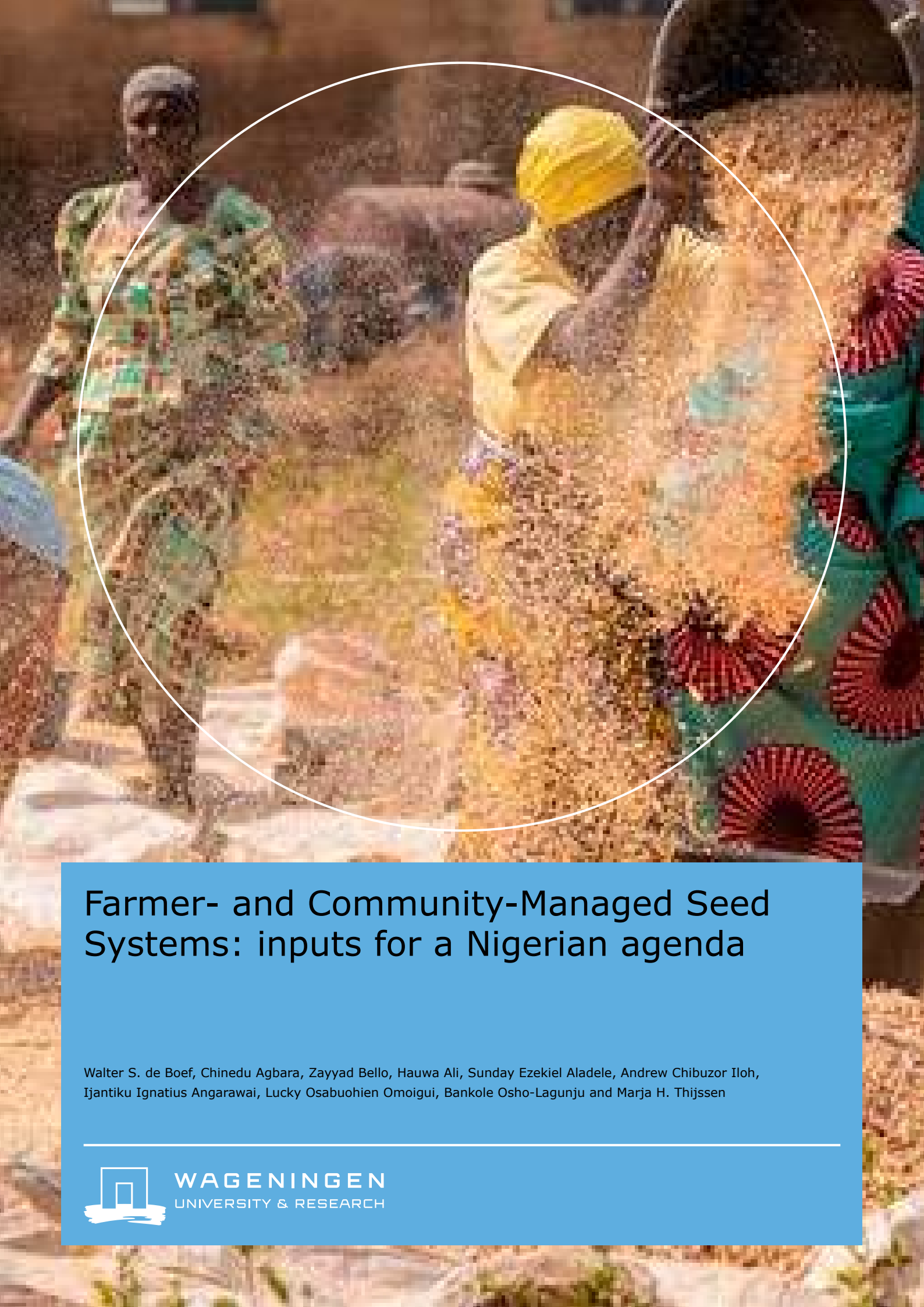

Farmer- and Community-Managed Seed Systems: inputs for a Nigerian agenda

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De Boef, W.S., C. Agbara, Z. Bello, H. Ali, S.E. Aladele, A.I. Chibuzor, I.I. Angarawa, L.O. Omoigui, B. Osho-Lagunju, M.H. Thijssen, 2025. *Farmer- and Community-Managed Seed Systems: inputs for a Nigerian agenda.* Wageningen, Wageningen Social & Economic Research, Report 2025-098. 46 pp.; 3 fig.; 2 tab.; 46 ref.

The report *Farmer and Community Managed Seed Systems (FCMSS): Inputs for a Nigerian Agenda*, outlines a strategic approach to integrating FCMSS into the development of the seed sector in Nigeria. Synthesising insights from stakeholder dialogues, policy discussions, and literature reviews, it highlights the role of FCMSS in ensuring seed security, biodiversity conservation, and the resilience of seed systems. It emphasises four critical roles of FCMSS: variety deployment, biodiversity conservation, seed systems resilience, and food security. The concluding recommendations propose three strategic pathways—Local Seed Business (LSB) development, biodiversity conservation, and resilience-building complementing Nigeria's National Seed Road Map. By fostering an enabling environment through policy reforms, market-driven approaches, and institutional support, FCMSS can enhance agricultural sustainability and smallholder farmers' access to quality seed of farmer preferred and improved varieties, contributing to a resilient and diverse seed sector in Nigeria.

Key words: farmer and community managed seed systems; stakeholder dialogues; national seed road map; local seed business; agrobiodiversity management; Nigeria

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Ministerie van Landbouw, Visserij, Voedselzekerheid en Natuur

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Various organisations, both international and Nigerian, participated in a series of discussions focused on Farmer and Community Managed Seed Systems. The key events included:

TRICOT Experience Workshop
- **Dates:** 8-9 October 2024
- **Theme:** 'Sharing and Learning from Various Applications of TRICOT, with a Focus on Promoting its Use in Nigeria'

Focus Group Discussions
- **Session 1:** 'Strengthening Farmer and Community Managed Seed Systems: Opportunities for Variety Deployment and Seed Sector Development in Nigeria'
- **Date:** 10 November 2024

- **Session 2:** 'Strengthening Farmer and Community Managed Seed Systems: Opportunities for Conservation and Use and Strengthening Practices in Nigeria'
- **Date:** 11 November 2024

Seed Connect Conference
- **Date:** 26 November 2024
- **Session title:** 'Perspectives for Strengthening Farmer and Community-Managed Seed Systems'

Multi-Stakeholder Workshop
- **Date:** 28 November 2024
- **Title:** 'Challenges and Ambitions of Strengthening Farmer and Community-Managed Seed Systems'

ISSD Africa Conference
- **Dates:** 17-18 February 2025
- **Title:** Building resilient and diverse farmer-managed seed systems

The organisations involved in these events include:

International organisations:
Alliance Bioversity International – CIAT, Uganda; Alliance For Green Revolution in Africa (AGRA), Nigeria; Bayer East Africa Limited, Kenya; Consulate General of the Netherlands in Lagos, Nigeria; Council of Scientific and Industrial Research (CSIR – CRI), Ghana; Crop Trust, Germany; Embassy of the Kingdom of Netherlands (EKN), Nigeria; Food and Agriculture Organization (FAO), Rome, Italy; Institut d'Economie Rurale (IER), Mali; International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Nigeria; International Institute of Tropical Agriculture (IITA), Nigeria; International Potato Center (CIP), Nigeria; Mercy Corps, Nigeria; Norwegian Refugee Council (NRC), Nigeria; One Acre Fund, Rwanda, Oxfam International, Nigeria;, Sasakawa Africa Association (SAA), Nigeria; Seedsystems.org, Stichting Wageningen Research Ethiopia, World Vegetable Center, and ZOA International,

Nigerian organisations:
Community-based organisations (CBOs): Albarka Community-Based Seed Entrepreneurs, Great Mind Farmers, Nigerian Soybean Association and Wale Taura Seeds and Sons Limited.

Government organisations: Agricultural Development Programme, Yobe (ADP-Yobe), Agricultural Research Council of Nigeria (ARCN), Borno State Agricultural Development Programme (BOSADP), Federal Ministry of Agriculture and Food Security (FMAFS), Federal Ministry of Humanitarian Affairs and Disaster Response, Gombe State Agricultural Development Programme (GSADP), Ministry of Agriculture/Government House Bauchi, National Agricultural Seeds Council (NASC), National Centre for Genetic Resources and Biotechnology (NACGRAB), Nigeria Incentive-Based Risk Sharing System For Agricultural Lending (NIRSAL, Plc) and Ogun State Agricultural Development Programme (Ogun ADP).

Non-Governmental Organisations (NGOs): Africa Projects Development Center, Biodiversity Education and Resource Centre, Justice Development and Peace Movement (JDPM), and Nuru Nigeria.

Private Sector: All Farmers Association of Nigeria (AFAN), Flour Mills of Nigeria, Plc (FMN), Giwa Agro, Greenfield Natural Resources Consultancy, Maize Association of Nigeria, Nigeria Agro Input Dealers Association, Onida Agri & Aquaculture Solutions, Seed Entrepreneurs Association of Nigeria (SEEDAN) and Teryima Nigeria Limited.

Private sector - Seed Companies: Afri Agri Product Limited, Boom Seed Nigeria Limited, Da-Allgreen Seeds Limited, Danafang Integrated Nigeria Limited Seed Company, East-West Seeds, Nigeria, Joy Seeds Limited, Nagari Seeds Limited, Premier Seeds Limited, Rijk Zwaan, Royal Blue Contractors Limited, Salamum Kmrhm Seed Nigeria Limited, Tecni Seeds Limited, Umudike Seeds Limited and Value Seeds Limited.

University and Research: Abubakar Tafawa Belewa University, Ajayi Crowther University, Federal University of Agriculture Abeokuta, Federal University of Technology Akure (FUTA), Institute for Agricultural Research Ahmadu Bello University (IAR-ABU), Institute of Agricultural Research and Training (IAR&T), Joseph Sarwuan Tarka University (JOSTUM), Lake Chad Research Institute, National Cereals Research Institute (NCRI), National Institute of Horticultural Research and Training (NIHORT), National Root Crop Research Institute (NRCRI) and Rubber Research Institute.

Contents

Foreword

A stronger, more inclusive seed sector for Nigeria

May I, on behalf of the Nigerian Seed Industry, introduce the paper, *Farmer- and Community-Managed Seed Systems: Inputs for a Nigerian Agenda*? This white paper provides a timely and strategic perspective on the evolving role of Farmer- and Community-Managed Seed Systems (FCMSS) in Nigeria's agricultural development, emphasising their critical contribution to seed security, agrobiodiversity management, and the resilience of farming communities.

Despite the growth of the formal seed sector, a significant percentage of Nigerian farmers still rely on informal and community-based seed networks. Recognising this reality, NASC under the leadership of the Federal Ministry of Agriculture and Food Security working in line with Pillar 3 of the Renewed Hope Agenda which is aimed at boosting agriculture to achieve food security is committed to strengthening the formal and farmer-managed seed systems, fostering an integrated and pluralistic seed sector that benefits all stakeholders.

The insights presented in this report highlight the strategic importance of Local Seed Businesses (LSBs), seed production models, and policies that support the quality assurance of farmer-managed seed systems. By creating an enabling environment for community-driven seed enterprises, we can enhance smallholder farmers' access to a diverse range of high-quality seeds, ensuring productivity and resilience in the face of climate change and global shocks.

The collaboration of research institutions, policymakers, seed enterprises, and farmer organisations showcased in this report reflects the strong collective commitment to transforming Nigeria's seed sector. At NASC, we will continue to champion progressive seed policies, innovative certification mechanisms, and market-driven interventions that integrate FCMSS into national seed sector strategies.

As we continue to work towards the full implementation of Nigeria's National Seed Road Map (NSRM), this report serves as a foundational document to guide action. The recommendations outlined will shape evidence-based policies, targeted investments, and sustainable seed industry innovations that drive agricultural growth and food security.

I extend my sincere appreciation to The Netherlands Ministry of Agriculture, Fisheries, Food Security and Nature (LVVN) for its invaluable support in the development of this white paper, which compliments other Dutch-funded initiatives in Nigeria's seed sector including the National Seed Road Map (NSRM) and the Collaborative Seed Programme (CSP). Together, these efforts reinforce Nigeria-Netherlands' partnership to foster the development of Nigeria's seed sector.

I commend the collaborative efforts of Wageningen Social & Economic Research, Sahel Consulting, and all stakeholders who have contributed to this effort. The future of Nigeria's seed sector lies in inclusivity, resilience, and strategic innovation. Together, we will build a more robust, dynamic, and inclusive seed system that secures our nation's agricultural future.

Dr. Ishiak Othman Khalid
Ag. Director General
National Agricultural Seeds Council (NASC)

Foreword

Agriculture is the cornerstone of Nigeria's economy, livelihoods and food security. Yet, the success of the farming systems - especially those driven by smallholder farmers - depends fundamentally on access to quality seed of a diversity of resilient varieties suitable to the individual farmers' needs and their farming conditions. In this context, Farmer- and Community-Managed Seed Systems (FCMSS) are essential. They serve, for the majority of Nigerian farmers, as the primary source of seed and play an essential role in food security, agrobiodiversity conservation and agricultural resilience.

There is growing recognition of the vital role that FCMSS play in seed sector development. This white paper, *Farmer- and Community-Managed Seed Systems (FCMSS): Inputs for a Nigerian Agenda*, is timely and essential. It brings together insights from farmers, seed sector stakeholders, policymakers and researchers to highlight the potential of FCMSS in a resilient and inclusive seed sector.

By synthesising findings from multi-stakeholder dialogues, reviewing the policy landscape, and proposing strategic innovation pathways, this report provides a strategic foundation for integrating FCMSS into Nigeria's National Seed Road Map. It offers a comprehensive framework for aligning Nigeria's seed system development agenda with the realities and strengths of farmers who have, for generations, nurtured seed diversity and ensured continuity in food production.

