SEED SYSTEM SECURITY ASSESSMENT

OXFAM Novib

NINGI AND SHIRA LOCAL GOVERNMENT AREA, BAUCHI STATE, NIGERIA

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ICRISAT
INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS

seed system

ACKNOWLEDGEMENTS

This paper was written by: Connie Formson (Oxfam Novib), Jerome Jonah (ICRISAT in Nigeria), Mohammed Jada (Oxfam in Nigeria), Louise Sperling (SeedSystem) and Sagir Hanafi (NAGRAB)

The authors extend their sincere gratitude to the Bauchi State Agricultural Development Program (BSADP) and the National Agricultural Seed Council (NASC) for their commitment to this Seed Systems Security Assessment. We particularly acknowledge the collaboration of Iliyasu Shu'aibu (Director of Extension Services, Bauchi State) and Mohammed Ahmad Ya'u (Bauchi State Certification Officer, NASC). We also acknowledge the invaluable support of Peter Shapland, Henry Ushie, Yetunde Adeyoola, Cedric Owuru, Madalla Dauda and Abdullahi Isa Mohammed. In addition, this report would not have been possible without the dedication of the enumerators who collected the quantitative data. We deeply appreciate the partnership of all involved. This work was funded by the former USAID Bureau of Humanitarian Assistance (BHA) under the *Crop Diversity for Food Security* pilot project, implemented in Mali and Nigeria by CIMMYT, Oxfam, and ICRISAT.

Finally, we extend our deepest gratitude to the many farmers and traders we encountered in the communities we had the privilege of visiting during this study. Thank you for your time and for generously sharing your knowledge, insights, and experiences with us. We hope this report will help stimulate the establishment of a robust, diverse and resilient seed system, that leads to improved food, nutrition, and livelihood security for the people of Ningi and Shira Local Government Areas.

Suggested Citation
Connie Formson, Jerome Jonah, Mohammed Jada, Louise Sperling, Sagir Hanafi (2026). *Seed System Security Assessment in Ningi and Shira Local Government Area of Bauchi state, Nigeria*. Produced by Oxfam Novib.

About Oxfam Novib
Oxfam Novib is part of the global Oxfam Confederation, fighting inequality worldwide. We partner to create a fair, safe, equal, and sustainable world for all, advocating for equal rights regardless of gender, identity, ethnicity, or skin colour. We believe in people's power to end inequality and support changemakers tackling injustice, inequality, violence, and climate impacts.

About ICRISAT
ICRISAT is a leading international research institute improving dryland farming and agri-food systems to combat hunger, malnutrition, poverty, and environmental degradation for 2.1 billion people in Asia and Sub-Saharan Africa. We empower smallholder farmers and ensure food security in semi-arid regions.

About SeedSystem
SeedSystem provides practical ('how-to') guidance and strategic thinking to help professionals design seed-related assistance. It aims to foster productive, resilient, and market-oriented seed systems, even in times of emergency and chronic stress.

For further information on the issues raised in this paper please email:
Connie.Formson@oxfamnovib.nl

Design: Connie Formson, Oxfam Novib
Cover photo: Handheld sorghum seeds in Uganda. © ESAFF Uganda

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ACRONYMS

ARCN	Agricultural Research Council of Nigeria
BSADP	Bauchi State Agricultural Development Programme
CBSP	Community Based Seed Producers
CIMMYT	International Maize and Wheat Improvement Centre
CIP	International Potato Centre
CRIN	Cocoa Research Institute of Nigeria
EGS	Early Generation Seed
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Filed school
FMAFS	Federal Ministry of Agriculture and Food Security
FMSS	Farmer Managed seed System
IAR	Institute for Agricultural Research
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IITA	International Institute of Tropical Agriculture
IRRI	International Rice Research Institute
LCRI	Lake Chad Research Institute
LGA	Local Government Area
NACGRAB	National Centre for Genetic Resources and Biotechnology
NASC	National Agricultural Seeds Council
NCRI	National Cereals Research Institute
NGOs	Non-Governmental Organizations
NRCRI	National Root Crops Research Institute
OXFAM	Oxford Committee for Famine Relief
SEEDAN	The Seed Entrepreneurs Association of Nigeria
SSSA	Seed System Security Assessment
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

This Seed System Security Assessment (SSSA) examines the performance, strengths, and constraints of seed systems in Shira and Ningi Local Government Areas of Bauchi State, Nigeria. The assessment provides a comprehensive evidence base to inform seed system programming, policy engagement, and interventions aimed at improving smallholder farmers' access to quality seed and strengthening agricultural resilience.

Context and Background
Agriculture is the primary livelihood in Bauchi State, with production systems shaped by diverse agro-ecological zones ranging from the Sudan to Sahel savannah. Despite significant agricultural potential, productivity remains constrained by limited access to improved inputs, particularly quality seed. The Nigerian seed system comprises formal, informal, and intermediary channels, with the informal system dominating farmer seed access. Structural challenges—including weak distribution systems, limited early generation seed supply, and prevalence of counterfeit seed—continue to undermine system effectiveness. Social factors such as farmer–herder conflict, insecurity, and entrenched gender inequalities further restrict agricultural productivity and equitable access to resources.

Methodology
The SSSA was conducted in July 2025 using a mixed-methods approach. Data collection included household surveys (160 households), focus group discussions, trader and farmer interviews, and key informant consultations with institutions and development actors. The analysis covers both the 2024 and 2025 cropping seasons, enabling assessment of short-term (acute) and longer-term (chronic) seed security dynamics.

Acute Seed Security Findings
Findings indicate that seed access for most farmers remains relatively stable across seasons, with no widespread acute seed shortages observed. The majority of farmers sourced seed from their own stocks (66%), complemented by local markets (24%) and social networks (7%). Formal channels—such as agro-dealers, government, NGOs, and community-based seed producers (CBSPs)—played a minimal role. While farmers generally planted expected quantities, their reliance on informal systems highlights vulnerability to shocks and limited access to improved varieties. Security challenges and market disruptions in certain areas also constrain timely access to inputs.

Chronic Seed Security Findings
Chronic constraints are more pronounced and systemic. Farmers face persistent challenges in accessing affordable, high-quality seed, with limited penetration of certified seed and improved varieties. Weak market infrastructure, limited agro-dealer presence, and inadequate seed distribution systems restrict availability. Although varietal diversity exists, adoption remains constrained by cost, trust issues, and limited awareness. Gender disparities significantly affect seed access, with women facing barriers in land ownership, finance, extension services, and decision-making. Despite these challenges, opportunities exist in strengthening CBSPs, improving market linkages, and leveraging farmer field school networks for seed dissemination.

Conclusions and Recommendations
The assessment concludes that while acute seed insecurity is not widespread, chronic seed system weaknesses significantly limit productivity and resilience. Addressing these requires a dual approach:

- Short-term (acute) actions: Support local seed markets through seed fairs, vouchers, and targeted distribution of adapted varieties to ensure timely access.
- Long-term (chronic) interventions: Strengthen community-based seed production, improve market infrastructure and agro-dealer networks, enhance farmer access to finance, and promote participatory varietal selection.
- System strengthening: Improve linkages between formal and informal systems, invest in seed quality assurance, and address counterfeit seed challenges.
- Gender inclusion: Implement targeted strategies to improve women's access to land, inputs, finance, and extension services.
- Context-sensitive programming: Integrate security considerations and local socio-economic dynamics into seed system interventions.

Overall, the SSSA highlights the need for a more integrated, inclusive, and market-oriented seed system that builds on existing informal strengths while expanding access to improved, high-quality seed for smallholder farmers.

1 INTRODUCTION

1.1 RATIONALE FOR THE ASSESSMENT

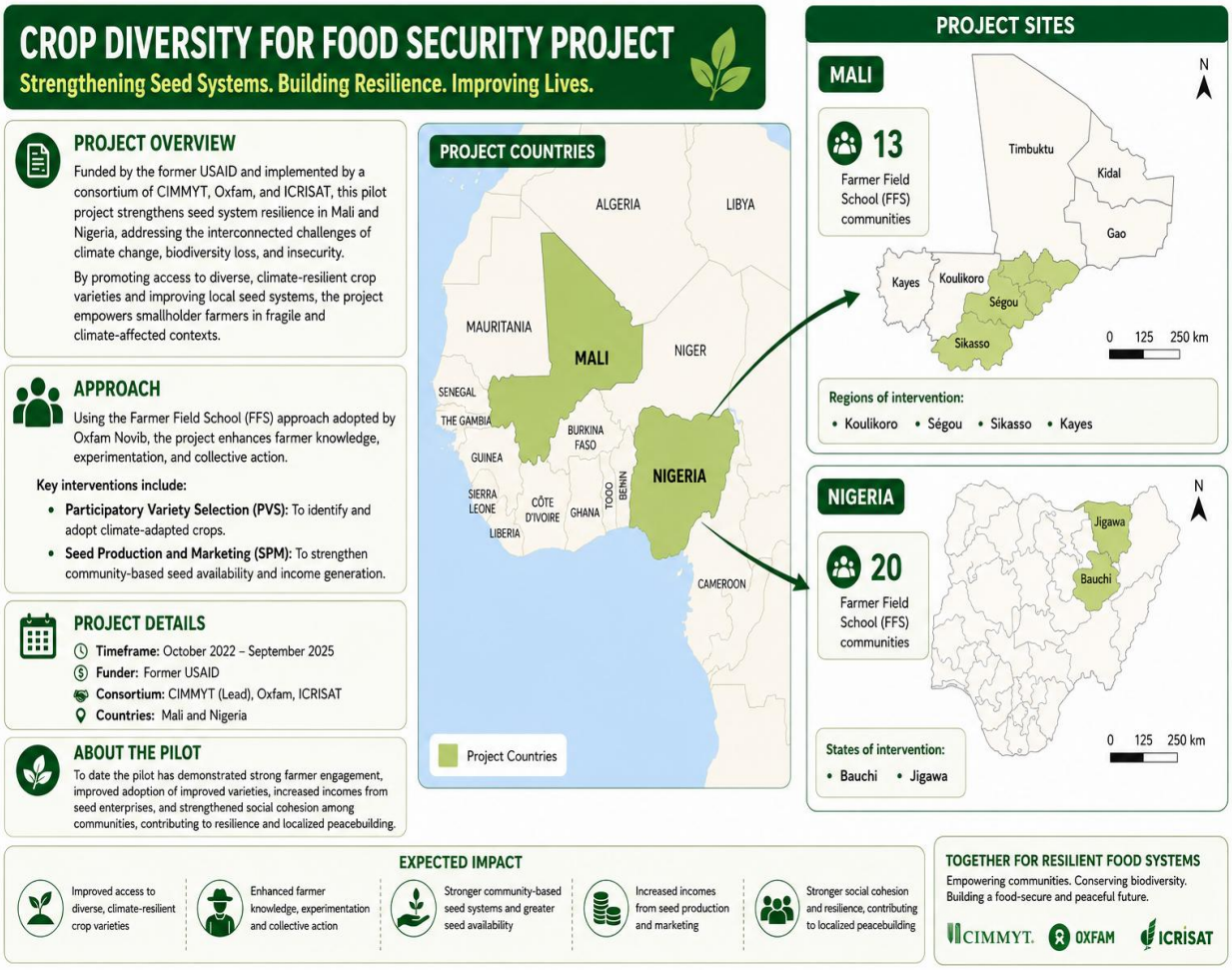
In Nigeria, particularly in Bauchi State, seed is the foundation of agricultural productivity, resilience, and food security. Smallholder farmers depend on timely access to high-quality seed to sustain crop production and enhance their livelihoods. However, the structure and performance of both formal and informal seed systems in the state remain poorly understood. This knowledge gap is especially critical as efforts are underway to scale up crop diversity initiatives and transition Farmer Field School groups—who have actively participated in three seasons of variety testing under the pilot phase of the Crop Diversity for Food Security in West Africa project—into registered seed producer groups. An overview of the Crop Diversity for Food Security in West Africa pilot project is provided in Box 1 below.

Given the critical role that seed systems play in enhancing agricultural outputs, supporting climate adaptation, and enabling farmers to adopt improved varieties, a comprehensive Seed System Security Assessment (SSSA) is indispensable. This assessment provides an evidence-based understanding of how seeds are sourced, produced, distributed, and accessed across the two agroecological zones under study in Bauchi state. It also identifies vulnerabilities that hinder seed availability, affordability, varietal diversity, and overall seed quality factors essential to sustaining farmer productivity and rural food systems.

This SSSA is therefore designed to establish a robust baseline for future seed programming in Nigeria and contribute to ongoing policy and seed aid reforms. By examining how smallholder farmers, including participating members of Farmer Field Schools (FFS), obtain seed for key staple and income-generating crops such as sorghum, millet, rice, sesame, soybean, cowpea, and groundnut, the assessment helps illuminate the strengths and weaknesses of supply channels. This includes analysing interactions between formal actors (seed companies, agro dealers, national seed regulatory agencies, and agricultural development programs) and informal networks (farmer-saved seed, local markets, and community exchanges).

Through extensive consultations with farmers, seed producers(s), agro dealers, the National Seed Council, extension services, research institutes and government agricultural programs, this assessment aims to generate actionable insights and foster joint programming. These collaborative efforts will inform the development of targeted, context-specific strategies that enhance seed security, farmers management of biodiversity and promote the adoption of improved varieties. Ultimately, the SSSA seeks to ensure that smallholder farmers, particularly FFS members involved in the Crop diversity project, can reliably access affordable, high-quality seed in time for the 2026/2027 planting seasons and beyond. This will contribute to sustainable agricultural development and improved livelihood outcomes across the region.

Box 1: Broader context of the Seed Systems Security Assessment in Ningi and Shira



1.2 REPORT STRUCTURE

- This report is organized in six (6) sections outlining the purpose, process, findings, and implications of the Seed System Security Assessment (SSSA). The structure is designed to ensure clarity, coherence, and ease of reference for policymakers, practitioners, and stakeholders. In short:
  - Section 1 introduces the report.
  - Section 2 provides background on seed system security assessments.
  - Section 3 outlines the methodology used in the analysis.
  - Section 4 describes the context, including agro-ecological, social, formal breeding, and seed sector backgrounds.
  - Section 5 presents field findings from Ningi and Shira.
  - Section 6 offers recommendations and implications for action.

2 BACKGROUND

Seed systems play a crucial role in sustaining agricultural productivity, enhancing resilience to climate change, and ensuring food security. Farmers are faced with both climatic variability and economic challenges. Understanding seed security is essential for: designing more effective seed system support programs, evaluating the effectiveness of agricultural practices; and improving both seed and food security.

2.1 SEED SYSTEM OVERVIEW

In Nigeria, the seed system can be broadly categorized into three main sub-systems, similar to global models, but with unique characteristics tailored to Nigeria's agrarian landscape. These sub-systems include the formal, informal, and intermediary systems, each contributing to the availability, accessibility, and quality of seeds across the country. An overview of each seed system is provided below.

The Formal Seed System

The formal seed system in Nigeria is organized and structured, focused on the production and distribution of high quality, certified seeds. The sector is regulated by the National Agricultural Seeds Council (NASC). As a system it follows a tiered structure of production and certification which begins with breeder seed (the initial, pure seed), produced by plant breeders within national and international agricultural research institutes as well as licensed private seed companies. Produced from breeder seed, foundation seed is generated under strict supervision by research institutions, public units, or licensed seed companies to maintain genetic purity. Finally, certified seed is produced in bulk by licensed seed companies and other seeds producing actors like community-based seed producers (CBSP) for distribution to farmers.

It is important to note that accredited CBSPs are authorised to produce certified seed under NASC oversight; Quality Declared Seed (QDS), used in some other countries, is not formally recognised within the Nigerian seed system. Throughout this process, NASC sets and enforces standards, conducting field inspections, sampling, and labelling to ensure seed purity, germination capacity, and phytosanitary health.[1] Key features of the formal seed system include:

- Public Research and Variety Development: The National Centre for Genetic Resources and Biotechnology (NACGRAB) coordinates variety release and registration, and several research institutions (IAR[2], LCRI[3], CRIN[4], NRCRI[5], NCRI[6])

[1] National Agricultural Seeds Council (NASC) Act of 2019
[2] Institute for Agricultural Research
[3] Lake Chad Research Institute
[4] Cocoa Research Institute of Nigeria
[5] National Cereals Research Institute
[6] National Root Crops Research Institute

governed by ARCN[7] including international research institutions (ICRISAT[8], IITA[9], CIMMYT[10], CIP[11], IRRI[12], African rice).

- Seed Certification: The National Agricultural Seed Council (NASC) plays a key role in certifying seeds produced by private seed companies and government institutions. The certification process ensures that seeds meet quality standards for purity, germination, and health.

- Commercial Seed Producers: Seed companies in Nigeria, both public and private, are responsible for multiplying and distributing improved varieties to farmers. These companies often focus on crops, like but not limited to, maize, rice, millet, groundnut, cowpea, sorghum, soybean and vegetables seeds.

The Informal Seed System

The informal seed system is the dominant mode of seed procurement in Nigeria, and the majority of farmers rely on this system. The system involves farm-saved seeds, local markets, and farmer-to-farmer exchanges. It is flexible, cost-effective, and often well adapted to local conditions. Most importantly, farmers themselves apply their own quality standards and markers when selecting and assessing seed.

While the informal system lacks official, formal certification structure, this does not mean seed quality is uniformly poor; quality varies considerably and is shaped by the care individual farmer take in selection, storage, and exchange. It is equally important to note that formal sector seed is not inherently superior, quality can degrade during storage or transport. The informal system does however lack official, formal quality control mechanisms, which in some cases can lead to the use of lower quality seeds. Overall, this system is characterized by the following:

- Farmer-Saved Seed: Most farmers save seeds from their previous harvests, using them for the next planting season. This method ensures a continuous supply of seeds. This however often leads to the gradual deterioration of seed quality over time.

- Seed Exchange: Farmers exchange seeds mainly through their social networks or local markets. Social network with family and friends is facilitated through gifts and small level sales within kin and neighbourhood networks. This is common for sorghum, millet, cowpea, and local rice. Trust and timeliness are key in these social transactions. Seed purchase from local markets can be seeds of local varieties or modern varieties that have been passed through informal channels from the formal system.

- Adaptation to Local Conditions: Seeds in the informal system are typically well-adapted to local agro-ecological conditions but may lack genetic diversity and resilience to climate change or pests.

[7] Agricultural Research Council of Nigeria
[8] International Crops Research Institute for the Semi-Arid Tropics
[9] International Institute of Tropical Agriculture
[10] International Maize and Wheat Improvement Centre
[11] International Potato Centre
[12] International Rice Research Institute

The Intermediary Seed System

The intermediary seed system serves as a bridge between formal and informal systems. This system is primarily driven by:

1. Farmer Groups and Cooperatives: Organized groups, often facilitated by NGOs, help farmers produce and distribute cleaner, improved seeds to their communities. These groups may focus on specific crops, like sorghum, millet, soybean, rice, cassava or sweet potatoes. Often such groups work closely with local farmers to improve seed quality.

2. NGOs and Development Organizations: NGOs and research organisations like OXFAM, USAID, and ICRISAT respectively have been instrumental in facilitating seed production programs, training farmers, and promoting improved seed practices. They also run seed fairs where farmers can exchange or purchase improved seeds at subsidized prices.

