000	120,000
	Breeding consumables (e.g., pollination bags and hybridization kits) etc.	1	Lump sum	500,000	500,000
Subtotal					2,300,000
Breeder seed	Quantity of breeder seed produced	0.15	mt	15,000	2,250
Foundation seed	Quantity of foundation seed produced	11.25	mt	1,000	11,250
Certified seed	Quantity of certified seed produced	1,125	mt	850	956,250
	Capacity building of technical staff of seed companies	100	#	5,000	500,000
	Capacity building of maize out-growers	2,000	#	2,000	4,000,000
Subtotal		1136.4			5,469,750
Quality assurance and certification	Recruitment of additional seed inspectors	5		36,000	180,000
	Accreditation of private seed inspectors	40		500	20,000

Priority area	Activity	Qty		Unit cost (US\$)	Budget (US\$)
	Accreditation of private labs for analytical work	5		1,500	7,500
	Recruit and capacitate adequate seed analysts	3		30,000	90,000
	Capacity building of recruited staff (inspectors + seed analysts)	8		20,000	160,000
	Equipping 1 seed testing lab for maize to maximize operations	1		150,000	150,000
Subtotal					607,500
Extension and advisory services	Training of trainer (TOT) of extension officers (train 1 officer/district)	16		10,000	160,000
	Purchase tablets for digital extension	32		500	16,000
	Purchase motorbikes for extension officers	32		4,000	128,000
Subtotal (extension and advisory)					304,000
Advocacy and communication	Facilitate the establishment of a national seed trade association for awareness creation	1	Lump sum	140,000	140,000
	Establish an innovation platform for information sharing and training on good agricultural practices (GAPs)	16		175,000	2,800,000
Subtotal					2,940,000
Monitoring, evaluation, accountability, and learning (MEAL)	MEAL activities/year	5	Years	150,000	750,000
Subtotal					750,000
Total					12,371,250
	Management and supervision				
	Contingency				1,855,687.50
					618,562.50
Grand total					14,845,500.00

Table 8.1.4: Estimated Budget to Support Soybean Seed Sector Development

Sierra Leone Soybean Seed Roadmap Budget (2024 – 2028)					
Priority area	Activity	Qty		Unit cost (US\$)	Budget (US\$)
Breeding	New varieties developed, released and registered	5		50,000	250,000
	Establish a soybean breeding lab and equip it at SLARI	1		500,000	500,000
	Establish a screenhouse (net-house) for breeding at SLARI	1		200,000	200,000
	Establish a medium-sized greenhouse with temperature control	1		200,000	200,000
	Develop a 2-ha crossing block and equip it at SLARI	1		120,000	120,000
	Breeding consumables (e.g., pollination bags, etc.	1	Lump sum	500,000	500,000
Subtotal					1,770,000
Breeder seed	Quantity of breeder seed produced	2.5	mt	10,000	25,000
Foundation seed	Quantity of foundation seed produced	40	mt	1,000	40,000
Certified seed	Quantity of certified seed produced	600	mt	850	510,000
	Capacity building of technical staff of seed companies	100	#	5,000	500,000
	Capacity building of out-growers	2,000	#	2,000	4,000,000
Subtotal					5,075,000
Quality assurance and certification	Recruitment of additional seed inspectors	5		36,000	180,000
	Accreditation of private seed inspectors and private labs for analytical work	5		7,500	37,500
	Recruit and capacitate adequate seed analysts	3		30,000	90,000
	Capacity building of recruited staff (inspectors + seed analysts)	8		20,000	160,000
	Equipping 1 seed testing lab for soybean to maximize operations	1		150,000	150,000
Subtotal					617,500

Sierra Leone Soybean Seed Roadmap Budget (2024 - 2028)					
Priority area	Activity	Qty		Unit cost (US\$)	Budget (US\$)
Extension and advisory services	TOT of extension officers (train 1 officer/district)	16		10,000	160,000
	Purchase tablets for digital extension	32		500	16,000
	Purchase motorbikes for extension officers	32		4,000	128,000
Subtotal					304,000
Advocacy and Communication	Facilitate the establishment of a national seed trade association for awareness creation	1	Lump sum	140,000	140,000
	Establish an innovation platform for information sharing and training on good agricultural practices (GAPs)	16		150,000	2,400,000
Subtotal (advocacy and communication)					2,540,000
Monitoring, evaluation, accountability, and learning (MEAL)	MEAL activities/year	5	Years	100,000	500,000
Subtotal					500,000
Grand total					10,806,500



9.0 References

Agyen-Sampong M, K. Prakah-Asante, and S.N. Fomba. 1994. Rice improvement in the mangrove swamps of West Africa. <https://edepot.wur.nl>.

Food and Agriculture Organization.2004. FAO statistics. Rome, Italy.

Food and Agriculture Organization. 2021. FAO statistics. Rome, Italy.

GoSL (Government of Sierra Leone) National Agricultural Investment Plan (NAIP). 2022. Freetown, Sierra Leone.

GoSL (Government of Sierra Leone) National Agricultural Transformation Plan (NAT).
2023. Freetown, Sierra Leone.