On a personal note, I am incredibly proud to be part of this first important step towards creating an inclusive seed sector that will not only, hopefully, shape the future of agriculture in Nigeria but also empowers farmers. Let's turn this document into a starting point of a new journey.

Inge Tenniglo
Counsellor for Agriculture and Nature Ghana and Nigeria
Embassy of the Kingdom of the Netherlands, Accra and Abuja

Executive summary

This white paper, titled *Farmer- and Community-Managed Seed Systems (FCMSS): Inputs for a Nigerian Agenda*, provides a strategic foundation for integrating FCMSS into Nigeria's national seed sector development agenda. It synthesises insights from multi-stakeholder dialogues, a literature review, and policy discussions to offer actionable recommendations for strengthening these systems. The goal of the white paper is to increase awareness among Nigerian key stakeholders of FCMSS, present key findings on their potential, consolidate perspectives to guide policy and investment, and provide strategic inputs by adding complementary strategic innovation pathways on FCMSS to Nigeria's National Seed Road Map. By highlighting the role of FCMSS in ensuring seed security, biodiversity conservation, and resilience of seed systems, the paper aims to foster an enabling environment that enhances smallholder farmers' access to quality seed of a diversity of farmers' preferred and improved varieties for multiple crops.

The introduction chapter establishes the context and significance of FCMSS in Nigeria's agricultural and seed sector, provides insights in the FCMSS Nigeria Dialogues project and provides the objectives and structure of the paper. The second chapter explores key definitions and conceptual frameworks, examining different seed systems farmers rely on. It introduces approaches such as Integrated Seed Sector Development (ISSD) and market archetypes that help understand seed sector dynamics. Additionally, it discusses the role of seed aid, institutional markets, and the principles for guiding effective seed aid in ensuring resilient seed systems. The chapter also examines how farmers and communities manage seed systems and the strategies supporting their development.

The third chapter presents three perspectives on the functions of FCMSS: variety deployment, agrobiodiversity management, and seed system resilience. It explains how FCMSS contribute to the availability of a diversity of crop varieties, facilitate adaptation to climate change, and enhance farmer resilience against external shocks. The chapter also highlights the importance of integrating FCMSS within broader agricultural strategies to improve sustainability and productivity.

The fourth chapter reviews the existing policy landscape and institutional support for FCMSS. It outlines the key organisations involved and government initiatives focusing on agrobiodiversity management and variety deployment. The chapter identifies major efforts linking FCMSS with broader agricultural policies and assesses ongoing projects designed to integrate farmer-led seed systems into the National Seed Road Map.

The fifth chapter identifies obstacles hindering the growth of farmer- and community-led seed systems. These include policy delays, capacity gaps, inadequate storage facilities leading to seed loss, weak integration with formal seed systems, and the unintended consequences of prolonged seed aid. The chapter argues that addressing these challenges is essential to ensuring FCMSS can effectively contribute to food security and agricultural sustainability.

The concluding chapter outlines three key pathways: promoting Local Seed Business (LSB) development, enhancing agrobiodiversity management, and building resilience within FCMSS. These strategies align with Nigeria's National Seed Road Map and emphasise capacity building, market integration, and policy support. The chapter proposes pilot programmes in six states to test and scale effective interventions, fostering an enabling environment for FCMSS.

Overall, the white paper provides a comprehensive framework and initial agenda for strengthening FCMSS in Nigeria, emphasising their role in enhancing seed security, conserving agrobiodiversity, and supporting smallholder farmers. It calls for coordinated efforts among policymakers, research institutes, development organisations, and farmer organisations to integrate FCMSS into Nigeria's agricultural and seed sector development strategies. Through targeted policy reforms, market-driven approaches, and institutional support, FCMSS can serve as a cornerstone for a more resilient, diverse, and sustainable seed sector.

Acronyms

ASBP	African Seed and Biotechnology Programme
AU	African Union
BASICS	Building an Economically Sustainable Integrated Cassava Seed System project
BERC	Biodiversity Education and Resource Centre
CAADP	Comprehensive Africa Agriculture Development Programme
CBM	Community Biodiversity Management
CBSP	Community-Based Seed Production
CIP	International Potato Center
CRS	Catholic Relief Services
CSB	Community Seed Bank
CSP	Collaborative Seed Programme
EGS	Early Generation Seed
FCMSS	Farmer- and Community-Managed Seed Systems
FGD	Focus Group Discussion
FMAFS	Federal Ministry of Agriculture and Food Security
FMIST	Federal Ministry of Innovation, Science and Technology
IITA	International Institute of Tropical Agriculture
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ISSD	Integrated Seed Sector Development
LSB	Local Seed Business
LSI	Licenced Seed Inspector
LVVN	Ministry of Agriculture, Fisheries, Food Security and Nature of the Netherlands
MoFA	Ministry of Foreign Affairs of the Netherlands
MT	Metric Tonnes
NACGRAB	National Centre for Genetic Resources and Biotechnology
NASC	National Agricultural Seeds Council
NGO	Non-Governmental Organisation
NSRM	National Seed Road Map
PPP	Public-Private Partnership
QDS	Quality Declared Seed
RTB	Roots, Tubers and Banana
SAA	Sasakawa Africa Association
SEEDAN	Seed Entrepreneurs Association of Nigeria
SIP	Strategic Innovation Pathway
SPC	Seed Producer Cooperative
SSA	Sub-Saharan Africa
TRICOT	Triadic Comparison of Technology Options
WUR	Wageningen University & Research

Glossary

A glossary with common terms used in this document, based on De Boef and Thijssen (2023), is provided below.

Certified seed	The seed class produced from foundation seed, which has been inspected and tested to ensure it adheres to minimum quality standards, and which is sold to farmers for crop production.
Community-managed seed system	Local organisations and networks that produce and market seed of locally important food and cash crops. These community organisations and their members often receive technical support from locally operating non-governmental or other organisations. Both local and improved varieties may be offered, with seed quality sometimes ensured through quality declared seed.
Early generation seed (EGS)	The classes of breeder seed and foundation seed used as the basis for the production of certified/quality seed; also referred to as pre-basic and basic seed.
Enabling environment	The context, including policies, regulations, institutions, funding, and infrastructure, that facilitates the development and growth of seed systems. It includes both formal and informal institutions that shape the 'rules of the game' This environment fosters innovation, ensures quality standards, promotes partnerships, and improves market access for seed producers and users.
Farmer-managed seed system	Farmers who produce and save their own seed at the farm, or source seed from relatives, neighbours or other farmers in their direct vicinity, who are known to be trustworthy seed sources. Varieties can be both local and improved. Farmer-saved seed is the most prominent source of seed in the Global South.
Focus group discussion (FGD)	An in-depth discussion among multiple stakeholders (8-15 participants) originating from different backgrounds and professions, but all involved in linked groups of activities, to jointly generate data. Participants are selected in order to obtain a maximum of opinions and information, and to reduce the bias that some stakeholders may have. The FGD facilitator needs to create a non-intimidating and comfortable environment for all participants to be able to talk openly, share honest opinions, and in particular give an opportunity to those who may feel uncomfortable speaking, such as less educated stakeholders like farmers.
Formal seed systems	Specialised activities of the seed value chain that are governed by an official regulatory environment. Seed in formal systems predominantly carries the label of full certification and is of a registered (and improved) variety; activities along the seed value chain are to a large extent commercialised.
Informal seed systems	The activities of farmers, rural communities and other stakeholders in saving, exchanging, bartering, gifting, and selling seed without formal regulatory involvement, with varying degrees of commercial orientation. Informal seed systems can be perceived as a negative term; a more neutral term is farmer-managed seed systems. Given its wide use, we use both informal seed systems and farmer-managed seed systems in this guide.
Integrated seed sector development (ISSD)	A pluralistic approach that recognises the relevance of formal and informal seed systems and aims to balance public- and private-sector involvement; it replaces a linear or blue-print approach towards solely the development of fully commercial and formal seed systems. It therefore accepts that farmers rely upon multiple seed systems for the seed that they use.

Intermediary seed system	Systems that bridge farmer-managed and formal seed systems by supplying quality seed for a broad range of crops, with often limited seed profit margins. Farmer seed producers or local entrepreneurs, often receive government support in seed supply. Quality assurance is usually organised at the local level, and connections to formal institutions—such as research institutes, seed quality assurance services, markets, financial institutions, and regulatory agencies—tend to be loose or temporary.
Local seed business (LSB)	Specialised farmers, mostly organised in groups, cooperatives and/or associations, multiply and sell quality seed to other farmers and different categories of other buyers for a small profit. Local seed businesses may multiply seed of the main grain cereals and grain legumes, but also root and tuber crops. This system is predominant for those crops of which seed profit margins are too small for the larger seed enterprises. Seed produced in this seed system is of local or improved varieties, developed by public research institutes. The quality of the seed may be assured through formal seed quality procedures, such as quality declared seed and certification.
Multi-stakeholder workshop	A way to engage multiple stakeholders – those who are affected by, have a direct interest in, or are somehow involved in the topic (such as the seed sector). The workshop is critical for allowing stakeholders to share and listen to different voices, not necessarily to come to a consensus, but rather to allow divergent perspectives to contribute to making strategic decisions. In the workshop, participants can also verify information gathered through other methodologies and tools.
National seed road map (NSRM)	A strategic policy document that guides stakeholders in the seed sector to work towards an increase in farmers' access to and use of quality seed of farmer preferred and improved varieties; while also providing the sector direction in its contribution to food system transformation.
Quality seed	Seed that is varietally pure with a high germination rate, free from diseases, and with a proper moisture content and weight. The use of quality seed ensures good germination, rapid emergence, and vigorous growth of the crop. Quality seed can be purchased as certified seed through commercial channels, but also obtained from informal sources.
Seed	All propagation materials used for crops, trees, forages, and other plant and crop species. With the focus of the current paper on crops, the term in this case is used for plant species only, leaving out livestock, fish and other species.
Seed quality	The sum of all factors such as varietal purity, seed health, germination rate, moisture content and vigour, which affect the performance of the crop.
Seed quality assurance	The assurance of varietal identity and purity, seed viability in terms of physiological and health conditions, and other standards in seed production and processing, through field inspection, laboratory testing, and labelling; including certification through the dedicated regulatory body and/or accredited third parties.
Seed sector	Interconnected seed systems, value chains, and activities that collectively ensure farmers have access to seed for crop production.
Seed sector stakeholders	Every individual, group and organisation that is somehow involved in, or affected by, the seed sector.
Seed system	The technological, organisational, and institutional frameworks—both market-driven and non-market—that facilitate farmers' ability to access to and use of quality seed.
Seed value chain	The successive operations and services leading to seed supply, i.e., breeding, early generation seed production and supply, seed production, seed processing, conditioning, and packaging, promotion, and marketing; also including seed quality assurance and other support services.
Strategic innovation pathway (SIP)	Key steps contributing to the realisation of ambitions for topics prioritised for the NSRM, and the context in which the ambitions are to be realised.

Tricot	Triadic comparison of technology options is a methodology that helps farmers to identify the most suitable technologies for the local conditions of their farm and in the context of seed systems applied to deploy local and improved varieties within farmer- and community-managed seed systems.
Variety	Populations with distinct genotypic and phenotypic traits that differentiate these from other populations within the same species of food, feed, fibre, and forage crops, as well as trees and perennial species.

1 Introduction

Farmer- and Community-Managed Seed Systems (FCMSS) are receiving growing attention across Africa due to their essential role in food security, agrobiodiversity management, and agricultural resilience. The African Union (AU), through the Comprehensive Africa Agriculture Development Programme (CAADP), highlights the need for accessible quality seed of farmer preferred and improved varieties to boost agricultural productivity. The African Seed and Biotechnology Programme (ASBP), endorsed by the AU Assembly in 2007, provides a strategic framework for seed sector development, emphasising an integrated approach that recognises both formal and informal seed systems. Box 1 provides more insights on the attention FCMSS are currently gaining at African continental level.

Box 1. FCMSS gaining momentum at Africa continental level

An ASBP status report (AUC, 2021) underscored FCMSS as the foundation of African agriculture, noting that 80-90% of seed used by smallholder farmers are sourced through informal networks of saving and exchanging, and informal seed markets. Recognising the contribution of FCMSS, ASBP has intensified its efforts to strengthen FCMSS by supporting policies that integrate farmer- and community-led practices into national, regional and continental agricultural strategies. The ASBP has established the African Seed and Biotechnology Partnership Platform, bringing together various thematic working groups, including one focused on FCMSS. In 2022, stakeholders outlined a roadmap to enhance FCMSS through capacity building programmes, seed production guidelines, and institutional frameworks to foster collaboration between farmers, researchers, and policymakers.

Sources: AU, 2021; Biovision, 2022.

In Nigeria, FCMSS have more recently gained attention at the highest levels of government, including the Presidency and the Federal Ministry of Agriculture and Food Security (FMAFS). The recognition stems from the critical need to empower Nigerian farmers in the production and distribution of quality seed to strengthen food security and agricultural sustainability. During the visit of Nigeria's Vice President Sen. Kashim Shettima to the International Institute of Tropical Agriculture (IITA) in Ibadan, in February 2025, he underscored this commitment, alongside the Minister of Agriculture and Food Security, Sen. Abubakar Kyari. Their engagement with research institutions and farming communities signals a commitment to enhancing FCMSS as part of broader agricultural development strategy.

At the policy level, FMAFS has prioritised improving access to quality seed of both farmer preferred and improved varieties, essential for increasing productivity and food security. Strengthening FCMSS aligns with national goals by ensuring the availability of quality seed of a wide portfolio of varieties for staple crops such as sorghum, millet, rice, cowpea, cassava, and yam, while also recognising the importance of nutrient-rich traditional vegetables in promoting healthy diets. The government thereby acknowledges that multiple, complementary seed systems enhance farmers' resilience to climate change, pests, and disease outbreaks and also uncertainty in times of crisis and conflict. Investments in decentralised seed production and distribution networks further strengthen Nigeria's agricultural sector, ensuring smallholder farmers not easily reached by commercial channels can sustain their livelihoods and meet the food and nutritional needs of growing urban and rural populations of the country.