Figure 1: The Seed System in Nigeria

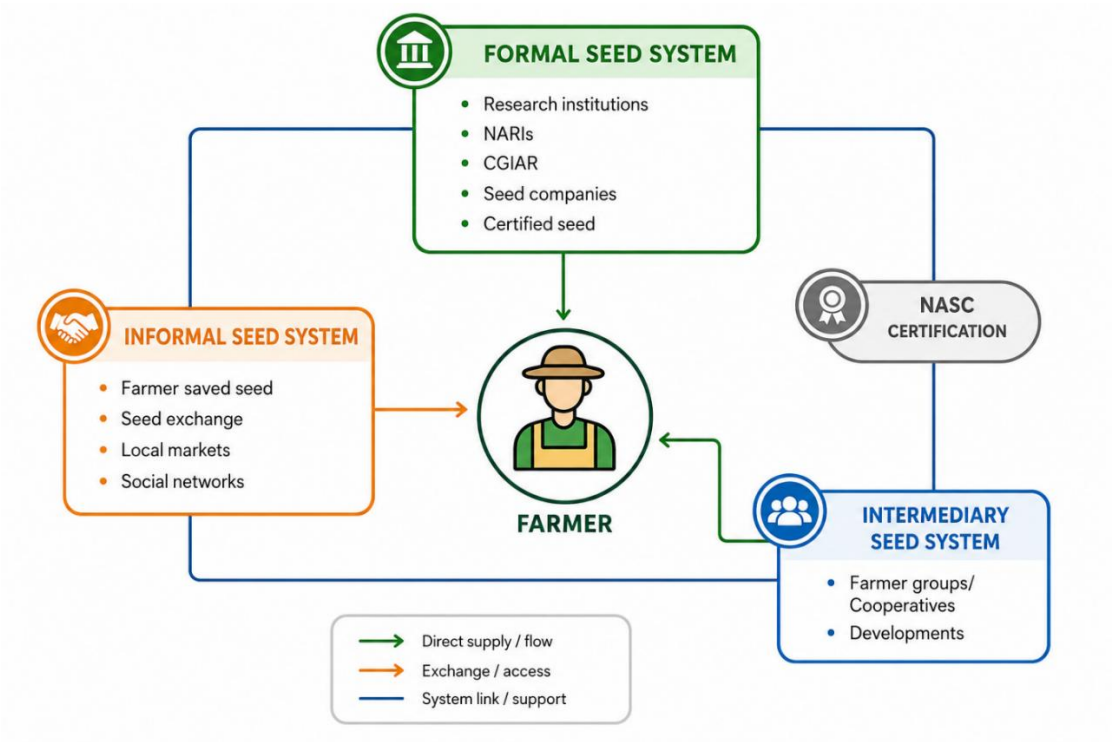
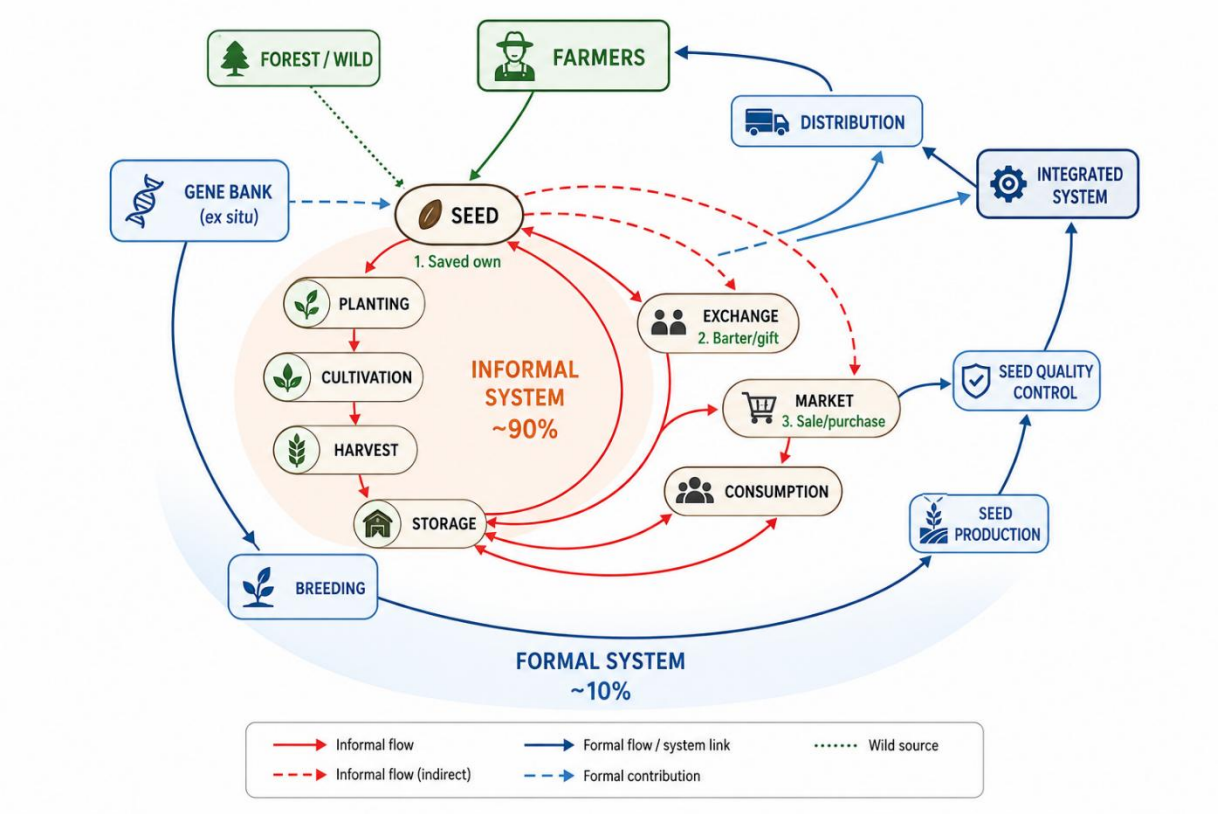


Figure 2: Seed Procurement Channels used by farmers in Nigeria



***Note**: Illustrative figure depicting procurement of seeds via formal, informal, and intermediary systems, adapted from global seed system models but localized for Nigeria's agro-ecological context: Almekinders & De Boef (2000).*

Box 2 below provides a summary of the performance of the Nigeria seed sector as at 2023.

Box 2: Nigeria Seed Sector Performance as at 2023

Quality of variety release and registration process is considered relatively good: The NACGRAB oversees the activities of the National Committee on Naming, Registration, and Release of Crop Varieties, Livestock Breeds, and Fisheries. All measures are in place to align the DUS (Distinctness, Uniformity, and Stability) and VCU (Value for Cultivation and Use) guidelines with both regional and national regulations for variety release and registration in Nigeria. Furthermore, there is an ongoing review aimed at reducing the costs associated with variety release, with the objective of making it more economically feasible for breeders and variety developers.

Number of varieties released in last 3 years is average: During the 2020–2022 period, 30 varieties were released for the four priority crops: two for rice, 23 for maize, two for sorghum, and three for soya bean.

Adequacy of national agricultural research institutes'(NARIs)breeding programs is generally weak: As of 2023, the Institute for Agricultural Research (IAR) at Ahmadu Bello University (ABU), the Institute of Agricultural Research and Training (IART) at Obafemi Awolowo University (OAU), and the National Cereals Research Institute (NCRI) collectively had 37 active breeders working on four crops: 6 for rice, 20 for maize, 4 for sorghum, and 7 for soybeans. However, the adequacy of breeder numbers was rated as medium across all four crops, primarily because most breeders lack sufficient funding to conduct meaningful breeding work. Funding for breeding programs remains severely limited, while equipment and infrastructure are inadequate. Many research stations require major upgrades to their existing facilities.

Adequacy of Early Generation Seed (EGS) is weak: The main sources of EGS in Nigeria are private seed companies as well as national and regional agricultural research institutions, such as NCRI, the International Institute for Tropical Agriculture (IITA)-Sentex, and IAR. Adequacy of the quantity of EGS supplied was weak across the four priority crops maize, rice, sorghum and soya bean). The quantity of EGS in most cases is far below the national requirement due to the lack of a proper central coordination and planning system. There is room for improvement on the quality of EGS supplied through the use of innovative technologies in the production and distribution of the EGSs. The timeliness of delivery of EGS supplied requires significant improvement through the introduction of licensing and contract seed production.

Availability of crop varietal choice to farmers is deemed fair: In 2022, the number of varieties available on the market for the four crops was 98: 15 for rice, 62 for maize, 14 for sorghum, and seven for soya bean.

Utilization of quality commercial seed by farmers is poor: In 2022, seed production for the four crops was: 36,010 MT for rice seed, 37,714 MT for maize seed, 3,463 MT for sorghum seed, and 4,220 MT for soya bean seed. Adjusted for imports and exports, total available seed meets 27% of national seed requirement for rice, 29% for maize, 9% for sorghum, and 16% for soya bean.

Adequacy of agro dealer networks is fair: In 2022, Nigeria had 30 agro dealers who were registered by NASC. However, the number of active but unregistered agro dealers is much higher.

Availability of seed in small package sizes is poor: Of the four priority crops, only 20% of rice seed, 60% of maize seed, 1% of sorghum, and 1% of millet seed are sold in small packages of 2kg or less.

Status of Farmer Managed Seed Systems (FMSS) in national seed policy instruments is good: FMSS in Nigeria are recognized in the National Agricultural Seed Policy (2022) and the National Agricultural Seeds Council Act (2019). Although FMSS are promoted in Nigeria, stakeholder engagement and sensitization are still needed to promote pluralistic seed systems.

Adequacy of seed inspection services is fair: In 2022, Nigeria had 152 seed inspectors. 77 were public while 75 were private. Efforts are ongoing to implement the Organization for Economic Cooperation and Development (OECD) seed scheme and decentralize the coordination of seed certification and quality assurance mechanisms to make it service-oriented and improve efficiency.

Adequacy of government efforts to combat counterfeit seed is fair: Combating the production and sale of counterfeit seed is guided by the NASC Act and the Seed Policy. Measures taken include regular market raids, surveillance missions, enlightenment missions, public burning of confiscated seeds, deployment of National Seed Tracker, and special labels called SEEDCODEX. Punitive measures include stoppage of sale of suspected seed, confiscation of seeds, sealing of premises, withdrawal of license, prison term of one year for a first offender or two years for a second offender, and withdrawal from participation in government seed subsidy programs.

Adequacy of national seed trade association is fair: The Seed Entrepreneurs Association of Nigeria (SEEDAN) is the umbrella body of seed producers in Nigeria. SEEDAN's performance average.

Extracted from: African Union Commission (AUC) et al., 2024). Seed Sector Performance Index (SSPI): 2023 Status Report for Africa.

2.2 THE CONCEPT OF SEED SECURITY

A secure seed system is critical for ensuring food security, as it allows farmers to maintain and even improve agricultural productivity, despite potential challenges such as climatic variability, economic shifts, or conflict.[13] Seed security plays a vital role in ensuring agricultural productivity and food security, especially in countries like Nigeria, where smallholder farmers form the backbone of agriculture. In Nigeria, seed security encompasses four main components: availability, accessibility, seed quality (health), and varietal suitability (genetic quality). Each of these components is necessary for a sustainable seed system that can withstand challenges like climatic variability, economic hardships, and changing market conditions.

Seed Availability: Seed availability refers to the physical presence of sufficient quantities of seed in the local environment when farmers need them. This includes both formal (certified seeds from research institutions and seed companies) and informal (seeds saved by farmers, traded at local markets, or exchanged among farmers) sources of seed. According to Sperling and McGuire (2010), the effectiveness of seed distribution networks is a critical factor in ensuring timely seed availability during the planting season. In Nigeria, availability is often seasonal, with more seeds available during the planting season. However, droughts, floods, and other natural disasters can disrupt seed availability. The formal sector has limited reach in rural areas, where most farmers rely on the informal sector for seeds. The lack of proper storage facilities and infrastructure also hampers year-round seed availability.

Seed Accessibility: Seed accessibility refers to the ability of farmers to acquire seeds when they need them, at a price they can afford. This is influenced by a range of factors, including economic conditions, market infrastructure, social networks, and farmers' purchasing power, FAO (2021). In Nigeria, many smallholder farmers face challenges in accessing high-quality seeds due to limited financial resources. The high cost of quality seeds, particularly those produced by commercial companies, makes them unaffordable for farmers with low incomes. It is worth noting, however, that financial barriers to seed access are not limited to certified commercial seed alone, farmers may face affordability challenges across a range of seed types and sources. Additionally, the lack of credit facilities, poor transportation networks, and underdeveloped seed markets in rural areas exacerbate accessibility issues.

Seed Quality (Health): Seed quality refers to the physical, physiological, and sanitary quality of seeds. High-quality seeds have a high germination rate, are free from pests and diseases, and have adequate purity levels. Seed health and quality are essential for ensuring high yields and productive farming, making it a critical component of seed security assessments. In Nigeria, seed quality in both the formal and informal seed system is impacted by a number of factors (see Box 3). The formal system, despite its regulatory framework, fails to ensure high-quality, pathogen-free seeds, partly due to inadequate enforcement and testing infrastructure.[14] The informal system, while more accessible and affordable for smallholder farmers, lacks quality control, leading to variability in seed health and physiological quality. Interestingly, Biemond (2013), found that in Nigeria- in the case of cowpea- seed recycling[15] did not significantly reduce seed quality. However, the

[13] Sperling & McGuire (2010)
[14] Biemond (2013).
[15] The practice of farmers repeatedly using saved seeds

widespread presence of seed-borne pathogens in both seed systems poses risks to crop productivity and food security.[16]

Varietal Suitability (Genetic Quality): Varietal quality refers to the suitability of seeds for local conditions, ensuring they meet farmers' specific needs for climate adaptation, pest resistance, and crop preferences. In Nigeria, there is a growing demand for improved varieties that are drought-resistant and pest-resistant. However, many farmers still prefer traditional varieties due to local knowledge and cultural preferences. According to Shiferaw and Tsubo (2013), farmers are more likely to adopt varieties that are adapted to their specific environmental and cultural contexts.

Generally, Seed security is vital for food security in Nigeria, but to ensure effective solutions, a comprehensive Seed System Security Assessment (SSSA) is necessary. An SSSA will help identify gaps in seed availability, accessibility, quality, and suitability across Nigeria's diverse agro-ecological zones. This will inform targeted interventions, improve seed system resilience, and guide policy decisions, ultimately strengthening the seed systems and supporting sustainable agricultural productivity.

Box 3: Nigerian Seed System and Seed Quality

A stark contrast is seen between the formal and informal seed systems in Nigeria. As discussed, the formal seed system, regulated by the National Agricultural Seed Council (NASC), focuses on breeding, certifying, and distributing high-quality, improved seed varieties. However, despite these efforts, the quality of seeds in the formal system is often compromised by the widespread distribution of adulterated or counterfeit seeds, which undermines farmer trust and reduces productivity. Farmers frequently encounter seeds labeled as "certified" that fail to meet genetic, morphological, or physiological standards, leading to poor yields and financial losses. On the other hand, the informal seed system, which relies on farmer-saved seeds and local exchanges, is more accessible and trusted by smallholder farmers. While these seeds may lack the genetic improvements of formal varieties, they are often perceived as more reliable due to their familiarity and immediate availability, even if their quality and productivity are generally lower.

Overall, there are several critical challenges faced by the Nigerian seed system that hinder its effectiveness. This includes:

- Poor distribution channels, insufficient infrastructure (such as electricity and roads), and weak enforcement of seed laws contribute to limited access to quality seeds, especially for smallholder farmers. The high cost of certified seeds and limited distribution channels outside of informal sources—used by over 90% of farmers—further exacerbates the issue.
- Counterfeit seeds, inadequate seed inspection, and a lack of trust in formal seed quality discourage farmers from adopting improved varieties.
- A system plagued by policy gaps, such as the absence of operational laws for crop variety protection and limited cross-border seed trade, which restrict the availability of diverse and resilient seed options.

Addressing these challenges requires updating national seed policies, strengthening quality control, and integrating farmers' preferences into seed development strategies to ensure sustainable agricultural growth.

Source: Izuogu, C. U.et al. (2023). A review of the Nigerian seed system.

[16] Biemond, P. C. (2013).

2.3 ACUTE AND CHRONIC SEED INSECURITY

Seed insecurity can be classified into two broad categories: acute and chronic, each with distinct characteristics and underlying causes. Understanding these two types is crucial for designing appropriate interventions to address seed insecurity in Nigeria, where both environmental and socio-economic factors contribute to seed challenges.

Acute Seed Insecurity: Acute seed insecurity is the result of sudden, short-term shocks that disrupt the availability, access, or quality of seeds. These shocks can include:

- *Natural Disasters:* Events such as floods, droughts, or extreme weather events that destroy crops, reduce seed stocks, and disrupt local seed production systems.
- *Conflict and Displacement:* Armed conflicts, regional instability, or displacement of populations often lead to the loss of stored seeds and the destruction of local agricultural infrastructure.
- *Market Disruptions:* Sudden economic shocks or market failures, including trade disruptions, can prevent farmers from accessing seeds at critical times.

Acute seed insecurity is typically temporary but can have long-lasting impacts on farmers' livelihoods if not quickly addressed. Immediate interventions, such as emergency seed distribution, seed fairs, or seed vouchers, are often necessary to restore access to seeds and ensure that farmers can replant in the next season.

Chronic Seed Insecurity: Chronic seed insecurity is a long-term, persistent condition linked to ongoing structural and systemic issues in seed production, distribution, and access. It is often driven by:

- *Economic Constraints*: Farmers may face persistent poverty, which prevents them from purchasing quality seeds or investing in seed production.
- *Poor Infrastructure*: Inadequate transportation, storage facilities, and seed distribution systems often hinder the availability and accessibility of quality seeds in rural or marginalized areas.
- *Low Investment in Seed Systems*: In some regions, there may be limited investment in seed research, development, and production, resulting in a lack of improved seed varieties that meet the needs of farmers.
- *Social Marginalization*: Farmers in remote, low-income, or socially marginalized communities may be excluded from formal seed systems, relying entirely on informal systems that often lack quality control.

Chronic seed insecurity often results in a continuous cycle of poor crop yields, lower productivity, and increased vulnerability to shocks. Addressing chronic seed insecurity requires long-term strategies that focus on improving seed systems, strengthening farmer access to financial resources, and promoting sustainable agricultural practices.

Overlapping Nature of Acute and Chronic Seed Insecurity

In many cases, acute and chronic seed insecurities can overlap. For instance, a community that is already experiencing chronic seed insecurity due to poor infrastructure and limited access to financial resources may become even more vulnerable to acute shocks such as floods or market disruptions. This overlap can exacerbate the challenges and require a coordinated, multi-faceted response to address both immediate and long-term needs.

Table 1: Seed security response framework: Acute and chronic interventions by seed security component

Component	Acute (Short-Term) Responses	Chronic (Long-Term) Responses
Availability	Local seed procurement & timely distribution; support rapid market restocking; targeted fairs for adapted crops	Strengthen CBSP and farmer groups; improve market connectivity & seasonal stocking; support EGS → certified flows into rural areas
Accessibility	Seed fairs, Seed vouchers or cash transfers to overcome immediate purchasing barriers; waive transport fees	VSLA[17]/credit schemes; small seed packs; inclusive market strategies; gender-responsive outreach to reduce normative barriers
Seed Quality (Health)	Distribute clean/treated seed; basic quality screening at fairs/DSD	Training on selection, germination tests, storage, and purity; promote hermetic storage; link CBSP to NASC guidance
Varietal Suitability	Prioritize adapted, farmer-preferred varieties in emergency procurement/fairs	Participatory varietal selection (PVS); diversify varietal portfolios; facilitate diffusion through markets and social networks

[17] Village Loans and Savings Associations

3 METHODOLOGY

This section of the report outlines the methodology adopted in conducting the seed systems security assessment. The SSSA was conducted during the 2025 cropping season between 24-30July 2025. The data collected was for the past season - 2024 (June-November) and the current season- 2025 (June-November).

The section is divided into three sub-sections. Section 3.1 covers the survey tools used and sample size of the assessment. In section 3.2, an overview of how sights were selected is provided, while section 3.3 outlines the demographics of respondents.

3.1 SURVEY TOOLS AND SAMPLE SIZES

This SSSA provides an analysis of seed systems in Bauchi State of Nigeria, highlighting weaknesses and opportunities for strengthening. The analysis is based on primary and secondary data. Primary data collection was conducted by a team[18] (see Annex 1) that carried out household surveys, focus group discussions, market-based interviews and key informant consultations with a range of actors as outlined in Table 2 below. Table 2 outlines the selection criteria and methodologies applied to identify respondents for the SSSA.

Table 2: Data collection overview 2025 SSSA in Shira and Ningi Local Government Area of Bauchi State

Sources	Sample size	Description
Secondary data collection and analysis		▪ Government reports ▪ Academic and research reports ▪ NGO reports ▪ Grey literature
Household survey	160 (80 per site)	Random selection was carried outstaring from the center of the ward moving outward, selecting every other household. A total of 160 households were covered from the two Local Government Areas (LGAs).
Ward Focus Group Discussions	5 (2 Women only and 3 mixed)	Focus group discussions provided an overview of 1) farmer crop properties and uses; 2) crop performance over a 3 season and; 3) trends through time (5 year period), with indication of which crops are expanding and decreasing and the reasons for the trend. Mixed and women focused discussions were held. Community Focus Group – Mixed and women focus group discussions were held in both Shira and Ningi LGA. The groups comprised of 20–30 men and women of varying ages. Three FGDs were held in total. In Shira LGA one FDG was held in Ziggau. In Ningi LGA two (2) FGD were held in Bura district. One was held in Balma

[18] Consisting of Oxfam Novib, Oxfam in Nigeria, NACS, ADP, ICRISAT,CARE Nigeria, COPPI, NACGRAB

		village and the second in Kafin Lemu, to capture the unique socio-economic aspects of the seed system in in Kafin Lemu. **Women's Focus Group:** A group of 20–30 women per LGA participated in the se ssion. As in the context of the mixed focus group, the women only FGD included a diverse age and socioeconomic representation. One FGD was held per LGA. In Shira LGA the FDG was held in Abisa, and in Ningi LGA in Ringya village.
Seed/ Grain trader interviews	12	Interviews were held with: Large Traders (1) Local traders (9) Seed Producers[19] (2) Agro-processer: Non were found in the LGA
Farmer interviews	10	Topics covered: key crops and seed varieties sought in local markets, seed quality, prices and distance to markets
Key Informant interviews	5	NGOs (CARE) National Agricultural Seed Council Extension services ICRISAT IITA

[19] Among the 2 seed producers interviewed one was a large scale rice producer in Shira local government area.

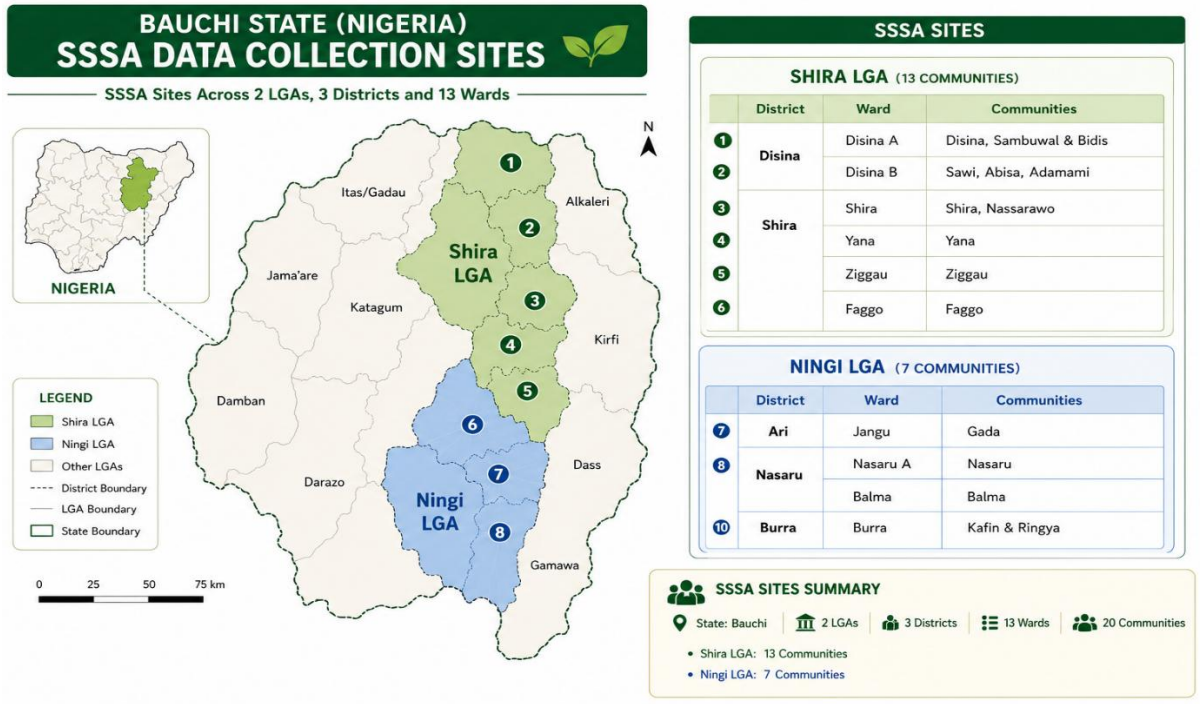
3.2 SITE SELECTION

The SSSA focused on Bauchi State, which is one of the project sites of the Crop Diversity in West Africa project implemented over the period Oct 2022–September 2025 led by CIMMYT and implemented by the Oxfam and ICRISAT. The project has been implemented in Bauchi and Jigawa state, supporting seed systems resilience building through farmer field schools (FFS) on participatory variety selection and elements of seed production. In Bauchi state, implementation has been in LGAs of Shira – northern Bauchi and Ningi central Bauchi. Data for the SSSA was collected from the various districts, wards and communities as outlined in Figure 3 below. Section 4 provides further information on Ningi and Shira LGA.

Bauchi State provides a strong foundation for a seed system security assessment because it spans three key agro-ecological zones: Northern Guinea Savanna, Sudan Savanna, and Sahel Savanna, offering broader environmental variability than Jigawa, which covers only the Sudan and Sahel Savannas. This expanded ecological representation captures differences in rainfall, soil characteristics, and cropping potential across both wetter and drier savanna belts, making Bauchi a more comprehensive landscape for evaluating how seed systems function under diverse agronomic conditions.

Additionally, of this ecological diversity, assessments conducted in Bauchi are better positioned to reveal how seed availability, varietal performance, and farmer seed use patterns shift across contrasting production environments. By incorporating the moderate rainfall Northern Guinea Savanna alongside the increasingly arid Sudan Sahel belt, Bauchi enables findings that are more broadly applicable to Nigerian seed system strengthening efforts. This makes Bauchi a more suitable and strategic choice for a seed system security assessment aimed at capturing wider environmental and production realities.

Figure 3: Seed System Security Data Collection Sites



	District	Ward	Communities
1	Disina	Disina A	Disina, Sambuwal & Bidis
2		Disina B	Sawi, Abisa, Adamami
3	Shira	Shira	Shira, Nassarawo
4		Yana	Yana
5		Ziggau	Ziggau
6		Faggo	Faggo

	District	Ward	Communities
7	Ari	Jangu	Gada
8	Nasaru	Nasaru A	Nasaru
		Balma	Balma
10	Burra	Burra	Kafin & Ringya

3.3 RESPONDENT DEMOGRAPHICS

A total of 160 households were surveyed, 80 households per LGA. Table 3 below provides a breakdown of the gender of the household head. As Table 3 highlights, 93 percent of household heads surveyed were men. Despite considerable effort taken to include women in the survey, only 7 percent of household heads surveyed were women. As sections 4.4 and 5.4 below discuss, gender disparities in agriculture exist in the North of Nigeria which the significantly high proportion of male respondents in the household survey suggests. After an introduction to the analysis in section 4.4, section 5.4 provides further discussion on gender dynamics and systems developments in the context of northern Nigeria drawing from the findings of the SSSA.

Household Size, Age and Gender of Household Head and Residential Status

Households surveyed were found to be predominantly residents (99 percent) with only one percent of household being internally displaced persons. In addition, 96 percent of households were headed by an adult, three (3) percent were child headed while one (1) percent were headed by a grandparent.

The average age of the household head was 43 years, and the oldest household head was 82 years old. The average household size in Nigeria is 9, and in the Northern states 12 people.[20] In Ningi and Shira LGA the average household size was 13, comparable in size to that found in other research.[21] There were however some large households with as many as 30 household members.

Table 3: Household Demographics

Feature	Description	Sample
Type of household	Adult headed	96%
	Child headed	3%
	Grandparent	1%
Sex of household Head	Male	93%
	Female	7%
Average age of household head	Age	43
Average size of household	# of people	13
Migration Status	Resident	99
	Displaced	1
Area Cultivated	< 0.5 ha	1%
	0.5 – 1.0 ha	6%
	>1.0-2.0 ha	27%
	> 2.0 ha	66%

[20] NAERLS (2024)
[21] For example (provide sesame, sorghum research in north)

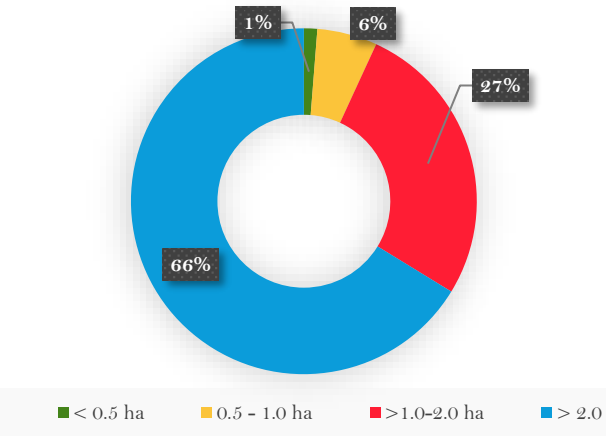
Area Cultivated by Household

In terms of area cultivated, 66 percent of households sampled had more than 2 hectares of land, while 27 percent had between 1-1 hectares. Households with between 0.5-1 hectare amounted to 5.6 percent of the sample, while 1 percent had farmed on less than 0.5 hectares. See Figure 4 for the area cultivated by households.

In Nigeria, the average farm size is approximately 1.5 hectares, with most smallholder farmers cultivating between 1–3 hectares. Larger farm sizes are more commonly observed in the northern regions compared to the south. This pattern is consistent with findings by Nuhu et al., (2014) which reported that 63.4 percent of farmers in Bauchi State operate within this range.

During data collection, enumerators clearly communicated that participation in the survey would not result in any direct benefits or rewards. However, it remains possible that some respondents overstated their landholdings, potentially in anticipation of indirect or future advantages.

Figure 4: Area cultivated by household



Crops Cultivated by Household

In 2022, rice, maize, sorghum and soya bean were the four priority crops being grown in Nigeria. Combined, these four crops accounted for 62 percent of area harvested to field crops.[22] Two years later, the findings of the SSSA indicated the continued importance of three of these crops. An analysis of crops considered important by households for both the 2024 and 2025 planting seasons shows a largely consistent trend with minimal variation. Sorghum ranked highest in the 2024 season with 88 percent of households, followed closely by rice at 87 percent (see Table 4). Bauchi state is one of the top sorghum producing states in Nigeria.[23] The state is also a big producer of maize, soya bean, millet and ground nut.[24]

Table 4: Key crops - crops named most frequently as 'most important' by households

2024/25 season		2025/26 Season	
Crop	% of HHs	Crop	% of HHs
sorghum	88%	Rice	86%
Rice	87%	sorghum	74%
Millets	43%	Millets	43%
Maize	34%	Maize	31%
Sesame	11%	Groundnut	13%

[22] AU & TASAI (2024)
[23] NAERLS (2024)
[24] Especially among community based seed producers

However, in the next season, rice takes the lead with 86 percent of households, while sorghum drops to second place at 74 percent. Rice maintained relatively equal importance to households in both seasons, as Figures 5 and 6 below indicate. The least prioritized crop in the 2024 season was sesame, which is replaced by groundnut in the 2025 season.

Figure 5: Total Kg of Seed Planted in the 2024 Season

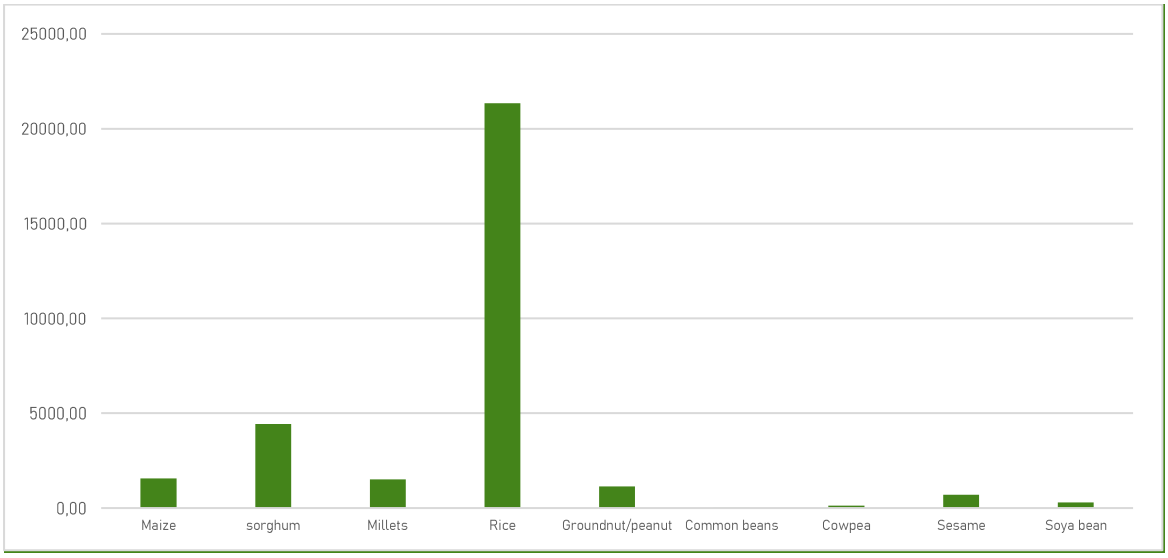
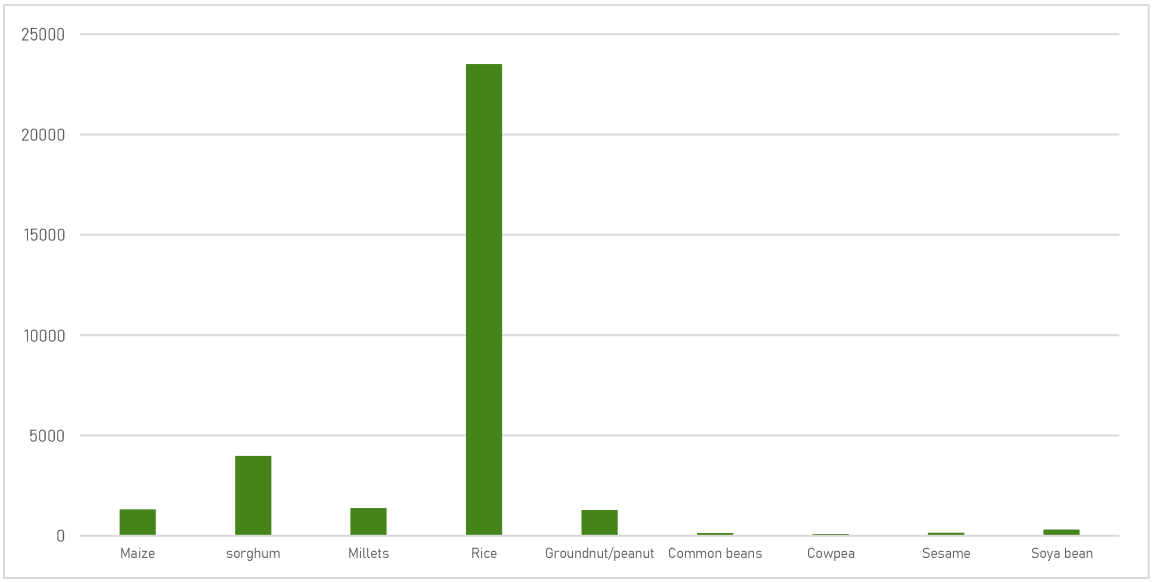


Figure 6: Total Kg of Seed Planted in the 2025 Season



4 THE CONTEXT – AGRO-ECOLOGICAL, SOCIAL, FORMAL BREEDING AND SEED SECTOR BACKGROUND

4.1 THE AGRO-ECOLOGICAL CONTEXT

Nigeria's agricultural sector remains a foundational pillar of the national economy, employing over 60% of the labour force and serving as the primary source of food and livelihoods for rural populations.[25] The sector is largely subsistence-oriented, with limited commercialization, making productivity-enhancing inputs—particularly improved seeds—critical. Empirical evidence indicates that improved seed varieties can account for 30–50% of yield gains when combined with good agronomic practices.[26]

Within this national context, Bauchi State possesses substantial but underutilized agricultural potential. Out of approximately 4.2 million hectares of arable land, only about 1.8 million hectares is currently cultivated, indicating significant scope for expansion and intensification.[27] Additionally, the state has roughly 181,000 hectares of Fadama (irrigable land) land, yet only about 25,000 hectares are utilized, underscoring missed opportunities for dry-season irrigation and climate-resilient agriculture.

Bauchi State lies within two main agro-ecological zones, namely the Sudan Savannah and the Sahel Savannah, each of which determines the nature of agricultural activities in different parts of the state.[28] The Sudan Savannah zone covers the southern portion of Bauchi State. It enjoys a longer rainy season, beginning as early as April, and records an annual rainfall of between 1,000 and 1,300 millimetres.[29]

The vegetation here is relatively dense, with taller grasses and diverse flora, particularly along rivers and water sources. The soil conditions are generally fertile and capable of supporting a wide range of crops including cereals such as millet, sorghum, and maize, in addition to legumes, yams, and potatoes. The zone also encompasses a small section of the Jos Plateau in the southwest, where the montane climate favours additional crop varieties.