It is within this context of attention at the Nigerian and African level, that the current white paper has been written. The paper has the following objectives:

- Increase awareness on and provide a foundation for strengthening FCMSS in Nigeria;
- Present key findings from a series of dialogues and stakeholder consultations on FCMSS and the potential strategies for their development;
- Consolidate perspectives that guide actionable policies and investments for strengthening FCMSS; and
- Provide strategic inputs on FCMSS to be added to the National Seed Road Map (NSRM) of Nigeria.

This white paper is the outcome of the project *Dialogues advancing Nigeria's agenda to strengthen farmer- and community-based seed systems for seed sector development and agrobiodiversity conservation and use* (in short FCMSS Dialogues Nigeria project). This project was funded by the Netherlands Ministry of Agriculture, Fisheries, Food Security and Nature (LVVN) and implemented by Sahel Consulting Agriculture & Nutrition Limited (Sahel Consulting), in collaboration with Wageningen Social & Economic Research, part of Wageningen University & Research (WUR). The project has been conducted within the framework of the Collaborative Seed Programme Nigeria (CSP Nigeria) funded by the Netherlands Ministry of Foreign Affairs (MoFA). Box 2 provides of the objectives of the project.

Box 2. Objectives of the FCMSS Dialogues Nigeria project

- Document insights and development organisations' perspectives on strengthening FCMSS in Nigeria;
- Facilitate multi-stakeholder dialogues on the modalities for strengthening FCMSS, focusing on agrobiodiversity management, food security, and farmer empowerment;
- Develop a position paper and strategy document outlining potential activities and serving as a roadmap for advancing FCMSS; and
- Empower local farming communities by equipping them with decision-making tools that safeguard local varieties while contributing to a resilient national seed sector.

The FCMSS Dialogues Nigeria project has been structured around a series events, which were all co-organised by CSP lead partners Sahel Consulting and Wageningen Social & Economic Research, in close collaboration with national and international stakeholders; see Table 1.This paper serves as a foundational document for guiding policy and investment decisions aimed at strengthening, supporting and scaling up FCMSS in Nigeria, ensuring they contribute effectively to food security, agrobiodiversity management, resilient seed systems, and seed sector development.

Table 1 *Overview of events covering various consultations and contexts for strengthening FCMSS in Nigeria*

Location and date	Context	Partners
Tricot workshop, Abuja 8-9 October 2024	Variety deployment through citizens science (tricot) linking with FCMSS	Sahel Consulting, Wageningen Social & Economic Research, NASC, NACGRAB, SEEDAN, Alliance, IITA, ICRISAT
Focus group discussion, Abuja, 10 October 2024	FCMSS in the context of variety deployment and seed sector development	Sahel Consulting, Wageningen Social & Economic Research, NASC, IITA, ICRISAT, Alliance, Oxfam
Focus group discussion, Ibadan, 11 October 2024	FCMSS in a context of conservation and use of agrobiodiversity and climate change resilience	Sahel Consulting, Wageningen Social & Economic Research, NACGRAB, IITA, Crop Trust
SeedConnect panel, Abuja, 26 November 2024	FCMSS in seed sector development	Sahel Consulting, Wageningen Social & Economic Research, NASC, NACGRAB, SEEDAN, Oxfam, FMAFS
Multi-stakeholder workshop, Abuja, 27 November 2024	FCMSS major challenges and opportunities for strengthening	Sahel Consulting, Wageningen Social & Economic Research, NASC, NACGRAB, SEEDAN, Oxfam
CSP & ISSD Africa workshop, Abuja, 17-18 February 2025	FCMSS in a humanitarian context and strengthening seed sector resilience	Sahel Consulting, Wageningen Social & Economic Research, NASC, NACGRAB, SEEDAN, ISSD Africa, Mercy Corps, Alliance, IITA, ICRISAT, CIP, Oxfam, SAA, FAO, FMAFS

Note: all workshops were organised in collaboration with the CSP.

This white paper is structured into seven key chapters. The current chapter establishes the context and significance of FCMSS within Nigeria's agricultural landscape. It outlines the objectives of the paper, emphasising the urgent need to strengthen FCMSS for food security, agrobiodiversity management, and agricultural resilience. The second chapter defines essential concepts and approaches, including the different seed systems farmers rely on. It introduces Integrated Seed Sector Development (ISSD) and market

archetypes, and examines the role of seed aid and institutional markets assessing their impact on the resilience of seed systems. It further elaborates different approaches for supporting FCMSS. The third chapter presents three key perspectives on FCMSS: their role in variety deployment, agrobiodiversity management, and seed system resilience. The fourth chapter highlights current initiatives strengthening FCMSS in Nigeria within the current policy context, particularly those that agrobiodiversity management and variety deployment. The fifth chapter outlines the challenges identified during the stakeholder dialogues, including policy delays, deficiency in business orientation, capacity gaps, seed storage constraints, and weak integration with formal seed systems. It also discusses the unintended effects of prolonged seed aid on local seed markets. The sixth and concluding chapter introduces three Strategic Innovation Pathways (SIPs) for strengthening FCMSS: Local Seed Business (LSB) development, agrobiodiversity management, and resilience building. These pathways provide an actionable agenda for integrating FCMSS into Nigeria's NSRM.

2 Definitions, concepts and approaches

2.1 Definitions

Before going into more detail of FCMSS, it is crucial to establish clear definitions on four key terms used throughout this document; note that these and other definitions are included in the glossary:

- 'Seed' is broadly defined to include all propagation materials used for crops, trees, forages, and other plant and crop species.
- 'Varieties' refer to populations with distinct genotypic and phenotypic traits that differentiate these from other populations within the same species of food, feed, fibre, and forage crops, as well as trees and perennial species.
- 'Seed systems' are the technological, organisational, and institutional frameworks—both market-driven and non-market—that facilitate farmers' ability to access and use seed (McGuire and Sperling, 2013).
- A 'seed sector' comprises interconnected seed systems, value chains, and activities that collectively ensure farmers have access to seed for crop production (De Boef et al., 2024).

The demand for quality seed is shaped by multiple factors, including household food security, nutrition, income generation, climate adaptation, and resilience to natural, social and economic shocks and stresses. These factors influence farmers' decisions on variety replacement, seed source selection, and level of financial investment in quality seed. The seed replacement rate and willingness to invest in farmer preferred, locally adapted and/or new improved varieties are key determinants of a vibrant and sustainable seed sector.

Farmers obtain their varieties through a diverse array of seed systems that range from formal to informal sources. Formal systems involve public and private seed systems, while informal systems include community-managed systems, informal commercial networks, farmer-led exchanges, and farmer-managed seed systems (Almekinders et al., 1994; Coomes et al., 2015; Sperling and Almekinders, 2023; Westengen et al., 2023). Recognising the complementary nature of multiple systems is essential for ensuring seed security, varietal diversity, and sustainable agricultural development (Louwaars and De Boef, 2012).

2.2 Sources of seed used by farmers

To fully comprehend the diversity of seed systems within a seed sector, it is essential to examine how farmers access seed and varieties for a range of crops. We use an imaginary example of a typical smallholder farmer household in Nigeria that sources seed through multiple channels, reflecting a blend of formal, commercial, informal, and community-managed seed systems including farmer-saved seed.

For staple crops such as maize, the farmer purchases both open-pollinated and hybrid varieties from nearby agro-dealer linked to Nigerian seed companies. In contrast, sorghum and millet seed is saved from previous harvests or exchanged with relatives and neighbours, reinforcing traditional seed saving and sharing practices. For groundnut and cowpea, the farmer either saves own seed or obtains them from organised farmer groups within the community. Planting materials for vegetatively propagated crops, such as yam tubers, cassava stems and sweet potato vines, are sourced directly from their own fields or if not available, from neighbours. Meanwhile, for vegetables, the farmer purchases imported seed for more commercial vegetables from an agro-dealer but relies on farm-saved seed and informal market sources for seed for African indigenous vegetables.

For each crop, the farmer makes strategic decisions regarding seed source, quality, and varietal traits and decides how much to invest. These decisions are guided by experience, economic considerations, and agronomic conditions, ensuring access to materials that support productivity, resilience to climatic stress,

pest resistance, and alignment with household- and market demands. The choice of crop, variety, and seed source is deeply influenced by socio-cultural preferences, economic realities, and environmental conditions, highlighting the need for diverse, dynamic and adaptive seed systems (De Boef et al., 2025).

2.3 Concepts enhancing understanding of FCMSS

2.3.1 Integrated Seed Sector Development

Since its emergence in 2008, Integrated Seed Sector Development (ISSD) has gained increasing recognition as an approach that acknowledges the diverse seed systems that collectively form a seed sector. Since its early days, the AU endorsed the approach, allowing for a partnership between the ASBP and ISSD Africa, a community of practice that through joint learning advances the approach (ISSD Africa, 2024). As approach ISSD arose in response to earlier seed interventions that primarily focused on formal and commercial seed systems, often neglecting the informal and farmer-managed systems that play a vital role in ensuring farmers' access to quality seed and improved varieties (Louwaars and De Boef, 2012). The ISSD framework categorises seed systems into three overarching types: formal, informal, and intermediary seed systems, reflecting a continuum of seed access and exchange mechanisms as also visualised in Figure 1.

Seed system	Farm-saved seed (FS)	Community-based associations (CB)	Community-based NGOs and public (CN)	National companies (NC)	International companies (IC)	Closed value chain (CV)
Type of crop(s)	local food crops	food and crops	food crops (roots and tubers)	food and cash crops	High-input cereals	closed value chain crops
Major crops	cereals and pulses	cereals and pulses	cassava and sweet potato	maize, beans, soy bean, and groundnut	maize and wheat	cotton, tobacco, malting barley
Type of varieties	local	local and improved	improved	improved	improved	improved
Type of system	farm-saved, informal	informal, quality declared and certified	quality planting material and informal	certified	certified	certified
Dissemination system	farm-saved and exchange, informal markets	exchange, local marketing	NGO distribution and local marketing	marketing, agro-dealers, and government dissemination (maize)	export, marketing, agro-dealer networks, and government dissemination (maize)	input package

Figure 1 *Characterisation of seed systems within a national seed sector (illustrative example)*
Source: Louwaars et al. (2013).

Formal seed systems operate within structured, regulated seed value chains, where seed production and distribution adhere to official certification and labelling standards. Activities within these systems are largely commercialised and closely monitored to ensure seed quality and market efficiency. In contrast, FCMSS, often referred to as informal seed systems, are rooted in local practices and community networks. These systems rely on seed saving, exchanging, bartering, gifting, and selling, often without formal regulatory oversight but with varying degrees of commercialisation (Louwaars and De Boef, 2012).

A landmark study by McGuire and Sperling (2016), which analysed the largest dataset on smallholder seed usage, found that over 90% of seed transactions occur within informal networks, with farmers primarily saving, exchanging, or selling seed among themselves. Interestingly, more than half of these exchanges involve cash transactions, indicating that affordability is not the sole determinant of farmer choices. Instead, trust in seed sources, developed through long-term relationships and social networks, plays a pivotal role in farmers' seed decisions. These trust-based networks function as embedded farmer seed systems, supporting both seed security and varietal diversity.

Farmer seed networks are instrumental in facilitating seed movement across long distances, ensuring the circulation of locally adapted and resilient varieties. These systems not only enable farmer-to-farmer exchange but also serve as channels for seed acquisition from diverse sources, including natural ecosystems, local markets, national seed agencies, research institutions, agro-dealers, and agribusinesses (Coomes et al., 2015). While the formal-informal dichotomy is widely used, it does not imply inferiority of informal systems; rather, informal seed networks remain essential for maintaining agricultural biodiversity and resilience, and other goals (Westengen et al., 2023).

Between the formal and informal systems exist intermediary or semi-formal seed systems, which blend characteristics of both. These include individual seed entrepreneurs, cooperatives, and community-based farmer seed producers engaged in commercial seed production and marketing. While these groups maintain loose or temporary links with formal institutions such as research centers, extension services, financial institutions, and regulatory bodies, they remain closely embedded within farming communities, providing locally adapted, quality seed options that bridge the gap between formal and farmer-managed seed systems.

The ISSD approach is designed to improve the efficiency and sustainability of seed value chains by addressing both operational challenges and the enabling environment in which seed systems function. Rather than implementing one-size-fits-all solutions, ISSD is grounded in local realities, offering systemic and context-specific solutions to the complex challenges of seed sector development. It also seeks to bridge the gap between policy and practice, ensuring that interventions are practical, scalable, and sustainable (Louwaars and De Boef, 2012). A core objective of ISSD is to create a functional balance between public and private sector efforts in the seed industry. While the approach encourages market- driven solutions and seed entrepreneurship, it equally recognises the vital role of public investments in supporting smallholder farmers and ensuring equitable access to quality seed.

ISSD has as overarching goal to ensure that both female and male smallholder farmers have reliable access to sufficient quantities of quality seed of preferred varieties at affordable prices. The approach also emphasises expanding farmers' choices, whether in terms of crop varieties, seed quality, pricing, or market accessibility. By addressing the diverse needs of farmers, particularly in low- and middle-income countries such as Nigeria, ISSD fosters a more inclusive and resilient seed sector that supports food security, agricultural sustainability, and rural development (ISSD Africa, 2024; De Boef et al., 2025). The above description of the approach is captured in a set of ten ISSD principles that guide seed sector practices, programmes and policies (Table 2)

Table 2 *Updated principles for an integrated approach to seed sector development*[*]

ISSD principles
1. Foster pluralism in practice, programmes and policies
2. Work according to the structure of seed value chains
3. Value and facilitate interactions between multiple seed systems
4. Recognise the relevance of and strengthen farmer-managed seed systems
5. Promote entrepreneurship and demand orientation
6. Recognise complementary roles of public and private stakeholders
7. Support an enabling and evolving environment for a dynamic sector
8. Strengthen performance in both domains of seed markets and seed sector governance
9. Promote evidence-based seed sector innovation
10. Be intentional about the transformation of the seed sector for more desirable outcomes for society, economy, and environment

*Note that the principles have been recently updated capturing insights from an analysis of seed programmes in three countries.