The Sahel Savannah zone covers the central and northern areas of the state. The rainy season here is much shorter, beginning in June or July, and annual rainfall averages about 700 millimetres. [30]The climate is generally hot, dry, and dusty for extended periods, while the vegetation consists mainly of thorny shrubs and short grasses. The soils are sandy and often support only drought-resistant crops. Despite these limitations, farming practices in this zone are adapted to the shorter growing season, and the zone contributes significantly to the state's agricultural output.

[25] National Bureau of Statistics [NBS], (2023)
[26] FAO (2021); World Bank (2020)
[27] Bauchi State Government (2024)
[28] FAO (2019); World Bank (2020).
[29] Nigerian Meteorological Agency (2022)
[30] Nigerian Meteorological Agency (2022)

Project Zone Coverage

The project area spans the Northern and Central Agricultural Zones of Bauchi State, together comprising thirteen Local Government Areas. In the Northern Zone, which has Katagum as its headquarters, the LGAs include Katagum, Gamawa, Giade, Jama'are, Shira, Itas Gadau, Dambam, Misau, and Zaki. The Central Zone, with its headquarters in Miya Ganjuwa of Ganjuwa Local Government, covers Darazo, Ganjuwa, Ningi, and Warji. These zones collectively represent a transition across the Sahelian and Sudanian ecological gradients and are critical to the state's agricultural economy.[31]

Figure 6: Project Zone Coverage

Local Government Agricultural Profiles

In Shira, despite the relatively low rainfall typical of the Sahel zone, agriculture flourishes in areas with access to rivers and fadama lands, particularly along the Jama'are River valley. The area supports the cultivation of cereals, vegetables, and fruits. Watermelon has emerged as a signature crop, with the Ajangara market in Shira recognized as a major outlet for this produce. The importance of fadama agriculture in sustaining dry-season farming and improving rural livelihoods in such environments has been well documented.[32]

Ningi, located in the central zone, forms part of the mid-altitude transitional area between the Sudan and Sahel Savannahs. Its geology is underlain by basement complex rocks and includes two hydro-geological units, namely the Crystalline Basement and the Basement Foreland. However, environmental challenges such as deforestation remain a concern. Agriculture in Ningi is vibrant, with farmers producing crops such as cotton, groundnuts, millet sorghum, maize, tomatoes, and yams reflecting both ecological adaptability and some level of market orientation.[33] The presence of fadama floodplains and river basins provides additional opportunities for irrigated farming, further enhancing agricultural potential.

Both Shira and Ningi contribute significantly to Bauchi State's agricultural economy. They are endowed with fertile soils and large tracts of land suitable for both rain-fed and irrigated agriculture. Rivers, dams, and floodplains provide crucial water resources that enable year-round farming activities. Additionally, the two areas are known for their strong livestock populations, including cattle, goats, and sheep, which complement crop production and reinforce the state's role as a major agricultural centre.

[31] BSADP, (2018).
[32] World Bank, (2017); National Fadama Development Office (2020)
[33] BSADP (2018); NBS (2022)

4.2 AGRICULTURAL PRODUCTION IN SHIRA AND NINGI LOCAL GOVERNMENT AREAS

Agriculture is the predominant economic activity in both Shira and Ningi Local Government Areas (LGAs) of Bauchi State, located within the Sudan and Sahel savannah vegetation zones. The regions possess favourable climatic and soil conditions that support the cultivation of a wide range of crops as well as livestock rearing. About 80 percent of the population in these areas are farmers, and both rain-fed and irrigation systems are employed to sustain production. In Shira, farming is the central livelihood of most residents.[34] The area is notable for the cultivation of cereals, legumes, and vegetables, with millet, maize, sorghum, rice, groundnuts, cowpea, and cotton forming the dominant crops. Irrigation plays a particularly important role in the production of rice, enabling its cultivation during both the wet and dry seasons. Shira also stands out for its specialized farm produce markets, including dedicated markets for watermelons and sweet potatoes, which are unique to the area. Farming in Shira is largely small-scale and relies heavily on inherited traditional methods. However, there have been recent efforts to introduce modern agricultural practices aimed at improving productivity and addressing the challenges posed by climate change.

Ningi on the other hand, is similarly agrarian, with a wide range of crops and livestock forming the basis of its economy. Sugarcane, millet, soybean, sorghum, and groundnut are among the major crops cultivated, while rice and yam are produced in wetlands and floodplains where water is readily available. Farming systems in Ningi are characterized by the Sorghum-Millet and Millet-Sorghum patterns, both of which often include intercropping with cowpea. Groundnut serve as a significant cash crop, while cotton also contributes to household income.[35]

Shira and Ningi LGAs remain highly productive agricultural hubs within Bauchi State. Their economy are deeply rooted in farming and livestock rearing, sustained by favorable natural endowment and the resilience of their farming communities. While traditional methods continue to dominate, the gradual introduction of modern practices provides opportunities for improved yields, better market integration, and long-term agricultural sustainability.

4.3 SOCIAL UPHEAVALS DISRUPTING AGRICULTURAL PRODUCTION

Agriculture remains the primary livelihood for most communities in Shira and Ningi, as well as in other parts of Bauchi State. However, persistent social upheavals, particularly farmer-herder conflicts, are increasingly undermining agricultural productivity and food security. These conflicts have created a climate of fear and insecurity, limiting farming activities, displacing populations, and weakening the economic foundation of rural communities.[36]

Nature of the Conflict: The farmer-herder conflict, driven by competition over land and resources, is the dominant form of social unrest in the region. Clashes often occur when

[34] BSADP, (2017)
[35] BSADP, (2017)
[36] FAO, (2021).

cattle graze on farmlands, destroying crops and sparking violent confrontations. Such conflicts have escalated over time, resulting in loss of lives, property, and livelihoods.[37]

Beyond farmer-herder conflict, banditry and kidnapping represent a significant and growing form of insecurity in several of the SSSA intervention communities. This is particularly acute in Balma, Kafin-Lemo, and Ringya communities in Ningi LGA, where armed criminal activity has intensified fear among farming households. Incidents of kidnapping targeting community members including farmers working on their fields, have further discouraged agricultural activity, reduced mobility, and curtailed access to markets and extension services. This form of insecurity compounds the challenges already posed by farmer-herder conflict, creating a compounded security burden that disproportionately affects communities already operating under constrained agricultural conditions. Any seed system programming in these communities must account for this heightened security environment when planning field activities, farmer mobilisation, and market linkage interventions.

Impact on Agricultural Production

Destruction of crops and farmlands takes place due to cattle grazing on cultivated land leads to the destruction of crops. In addition, farmers face direct harvest losses, discouraging further cultivation due to fear of repeated destruction.[38] Displacement and Loss of agricultural labour also exist where violence and insecurity force farmers and their families to abandon their homes and farmlands. Displacement reduces available labour for farming, harvesting, and land preparation. Community members increasingly migrate away from agriculture in search of safety and alternative livelihoods.[39]

Reduced productivity and investment in the area is as a result of insecurity discourages farmers from investing in improved seeds, fertilizers, and other modern inputs. Often, fear of losing investments reduces willingness to adopt better farming practices, leading to consistently low yields. Also prevalent is the disruption of markets and supply chains. Social unrest makes roads unsafe, preventing the transport of goods to markets. At times markets close or become inaccessible, limiting both the sale of produce and the purchase of farming inputs. The breakdown of value chains undermines the economic sustainability of farming activities.

The economic consequences of these effects go beyond immediate crop losses. Conflict also erodes household incomes and deepens rural poverty. The outcome of this is an increase in food insecurity as local production declines, while food prices increase due to shortages. Consequently, the overall agricultural economy becomes less viable, threatening long-term development in the region.[40]

[37] World Bank, (2020).
[38] World Bank, (2020).
[39] FAO, (2021a).
[40] IFAD, (2019)

4.4 GENDER DYNAMICS IN SEED SYSTEMS DEVELOPMENT IN NIGERIA

In Shira and Ningi Local Government Areas (LGAs), farming activities are influenced by entrenched gender dynamics that determine access to resources, roles in production, and overall decision-making.[41] While both men and women contribute significantly to agricultural production, women remain disadvantaged due to socio-cultural, economic, and institutional barriers. This section focuses on the predominant gender context of farming in Shira and Ningi, highlighting the division of labour, access to resources, and the challenges faced by women farmers. The discussions below outline the main barriers women face in seed systems development and the agricultural sector at large.

4.4.1 GENDERED DIVISION OF LABOR AND ROLES IN SHIRA AND NINGI

In the North of Nigeria, men are traditionally viewed as heads of households and primary farmers. They dominate land ownership, decision-making, and major aspects of agricultural production. Men cultivate staple food crops such as maize, rice, and millet, and control high-value produce. In livestock production, men are more involved in trading animals such as sheep and goats, giving them overall control over productive household assets and income.

In contrast, although women are indispensable to farming, their roles are often undervalued and described as supportive.[42] They contribute extensively to both domestic and agricultural activities, including planting, weeding, fertilizer application, and post-harvest tasks such as processing, storage, and small-scale marketing. In some cases, women also engage in animal rearing and management. Despite this, their contributions are rarely recognized on per with men's roles.

4.4.2 ACCESS TO AND CONTROL OF RESOURCES

Land ownership is one of the most critical gender disparities found in Bauchi State. Patriarchal and customary systems largely deny women's the right to own land. In limited cases, women's may acquire land through inheritance or purchase, but their access remains insecure. This discourages long-term investments in land, such as tree planting and sustainable farming practices.

In terms of access to finance, women face significant obstacles in accessing financial services. Credit facilities and agricultural loans are mostly designed for men, leaving women unable to secure the capital needed to expand or improve their farms. This limitation perpetuates low productivity and restricts women's economic empowerment and adoption of improved technologies.[43]

In terms of access to agricultural inputs and technology, women farmers are often marginalized and lack access to agricultural inputs, improved technologies, and extension services. Many rely on outdated tools, which hinder efficiency and output. Extension

[41] Afolabi (2008, June 19–July 21).
[42] Obayelu et al., (2020).
[43] IFAD, (2019); RFLD. (2023)

programs and government interventions tend to prioritize men, overlooking women's as active farmers and instead framing them as mere assistants.

4.4.3 CHALLENGES AND CONSTRAINTS FACED BY WOMEN FARMERS

In northern Nigeria, socio-cultural norms and religious beliefs strongly influence women's participation in agriculture. In Shira LGA, a proposed legal framework has sought to ban women and teenage girls from farming, citing cultural and safety concerns.[44] This illustrates how entrenched socio-cultural norms restrict women's mobility and visibility in farming, despite their vital contributions.

Economic Barriers: High costs of inputs such as fertilizers, farm labor, and land rental posed major challenges to women, coupled with limited access to credit (loan), these factors prevent women from scaling up their farming activities or adopting improved farming methods.[45]

Infrastructure and Post-Harvest Losses: Women face inadequate access to storage facilities, processing equipment, transport systems, and markets. These limitations often lead to significant post-harvest losses and reduce women's ability to maximize income from their produce. [46]

Limited Access to Information: Female farmers have insufficient access to information such as weather forecasts, market trends, and climate-smart practices. This restricts their capacity to make timely and informed decisions, further weakening their resilience to climate variability and shocks. [47]

4.5 LEGAL CONTEXT: SEED POLICY

Nigeria's seed policy has evolved from government-led programs in the 1970s to a more structured, private-sector-focused system. This shift is primarily guided by the National Agricultural Seeds Council (NASC) Act of 2019, the National Seed Policy (2021) and the National Agricultural Seed Road Map (NASRM) of 2020 which provide the policy and regulatory framework for the formal seed sector.

The central goal of formal seed sector policy is to ensure food security, boost farmer income, and promote a robust seed industry. The 2019 NASC Act established a strong legal framework to ensure quality control, protect plant breeders' rights, and align with ECOWAS seed regulations.

[44]Emmason, J. (2025, August 2)
[45] Obayelu, A. E., Ogbe, A. O., & Edewor, S. E. (2020); FAO (2011)
[46] RFLD. (2023) ; IFAD, (2020); FAO (2011)
[47] FAO (2011)

Box 4: Key Objectives and Role of the NASC

The Seed policy and the NASC focus on several key areas:

- *Encouraging private-sector participation*: The government's role has shifted from directly producing and distributing seeds to regulating and overseeing the industry.
- *Ensuring seed quality*: The NASC establishes a rigorous system of quality control, certification, and inspection to protect farmers from fake or substandard seeds.
- *Enhancing seed availability and access*: The policy aims to create an efficient supply chain that provides farmers with affordable, high-quality seeds.
- *Supporting varietal development*: The policy promotes the research, development, and release of new crop varieties and protects the rights of plant breeders.
- *Regulating import/export*: The NASC strictly regulates the movement of seeds in and out of the country, ensuring they comply with national and biosafety standards.
- *Harmonizing with regional policies*: Nigeria's seed laws align with the Economic Community of West African States (ECOWAS) Seed Regulations to facilitate regional trade.

A dedicated policy framework also exists for community-based seed production (CBSP). The Nigeria 2014 Seed Policy formally protects the CBSP approach, defining it as an approach "directed at empowering registered farmer groups to produce seeds from traceable source(s) and make them accessible to other actors within and around their communities".[48] This semi-formal seed system brings together core elements of both formal and informal systems: farmer groups or producer cooperatives produce and market seeds inspected and certified by NASC, with supply extending to members of their groups and surrounding communities. A NASC survey in 2016 identified 712 farmer groups engaged in this system nationally, with 92% (655) producing and marketing Certified Seeds.[49]

The crops promoted through CBSP in Nigeria include groundnut, yams, cassava, cowpea, ginger, cocoyam, potatoes, millet, rice, maize, sorghum, soybean, and sesame. Several of which are key staples in the Shira and Ningi LGAs covered by this assessment. The CBSP approach is increasingly attracting support from donor-funded programmes given its potential to make certified seeds more available to farmers at accessible prices, enhance investment by farmer groups, and ensure access to farmer- and market-preferred varieties.[50] This policy context is directly relevant to the SSSA findings, as CBSPs represent an emerging and underutilised channel in the project area (see Section 5).

[48] Vabi *et al.*, (2018a)
[49] Vabi *et al.*, (2018a)
[50] Vabi *et al.*, (2018b)

Seed Policy in Bauchi State

Bauchi State's seed policy is integrated into its broader agricultural development initiatives. The state government, often in partnership with federal bodies and private companies, implements several programs:

- *Seed distribution and subsidies*: The government directly provides certified seeds and improved crop varieties to smallholder farmers, often with subsidies, to improve their yields.
- *Seed multiplication and quality control*: The state establishes seed farms and collaborates with registered private companies to ensure the availability and quality of seeds, adhering to national standards set by the NASC.
- *Focus on specific crops*: The policy prioritizes crops vital to the local economy and food security, such as maize, rice, wheat, and groundnuts.
- *Role of the BSADP*: The Bauchi State Agricultural Development Programme (BSADP) plays a crucial role in implementing these policies by providing extension services, facilitating input supply, and conducting on-farm research.

4.6 PLANT BREEDING AND SEED STRUCTURES BACKGROUND

Plant breeding and seed system development, plays a vital role in ensuring food security, poverty reduction, and economic growth. The Nigerian seed sector has gradually transformed from indigenous farmer-led practices to a structured system that integrates public research institutions, private companies, and regulatory bodies. The Nigerian agricultural sector has a dual system for plant breeding and seed distribution, blending traditional methods with modern, formalized structures. The system is crucial for achieving food security and economic growth.[51]

Plant Breeding in Nigeria

Plant breeding in Nigeria has evolved from early colonial-era botanical gardens to a formalized system driven by key institutions. The International Institute of Tropical Agriculture (IITA) and National Agricultural Research Institutes (NARIs), such as the National Cereals Research Institute (NCRI) and the National Root Crops Research Institute (NRCRI), have been instrumental in developing high-yielding, disease-resistant, and biofortified crop varieties like vitamin A cassava.[52]

Table 5 below provides an overview of registered crop varieties for Sudan and Sahel Savanna ecologies that are suitable for the project implementation areas Crop Diversity for Food Security in West Africa project areas where the SSSA was conducted.

[51] World Bank, (2019).
[52] IITA, (2020).

Table 5. NACGRAB-Registered Crop Varieties for Sudan and Sahel Savanna Ecologies: Suitable for project implementation areas.

Crop	Variety	Key Characteristics	Agro-Ecology
Sorghum	SAMSORG 45	Early maturity, high Fe content (128.99ppm)	Sudan & Sahel Savanna
	SAMSORG 46	Early maturity, moderate Fe content (53.92ppm)	Sudan & Sahel Savanna
	SAMSORG 47	High grain yield	Sudan & N. Guinea Savanna
	SAMSORG 49	Early maturing	Sudan & Sahel Savanna
	SAMSORG 52	Fe-dense (55ppm), Striga tolerant, dwarf	Sahel & Sudan Savanna
	SAMSORG 53	High grain/biomass, Fe-dense (54ppm), Striga tolerant	Sudan Savanna
Pearl Millet	SUPER SOSAT	High grain yield (74.2ppm) & Zinc (44.7ppm)	
	LCICMV-5 (Chakti)	High Iron (74.2ppm) & Zinc (44.7ppm)	Sahel
	LCICMV-6	High yielding	Sudano-Sahelian
	LCIC MH2	Early maturity, high yield, high Zinc	Sudano-Sahelian
Sesame	NCRIBEN-04E	High yield, high oil content, early maturity	Savanna
	NCRIBEN-05E	High yield, high oil content, early maturity	Savanna
	NCRIBEN-07E	High yield	Savanna
Rice	FARO 63	Early maturity, high yield, 6.2t/ha	
	FARO 64	Early maturity, drought tolerance, 5.2t/ha	Savanna, Sudan Savanna
	FARO 65	Early maturity, drought tolerance, 6.4t/ha	Savanna & Rainforest
	FARO 66	Submergence tolerant, high yield, 6.7t/ha	Savanna & Rainforest
	FARO 67	Submergence tolerant, high yield, 6.7t/ha	Sudan Savanna
	GAWAL R1	Blast tolerant, high yield, 10.4t/ha	Savanna & Rainforest
	Ex Badaru	Early maturity, high tillering, 9.9t/ha	Lowland
	FARO 44	Long grain, optimum production under low management	Sudan Savanna
Soybean	TGx 1951-3F	Low shattering, rust tolerant, 2.5t/ha	
	NCRISOY 1	Extra early, rust & bacterial pustule resistant	
	NCRISOY 2	High yield, promiscuous nodulation	
	NCRISOY 4	High yield, high protein & oil, early maturing	

Modern Initiatives in Bauchi State

In Bauchi State, modern initiatives have been introduced to improve crop yields. This includes the promotion of improved and hybrid crop varieties that are high-yielding and resistant to pests and diseases. Research institutions like IAR, IITA, and ICRISAT collaborate with the state government to breed and distribute these new varieties. The NASC oversees the registration of seed companies that supply certified seeds to farmers. The state government also provides support through its Ministry of Agriculture and Rural Development, distributing certified seeds and providing training via the Bauchi State Agricultural Development Programme (BSADP).