Source: De Boef et al., 2025; adapted from Louwaars et al., 2013.

2.3.2 Market archetypes

The framework for market archetypes classifies seed systems based on market demand and the economic value of quality seed as part of crop commodity value chains. Originally developed by the Bill & Melinda Gates Foundation and USAID, this framework was designed to address challenges in scaling early generation seed (EGS) production and supply across Sub-Saharan Africa (SSA). The framework provides insights into how market forces interact with the biological characteristics of crops, that shape seed sector dynamics and differentiate seed systems (De Boef et al., 2015).

Market archetype analysis categorises seed systems based on two key dimensions:

- Excludability (Marginal Economic Value): The degree to which the economic benefits of quality seed of improved varieties can be restricted to those who pay for them.
- Rivalry (Demand Level): The extent to which market demand exists for quality seed of improved varieties.

The intersection of these two dimensions results in four distinct market archetypes described below and illustrated in Figure 2:

1. Private Sector Dominant: High demand and profitability attract strong private investment, typically seen in hybrid maize and vegetable varieties.
2. Public-Private Collaboration: The public sector supports crops with uncertain demand to encourage private investment. This includes rice, sweet potato, and cassava in Nigeria, where the public sector provides EGS to offset high production costs, while locally operating seed companies and community-managed seed systems handle production and supply.
3. Public Sector Dominant: The government leads EGS production and supply for crops with low market demand but high food security value. Variety deployment and supply predominantly rely on farmer-managed and community-based seed systems (e.g., sorghum in Nigeria).
4. Niche Private Sector: Specialised private investment caters to smaller but profitable markets, such as hybrid sorghum for brewing.

The four archetypes, positioned within four quadrants (Figure 2) provide seed sector stakeholders, including entrepreneurs, policymakers, and donors, with a framework for understanding seed sector dynamics and guiding targeted financial, institutional and technical interventions based on specific market conditions, crop types, and sectoral needs.

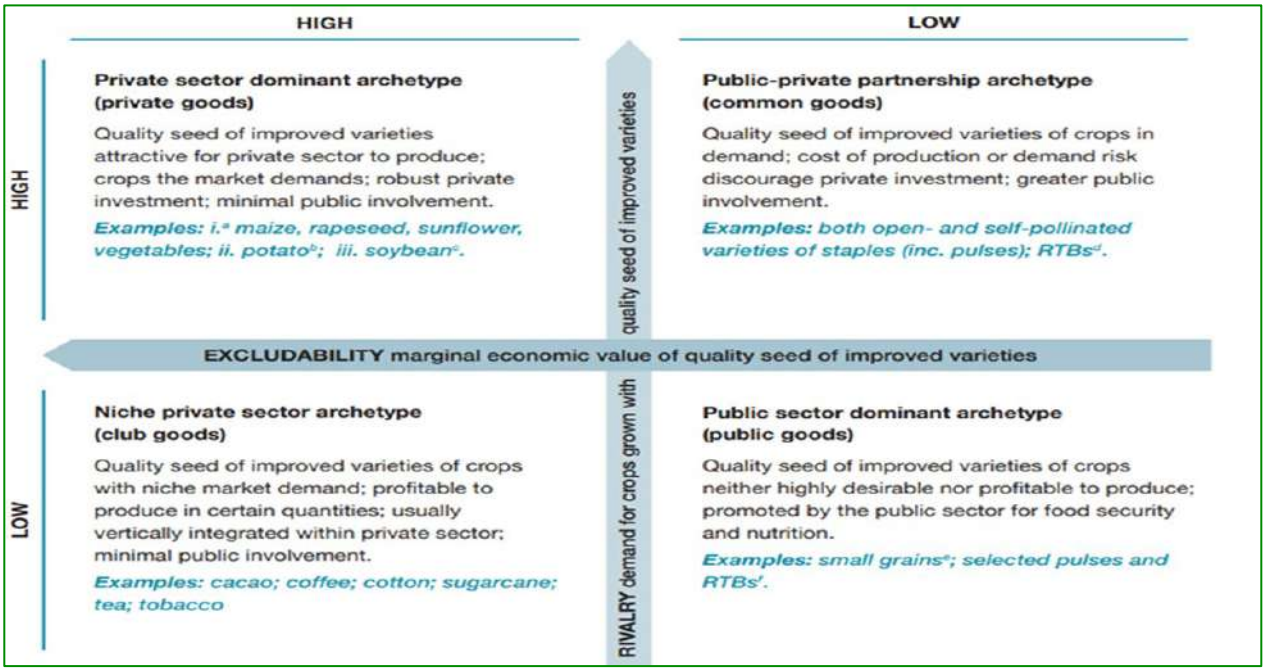

Figure 2 *Seed market archetypes*
Source: Borman et al. (2025b), adapted from De Boef et al. (2015).

Market archetype analysis reinforces the ISSD approach, emphasising the importance of a pluralistic seed sector that balances public and private efforts while recognising multiple seed systems as essential for strengthening seed sector development. This analytical framework helps stakeholders identify the most effective mix of public and private interventions for different crops, seed systems, and market contexts. By applying this analysis, policymakers and seed sector stakeholders can determine where government intervention is necessary, where private investment can be scaled, and how to design market-based interventions that yield optimal seed sector outcomes.

The framework furthermore highlights the complementary nature of different seed systems. Certain crops align with private and commercial seed systems due to their biological and market characteristics, while others thrive in public-private partnerships or are predominantly maintained within an interface between public entities with FCMSS. The study offers key recommendations, including strengthening policy frameworks that recognise this pluralism, fostering public-private partnerships, enhancing seed quality

assurance mechanisms tailored to multiple market archetypes and seed systems, and addressing financial constraints that impact both seed entrepreneurs and smallholder farmers.

2.3.3 Guiding principles for seed aid

Seed aid plays a crucial role in supporting farmers facing crises caused by conflict, climate shocks, economic instability, or natural disasters. However, when implemented without a clear strategy, repeated emergency seed distributions can undermine FCMSS, disrupt markets, and create long-term dependency. Recognising these risks, the ten principles for good seed aid were developed to guide effective, context-specific, and sustainable interventions that strengthen rather than replace existing seed systems (Seedsystems.org and Mercy Corps, 2024). These principles emphasise the importance of assessing seed security needs, selecting appropriate response mechanisms, ensuring quality seed access, and supporting local markets. Instead of relying solely on direct seed distribution, they promote market-based approaches, farmer participation, and long-term resilience-building. By following these guidelines, governments, humanitarian agencies, and development partners can align emergency interventions with broader agricultural development goals, ensuring that seed aid contributes to food security, farmer empowerment, and sustainable seed sector growth. Box 3 presents the ten principles. These principles promote effective, sustainable, and farmer-driven seed aid interventions that strengthen resilient seed systems rather than creating dependency. During a recent workshop organised by CSP Nigeria and ISSD Africa, awareness was raised particularly among seed sector stakeholders on the value of the principles. The participants shared the view that organisations engaged in seed procurement, seed production and supply, and seed distribution, are obliged to subscribe to a code of conduct based on the principles that is overseen by an authority that ensures adherence.

Box 3. Ten principles for good seed aid

1. Seed system security assessment (SSSA) – Conduct assessments before intervention to understand seed security challenges (availability, access, quality, and variety suitability) and tailor responses accordingly.
2. Response type – Select interventions based on identified needs, whether direct seed distribution, vouchers, or market-based solutions, avoiding one-size-fits-all approaches.
3. Clear intervention goals – Define objectives beyond just seed access, incorporating nutrition, income, and resilience-building in line with farmers' priorities.
4. Context-specific interventions – Adapt seed aid to local conditions (e.g., conflict, drought, or displacement) and apply a 'do no harm' approach.
5. Timeliness – Ensure farmers receive seed on time for their planting season to maximise productivity and avoid wasted effort.
6. Market-based assistance – Strengthen formal and informal seed markets rather than undermining them with repeated free seed distributions.
7. Crop and variety suitability – Provide locally adapted, farmer-preferred varieties, considering gendered preferences and practical farming conditions.
8. Seed quality assurance – Ensure seed meets minimum quality standards for viability, health, and performance, including vegetative planting material.
9. Farmer choice – Enable farmers to select from diverse crop and variety options, integrating formal and informal seed channels.
10. Feedback mechanisms – Establish monitoring and evaluation at multiple points, incorporating farmer input and long-term impact assessments.

Source: Seedsystem.org and Mercy Corps, 2024

2.4 Farmer-managed seed systems

Within the larger whole of informal seed systems or FCMSS, farmer-managed seed systems refer to the farmer-based practices through which farmers produce, save, exchange, and distribute seed. These systems are deeply rooted in traditional and local knowledge, customs, and agricultural biodiversity. They are typically informal and rely on the farmer's and community-based experience in selecting, storing, and reusing seed from previous harvests, often tailored to specific environmental conditions and local cultural preferences. These systems play a crucial role in maintaining genetic diversity, fostering resilience to climate

change, and ensuring food security at the household and community levels (Almekinders et al., 1994; Almekinders and Louwaars, 1999; De Boef et al., 2013). Figure 3 positions farmer-managed seed systems within the outside ring of formal seed systems.

In farmer-managed seed systems, seed is sourced through saving, sharing, and bartering among family, neighbours, and community groups and to a large extent also purchasing within local networks (Coomes et al., 2015; McGuire and Sperling, 2016). Unlike formal seed systems that involve regulatory oversight and certification processes, farmer-managed systems operate without formal quality controls but are built on trust, social relationships and networks (Coomes et al., 2015). These systems are especially vital for crops within public-private collaboration and public sector dominant market archetypes. These systems are critical for smallholder farmers in areas where access to commercial seed markets can be limited due to high costs, poor infrastructure, or unsuitability of improved varieties to local conditions.

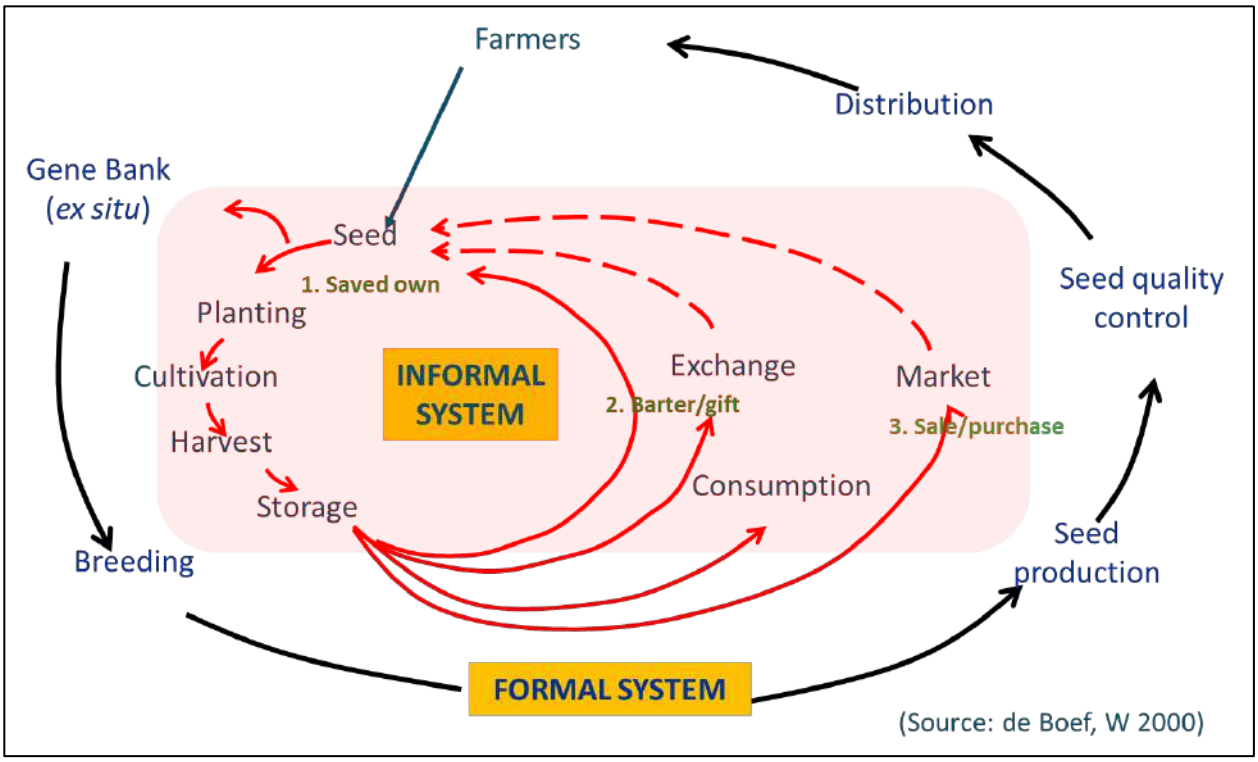

Figure 3 *Farmer- and community-based seed systems shaping informal seed systems and their conventional interaction with formal seed systems*
Source: De Boef et al. (2000).

Strengthening farmer-managed seed systems requires a comprehensive approach that supports farmers' existing practices while also improving access to new varieties and crops (Almekinders et al., 1994). This can be achieved by providing training on seed selection, storage, and management techniques to enhance seed quality. Establishing community seed banks and facilitating seed fairs can help farmers access a broader range of local and improved varieties (De Boef et al., 2013). Additionally, fostering partnerships between farmers and formal breeding institutions can introduce new, resilient varieties that meet local needs without undermining traditional knowledge. Strengthening groups of farmers becoming more specialised in seed production and marketing in a community-based and entrepreneurial manner connects this seed system with community-managed seed systems (Sperling and Almekinders, 2023; Borman et al., 2025b). Policy support is also essential, including recognising farmers' rights to save and exchange seed and protecting farmers' varieties through legal frameworks (De Jonge et al., 2024). By combining these efforts, farmer-managed seed systems can become more resilient, adaptable, and capable of contributing to food security and climate change adaptation.

An important yet often underrecognised dimension of farmer-managed seed systems is the differentiated roles played by women and men, youth and elders, and distinct social groups within communities. Gender, generational, and cultural norms shape who produces, selects, stores, and exchanges seed, and for which crops and purposes (Badstue et al., 2006; Farnworth et al., 2020). For instance, women frequently manage seed for food security crops such as legumes and vegetables, while men may be more involved in cereal seed production (Meinzen-Dick et al., 2011). Women may also have different perspectives on the type of varieties or even consider a preference for open-pollinated rather than hybrid varieties (Mastenbroek et al., 2024). Intergenerational knowledge transfer, particularly from older women to younger family or group members, is central to the continuity and evolution of farmer-managed seed systems. Strengthening FCMSS therefore presents both a challenge and an opportunity to embed inclusive approaches. Gender-sensitive and socially inclusive strategies—such as tailored training, gender-equitable access to resources, gender and socially inclusive participatory varietal selection, and inclusive governance of community seed banks—are essential for making these systems more resilient, effective, and equitable (Nankya et al., 2022; Kramer and Trachtman, 2024). Supporting the diverse roles within seed systems is essential for ensuring inclusivity, enhancing access to quality seed and preferred varieties, strengthening agrobiodiversity management, and contributing to broader goals of equity and social cohesion.

2.5 Community-managed seed systems

Community-managed seed systems are part of the group of FCMSS and are locally organised frameworks where farmers collectively manage seed production, processing, exchange, and distribution. Similar to farmer-managed seed systems, they draw upon local knowledge and practices but operate in a more structured and collaborative manner. They are structured as community seed banks, community seed schemes, seed producer cooperatives and farmer seed associations. These systems promote collective decision-making on variety selection, seed production and quality assurance, seed storage, and variety conservation, but also seed marketing and dissemination. The collective nature fosters knowledge-sharing and long-term sustainability (Ojiewo et al., 2015; Sperling and Almekinders, 2023; Borman et al., 2025b).

In community-managed seed systems farmers contribute seed from their own fields to a shared resource, ensuring a steady supply of locally adapted, farmer preferred and improved varieties, particularly for crops for which commercial seed systems are not viable and for which certified seed of improved varieties is hardly available in commercial seed markets (Dey et al., 2022; Sperling and Almekinders, 2023). Introducing structured seed exchange such as seed fairs, shared resources and infrastructure like seed banks, and capacity development programmes, but also local marketing and sales practices enhances the resilience of farmer-led seed practices. These practices contribute to seed security, maintenance of local varieties, access to and use of new improved varieties, and reduced vulnerability to crop failure.

Community-managed seed systems act as bridges to formal seed systems through entrepreneurship and market orientation. Organised groups engage in quality seed production, while meeting basic quality standards, such as in East Africa with Quality Declared Seed (QDS). These groups can partner with research institutions for access to EGS and with regulatory bodies for quality assurance. Seed producer groups can operate independently within local and sometimes even regional seed markets, but may also function as contracted outgrowers for seed companies, which makes them part of the formal seed system (Sisay et al., 2017; Borman et al., 2025b). Selling surplus seed of local and improved varieties creates economic benefits for farmers while fostering a more inclusive, diversified, and resilient seed sector.

Importantly, the effectiveness and inclusiveness of community-managed seed systems are likewise to farmer- managed seed systems shaped by gender dynamics, generational roles, and community structures. Additionally, community institutions such as self-help groups (SHGs) or community-based organised organisations can create inclusive spaces for women farmers, youth or specific social groups to participate in seed-related activities. As shown in India, integrating SHGs in seed system development can improve seed access and empower women as custodians of local seed diversity and key players in seed systems (De Boef et al., 2021). Social groups within communities—such as SHGs, religious associations, and cooperatives—shape how seed systems function. Inclusive strategies that recognise and empower these different roles, for example through gender-sensitive training, intergenerational learning exchanges, and

targeted support for specific groups within communities, are key to strengthening community-managed seed systems (De Boef et al., 2021; Farnworth et al., 2020; Kramer and Trachtman, 2024; Kerr et al., 2018). These approaches enhance social equity while boosting the effectiveness and sustainability of community managed seed systems.

2.6 Approaches supporting FCMSS

2.6.1 Community biodiversity management safeguarding diversity

The conservation and sustainable use of biodiversity have been central to global policy discussions since the 1992 Earth Summit in Rio de Janeiro. As part of in situ conservation efforts for plant genetic resources for food and agriculture, the community biodiversity management (CBM) approach has been developed to empower local communities in conserving, utilising, and managing their agricultural biodiversity. CBM enhances community resilience by maintaining diverse plant genetic resources that are vital for food security and climate adaptation. CBM practices such as participatory crop improvement, community biodiversity registers, diversity kits, and the commercialisation of local varieties contribute to maintaining genetic diversity within farming systems (De Boef et al., 2012; 2013).

A key strategy within CBM is the establishment of community seed banks (CSBs), which function as local repositories for seed of local and improved crop varieties. CSBs enable farmers to save, exchange, and access diverse seed stocks, improving resilience against pests, diseases, and climate-related stresses. By facilitating seed circulation within communities, CSBs sustain local knowledge while incorporating new varieties from research institutions introduced through participatory varietal selection. Additional community-led practices such as diversity fairs, seed registers, and farmer or grassroots' breeding initiatives further enhance on-farm conservation and genetic diversity (Vernooy et al., 2015).

CBM is deeply interwoven with FCMSS, reinforcing traditional and local seed-saving, sharing, and exchange practices. Additionally, it serves as a link to formal seed systems, fostering collaborations with research institutions, genebanks, governmental agencies, and NGOs. These partnerships enable farmers to access improved or regionally adapted varieties while maintaining autonomy over their seed management. CBM also creates opportunities for entrepreneurship, as farmer groups engaged in community seed production can develop local seed markets, transforming agrobiodiversity management into a viable economic activity. This integration strengthens seed sector development, promoting and linking food security with farmer and community empowerment, agrobiodiversity management and sustainable rural development (De Boef et al., 2013).

2.6.2 Local seed business development promoting entrepreneurship

Local seed businesses (LSBs) represent a structured evolution of community-managed seed systems, where farmer groups transition from informal seed production and exchange to organised, market-oriented local seed enterprises. Emerging from farmer-led and community-organised networks, LSBs scale up seed production by offering quality seed of portfolios of locally adapted and improved varieties of a wide diversity of crops. These businesses empower farmer seed producers to manage varietal selection, seed multiplication and distribution, ensuring the availability of and encouraging farmers' use of quality seed of farmer preferred, locally adapted and newly released improved varieties. To enhance their effectiveness, LSB members receive technical training in seed selection, storage, pest control, and quality assurance, aligning their production processes with national and local quality standards (Mastenbroek et al., 2015; Thijssen et al., 2015; Sisay et al., 2017; Sperling and Almekinders, 2023).

Beyond technical expertise, LSBs are strengthened in entrepreneurship, equipping their members and leadership with skills to operate LSBs as sustainable and autonomous seed enterprises. Support initiatives focus on financial management, marketing strategies, business planning, and market research, enabling LSBs to identify demand-driven seed varieties of specific portfolios of crops and develop profitable business models. Organisational development is also central, as LSBs receive training in leadership, governance, cooperative management, bookkeeping, and decision-making, fostering their transformation into

professionally managed, yet cooperative entities. Their collective nature, combined with enhanced autonomy, ensures long-term sustainability, allowing them to adapt to market opportunities and challenges while maintaining farmer ownership and control (Borman et al., 2025b).

Box 4. Some key features of local seed business in Ethiopia, Uganda and Myanmar

- LSB market share estimates in Ethiopia: 16% for cereals, 11% for pulses, 3% for oilseeds, and 13% for Roots, Tubers and Bananas (RTBs);
- LSB market share estimates in Uganda: 6.5% for cereals, 4% for pulses, 9% for oilseeds, and 10% for RTBs;
- In the three countries: supply of 96,000 MT of certified seed and QDS of 219 varieties of 30 crops; the quality seed that they multiplied was sufficient for 3.28 million smallholder households;
- The LSB model added US$ 383 million worth of marketable produce to the three countries' economies, which is a fifty-fold return on the US$ 6.65 million invested by the three country programmes supporting LSBs;
- LSBs deploy quality seed of wider diversity of crops; the crop portfolio is more nutrition-sensitive and climate responsive that available through formal and commercial seed systems.

Source: Borman et al. (2025b).

To further solidify their role in the seed sector, LSBs are strategically linked to key external stakeholders, including government agencies, research institutions, seed quality assurance bodies, and both public and private seed companies. These partnerships facilitate access to EGS, improved varieties, technical expertise, credit facilities, and expand market opportunities. For instance, in Ethiopia, Seed Producer Cooperatives serve as intermediaries between community-managed seed systems and formal seed markets, producing certified seed of multiple crops and varieties while supporting local economic development and employment. Box 4 illustrates how ISSD projects in Ethiopia, Uganda and Myanmar by fostering technical expertise, entrepreneurship, organisational structures, and multi-stakeholder partnerships, LSBs evolved into autonomous, market-driven entities capable of sustainably meeting local seed demands and contributing to national food security and nutrition (De Boef et al., 2025, Thijssen et al., 2015; Mastenbroek et al., 2015; Sisay et al., 2017).

2.6.3 Market systems approach for sustainable and demand-driven interventions

The market systems approach plays a pivotal role in strengthening the seed sector including FCMSS by integrating market-driven solutions in seed sector development. This approach prioritises systemic interventions that ensure seed security, accessibility, and sustainability, rather than relying on short-term relief efforts (Mercy Corps, 2018, 2023). By analysing constraints within informal and formal seed markets, interventions can improve seed multiplication, distribution networks, and farmer-led quality assurance mechanisms, enabling smallholder farmers to access climate-resilient, locally adapted seed varieties. In Northeast Nigeria, for example, the Feed the Future Rural Resilience Activity has supported decentralised seed production and market linkages, empowering farmer cooperatives and community seed enterprises to sustainably produce and distribute quality seed of varieties that meet local demand (Mercy Corps, 2024).

A core principle of this approach is leveraging financial and institutional resources to strengthen FCMSS. Mercy Corps' work highlights the importance of reinforcing local seed markets, ensuring that farmers, agro-dealers, and cooperatives in areas facing environmental, civil, social and economic uncertainties or crisis have the necessary support to produce, store, and market quality seed without dependence on external aid. By enhancing access to credit, financial services, and extension support, farmer-managed seed systems can transition from subsistence-level operations to structured community-based seed enterprises (e.g., LSBs), capable of supplying quality seed of locally adapted varieties at scale. Additionally, interventions focus on developing contractual agreements between seed producer groups and buyers including in outgrower schemes with seed companies, enabling community seed businesses to engage with formal seed markets while maintaining farmer control over seed diversity and accessibility.

Strengthening FCMSS is central for farmers and communities to be able to cope with conflict and climate change, and adapting to environmental shocks while maintaining seed security. In fragile contexts such as Northeast Nigeria, market-driven interventions have increased access to drought-tolerant, early-maturing,

and pest-resistant crop varieties, reducing vulnerability to climate change. Strengthening seed storage infrastructure, community seed banks, and farmer-led quality control systems further enhances seed availability and resilience in crisis-prone regions. By embedding FCMSS within market-oriented strategies, interventions ensure that seed production, conservation, and exchange networks remain robust and self-sustaining, ultimately securing long-term food security and economic stability for smallholder farmers (Mercy Corps, 2023; 2024).

2.6.4 Citizens science driving variety deployment

Triadic Comparison of Technologies (tricot) is an innovative, farmer-centred citizens science approach that has significant potential in deploying improved crop varieties to FCMSS across Africa. Tricot enables farmers to actively participate in varietal evaluation by cultivating and comparing a small set of randomly assigned varieties under real farming conditions. It engages large numbers of farmers across diverse agroecological zones generating valuable data for variety development on varietal performance, resilience, and farmer preferences. By integrating digital tools such as mobile-based data collection, tricot ensures that farmers' observations contribute not only to national and regional breeding programmes but also but also provide important information on variety performance and preference to seed companies and farmer seed producers organised in community-based seed systems, such as LSBs. This reinforces the position of FCMSS in the seed sector (De Sousa et al., 2024; Borman et al., 2025a).

Tricot further enhances FCMSS by providing a structured yet adaptable mechanism for integrating improved varieties and also local varieties from other areas into local seed networks. Once farmers identify high-performing and preferred varieties through tricot trials, these varieties can be integrated into FCMSS, including LSBs, for multiplication and broader distribution, including in remote or last mile rural areas. Tricot facilitates the movement of promising local varieties across different regions, ensuring that valuable varieties, that have been released but have not been delivered to farmers, can be introduced and tested by farmers. By fostering varietal selection, tricot strengthens farmers' decision-making power, enhances climate resilience through varietal diversification, and provides scalable, integrated solutions for linking formal breeding programmes with FCMSS. As the Nigerian government and agricultural research institutions increasingly prioritise integrated seed sector development and recognise FCMSS, tricot emerges as an efficient, scalable approach for ensuring that a diverse range of farmer-preferred and improved varieties reach those who need them most (De Sousa et al., 2024; Westengen et al., 2023; Borman et al., 2025a).