Challenges and Opportunities

Many farmers in Bauchi still lack access to certified seeds and modern inputs, and traditional low-yielding varieties remain widespread. Weak distribution systems and poor post-harvest management also limit productivity. On the other hand, new opportunities exist. The state government is investing in irrigation projects for year-round agriculture, establishing an Agro-Industrial Hub, and revitalizing its fertilizer plant. Private seed companies are expanding, farmers engagement with NGOs, creating prospects for improved seed access, with stronger public-private partnerships. Bauchi State, and Nigeria as a whole, can significantly boost agricultural productivity.

5 FIELD FINDINGS IN NINGI AND SHIRA LOCAL GOVERNMENT AREA

As indicated, the SSSA was conducted during the 2025 cropping season, to assess whether seed channels used by smallholder farmers in Bauchi state facilitate access to good quality seed to meet farmers' needs. Data for this SSSA was collected between 24-30 July 2025. At the time of data collection farmers had started planting for the 2025 rainy season.

The findings cover the seed security findings for two Local Government Areas (LGA) in Bauchi state, Shira and Ningi. The SSSA analysis is structured to focus on two main themes, acute and chronic seed security. Findings from the short-term acute seed security situation for the 2024 (June-November) season and the 2025 (June-November) season are presented first. This is followed by an analysis of trends over multiple seasons to assess chronic seed security issues and emerging development opportunities.

The findings of this SSSA are provided in 4 main sub-sections. Section 5.1 provides an analysis of the acute seed security situation in Ningi and Shira LGA based on the findings over the 2024 and 2025 seasons. Chronic seed systems concerns, and emerging opportunities are discussed in section 5.2. Because the proportion of women in the household survey is only 7 percent, a gender disaggregated analysis of data is not carried out in depth, given the lack of statistical significance. However, in section 5.3, an analysis of gender dynamics in seed systems development is provided cantered on the findings of the women only focus group discussions. A concluding discussion is provided in section 5.4. The findings from Ningi and Shira LGA varied, somewhat. Consequently, individual analysis is provided in select instances to bring out the location-specific contexts.

5.1 ACUTE SEED SECURITY FINDINGS FOR NINGI AND SHIRA LGA

Assessment of short term (acute) seed security addressed the issue of how and where farmers sourced their seed in the two seasons, 2024 (last season) and 2025 (next season). Did farmers in Ningi and Shira plant the same "normal" amounts or less than their normal? How do farmers evaluate their seed security for the upcoming season (2025)? To understand seed system stability and resilience, it is also important to analyse trends over multiple seasons.

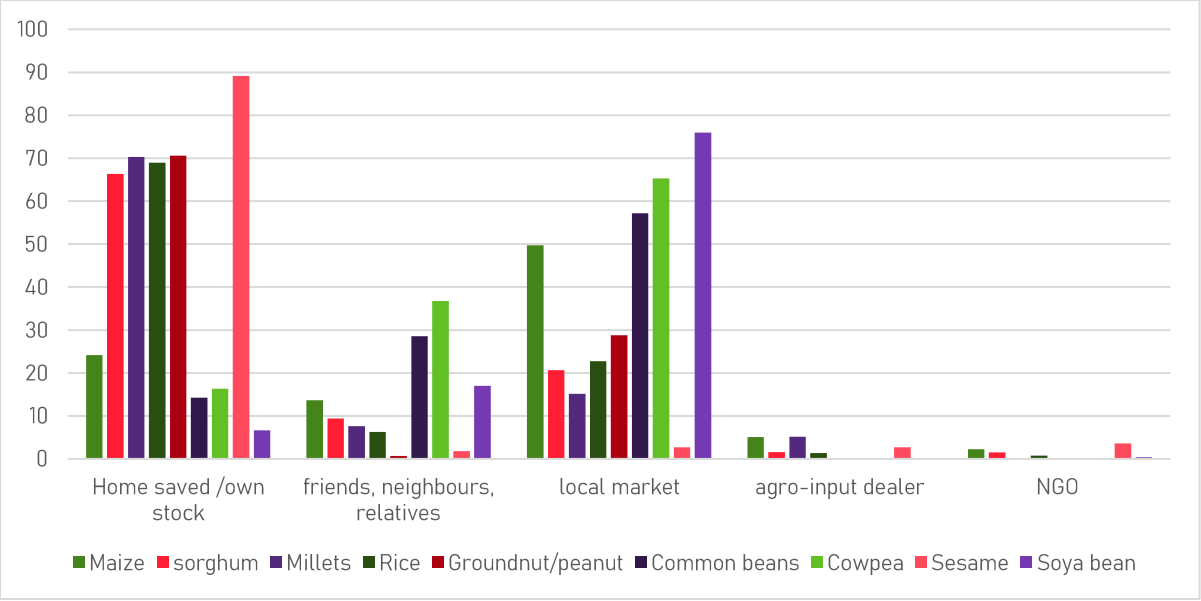
5.1.1 FARMERS SEED SOURCES IN THE 2024 SEASON

Table 6 and Figure 8 below provide insight into where farmers in Shira and Ningi source their seed and the quantities they planted during the 2024 season. These findings, based on the household survey, indicate that home saved seed, social networks and local markets are the most important source of seed for smallholder farmers in the two local government areas. During the season, most seeds planted were from farmers own saved seed (66 percent). Home saved seed were important for several crops, but particularly for sesame, sorghum, ground nut, millet and rice (see Figure 9).

Table 6: Proportion of seed planted by source in the current season (2024)

Crop	Home saved /own stock	Friends, neighbours, relatives	Local market	Agro-input dealer	Community-based seed groups	Government	NGO
Maize	24,2	13,6	**49,8**	5,0	4,8	0,8	2,2
Sorghum	**66,3**	9,4	20,7	1,6	0,0	0,0	1,5
Millets	**70,3**	7,6	15,2	5,1	0,0	1,0	0,0
Rice	**69,0**	6,3	22,8	1,4	0,0	0,2	0,8
Groundnut/peanut	**70,6**	0,7	28,8	0,0	0,0	0,0	0,0
Common beans	14,3	28,6	**57,1**	0,0	0,0	0,0	0,0
Cowpea	16,3	**36,7**	**65,3**	0,0	0,0	0,0	0,0
Sesame	**89,1**	1,8	2,7	2,7	0,0	0,0	3,6
Soya bean	6,6	17,0	**75,9**	0,0	0,0	0,0	0,4
TOTAL-all crops	**66,1**	7,1	23,9	1,7	0,2	0,2	0,9

Figure 8: Farmers' seed sources in Shira and Nigi LGA for the current season (2024)- Percentage of total

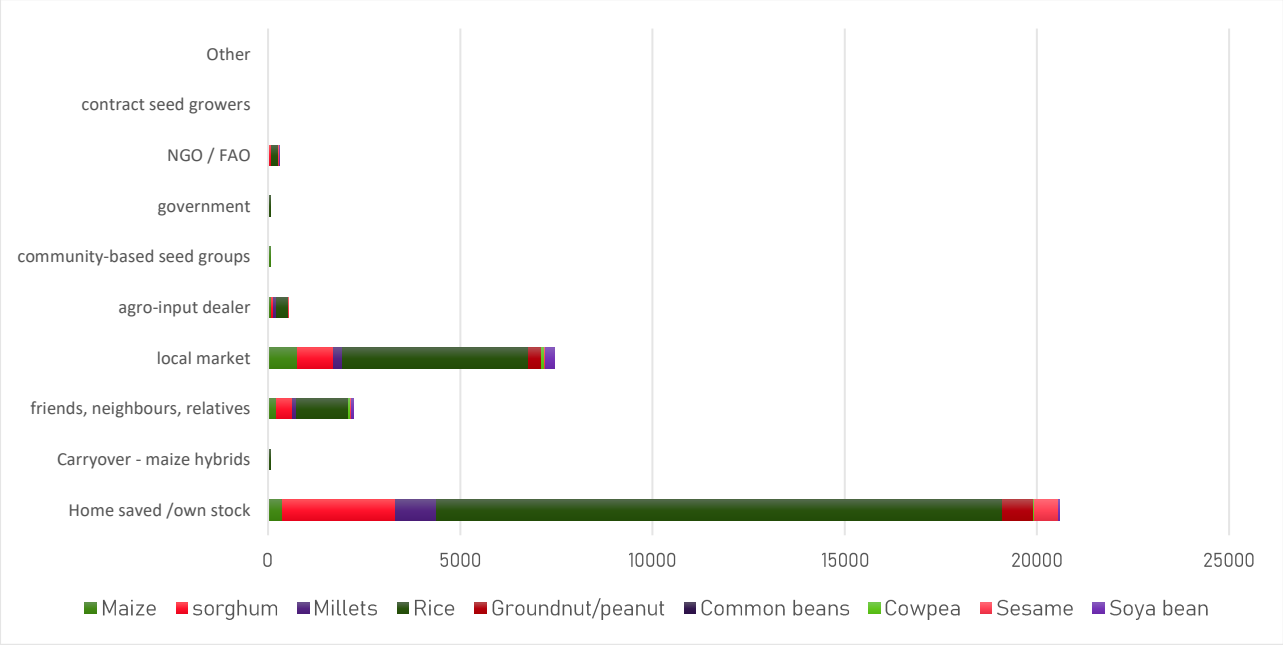


In addition to their own stock, farmers also sourced 7 percent and 24 percent of their seed from social networks and local markets respectively as indicated in Table 6. Social networks (neighbours, friends and family) were the primary source of seed for the legumes-cowpea, common beans and soya beans. In addition to the legumes, about 14 percent of maize seed was obtained from social networks. The crops for which farmers sourced seed from the market were cowpea, common beans and maize.

Interestingly, seeds from community-based seed producer (CBSP) groups was negligible, accounting for only 0.2 percent of seed planted. Despite Bauchi state being one of the biggest groundnuts producing states (through CBSPs), only maize seed being sourced through CBSPs. The low amount seed sourced from this channel could be because community-based seed production is relatively new in Nigeria. CBSPs have been promoted since 2022 through the National Seed policy of the same year. Only a small proportion of seed in both Ningi and Shira was from NGOs as can be seen in Table 6.

Very few agro dealers were found in the Ningi and Shira local government area. In both sites 2 percent of the seeds planted in the 2024 season was from agro dealers. Agro dealers were a source of seed for 5 percent of maize, and millet planted during the season and contributed to 3 percent or less of sesame rice and sorghum planted. In the 2024 season the informal sector was the source of 98 percent of seed planted, with only 2 percent coming from the formal sector (see Table 6 and Figure 8). Overall, both Ningi and Shira, the findings highlight the importance of the informal seed system to smallholder farmers.

Figure 8: Farmers seed sources by crop in the 2024 season



5.1.2 FARMERS PRODUCTION AND ASSESSMENT OF SEED QUANTITY AND YIELD IN THE 2024 SEASON

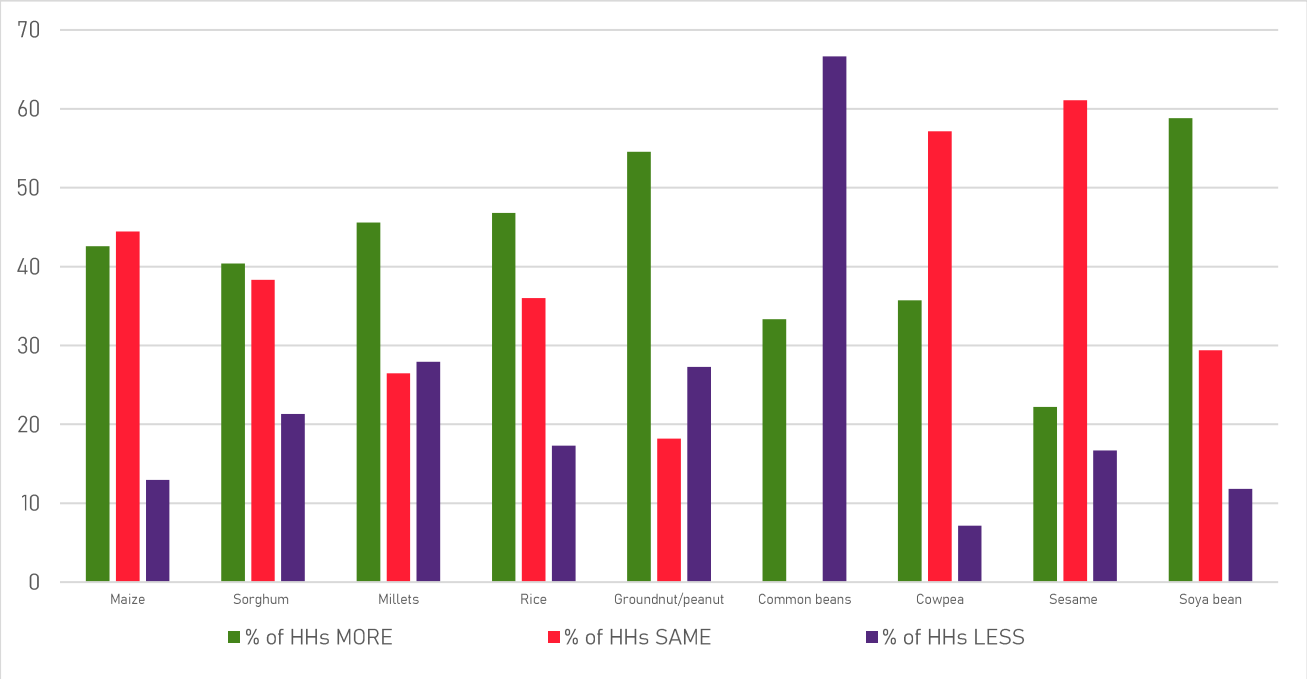
In the household survey farmers were asked to compare by crop the quantities of seeds that they planted in the 2024 season with what they would *normally* plant at the same time each year. This was done to establish possible vulnerability based on farmers' own assessment.

Responding to the question of whether they had planted *more, less or the same as they "normally" do*, farmers indicated a 45 percent increase in the amount planted for all crops by as shown in Table 7 and Figure 10 below. Except for sesame, farmers planted the same amount as normal or more, indicating an overwhelmingly positive upward trend. This suggests that the 2024 season was not a high stress season; it was a good season for farmers.

Table 7: Farmers sowing amounts for the 2024 season–did they plant More, Less or Same?

Crop	Number of HHs	% of HHs			Change sowing quantities for all growing the crop
		MORE	SAME	LESS	average % change
Maize	54	42,6	44,4	13,0	63,83
Sorghum	141	40,4	38,3	21,3	38,19
Millets	68	45,6	26,5	27,9	15,34
Rice	139	46,8	36,0	17,3	65,56
Groundnut/peanut	11	54,5	18,2	27,3	71,21
Common beans	3	33,3	0,0	66,7	
Cowpea	14	35,7	57,1	7,1	44,64
Sesame	18	22,2	61,1	16,7	*-2,30*
Soya bean	17	58,8	29,4	11,8	30,00
TOTAL–all crops	465	43,4	37,0	19,6	45,30

Figure 10: Farmers sowing amounts for the 2024 season–did they plant more, less or same?

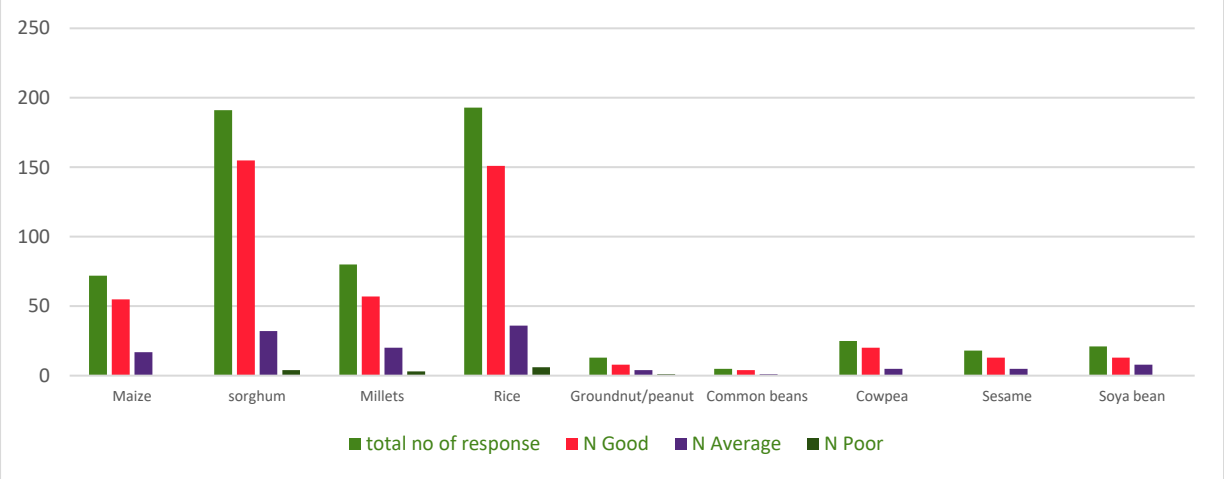


Sowing/planting quantities alone do not provide a complete picture farmers' seed security situation. Gaining insights into crop yields is also an important indicator. What the findings indicate is that beyond the upward trend in production, farmers were primarily happy with crop yields from the 2024 season. Across all crops 77 percent of farmers evaluated their overall yield as good and 21 percent as average. Only a small proportion of farmers assessed their overall yield as poor (see Table 8 below). Farmers were very positive about the yield from their key crops sorghum, millet, rice and maize, and rated the yield from these crops as good as indicated in Table 0 and Figure 11 below.

Table 8: Farmers assessment of yield/production in this current season (2024)-for crops

Crop	Total no of responses	How was the yield?					
		N			%		
		Good	Average	Poor	Good	Average	Poor
Maize	72	55	17	0	76.4%	23.6%	0.0%
Sorghum	191	155	32	4	81.2%	16.8%	2.1%
Millets	80	57	20	3	71.3%	25.0%	3.8%
Rice	193	151	36	6	78.2%	18.7%	3.1%
Groundnut/peanut	13	8	4	1	61.5%	30.8%	7.7%
Common beans	5	4	1	0	80.0%	20.0%	0.0%
Cowpea	25	20	5	0	80.0%	20.0%	0.0%
Sesame	18	13	5	0	72.2%	27.8%	0.0%
Soya bean	21	13	8	0	61.9%	38.1%	0.0%
TOTAL-all crops	**618**	**476**	**128**	**14**	**77.0%**	**20.7%**	2.3%

Figure 11: Farmers assessment of yield in the 2024 season



Farmers Assessment of Seed Quality in the 2024 Season

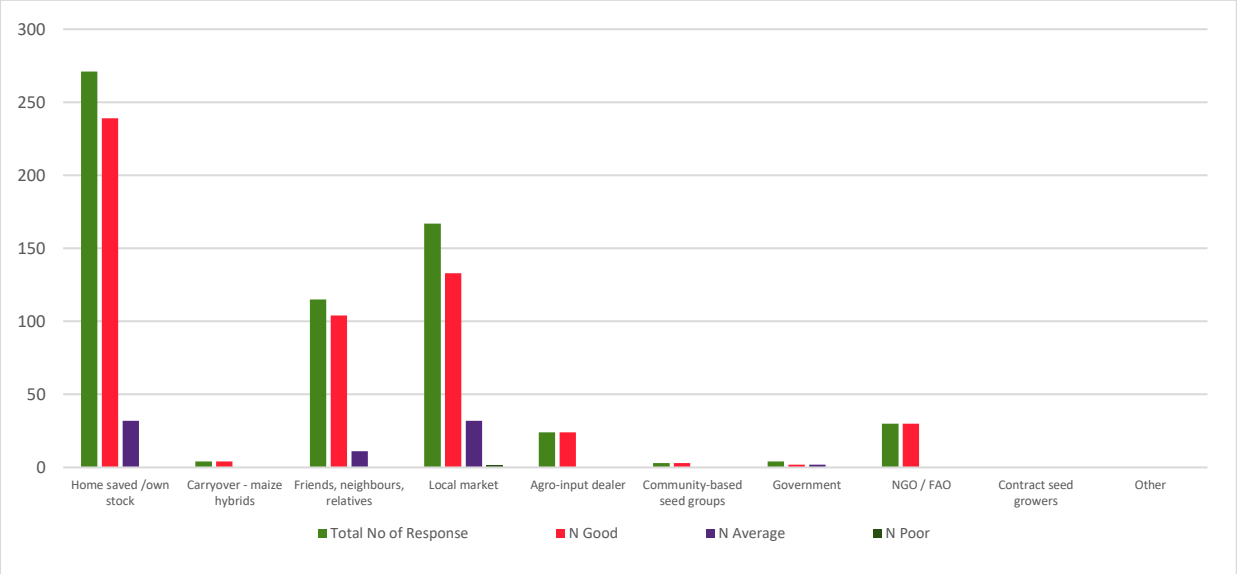
As part of the SSSA, farmers were also asked to rate the quality of seed sourced from different channels. These findings are therefore *farmers' own perceptions* about the quality of the seed they use.