2.7 Seed enabling environment supporting FCMSS

The seed enabling environment encompasses the policies, laws, and regulations that govern the seed sector, shaping how farmers, private seed companies, government institutions, and community groups interact within the sector (De Boef and Thijssen, 2023). For FCMSS, the seed enabling environment plays a critical role by either facilitating or restricting access to quality seed of a diversity of crops of both farmer-preferred and improved varieties. These systems thrive on trust-based and informal structures, yet they often face challenges due to legal frameworks that prioritise commercial seed markets. Stringent regulations, such as distinctness, uniformity, and stability criteria for variety registration and strict certification standards for seed quality, tend to marginalise FCMSS. However, more flexible regulatory approaches in relation to registration of seed producers, farmers' variety registration, and decentralised quality assurance mechanisms, offer new pathways for integrating FCMSS within the national seed sector (Kuhlmann and Dey, 2021; Mastenbroek et al., 2021).

To foster an inclusive and supportive regulatory environment, policies must balance formal commercial seed systems with FCMSS. Government interventions can support less commercially attractive crops, crucial for food security and nutrition, but also with the potential to boost economic growth and employment at rural levels. These crops include small-grain cereals, pulses, root and tuber crops, and indigenous vegetables. Government may invest in variety development, EGS production, and decentralised quality assurance (see also the section on market archetypes). Farmers' variety registration initiatives, as seen in several African countries, create opportunities for the commercialisation of community-developed varieties, ensuring minimum quality standards while preserving genetic diversity (De Jonge et al., 2024). This recognition not

only strengthens FCMSS but also fosters collaboration among farmers, researchers, and private sector stakeholders to improve seed production and distribution at local and national levels.

At Africa level, the ASPB recognises that FCMSS face multiple challenges. These include limited policy support and insufficient integration with formal seed systems. During consultations within ASBP it is recommended to strengthen FCMSS through legal frameworks, participatory breeding, investment in local seed enterprises, and integration with formal seed sector initiatives. Another critical point is to recognise farmers' rights and knowledge in variety conservation and seed exchange, which is considered key to building resilient and sustainable seed systems across the continent (AU, 2021).

Recognising FCMSS as complementary to formal seed systems enhances agrobiodiversity management, food security and nutrition, seed security and sovereignty, and seed sector resilience. A well-designed seed policy and regulatory framework can further support FCMSS by promoting equitable benefit-sharing mechanisms and ensuring legal recognition of farmers' rights. By leveraging the strengths of both formal commercial seed systems and FCMSS, policy frameworks can create a resilient and inclusive seed sector that supports smallholder farmers while ensuring long-term agricultural sustainability (Kuhlmann and Dey, 2021; Thijssen et al., 2025).

3 Perspectives on the functions of FCMSS

3.1 Strengthening FCMSS for variety deployment

FCMSS are increasingly recognised as essential for ensuring accessible and affordable quality seed of both locally adapted and improved varieties for smallholder farmers. These systems bridge critical gaps left by formal seed markets, which often remain inaccessible to rural farmers due to the concentration of seed companies and regulatory agencies in urban centers. FCMSS play a vital role in ensuring the availability of crops that are not or less commercially viable for private seed companies, such as rice, sorghum, millet, cowpea, groundnut, root and tuber crops, and traditional vegetables. Rather than competing with formal seed systems, FCMSS complement them by filling voids where private investment is absent or constrained, ensuring that public breeding programmes have effective pathways to deploy improved varieties. Researchers and development organisations can further facilitate variety adoption through demonstration plots, farmer field schools, field days, and seed distribution programmes. They can do so in close collaboration with and strengthening of community-based organisations with an interest and potential becoming more professional in in seed production and supply, such as LSBs, allowing farmers to test and adopt, and gain access to quality seed of new varieties in sustainable manner.

Insights from FDGs, panel dialogues, and a multi-stakeholder workshop have reinforced an agreement on the importance of FCMSS in variety deployment. These systems provide reliable access to improved varieties, enhancing agricultural productivity while promoting climate adaptation through locally suitable crops. Experiences from Ethiopia and Uganda highlight how community seed schemes can transition into LSBs that are autonomous, market-driven, and technically equipped to meet local seed demand. These LSBs empower farmers by enabling them to produce, manage, and distribute seed of locally preferred varieties, fostering economic development, agricultural diversity, and improved nutrition at the community level.

An integrated seed sector development approach is essential for ensuring effective linkages between formal, farmer-, and community-managed seed systems, supported by appropriate quality assurance mechanisms. In Nigeria, the Licensed Seed Inspector (LSI) and self-compliance reporting model, the latter for seed companies as well as external service providers, as tested under the CSP, present opportunities to decentralise seed quality control. These decentralised models reduce the reliance on government inspectors and eliminate the need for a QDS system, which has been adopted in several East African countries. The accreditation model could further adapted to enhance seed quality management within community-based seed systems, such as LSBs, strengthening trust and reliability in the local seed sector.

However, strengthening FCMSS also requires legal and regulatory recognition for legitimacy and scalability. Instead of introducing new policies, optimising existing regulations to recognise community seed groups such as LSBs as legal entities would enhance sustainability, allowing them better access to technical training, market linkages, financial services, and seed certification. Affordability remains a key challenge, as high seed certification and seed producer registration costs often limit the participation of individual seed producers or their groups in formalised seed production. To address this, regulatory fees should be kept low, and investments in mapping existing community seed schemes should be prioritised. This mapping will help optimise seed system interventions, secure funding, and facilitate access to complementary inputs such as fertilisers and mechanisation.

3.2 Strengthening FCMSS for agrobiodiversity management

Historically, farmers have played a pivotal role in domesticating and maintaining a wide diversity of varieties of many crops. However, traditional conservation practices often lack security, putting many of these varieties at risk of being lost due to insufficient propagation knowledge, environmental disasters, climate variability, and uncertain civil, social and economic conditions. This highlights the need to establish CSBs to safeguard genetic diversity and ensure that germplasm and landraces are continued in their use and retain their adaptive value.

During FDGs, panel dialogues, and a multi-stakeholder workshop, we explored the role of FCMSS in conserving and utilising agrobiodiversity while identifying strategies for strengthening these systems. In Nigeria, FCMSS are deeply rooted in social capital, with structures built on local trust networks, traditional leadership, and cooperative-based seed trading. These systems play a critical role in genetic resource conservation, ensuring that local crop varieties are preserved, adapted, and multiplied across different agroecological zones.

CSBs can serve as essential repositories for traditional varieties but currently they are few, and those that operate do so independently from the national genetic conservation framework. Strengthening agrobiodiversity management requires integrating CSBs with NACGRAB to facilitate seed collection, cleaning, storage, and controlled sharing mechanisms, and include back-up and duplication mechanisms. Collaboration with research institutes and genebanks would further enhance variety reintroduction efforts that contribute to climate adaptation.

Efforts to reintroduce local varieties and indigenous crops from national genebanks to farmers' fields have already yielded promising results, as demonstrated by NACGRAB's successful reintroduction of climate-resilient sorghum and cowpea varieties. Expanding this initiative through FCMSS and for example LSBs, could establish a sustainable, revenue-generating system for preserving genetic diversity while ensuring that regionally adapted varieties remain accessible to farming communities.

Many local varieties exhibit exceptional climate resilience, enabling them to withstand climatic shocks in specific agro-ecologies. Conserving these varieties and promoting their continued through FCMSS structures, thus through CBM, ensures the conservation of scarce and diverse genetic resources. However, systematic trait evaluation and field testing are essential before incorporating these varieties into genebanks and breeding programmes. Breeders play a key role in this process by integrating climate-resilient traits into their breeding goals, utilising locally adapted genetic materials as a foundation.

Local market platforms facilitate seed exchange and commercialisation, further strengthening FCMSS. Research and mapping are essential to document FCMSS, assess the demand for underutilised crops such as fluted pumpkin and pigeon pea, and develop improved seed management strategies. Strengthening collaborations between FCMSS and formal seed systems will contribute to a resilient, farmer-driven seed sector, ensuring Nigeria's long-term agricultural biodiversity conservation.

3.3 Enhancing the resilience of seed systems

The persistence of emergency seed aid beyond five years underscores the urgent need for national authorities to shift toward sustainable, community- and market-based seed interventions. When emergency seed distributions become the norm, they can inadvertently weaken FCMSS by reducing farmers' incentives to save, exchange, or purchase seed through traditional and community channels. This prolonged reliance on external seed aid erodes seed sovereignty, disrupts informal and commercial seed markets, and often results in the distribution of varieties poorly adapted to local agroecological conditions. Rather than perpetuating emergency responses, governments should strategically transition humanitarian interventions toward strengthening FCMSS, ensuring that local seed networks and markets remain resilient, self-sustaining, and functional even during crises and uncertainty.

A community- and market-based approach to seed system development shifts the focus from short-term relief to long-term resilience by investing in local seed production, LSBs, decentralised quality assurance mechanisms, and stronger linkages between FCMSS and formal seed systems. This strategy supports CSBs, LSBs, informal seed markets and networks to produce and distribute quality seed of locally preferred and climate-resilient varieties. Such interventions not only enhance seed security and genetic diversity but also create economic opportunities for smallholder farmers, reducing reliance on external seed aid. Governments, in collaboration with humanitarian agencies, should integrate seed aid within local markets, ensuring that farmers receive vouchers or cash transfers that allow them to purchase quality seed of adapted varieties from seed companies, LSBs, local producers and traders rather than relying on free distributions that disrupt market stability.

Ultimately, transitioning from repetitive seed aid to localised, farmer-driven seed interventions strengthens the long-term sustainability of national food systems. This shift fosters local ownership, seed sovereignty, and economic empowerment, while enhancing resilience to climatic, socio-economic, and civil shocks. Moreover, this transformation aligns with broader agricultural policies that support pluralistic seed systems, where formal, commercial, and FCMSS frameworks coexist, providing farmers with a diversity of quality seed options for both farmer-preferred and improved varieties across a wide range of crops. By instructing humanitarian and development agencies, as well as government-backed institutional market schemes, to prioritise market-driven and community-centred solutions, policymakers can ensure that seed security evolves from an emergency response into a long-term seed sector development approach, supporting agricultural sustainability, food security, nutrition, and rural economic growth (Mercy Corps, 2024).

4 Current initiatives strengthening FCMSS in Nigeria

4.1 Increased policy focus on FCMSS

By enhancing farmers' access to quality seed of farmer-preferred, locally adapted, and improved varieties, FCMSS are increasingly recognised in Nigeria for their pivotal role in agrobiodiversity management and local seed security. Strengthening them will contribute to increasing agricultural productivity. Appreciating their importance, the Nigerian government has prioritised FCMSS within its national agricultural agenda. At the policy level, the Federal Ministry of Agriculture and Food Security (FMAFS) is actively working to enhance seed availability for smallholder farmers, focusing on both locally adapted and improved crop varieties across multiple regions. In addition to boosting agricultural productivity, these efforts help farmers cope with climate variability, pests, and diseases, while also addressing civil, social, and economic uncertainties.

By investing in decentralised seed production and distribution systems, including decentralised quality assurance, the government complements private sector investments, which primarily focus on commercial crops such as maize. This complementary approach strengthens sustainable livelihoods for smallholder farmers amid social, economic, and environmental uncertainties.

Additionally, Nigeria became a contracting party to the International Treaty on Plant Genetic Resources for Food and Agriculture (IT-PGRFA) in 2022, thereby reaffirming its commitment to the conservation and sustainable use of plant genetic resources, the recognition of farmers' rights. This step contributes to a more enabling policy environment that supports farmer- and community-managed seed systems and strengthens national efforts in agrobiodiversity management and seed system resilience.

4.2 Type of organisations involved and crops addressed

Various initiatives focussing on CSBs and community-based seed production, often collaborate with genebanks, research institutes, and NGOs. These efforts prioritise a diverse range of nutritionally and culturally important crops, including root and tuber staples such as cassava, yam, and sweet potato; legumes like cowpea and groundnut; cereals including rice, sorghum, and millets; and traditional African vegetables such as amaranth, okra, fluted pumpkin, and jute mallow. These crops, while essential for food security, nutrition, and rural livelihoods, often receive limited attention from commercial private seed companies due to the lower profitability of the seed crop.

4.3 Initiatives supporting agrobiodiversity management

CBSs in Nigeria serve as potential hubs for variety conservation, exchange, and accessibility, ensuring that farmers maintain access to a diverse range of locally adapted varieties. Managed by farmer groups and local organisations, CSBs have the potential to play a critical role in preserving genetic diversity, enhancing climate resilience, and strengthening local food systems. The National Centre for Genetic Resources and Biotechnology (NACGRAB), in partnership with the Crop Trust, has led initiatives conserving over 11,000 accessions, including vital sorghum, cowpea, and root and tuber crop varieties. By reintroducing climate-resilient varieties from the national genebank to farmers in Oyo, Niger, and Kano states, NACGRAB supports smallholder adaptation to climate change while improving crop productivity (Crop Trust, 2024). Another example is the Biodiversity Education and Resource Centre (BERC), based in Abuja, that is actively involved in conservation actions and promoting the use indigenous crop diversity. It supports the Seed Bank of the Sheda Community, which functions as a repository of traditional crop varieties, ensuring farmers can access seed of resilient, locally preferred varieties. By fostering at community level conservation of local diversity, exchange networks, and farmer empowerment, CSBs can contribute significantly to agrobiodiversity management, adaptation strategies, and sustainable agricultural development across Nigeria.

4.4 Initiatives supporting variety deployment

Community seed schemes serve as a critical link between farmer-managed seed systems and formal certified seed markets, facilitating the production and distribution of quality seed of improved varieties. Supported by organisations such as the National Agricultural Seeds Council (NASC), IITA, and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), over 700 farmer groups across Nigeria are engaged in these schemes. They contribute to certified seed supply of key crops, including rice, groundnut, millet, and cassava (Takeshima et al., 2025). These schemes have been instrumental in increasing both the availability and adoption of improved varieties. For example, in northern Nigeria, partnerships with organisations such as Oxfam Nigeria and ICRISAT have enabled farmers to benefit from improved sorghum, millet, and groundnut varieties.