In the 2024 season almost all farmers were generally happy and positive about the quality of seed sourced for all their crops. As Table 9 highlights, farmers felt that 87 percent of the seed for various crops as good. Twelve (12) percent assessed the quality of seed to be average, while no farmers felt that the seed they used was poor. Farmers similarly were also generally happy with the quality of the seed from all seed channels (see Figure 12).

Table 9: Farmers assessment of seed quality in the current season (2024)

Crop	Quality of seed used?						
	N total	N			%		
		Good	Average	Poor	Good	Average	Poor
Maize	72	61	11	0	84.7%	15.3%	0.0%
sorghum	191	166	25	0	86.9%	13.1%	0.0%
Millets	80	72	8	0	90.0%	10.0%	0.0%
Rice	193	166	25	2	86.0%	13.0%	1.0%
Groundnut/peanut	13	11	2	0	84.6%	15.4%	0.0%
Common beans	5	5	0	0	100.0%	0.0%	0.0%
Cowpea	25	22	3	0	88.0%	12.0%	0.0%
Sesame	18	18	0	0	100.0%	0.0%	0.0%
Soya bean	21	18	3	0	85.7%	14.3%	0.0%
TOTAL-all crops	**618**	**539**	**77**	**2**	**87.2%**	**12.5%**	0.3%

Figure 12: Farmers assessment of seed quality from various seed channels in the 2024 season



5.1.3 FARMERS SEED SOURCES AND QUANTITIES PLANTED IN THE 2025 SEASON

The household survey also asked farmers about the seed sources and quantities planted for the next (2025) season. At the time the data was collected many farmers had just planted or were preparing to plant. Consequently, this provides "hard "data for the 2025 season and provides an indication of the challenges or stress farmers were experiencing.

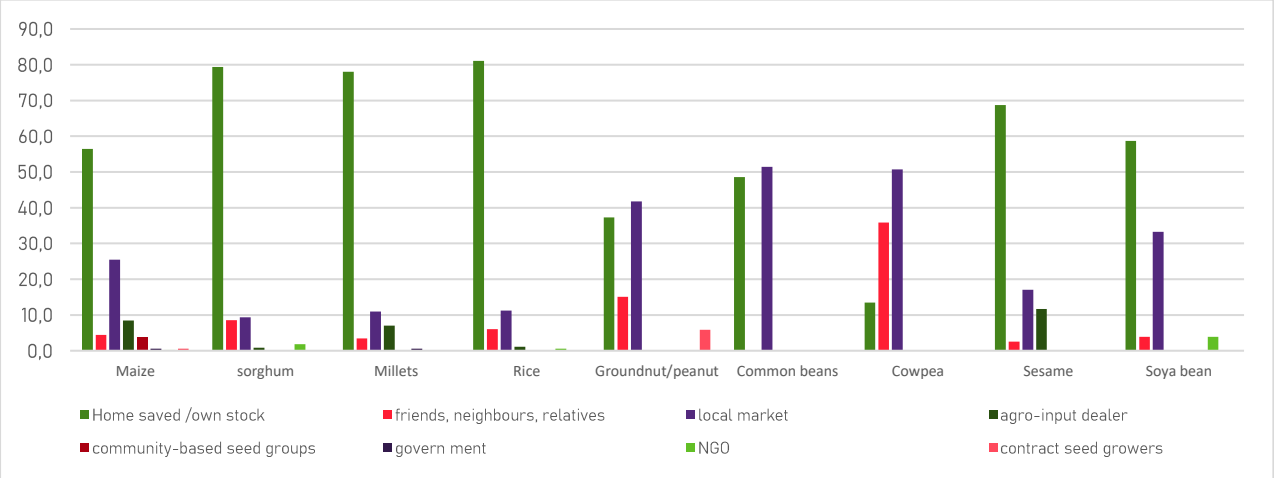
In both local government areas, farmers' seed sourcing strategies in the 2025 season closely mirrored those adopted in the 2024 season (see Table 10 and Figure 13 below). The data indicates that the farmers had a good harvest and obtained most of their seed from their own stock (77 percent). During the 2025 season, more than 75 percent of the rice, sorghum and millet was home saved seed. In addition, more than 60 percent of sesame planted was from the same source.

The proportion of seed from social networks remained relatively the same in the 2025 season as it was in the 2024 season at around 7 percent. Cowpea remained a crop farmers sourced through their social networks. However, farmers sourced more groundnut (14 percent more) than maize (9 percent less) through their social networks in the 2025 than they did in the 2024 season.

Table 10: Seed (percent) planted and sources used by farmers in Ningi and Shira during the 2025/26 season

Crop	Total kg sowed	% of Total							
		Home saved /own stock	friends, neighbours, relatives	local market	agro-input dealer	community-based seed groups	government	NGO	contract seed growers
Maize	1324,8	**56,5**	4,5	25,5	8,5	3,8	0,6	0,2	0,6
sorghum	3976,7	**79,4**	8,6	9,4	0,8	0,0	0,0	1,9	0,0
Millets	1375,3	**78,0**	3,5	11,0	7,0	0,0	0,5	0,0	0,0
Rice	23517,2	**81,1**	6,0	11,2	1,1	0,0	0,0	0,6	0,0
Groundnut/ Peanut	1282,4	**37,3**	15,1	**41,7**	0,0	0,0	0,0	0,0	5,8
Common beans	136,2	**48,6**	0,0	**51,4**	0,0	0,0	0,0	0,0	0,0
Cowpea	83,8	13,4	**35,8**	**50,7**	0,0	0,0	0,0	0,0	0,0
Sesame	154,5	**68,7**	2,6	17,0	11,7	0,0	0,0	0,0	0,0
Soya bean	319,3	**58,7**	3,9	**33,3**	0,0	0,0	0,0	3,9	0,0
TOTAL-all crops	32169,9	**77,4**	6,6	13,3	1,6	0,2	0,0	0,7	0,3

Figure 13: Planned/Actual seed sources in Shira and Nigi LGA for the current season (2025)



Even after a good season in 2024, the local market remains important although farmers sourced 11 percent *less* of their seed from the market in the 2025 season. The 11 percent decline in seed purchases corresponds to an equivalent increase in the use of farmers' own stock for planting. In the 2025 season farmers sourced/planned to source 13 percent of their seed from the local market primarily for the legumes and maize (see Table 12). In both seasons, local markets were an important source of seed for maize and crops such as the legumes which farmers don't like to store due to pest and disease. In both seasons community-based seed producers (CBSP) were a source of seed for only one crop, maize.

Consequently, in the 2025 season, the informal seed system remained a primary source of seed and was particularly important for cereals and legumes. Only 2 percent of seed was sourced from the formal seed system in both seasons.

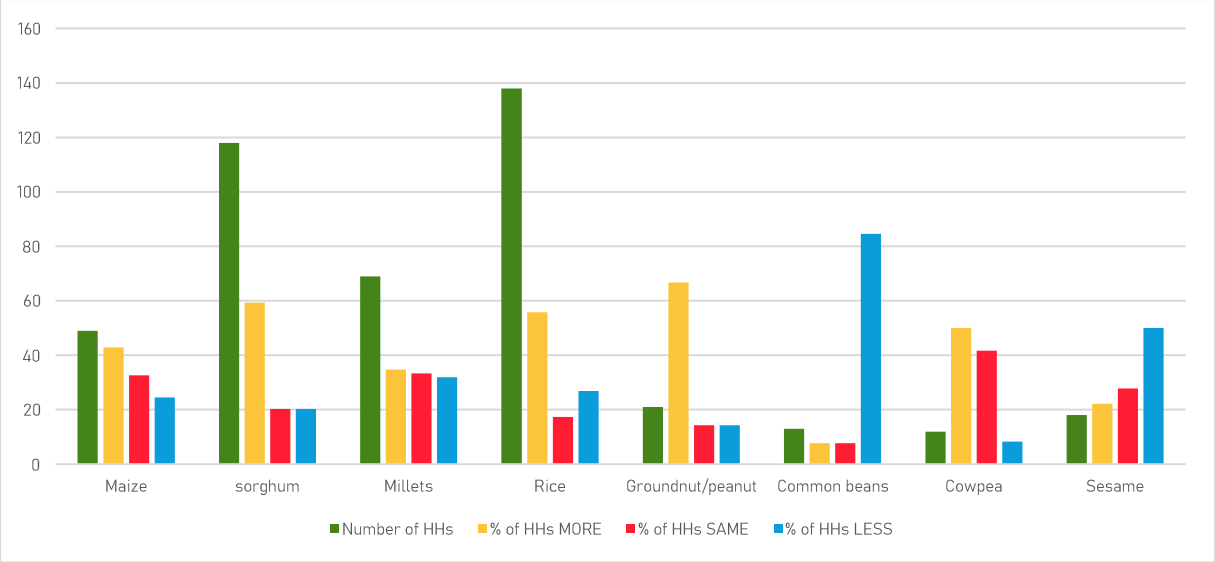
5.1.4 WHERE FARMERS STRESSED IN THE 2025 SEASON?

As with the 2024 season, farmers were asked to assess whether the amounts they plant/planned to plant in the 2025 season was the *same, more or less than they "normally"* planted of each crop at the same time each year. Farmers' responses indicate a positive second season across all crops. Seventy-three percent (73 percent) of farmers planned to maintain or increase the amounts planted in the 2025 season (see Table 11 and Figure 14). This shows a continued upward trend in production, with an overall increase of 77 percent.

Table 11: Farmers sowing amounts for the current season (2025)-More, Less or Same as usual?

Crop	Number of HHs	% of HHs			Change sowing quantities for all growing the crop
		MORE	SAME	LESS	average % change
Maize	49	42.9	32.7	24.5	64.84
sorghum	118	59.3	20.3	20.3	80.47
Millets	69	34.8	33.3	31.9	10.26
Rice	138	55.8	17.4	26.8	121.92
Groundnut/peanut	21	66.7	14.3	14.3	217.80
Common beans	13	7.7	7.7	84.6	*-31.52*
Cowpea	12	50.0	41.7	8.3	22.57
Sesame	18	22.2	27.8	50.0	*-12.13*
Soya bean	20	60.0	25.0	15.0	55.03
TOTAL-all crops	**458**	**50.0**	**23.4**	**26.6**	77.09

Figure 14: Change in farmers sowing quantities in the 2025 season-did they plant More, Less or Same as usual?



5.1.5 REASONS WHY FARMERS PLANTED MORE, LESS OR THE SAME IN THE 2024 AND 2025 SEASONS

The reasons farmers increased or decreased production in the 2024 and 2025 seasons is reflected in their responses to why they planted more or less. In both seasons seed access, land and labour challenges influence seed security in Ningi and Shira (see Table 12 and Table 13). For both seasons, increased land availability was a key factor determining increased or decreased production. Lack of money to purchase seed and insufficient labour were factors that negatively impacted household production.

Food security concerns positively influenced planting behaviour in both years, but more so in 2025 as discussed below. Increased intensification of rice, sorghum and maize can be seen for both seasons, aligning with the focus on food security in the case of millet and sorghum, while maize potentially for income generation as well. Interestingly, the data suggests that there are limited market opportunities driving seed use in Ningi and Shira. Further analysis into why farmers planted more and less is provided below.

Why Farmers Planted More, the Same or Less in the 2024 and 2025 Seasons

Reasons Farmers Planted LESS

To understand why farmers planted more or less than their normal, as part of the household survey they were asked to provide the reasons for their increased or decreased planting. This information helps to gain better insights into potentially hidden vulnerabilities in farming communities. While production trends were positive in both seasons, 19 percent and 27 percent of farmers sowed less than their normal in the 2024 and 2025 seasons respectively. The reasons why farmers in the two-season planted less than normal can be seen in Tables 12 and 13 below.

The household survey also asked questions to get insight into “seed related”, “non seed factors of production” and “other priorities/strategies” that determined farmers planting strategies in both seasons. As Figure 15 and 16 indicate, non-seed related factors were the main reason why farmers in both seasons planted less.

“No money for seed” and insufficient land were two top reasons why farmers planted less in both seasons. In the 2024 season 37 percent of farmers cited seed related reasons for why they planted less. In the household survey seed related reasons were sub categorized according to *seed availability*, *seed access* and *seed quality* factors. In the 2025 season, 23 percent of farmers (14 percent less than the past season) attributed their reduced production to lack of money.

In both seasons, farmers did not cite seed availability and quality as a reason for reduced planting. The fact that farmers planted less due to lack of money indicates a seed access issue in the two seasons (see Table 12 and Table 13).

Figure 15: Why farmers planted LESS than normal in the 2024 season

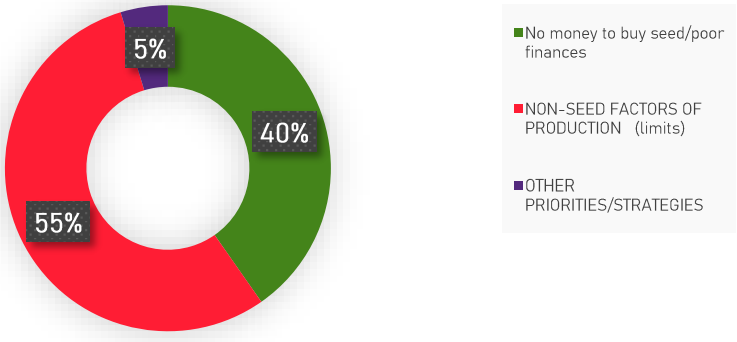
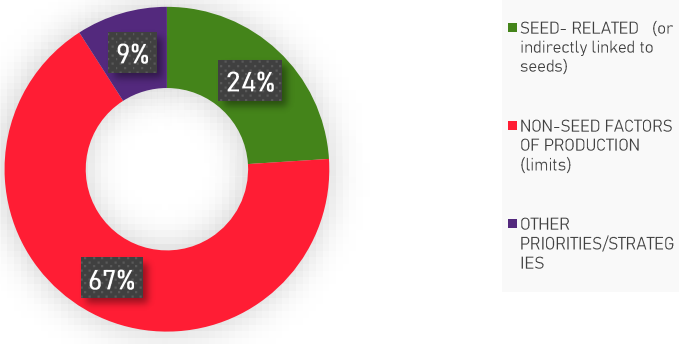


Figure 16: Why farmers planted LESS than normal in the 2025 season



As Table 12 and 13 indicate, various non-seed related factors influenced farmers planting strategies and were the reason for 52 percent and 66 percent of farmers planting less in the 2024 and 2025 seasons respectively. The main non-seed related reason farmers planted less was lack of land. In the two seasons, more than 20 percent of farmers planted less due to insufficient land. This decline is believed to be due to the reduced availability of farmland. Increased land demand from farmers migrating from other states, who offer higher rental prices, has limited local farmers' access to affordable land. For example, in Ningi, half a hectare is now rented for NGN 100,000 (US$ 73) per season.

Insufficient labour negatively impacted more farmers in the 2024 season resulting in farmers planting less than they did in the 2025 season for this reason. The data also suggests that farmers planted less due to a lack of availability of other inputs (including fertilizers and irrigation). However, it is interesting to note that in both years the cost of inputs was not a significant concern for farmers as none cited “high cost of non-seed inputs” as a reason for reduced planning. To a lesser extent, other priorities/strategies beyond the seed and non-seed related factors influenced farmers planting less in the two seasons. For a very small number of farmers, changing crop varieties in both seasons resulted in less planting in both seasons (see Table 12).

It is important to note that seed availability was not cited as a major reason farmers planted less in both the 2024 and 2025 season. In 2024 no farmers cited this reason, while in 2025 only 0.8 percent indicated that they planted less due to "no seed/cuttings available from neighbours." Consequently, farmers' reasons for planting less than normal in the two seasons suggests a lack of purchasing power and primarily non seed related factors namely- lack of land, labour and inputs.