In northeastern Nigeria, IITA and NASC have supported over 2,250 community-based seed entrepreneurs, training them in seed multiplication techniques for crops such as rice, cowpea, maize, and sorghum. These efforts ensure consistent access to quality seed of improved varieties of those grain crops to smallholder farmers. Meanwhile, in southwestern Nigeria, Agro Business Cities in Ondo State trained farmers in cassava, yam, and vegetable seed production, promoting youth engagement in agriculture and expanding regional seed availability.

The Building an Economically Sustainable, Integrated Cassava Seed System (BASICS) project, led by IITA in collaboration with Catholic Relief Services (CRS) and Sahel Consulting, has significantly advanced community-based cassava seed production and marketing in Nigeria. Operating between 2016 and 2020, BASICS engaged over 150 community-based seed entrepreneurs in states such as Benue, Abia, Akwa Ibom, Cross River, and Imo. These entrepreneurs were trained to produce and sell certified cassava stems, ensuring farmers had reliable access to improved varieties. The initiative not only enhanced cassava productivity but also generated economic opportunities, contributing to the development of a self-sustaining cassava seed system in Nigeria.

The Sasakawa Africa Association (SAA) has played a pivotal role in strengthening community-managed seed systems across Nigeria, Ethiopia, and Mali. In Ethiopia, SAA has implemented farmer-led seed production programmes, integrating community seed multiplication groups with national seed certification systems. This approach has enabled smallholder farmers to participate in the formal seed sector while maintaining local seed availability. Similarly, in Mali, SAA introduced a community-based seed multiplication model, which actively involves farmers in multiplying, storing, and distributing quality seed for staple crops. This model has been integrated into agricultural extension training programmes, ensuring long-term capacity building for future farmers. In Nigeria, SAA has prioritised training community-based facilitators to serve as extension agents, bridging formal seed companies and smallholder farmers through farmer-to-farmer seed networks. These initiatives have enhanced seed adoption and access to climate-resilient varieties, increasing smallholder farmers' ability to adapt to changing environmental conditions. Additionally, SAA supports Nigerian seed entrepreneurs, facilitates community seed multiplication, and strengthens market linkages, contributing to the development of a sustainable local seed economy.

Nigeria's diverse agricultural landscape necessitates a broad-based approach to seed sector development, incorporating a wide range of crops. From cereals and legumes to root and tuber crops and African traditional vegetables, the country's seed systems must cater to regional variations in climate, soil, and farming practices. Collaborative efforts between national and international research institutions, state governments, NGOs, and local communities are essential in strengthening FCMSS for unveiling their potential contribution to food security and nutrition, climate change adaptation and resilience, and preserving Nigeria's agricultural biodiversity.

Empowering farmers to produce and manage their own seed while professionalising entrepreneurial community-managed seed systems through technical training and structured market integration emerges as a key strategy within the larger context of Nigeria's government effort to support FCMSS. By equipping farmers with technical expertise, quality assurance systems, and business development skills, these initiatives contribute to sustainable, resilient, and inclusive seed systems, ensuring long-term benefits for smallholder farmers, rural economies, and national food security.

5 Key challenges in strengthening FCMSS

Dialogues and discussions during the various events organised in the FCMSS Nigeria Dialogues project identified the following key challenges to be addressed for strengthening FCMSS. They are elaborated in the subsequent sections.

5.1 Delays and limitations in policy implementation

Although FCMSS are formally recognised in Nigeria's National Seed Policy and have gained attention at the Federal Government level, strengthening them and considering them as critical components of the seed sector remains slow and inconsistent. Policy commitments have yet to be translated into concrete institutional support, adaptation and refinement of regulatory frameworks, and investment in farmer- and community-managed seed schemes. Bureaucratic delays, fragmented institutional mandates, and limited financial resources hinder the establishment of decentralised seed production models, participatory breeding programmes, and formal recognition of community seed groups and enterprises (such as LSBs). Without targeted policy interventions and effective enforcement mechanisms, FCMSS will struggle to integrate into the broader seed sector, limiting their potential impact. Strengthening multi-stakeholder collaboration, improving regulatory clarity, and ensuring that national and state-level policies align with FCMSS objectives is crucial for accelerating progress.

5.2 Deficiency in sustainability and business-oriented approaches

A major challenge for FCMSS is their long-term sustainability, as many interventions strengthening them incorporate them within a developmental structure, for example increasing seed security or fostering farmers adoption of varieties rather than targeting their commercial viability and sustainability. Donor-driven projects often provide short-term support without establishing sustainable business models, leading to disruptions in seed production when funding ends. Farmer- and community seed enterprises require structured economic incentives, financial literacy, and business development support to transition from subsistence seed saving to entrepreneurial seed production. Without market-oriented approaches, many community-led seed initiatives risk fading out once external funding is withdrawn. Developing LSBs, facilitating access to finance and credit, and enhancing market linkages between formal and informal seed actors will ensure that FCMSS can thrive beyond donor support.

5.3 Capacity gaps and limited stakeholder connections

Traditional and local seed-saving practices remain vital for farmer-led conservation and farmer seed management practices, but many lack capacities on and alignment with seed quality standards, and the use of innovative seed management practices including for storage. Most capacity-building programmes focus solely on farmers' seed use and improved variety adoption, overlooking other critical stakeholders in the seed value chain, including research institutes, agro-dealers, extension officers, seed producers and their groups, and LSBs. The absence of comprehensive training programmes weakens the ability of individual and groups of farmers within FCMSS to manage seed multiplication, post-harvest handling, quality assurance, storage, and marketing. Expanding participatory breeding programmes, decentralised extension models, and farmer field schools can help bridge knowledge gaps and equip farmers and seed producers with improved seed management skills.

5.4 Inadequate storage and seed loss

A critical weakness in FCMSS is the lack of proper storage facilities, leading to declining seed quality and high post-harvest seed losses. Many CSBs, farmer seed producers and their groups operate without temperature-controlled storage, seed treatment facilities, or effective pest management practices. As seeds are living materials, their viability declines under poor storage conditions, leading to lower germination rates, increased vulnerability to diseases and pests, and eventually reduced farmer confidence in local seed sources. Addressing storage constraints requires investment in FCMSS-based storage infrastructure, access to affordable hermetic storage technologies, and the development of regional seed hubs that enhance seed longevity and seed quality preservation.

5.5 Weak integration between formal seed systems and FCMSS

Despite their complementary roles, formal seed systems and FCMSS operate in silos, creating inefficiencies and value chain distortions. A lack of collaboration and alignment between public breeding institutes, private seed companies, regulatory bodies, and farmer-led seed initiatives results in gaps in EGS supply, limited access to improved varieties, and limitations in the release of a wide portfolio of varieties, and untapped networks for the distribution and marketing of quality seed. Linkages between research institutes and FCMSS continue to the driven by a push for variety adoption, not necessarily creating sustainable linkages. Tricot rather informs variety development with farmers' preferences, but is not yet embraced as a model to deploy at large scale varieties into FCMSS. Weak regulatory integration means that FCMSS remain largely informal, preventing them from accessing official quality assurance mechanisms, market infrastructure, EGS and improved varieties, and also financial products. Strengthening linkages between formal seed actors, farmer seed producers, and regulatory bodies will ensure that quality seed production and distribution are streamlined across multiple seed systems.

5.6 Seed aid and institutional interventions undermining local seed markets

Prolonged seed aid programmes and large-scale institutional market schemes often undermine FCMSS by distorting local seed markets, discouraging FCMSS, and reducing incentives for farmer seed producers and groups (e.g., LSBs). When free or subsidised seed is repeatedly distributed over multiple seasons, smallholder farmers may deprioritise their own seed saving and seed production efforts, leading to dependency on external interventions rather than fostering self-sustaining seed systems. Additionally, large-scale institutional seed procurement, such as government distribution programmes, frequently prioritise bulk purchases from formal seed companies, excluding small-scale, community-based seed producers from market access.

This imbalance limits economic opportunities for local seed producers and LSBs, restricting their ability to scale up quality seed production, invest in improved storage, or expand seed distribution networks. To mitigate these risks, policies should focus on integrating LSBs into institutional procurement programmes, ensuring that they benefit from structured market opportunities rather than being displaced by short-term, externally driven interventions. Shifting from direct seed aid to voucher-based or market-responsive approaches recognising both commercial and community-based seed actors can enhance seed sovereignty, resilience, and the economic viability of FCMSS while reducing long-term dependency on external assistance.

5.7 Additional challenges

Beyond these core challenges, limited access to finance, seed quality assurance focusing on commercial seed systems, and restricted participation of women and youth in seed entrepreneurship further limit the development of FCMSS. Addressing these barriers requires a multi-faceted approach that integrates policy reforms, market incentives, research collaboration, and community and farmer-led innovation, ensuring that FCMSS achieve their full potential.

6 Proposed new SIPs targeting FCMSS

Based on the SIP on Community-based seed production, which is part of the Nigeria's National Seed Road Map (NASC and SEEDAN, 2020; see also Appendix 1), and incorporating the insights gained from the various dialogues, three new SIPs have been developed:

- Promoting LSB development
- Strengthening FCMSS for conservation and use of agrobiodiversity and
- Strengthening FCMSS for building resilience.

The structure of the SIPs are similar to the SIPs elaborated in the NSRM. Each SIP takes an integrated approach, capturing piloting innovations and capacity development within FCMSS while also strengthening the associated organisations and addressing policy and regulatory challenges.

It should be noted that the current SIPs are a first draft, and unlike the SIPs part of the NSRM published in 2020, the three proposed SIPs have not yet been reviewed by a national and international experts. They still need to be further elaborated and refined. The FCMSS Nigeria Dialogues project did not allow further investment in such a review process.

6.1 Promoting LSB development

Ambition	A nationwide network of LSBs operates across key agricultural production areas, ensuring increased availability of quality seed for major cereals (excluding maize), legumes (cowpea, groundnut), rice, sorghum, millets, root and tuber crops (yam, cassava, sweet potato, plantain), and traditional African vegetables. These LSBs play a critical role in strengthening farmers' access to quality seed, contributing to food security, climate adaptation, and resilient agricultural systems. LSBs have evolved into structured, market-oriented, and institutionally recognised enterprises, serving as legitimate and sustainable actors in seed production and marketing. They maintain formal linkages with public research institutions for access to new varieties, EGS, and innovative agricultural technologies. Additionally, LSBs are integrated into decentralised seed quality assurance systems, collaborating with NASC and financial institutions to enhance business viability, access to credit, and long-term sustainability. Their strong connections with local and regional markets further ensures that quality seed reaches farmers efficiently, reinforcing an inclusive and diversified seed sector.
Challenges	• Deficiency in sustainability and business-oriented approaches • Capacity gaps and limited stakeholder connections • Inadequate storage and seed loss • Weak integration between formal seed systems and FCMSS • Seed aid and institutional interventions undermining local seed markets
Strategic innovation pathway	1. To enhance the sustainability and impact of LSBs, it is essential to assess ongoing initiatives and partnerships that support farmer- and community-managed seed production and marketing. This includes mapping the roles of research institutions, conservation programmes, NGOs, and private sector actors engaged with farmer groups. Establishing a coordinated network among these stakeholders will facilitate stronger connections with variety development programmes, seed quality assurance bodies, and financial institutions. Additionally, an assessment of legal and regulatory requirements, financial services accessibility, and farmer demand for quality seed will inform targeted interventions. 2. A pilot initiative across six states in diverse agro-ecological zones will focus on transforming farmer groups into structured, autonomous, and sustainable LSBs. Drawing from successful models in Ethiopia and Uganda, this approach will strengthen technical, organisational, and business capacities to ensure long-term viability. 3. At scale, stronger linkages between LSBs and research, quality assurance, and financial institutions will be fostered. Technical and business-focused capacity building, including entrepreneur coaching, business-to-business facilitation, and financial incentives, will further enhance LSB sustainability. Engaging citizen science approaches will support farmer-driven variety selection while demonstrating the value of quality seed through field trials, demonstrations, and farmer-led promotion efforts. 4. A robust monitoring and learning framework will track progress, extract key lessons, and guide scaling strategies. 5. To institutionalise LSB support, efforts will focus on establishing a dedicated association or subchapter within an existing seed industry body, such as SEEDAN. This association will provide commercially viable services that sustain and expand LSB operations, ensuring ongoing technical and market support for local seed entrepreneurs.
Stakeholders	FMAFS, research institutes (IITA, ICRISAT, CIP, various national research institutes), NGOs with a strong profile in FCMSS and potential in LSB development (e.g., SAA, Oxfam, CRS, Mercy Corps), State Government agencies supporting at local level seed sector development, seed regulatory bodies (NASC, NACGRAB).

Proposed five-year horizon	A network of autonomous and commercially viable LSBs has been established in six pilot states, with expansion underway. These LSBs maintain structural linkages with research institutes, ensuring access to new varieties and EGS, and collaborate with NASC for decentralised seed quality assurance. LSBs engage commercial stakeholders in the production and marketing of quality seed, supporting variety dissemination. Through citizen science, they facilitate farmer adoption of preferred and improved varieties, including in remote areas. Operating within a clear legal and regulatory framework, these LSBs gain access to technical support, market services, and financial opportunities. They are formally organised within a dedicated association or as a SEEDAN subchapter, reinforcing their institutional presence and long-term sustainability.
Proposed ten-year horizon	The use of quality seed from farmer-preferred and improved varieties produced by LSBs and other local seed enterprises has significantly increased. The adoption of new and improved varieties within the PPP and public market archetypes has expanded, ensuring a sustainable flow of quality seed across all relevant agricultural areas and states. LSBs have formed commercial and sustainable networks, leveraging economies of scale and association to enhance seed production and market access. As a critical part of the national seed sector, they maintain structural linkages with research institutes for variety access, NASC for quality assurance, financial institutions, and service providers offering technical and business development support. Through citizen science, LSBs actively deploy and promote improved varieties, extending seed access to farmers in remote areas. They are formally organised as a SEEDAN subchapter or within a new association, facilitating strategic stakeholder engagement and commercial service provision, ensuring business sustainability and sector-wide integration.