Table 12: Reasons farmers gave for planting LESS than normal in the 2024 season

Reasons	N	% of responses
SEED- RELATED (or indirectly linked to seeds)		
Seed availability		
No seed available in market	0	0,0%
No seed/cuttings available from neighbours	0	0,0%
Seed access		
No money to buy seed/poor finances or seed too high	34	37,8%
Seed quality		
Seed available is not good quality or the variety is not liked	0	0,0%
Sub-total: seed-related	**34**	**37,8%**
NON-SEED FACTORS OF PRODUCTION (limits)		
No/insufficient labor	15	16,7%
Illness/health problems	0	0,0%
No/insufficient land or land not appropriate/sufficiently fertile	21	23,3%
Lack of tools/tractor/ other machinery to farm	3	3,3%
Plant pests/diseases make production not possible	0	0,0%
Animals/predator make production not possible	0	0,0%
Lack (availability) of other inputs: controlled water supply/irrigation or fertilizer	7	7,8%
Poor weather/rainfall	1	1,1%
Insecurity (e.g. theft)	0	0,0%
Poor quality of agricultural NON-Seed inputs (herbicides, pesticides, insecticides, etc)	5	
High cost of NON seed inputs	0	0,0%
Sub-total: Factors of Production	**52**	**57,8%**
OTHER PRIORITIES/STRATEGIES		
Markets for crop or crop products not well-developed	0	0,0%
Other priorities than agriculture (e.g. have shop)	1	1,1%
Changing Crop priorities or changing agricultural practices	3	3,3%
Other	0	0,0%
New farming methods allow lower seeding rate	0	0,0%
Sub-total: Other priorities/strategies	**4**	**4,4%**
TOTAL	90	100,0%

Table 13: Reasons farmers gave for planting LESS in the 2025 season

Reasons	N	% of responses
SEED- RELATED (or indirectly linked to seeds)		
Seed availability		
No seed available in market	0	0,0%
No seed/cuttings available from neighbors	1	0,8%
Seed access		
No money to buy seed/poor finances or seed too high	28	23,1%
Seed quality		
Seed available is not good quality or the variety is not liked	0	0,0%
Sub-total: seed-related	**29**	**24,0%**
NON-SEED FACTORS OF PRODUCTION (limits)		
No/insufficient labor	8	6,6%
Illness/health problems	1	0,8%
No/insufficient land or land not appropriate/sufficiently fertile	43	35,5%
Lack of tools/tractor/ other machinery to farm	2	1,7%
Plant pests/diseases make production not possible	0	0,0%
Animals/predator make production not possible	0	0,0%
Lack (availability) of other inputs: controlled water supply/irrigation or fertilizer	13	10,7%
Poor weather/rainfall	6	5,0%
Insecurity (e.g. theft)	0	0,0%
Poor quality of agricultural NON-Seed inputs (herbicides, pesticides, insecticides, etc)	8	6,6%
High cost of NON seed inputs	0	0,0%
Sub-total: Factors of Production	**81**	**66,9%**
OTHER PRIORITIES/STRATEGIES		
Markets for crop or crop products not well-developed	0	0,0%
Other priorities than agriculture (e.g. have shop)	1	0,8%
Changing Crop priorities or changing agricultural practices	7	5,8%
Other	3	2,5%
New farming methods allow lower seeding rate	0	0,0%
Sub-total: other priorities/strategies	**11**	9,1%
TOTAL	**121**	**100,0%**

Reasons Farmers Planted MORE in the 2024 AND 2025 Seasons

As Tables 14 and 15 indicate, for more than 70 percent of farmers the reasons why they planted more in both the 2024 and 2025 season were non-seed related. In both years, increased land and labour availability were the top two reasons why farmers planted more. While 48 percent of farmers planted more due to increased land availability in the 2024 season, slightly more farmers, 54 percent, planted more for this reason in the 2025 season. Having more labour accounted for increased production for 14 percent and 8 percent of farmers in 2024 and 2025 respectively.

Table 14: Reasons farmers gave for planting MORE than normal the 2024 season

Reasons	N	% of responses
SEED- RELATED (or indirectly linked to seeds)		
Seed availability		
More seed available due to good harvest	3	1,5%
More seed available due to free seed	2	1,0%
Seed access		
More money to buy seed or seed price low	16	8,0%
got credit or coupon to buy seed	0	0,0%
Seed quality		
Have especially good seed or good variety	21	10,6%
Sub-total: seed-related	42	21,1%
NON-SEED FACTORS OF PRODUCTION (opportunities)		
Good/increased labour	28	14,1%
Feeling strong/healthy	0	0,0%
Have more land/more fertile land	97	48,7%
Have tools/tractor, other machinery to help farm	0	0,0%
Have access to irrigation, fertilizer or other inputs (for example, stakes)	0	0,0%
Good weather/rainfall	11	5,5%
Good security (peace has arrived; less theft)	0	0,0%
Sub-total: Factors of Production	136	68,3%
OTHER PRIORITIES/STRATEGIES		
seeking enhanced income/ well-developed or new markets for crop or crop products	6	3,0%
seeking food security / have decided to give more priority to agriculture	14	7,0%
changed crop profiles or priority to certain crops	0	0,0%
re-sowing due to stress (e.g. poor soils/ low germination rate)	0	0,0%
Other	1	0,5%
Sub-total: Other priorities/strategies	21	11%
TOTAL	199	100,0%

More money to buy seed/seed access (8 percent) and having an especially good variety (10 percent) were the top seed related factors that influenced farmers' increased production in 2024. As Table 14 and 15 indicate, a comparable proportion of farmers in the 2025 season planted more for the same reasons. In addition, increased seed availability from a good

harvest[53] was the reason a small number of farmers planted more in both seasons (see Table 14 and 15).

Other factors that influenced increased production by farmers was the focus on food security. Overall, 7 percent of farmers in 2024 and 11 percent in 2025 increased production in an effort to be more food secure. In both seasons, the data suggests that limited market opportunities drive seed production in Ningi and Shira. Only 3.4 percent and 2.2 percent of farmers in 2024 and 2025 respectively reported that they increased production to improve their income or that well developed or new markets existed for crops or crop products.

Table 15: Reasons farmers gave for planting MORE than normal in the 2025 season

Reasons	N	% of responses
SEED- RELATED (or indirectly linked to seeds)		
Seed availability		
More seed available due to good harvest	5	2.2%
More seed available due to free seed	6	2.6%
Seed access		
More money to buy seed or seed price low	20	8.7%
got credit or coupon to buy seed	1	0.4%
Seed quality		
Have especially good seed or good variety	18	7.9%
Sub-total: seed-related	**50**	**21.8%**
NON-SEED FACTORS OF PRODUCTION (opportunities)		
Good/increased labor	18	7.9%
Have more land/more fertile land	124	54.1%
Good weather/rainfall	5	2.2%
Good security (peace has arrived; less theft)	1	0.4%
Sub-total: Factors of Production	**148**	**64.6%**
OTHER PRIORITIES/STRATEGIES		
seeking enhanced income/ well-developed or new markets for crop or crop products	5	2.2%
seeking food security / have decided to give more priority to agriculture	26	11.4%
Sub-total: other priorities/strategies	**31**	13.5%
TOTAL	**229**	**100.0%**

[53] For the 2024 season the harvest from the season before (2023) and for the 2025 season due to harvest from the 2024 season

Box 5: Reflection on Seed systems smallholder farmers use in Bauchi and Ningi against global experiences

In their foundational paper *"The importance of the farmers' seed systems in a functional national seed sector"* Almekinders and Louwaars (2002) flag the critical role of informal seed systems for smallholder farmers, particularly in regions where formal seed markets are inaccessible or unaffordable. These systems they argued, are driven by farmers' local knowledge, seed exchange, and on-farm saving and complement formal seed systems by providing low-cost, locally adapted seeds that sustain agricultural biodiversity and resilience. While formal systems deliver high-yielding, certified varieties, they often exclude smallholders due to high costs, limited variety options, and rigid regulations. The authors advocate for policy integration that bridges these systems, emphasizing participatory breeding and flexible quality assurance to empower farmers, especially women, who play a central role in seed management.

The work of McGuire and Sperling (2016) on *"Seed systems smallholder farmers use"* further revealed that smallholders strategically combine seeds from multiple sources—saving, exchanging, and purchasing—based on availability, cost, and crop-specific needs, challenging the formal-informal binary. This adaptive behaviour highlights the fluid, interconnected nature of seed systems, where farmers prioritize reliability and affordability over formal certification. However, informal systems face quality variability and limited access to improved varieties, gaps that formal systems could address. Together, these studies acknowledge the importance of pluralistic seed policy that validates farmers' knowledge, strengthens local seed networks, and integrates formal innovations where beneficial, ensuring resilient, inclusive, and productive smallholder agriculture. The findings from this SSSA of Ningi and Shira local government area in Nigeria reinforce these results and underscore the ongoing need to develop integrated seed systems that are responsive to the diverse needs of smallholder farmers.

5.1.5 SUMMARY OF ACUTE SEED SECURITY FINDINGS

A review of various indicators suggests that the seed systems in the Ningi and Shira local government areas were not under stress for the seasons monitored. In the short term, the seed system seems relatively stable. The upward trend in quantities planted during the two seasons coupled with the positive yields reported suggests that the 2024 was a good season for farmers in Ningi and Shira local government area, with potentially an equally positive outlook for the 2025 season.

Overall, for the 2024 season, the findings are that during the season farmers did not experience acute stress.

5.2 CHRONIC SEED SYSTEM FINDINGS AND EMERGING OPPORTUNITIES IN NINGI AND SHIRA

Assessment of chronic seed security in Ningi and Shira LGS was carried out by looking at broader systemic trends in the two local government areas. Focus group discussions (mixed and women only), market analysis in addition to key informant interviews informed this analysis. The market analysis carried out included interviews with local traders, farmers buyers, and one large seed producer. In Ningi and Shira it was difficult to find seed producer groups. It was equally difficult to find agro dealers; only one was found in Shira.

5.2.1 SEED SOURCING TRENDS: ACCESS TO NEW VARIETIES

Household Survey: Access to new varieties over time

As Figure 17 indicates, in the past 5 years a little less than half (48 percent) of the sampled households obtained new varieties. Social networks were the main source of these new varieties (see Figure 18). Farmers also obtained new varieties from NGOs, local markets and to a small extent from the government. New varieties acquired were mainly based on direct distribution, exchange/bater, purchase or as gifts (see Table 16).

As Table 17 indicates, most farmers (83 percent) still sow the new varieties they obtained particularly for their newly acquired varieties of rice and sorghum. The acquisition of new varieties in the last 5 years was primarily once off distributions as opposed to a continuous flow of varieties into the communities.

Figure 17: Did farmers obtain new varieties past 5 years?

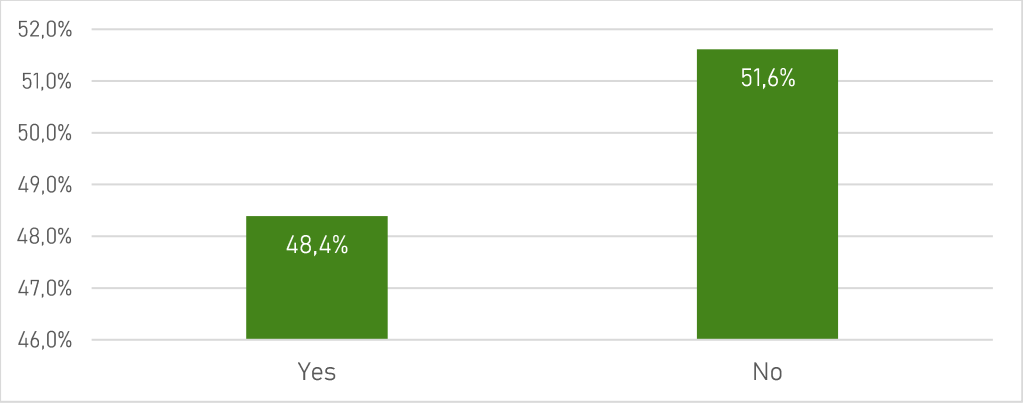


Figure 18: Sources of new varieties obtained by farmers in the past 5 years

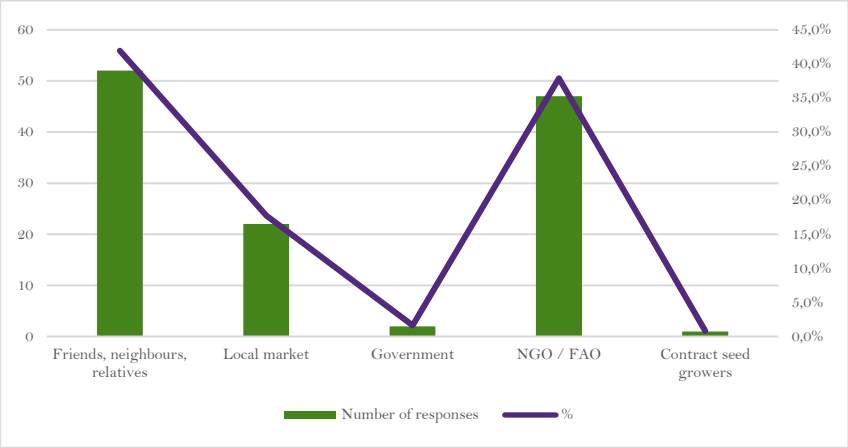


Table 16: Means of acquisition: New varieties planted by farmers in the past 5 years

Access	Number of responses	%
Exchange / barter	22	17.7%
Gift (friends, family, neighbors)	17	13.7%
Purchase	36	29.0%
Direct seed distribution	46	37.1%
Seed loan	2	1.6%
Food aid	1	0.8%
total	124	100.0%

Table 17: Proportion of new varieties still being planted by farmers

Crop	Number of instances varieties were introduced	Still sowing?
		%
Maize	12	91.7%
sorghum	42	83.3%
Millets	5	100.0%
Rice	54	75.9%
Groundnut/peanut	4	100.0%
Cowpea	2	100.0%
Sesame	5	100.0%
Soya bean	1	100.0%
TOTAL-all crops	126	82.5%

Seed Aid going into Ningi and Shira Local Government Area

Seed aid in Ningi and Shira LGA is relatively modest with 28 percent of farmers indicating they received seed aid in the last five years (see Figure 19). Seed aid going into the communities was over the period 2013 and 2020-2024. Ninety-two (92) percent of seed aid received was from NGOs in the form of direct distributions (see figure 20). FAO is not operating in Bauchi state while seed from the government is negligible at 0.2 percent.

The top three crops for which seed aid was obtained were sorghum, maize and rice as Figures 21 indicates. Overall, the Ningi and Shira local government area appear to be relatively self-contained with little or no reliance on external seed sources. There has been very little variation in the amount of seed aid going into the two areas.

Figure 18: Seed Aid obtained in the Last 5 years

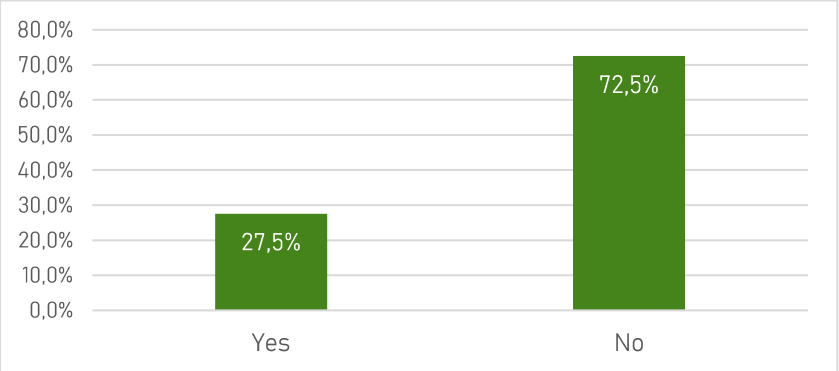


Figure 20: Mode of Seed Aid distribution in Ningi and Shira LGA

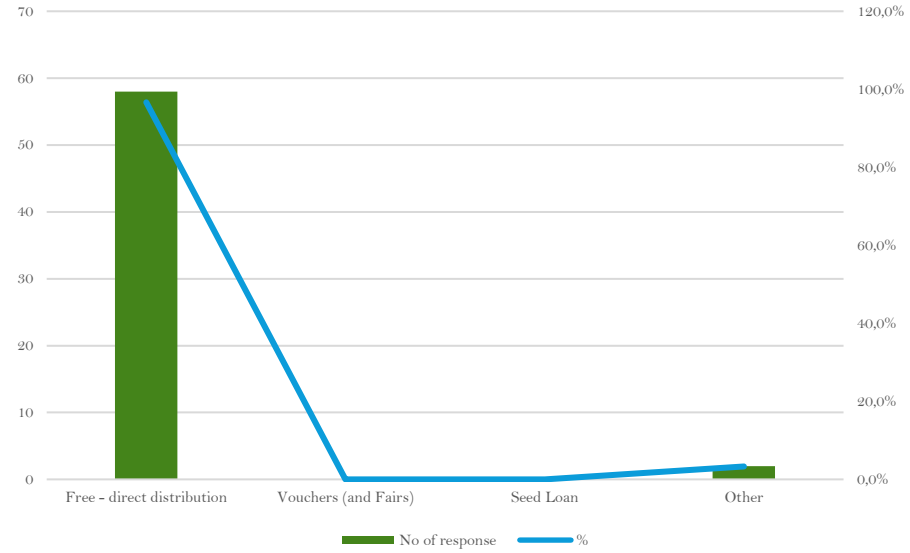
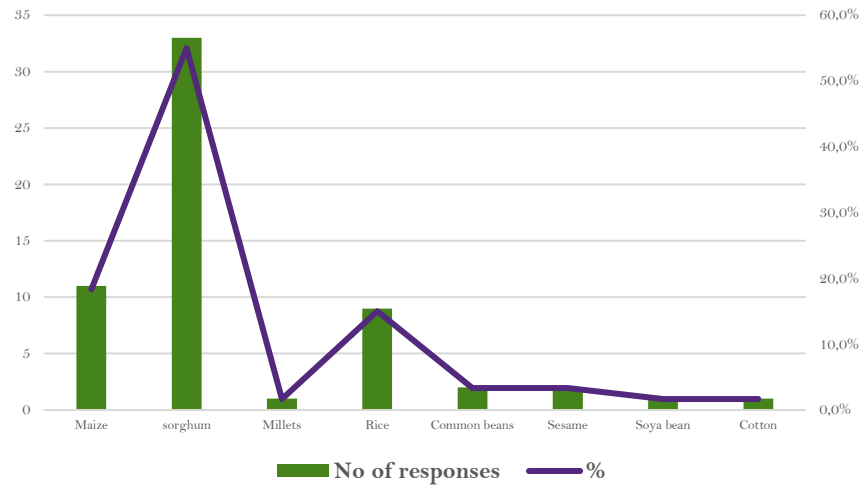


Figure 21: Crop for which Seed Aid was provided in Ningi and Shira LGA



Mapping Community Seed Sources: Seed sources of key crops over time

As part of focus group discussions, a seed mapping exercise was conducted in the three SSSA communities—Kafin Lemu, Balma, and Ziggau. The exercise documented and prompted discussions on how farmers access seeds for their key crops, the significance of various seed channels, their respective advantages and disadvantages, and any shifts in seed sourcing over the past five years.[54] The mapping results reveal that seed sources in the three communities have remained largely unchanged over the past five years. Focus group discussions further support the household survey findings, highlighting the importance of the informal seed sector.

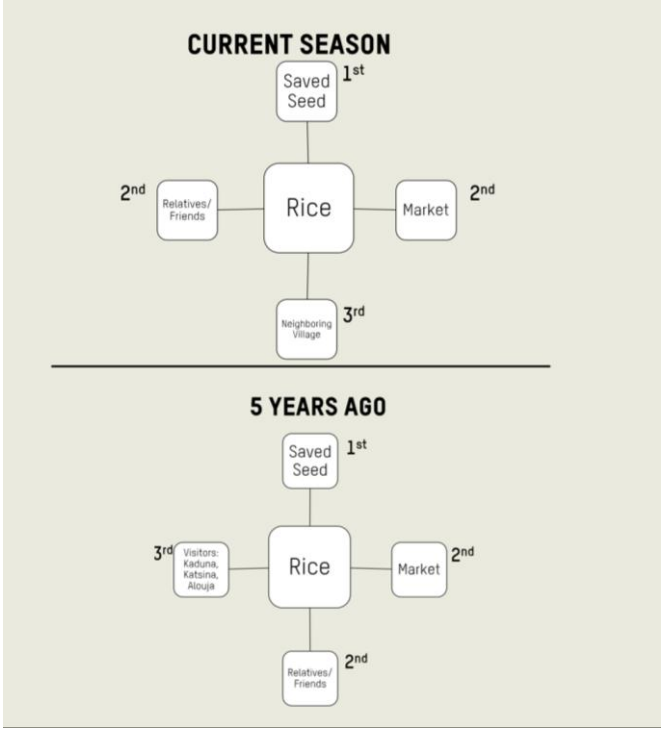
Across all three communities, farmers primarily source seeds for their most important crops from their own stock and local markets, supplemented by government programs and/or international research centres.