6.2 Strengthening FCMSS for conservation and use of agrobiodiversity

Ambition	A robust network of farmers, organised in diverse community groups, operates across Nigeria, ensuring the conservation and continued use of locally adapted crop varieties through FCMSS. These systems play a critical role in safeguarding Nigeria's agricultural heritage, particularly for traditional food crops and underutilised species. Through CBM practices, these farmer groups, structured as CSBs and other locally driven conservation entities, conserve, multiply, and reintroduce genetic resources while ensuring their continued use by smallholder farmers. These community-driven seed systems have evolved into structured, institutionally recognised conservation and seed production networks, directly linked with NACGRAB, national genebanks, and research institutes. These partnerships facilitate systematic seed collection, storage, and breeding efforts for climate adaptation, ensuring that regionally adapted seed stocks remain viable and accessible. Through citizen science initiatives, CSBs and local organisations actively expand farmers' access to traditional varieties, even beyond their original cultivation areas. These farmer-led seed networks engage with LSBs, market actors, and community stakeholders, creating economic opportunities, strengthening farmer participation in conservation, and ensuring the long-term sustainability of agrobiodiversity management. By embedding FCMSS within national seed policies and market-driven approaches, Nigeria can secure food sovereignty, resilience, and rural development through locally driven seed conservation efforts.
Challenges	• Deficiency in sustainability and business-oriented approaches • Capacity gaps and limited stakeholder connections • Inadequate storage and seed loss • Weak integration between formal seed systems and FCMSS • Seed aid and institutional interventions undermining local seed markets
Strategic innovation pathway	1. Conduct a comprehensive assessment of ongoing efforts supporting agrobiodiversity management and seed system development. This includes identifying key stakeholders across research institutes, conservation bodies, NGOs, and the private sector that work with farmer groups. It should also include an assessment of the role of local traders operating in the informal markets. Moreover, it should address the role gender, generations and specific social and cultural groups in agrobiodiversity management and seed systems. The assessment will also evaluate legal and regulatory requirements for CSBs, access to tailored support services, and challenges faced by farmer-led conservation initiatives. 2. Implement pilot programmes in six states, applying CBM best practices from both Nigeria and international experiences. These pilots will focus on taking an inclusive approach to strengthening technical, organisational, and business skills to ensure that CSBs and other conservation groups evolve into independent, autonomous, and sustainable entities. 3. Strengthen structural connections between CSBs, genebanks, and research institutions. Activities will integrate citizen science approaches to enhance farmer-driven variety selection, promote policy engagement on seed quality assurance and the recognition of farmers' varieties, and advance strategies for conserving and utilising agrobiodiversity at scale. 4. Establish a robust monitoring framework to track pilot outcomes, measure impacts, and generate insights for scaling successful, inclusive and sustainable models. Facilitating knowledge exchange among stakeholders and farmer organisations will ensure continuous learning and adaptation. 5. Develop a network of CSBs and agrobiodiversity management groups, formally associated with NACGRAB, to enhance institutional recognition and service provision. A specific unit will function as a central support structure, offering technical guidance, policy advocacy, and financial sustainability mechanisms to ensure the long-term success of grassroots conservation efforts.

Stakeholders	FMAFS and the Federal Ministry of Innovation, Science, and Technology (FMIST), NACGRAB and other genebanks and genetic resource conservation organisations, research institutes (IITA, ICRISAT, CIP, various national research institutes), national and local NGOs with a strong profile in FCMSS and agrobiodiversity management, and potential in applying CBM practices (e.g. Biodiversity Education and Resource Centre-Abuja; Organization for Positive Sustainability Culture in Nigeria - Cross Rivers State; Global Initiative for Food Security and Ecosystem Preservation (GIFSEP) – Abuja; New Foundation Abakaliki-Ebonyi State; Lifebuilders Nigeria, Oyo State) and Nigerian branches of international NGOS (e.g., Oxfam, Sasakawa Africa Association, CRS and Mercy Corps), State Government agencies supporting at local level seed sector development, seed regulatory bodies (NASC)
Proposed five-year horizon	A network of farmer-led and inclusive community groups across Nigeria ensures the conservation and use of locally adapted crop varieties through FCMSS. These systems safeguard traditional food crops and underutilised species, preserving genetic resources through CBM practices. CSBs and other conservation entities multiply and reintroduce varieties, maintaining their use by smallholder farmers considering also gender, generations and specific social groups. CSBs and related initiatives are institutionally recognised and linked with NACGRAB, genebanks, conservation groups, and research institutes. They engage in conservation activities, applying CBM practices and citizen science approaches to enhance farmer-led crop diversity utilisation. Policy and regulatory barriers have been addressed, ensuring formal recognition of farmers' varieties. CSBs now have legal status, securing their access to essential services. These entities are organised within a national association, integrated into Nigeria's framework for the conservation and sustainable use of plant genetic resources.
Proposed ten-year horizon	The on-farm and in situ conservation and use of plant genetic resources is driven by CSBs and other grassroots organisations engaged in CBM. These entities actively conserve and utilise genetic diversity, applying various CBM practices, including citizen science, to enhance farmers' access to and use of diverse local varieties. Over time, these organisations cover a diversity of groups considering gender, generation, culture and different social groups, they have formed sustainable networks, benefiting from collective scale and association while establishing strong linkages with NACGRAB and other conservation bodies. As a critical component of the national seed sector, they contribute to the framework for genetic resource conservation, maintaining structural partnerships with genebanks, research institutes, and other key stakeholders. These organisations are formally recognised and are integrated into a specific national association dedicated to the conservation and sustainable use of plant genetic resources, ensuring their long-term viability and institutional support.

6.3 Strengthening FCMSS for building resilience

Ambition	A transition from prolonged emergency seed aid to sustainable, community- and market-driven seed systems ensures that local seed networks remain resilient, self-sustaining, and functional, even during crises. No longer free seed distributions weaken FCMSS by discouraging traditional seed-saving, exchange, and market engagement, leading to seed sovereignty loss and market disruptions. Strengthening FCMSS enhance seed security, agrobiodiversity management, and climate resilience while reducing dependence on seed aid. Investing in LSBs, CSBs, other community based approaches and their linkages to other seed sector stakeholder shifts the focus in seed aid from short-term relief to building long-term resilience. Strengthening local seed production, seed markets, and formal-FCMSS linkages ensures farmers access quality seed of locally preferred and climate-resilient varieties through market-based interventions such as seed vouchers and structured procurement schemes. This shift aligns with pluralistic seed sector policies, integrating formal, commercial, and community-based seed systems to provide farmers with diverse, quality seed options. Prioritising market-driven and community-centred solutions secures seed security as a pillar of agricultural sustainability, food security, and rural economic growth, ensuring resilience to climatic, socio-economic, and civil shocks.
Challenges	• Deficiency in sustainability and business-oriented approaches • Capacity gaps and limited stakeholder connections • Inadequate storage and seed loss • Weak integration between formal seed systems and FCMSS • Seed aid and institutional interventions undermining local seed markets
Strategic innovation pathway	1. Assess current humanitarian and development organisations, and partners engaged in seed aid and institutional seed markets; link with responsible federal and state level government agencies responsible; develop a network of these stakeholders; link with other seed sector organisations. 2. Assess their strategies and activities in seed aid, institutional markets, strengthening resilience of seed systems and policy frameworks guiding them; engage with them in developing models that strengthen FCMSS building resilience; engage with them developing policy guidance (based on 10P for good seed aid); and consolidate a joint framework for piloting innovations in enhancing resilience of seed systems, transforming seed aid and institutional markets; and building a network of partners with a diversity of relevant organisations in the government, humanitarian and development organisations, and private sector. 3. Pilot in at least six states in different agro-ecologies how programmes for seed aid and institutional markets can transition to good practices in seed procurement, production and supply and distribution, and supporting FCMSS and enhancing resilience of seed systems; learn lessons from the transition in the pilot programmes, and transform lessons in consolidating the guidelines and practices; 4. Foster, strengthen and scale good practices, and consolidate the tested guidelines in an overarching policy framework guiding seed aid and institutional markets, with clear responsibilities and institutional mandates for oversight, guidance and enforcement.
Stakeholders	FMAFS, Federal Ministry of Humanitarian Affairs, seed regulatory bodies (NASC), State Government agencies providing seed aid and supporting input (including seed) supply, international and national organisations engaged in humanitarian and development work including seed aid and strengthening resilience of seed systems, SEEDAN including seed companies and newly established network of LSBs and CSBs.
Proposed five-year horizon	A diversity of organisations engaged in seed aid and institutional markets in the six pilot states have transitioned to good practices for seed aid and institutional markets, and target enhancing resilience of seed systems including strengthening FCMSS, and initial scaling into other states has started. The tested guidelines have been institutionalised with recommendations on how to institutionalise and consolidate them.

Proposed ten-year horizon	Good practices and guidelines for seed aid and institutional markets have been incorporated in a national policy framework that guides government, humanitarian and development organisations, and private sector. Stakeholders nation-wide have transitioned to good practices, and a clear institutional and policy framework with clear institutional mandates for guidance, monitoring and enforcement is functional. As a result resilience of seed systems is a common goal, while seed aid and institutional market interventions follow good practices and contribute to building resilience of seed systems.

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Appendix 1 NSRM SIP Community-based seed production

The following overview presents the strategic innovation pathway being part of the national seed road map, published by NASC and SEEDAN in 2020.

Ambition	Strengthened community-based seed production (CBSP) schemes and local seed entrepreneurs contribute to the increased availability of quality seed of major cereals (except maize), legumes, small grains and RTBs, accessible to farmers; they have evolved into business-oriented, legitimate, legal, institutionally supported and organised, trustworthy and sustainable stakeholders in the production and marketing of quality seed of improved varieties (*production systems; market development*); CBSP schemes and local seed entrepreneurs have structural linkages with public research organisations for access to new improved varieties, EGS and other technologies; they are also linked to the NASC, using decentralised modalities for seed quality assurance and with financial organisations, enhancing their business orientation, available financial resources and sustainability (*service provision*).
Challenge	The fact that quality seed of new improved varieties for major cereals (except maize), legumes, small grains and RTBs is not readily available to farmers limits variety replacement and opportunities to increase productivity for those crops. Moreover, farmers do not get the chance to compare improved varieties in fields similar to their own; they are hesitant to risk trying them. The low profitability of seed business for those crops limits the investment from seed companies in their production, promotion and marketing, unless triggered by institutional markets or by a strong demand from value chain actors like aggregators and processors. Variety development is the responsibility of public research organisations. CBSP schemes and local seed entrepreneurs depend on structural linkages with public organisations engaged in variety development and seed quality assurance; currently, such linkages are project dependent. They often operate without a legal and regulatory status, which further jeopardises their linkages and operations, as well as restricts their access to financial products and services to further develop as a business and ensure their sustainability.
Strategic innovation pathway	1. Assess current CBSP, local and informal seed production systems for linkages with organisations engaged in variety development and seed quality assurance; assess the legal and regulatory requirements for seed producers and entrepreneurs; assess their access to and availability of tailored financial products and services; assess farmers' willingness to pay for quality seed produced and marketed for those crops. 2. Explore and pilot mechanisms within major value chain development programmes to strengthen at scale the linkages between seed entrepreneurs and research, seed quality assurance, and financial organisations; engage in technical and business-focused capacity development, such as in the coaching of entrepreneurs, business-to-business facilitation, and financial incentivisation; combine these mechanisms with activities among farmers and their organisations to demonstrate the value proposition, and promote the use, of quality seed of improved varieties. 3. Monitor the progress and impact of pilots, facilitate learning lessons, and foster scaling. 4. Bring together local seed entrepreneurs and CBSP organisations in a new association or subchapter of an existing association (e.g. SEEDAN), which hosts a unit that provides services in a commercial and thereby sustainable manner.

Stakeholders	• Community-based seed producers, local seed entrepreneurs and their associations • NARIs, universities and CGIAR Centers • NASC, SEEDAN and/or farmers' associations • Value chain development programmes, including CBSP and local seed entrepreneurship components.
Catalyst	Consulting company or NGO with knowledge of the seed sector, including a strong business profile and understanding of informal markets.
Policy reference	Article 39 of the NASC Act (2019) defines that seed from the informal sector of registered varieties, if commercialised, is subject to quality control procedures; and article 15 supports decentralised (third party) seed quality assurance. The NASC strategy (2020-2024) aims to register and issue licenses to community-based seed entrepreneurs to produce quality seed, and outlines that the NASC engages in local entrepreneur training.
Proposed five-year horizon	Seed producers engaged in CBSP and local seed entrepreneurs have stronger and more structural linkages with research organisations for accessing new varieties and EGS. These seed producers and entrepreneurs have a clear legal and regulatory status, which ensures their access to various services and creates opportunities for accessing tailored finance. They are organised in a specific association or subchapter of an existing association that hosts the service provision unit. Decentralised seed quality assurance is well-functioning and financially viable.
Proposed ten-year horizon	The use of quality seed of improved varieties for the crops produced and marketed by farmers engaged in CBSP, and by local seed entrepreneurs, has increased significantly. These entrepreneurs have coalesced into commercial and sustainable networks to enjoy the benefits of scale and association. They are a critical part of the seed sector and have structural linkages with research, seed quality assurance and financial organisations. They are organised in a subchapter of an existing or new association, which facilitates their linkages with critical stakeholders, and provides commercial services in business development.
Illustrative examples	• BASICS established and supported a network of geographically distributed, village seed entrepreneurs (or CBSPs) who produce and sell certified stems of market-preferred improved cassava varieties (RTBCGIAR, 2020; Link). • Both ISSD Ethiopia and ISSD Uganda (Link) have been successful in establishing local seed business, and supporting their linkages with research and quality assurance organisations on a structural basis.

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The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 7,700 employees (7,000 fte), 2,500 PhD and EngD candidates, 13,100 students and over 150,000 participants to WUR's Life Long Learning, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.