As shown in Figure 22 below, farmers in Kafin Lemu (Ningi) primarily source seeds for their key crops—sorghum, rice, and sugarcane—from their own stock, local markets, and social networks in order of importance. For sorghum, farmer field schools established by the Crop Diversity for Food Security in West Africa project have emerged as an important new seed source over the past five years.

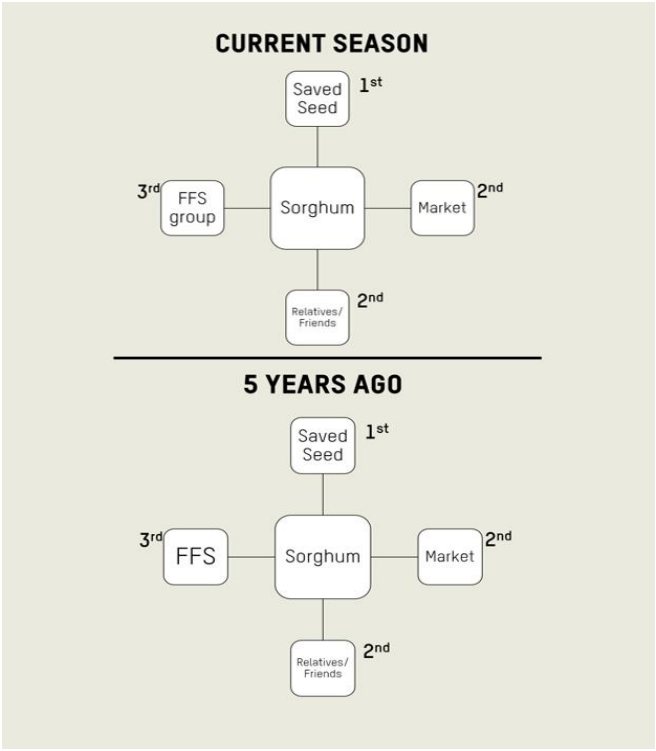
[54] Seed System Security Assessment e-Course

Figure 22: Seed mapping of 2 most important food crops Kafin Lemu (Ningi LGA) –current season and 5 years ago

A: Rice seed map Kafin Lemu



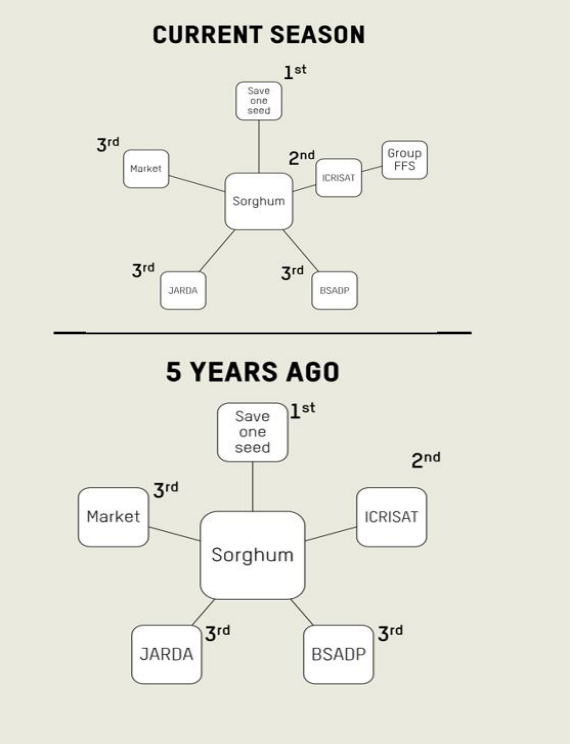
B: Sorghum seed map Kafin Lemu



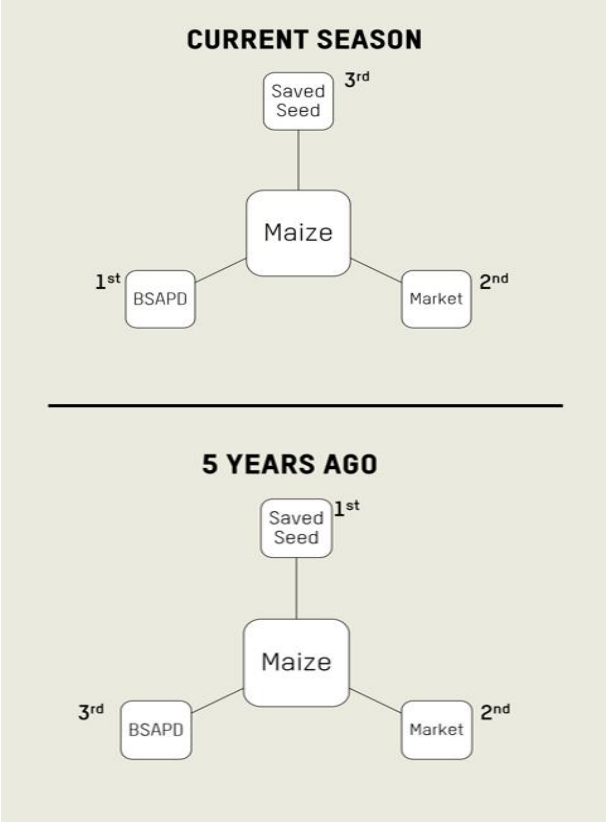
In Balma community (Ningi LGA), seed sourcing trends have followed a similar pattern as Kafin Lemu (Figure 22). The community's main crops—millet, sorghum, maize, and rice—have consistently been sourced through four channels over the past five years: home-saved seed, local markets, government programs including the Jigawa State Agricultural and Rural Development Authority (JARDA) (Figure 23). However, during the 2024 season, rice seed was obtained from only three sources, indicating a slight reduction in seed channel diversity.

Figure 23: Seed mapping 3 most important crops in Balma (Ningi LGA)-current season and 5 years ago

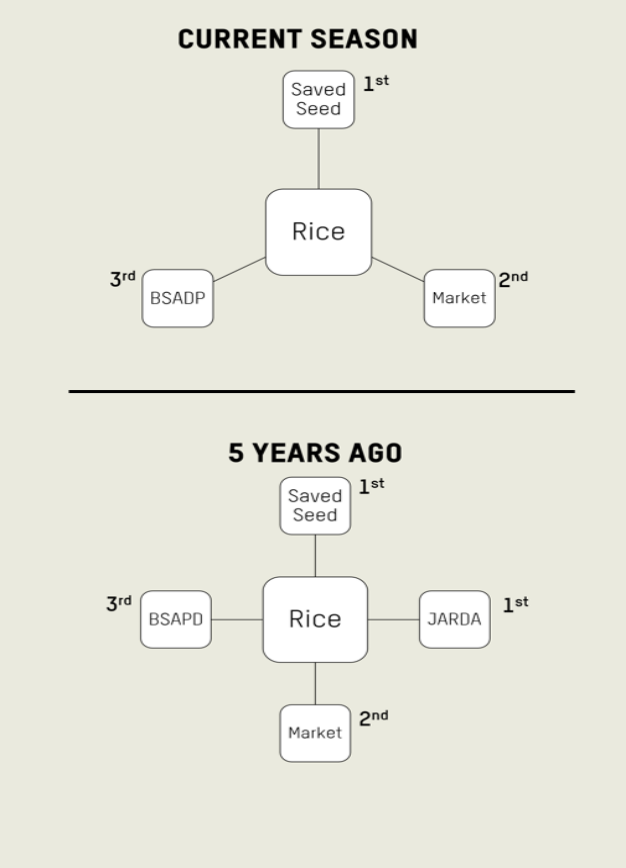
A: Sorghum seed map Balma



B: Maize seed map Balma



C: Rice seed map Balma

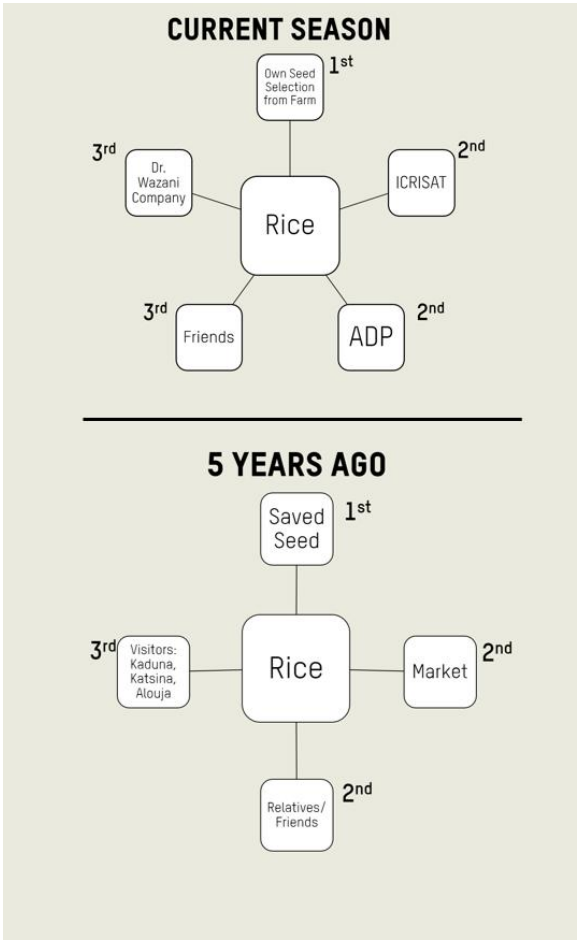


In Ziggau community (Shira LGA), rice, sorghum, and maize are the primary crops cultivated. Over the past five years, seed sourcing for sorghum and maize has remained unchanged, with consistent channels used for each crop. For sorghum, seeds have been obtained through four main sources in order of importance: own stock, ICRISAT, government programs, and local markets (Figure 24).

Maize seeds, meanwhile, are sourced from three channels: own stock, government programs, and local markets. In the case of rice, farmers primarily acquire seeds through own stock, government programs, social networks, and a single local rice seed producer.

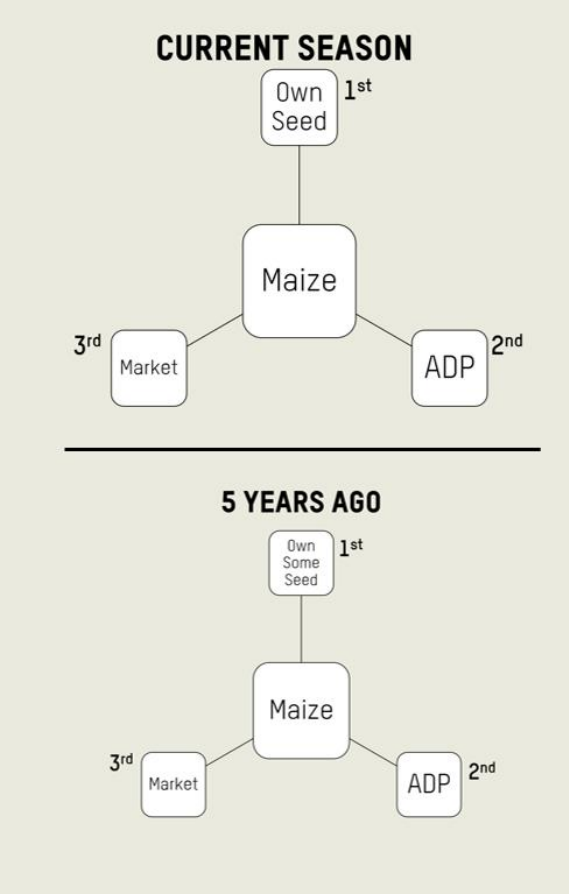
Figure 24: Seed mapping 3 most important crops Ziggau (Shira LGA)–current season and 5 years ago

A: Rice seed map Ziggau



B: Sorghum seed map Ziggau

C: Maize seed map Ziggau



5.2.2 ASSESSMENT OF YIELD AT COMMUNITY LEVEL

The same three communities in Ningi and Shira local government area were also asked to assess their yield during the focus group discussions. Communities' assessment of yields in the past three years was mixed and differed per crop (see Table 18). In the past three years the greatest dissatisfaction was with sorghum yields which all communities rated as poor. In Kafin Lemu (Ningi), for the three most important crops (rice, sorghum and sugarcane), the community assessed the yield of rice and sugarcane as good but assessed yields of sorghum as poor.

Farmers in Balma (Ningi LGA), were generally positive about their yields of key crops, millet, maize and rice in the last three years. As indicated in Table 18, except for sorghum, yield was rated good or average over the same period. Millet yields were consistently rated as good, attributed to bumper harvests from ICRISAT seed. Rice yields were also rated as good, except in 2024, when below-average rainfall led to average yields.

However, sorghum remained the crop of greatest concern in both Ningi communities. Its yields were rated poor in 2022 and 2023, improving only to average in the most recent 2024. The poor sorghum yields observed in Table 18 are largely attributed to erratic rainfall and drought stress between 2022 and 2024, which are the most limiting factors for sorghum productivity in the region. In addition, underlying constraints such as low soil fertility, and use of low-yielding local varieties continue to suppress yields even in seasons without severe climatic stress.

Table 18: Farmers yield assessment in the last three seasons

Key crops	Most recent season: 2024	Season before: 2023	3 seasons ago: 2022
Community	Kafin Lemo	Ziggau	Balma
Rice	Good Good Average (poor rains)	Good Poor (drought) Good	Good Average Good
Sorghum	Poor Poor (rains) Average	Poor Good Poor (wind)	Poor Good Poor
Maize	Good Good	Good Average (drought and insect)	Good (complemented with irrigation) Good
Millet	Good (The product of ICRISAT seed contributed to the bumper harvest since 2019).	Good (The product of ICRISAT seed contributed to the bumper harvest since 2019).	Good (The product of ICRISAT seed contributed to the bumper harvest since 2019).

For Ziggau in Shira LGA, the community reported mixed yields results for two of their most important crops rice and sorghum. For rice while yields in the 2024 season were good, due to drought poor yield was experienced the season before (2023) with average yield experienced the year before that (2022). Sorghum yield was good the two years prior to the 2024 season but was poor in the current season (2024) due to poor rains. Only maize yields were assessed as good over the past three years, attributed to the fact that it was complemented with irrigation farming particularly in the 2022 season.

Overall, the three communities assessment of yield in the 2024 season is in contrast to the findings of the household survey where 87 percent of farmers rated their yield in the 2024 season as generally good for all crops they planted. Even with sorghum, in line with the household survey, only 2.1 percent of farmers expressed that their yield was bad (see section 5.1.2).

5.2.3 COMMUNITY PERCEPTIONS OF SEED SECURITY IN NINGI AND SHIRA LGA

As part of the focus group discussions, communities were asked to assess the seed security of their members. This section provides analysis of community perceptions based on the three mixed focus group discussions. In the sessions the definition of seed in Box 6 guided discussions.

Box 6: Defining seed security

Seed security means that a household has the seed it needs (in house stocks / harvest) or that it can get the seed it needs, for example, through purchase or barter.

The mixed focus groups were held in three communities where the Crop Diversity project is being implemented, namely Balama (Ningi), Kafin Lemu (Ningi), and Ziggau (Shira). Overall, findings are in contrast from the findings of the household survey, and reveal significant variation in household seed security between communities and across crop types (see Table 19 and 20). Balama and Ziggau reported predominantly low levels of seed security in the 2024 season, whereas Kafin Lemu experienced strong seed security performance across rice, sorghum, and sugarcane. Focus group discussants in Shira LGA (Ziggau) expressed that in their community between 20-25 percent of rice, sorghum and maize farmers were seed secure in the 2024 season. In Ningi LGA, in Balma community perceptions of seed security were extremely low, at 10–20 percent for most crops. However in Kafin Lemu the community was more positive with higher seed security estimated for their main crops, especially rice (95 percent).

Looking ahead to the upcoming season, projections show mixed expectations. Balama anticipates continued vulnerabilities for millet and maize, with relatively stronger performance for rice. Kafin Lemu expects slightly lower seed security next season but remains significantly better off than the other communities. Ziggau projects minimal improvement, with seed insecurity remaining a major constraint.

Across the three communities, proposed coping strategies vary widely. Balama showed more dependence on external assistance (humanitarian aid), while Kafin Lemu highlights reliance on internal resilience strategies including seed sharing and local multiplication. In Balma, indications are that households are converting seed into food as a coping strategy. Ziggau members emphasized experimentation through variety selection, cooperative and gender-focused farming initiatives, and capacity strengthening for improved seed storage and climate-adapted varieties.

Table 19: Community assessment of the percentage of its members who are seed secure- 2024/25 season

Local Government Area	Community	Crop	HH Growing Crop	% Seed Secure
Ningi	Balama	Sorghum	100	20%
		Rice	80	50%
		Millet	90	11%
		Maize	45	11%
	Kafin Lemu	Rice	100	95%
		Sorghum	100	75%
		Sugarcane	100	100%
Shira	Ziggau	Rice	70	21%
		Sorghum	50	20%
		Maize	40	25%

Table 20: Community assessment of the percentage of its members who are seed secure- 2025 season

Local Government Area	Community	Crop	HH Growing Crop	% Seed Secure (Projected)
Ningi	Balama	Sorghum	100	15%
		Rice	80	55%
		Millet	90	55%
		Maize	35	8%
	Kafin Lemu	Rice	100	80%
		Sorghum	80	50%
		Sugarcane	100	100%
Shira	Ziggau	Rice	100	20%
		Sorghum	30	33%
		Maize	50	20%

5.2.4 USE OF FARMING INPUTS IN NINGI AND SHIRA LGA

The use of non-seed related agricultural inputs in relatively high as outlined in the findings below. Farmers in both LGA use a considerable amount of pesticides, chemical and organic fertilizers. Two thirds or more of farmers surveyed use inputs.

Farmers use of fertilizer

In both seasons, a large proportion of farmers used fertilizer and compost in their production (see Table 21). In the 2024 season, the data shows that 91 percent of farmers used fertilizer. Farmers used slightly less fertilizer in the second season (2025). As Table 22 indicates, in both seasons, most farmers applied fertilizer to four main crops, rice,

Table 21: Farmers' use of mineral fertilizer in the 2024 and 2025 seasons

Current/most recent season		Next season	
Yes	93.1%	Yes	88.1%
No	6.9%	No	11.9%
N total	160	**N total**	160

sorghum, millet and maize. The significant proportion of farmers using fertilizers in the two LGAs even on crops such as sorghum is attributed to poor soil health.

Table 22: Farmer use of mineral fertilizer by crop in the 2024 and 2025 seasons

Crop	Current/most recent season		Next season	
	N	*%*	*N*	*%*
Maize	44	13.3%	44	13.9%
sorghum	87	**26.4%**	98	**30.9%**
Millets	45	13.6%	39	12.3%
Rice	134	**40.6%**	111	**35.0%**
Groundnut/peanut	2	0.6%	5	1.6%
Common beans	3	0.9%	4	1.3%
Sesame	9	2.7%	10	3.2%
Soya bean	3	0.9%	4	1.3%
TOTAL-all crops	328	100.0%	314	100.0%

As Figures 25 and 26 indicate for the proportion of farmers who did not use fertilizer both the 2024 and 2025 season various reasons, were cited by farmers. At the top of the list is that the fertilizer was too expensive. In the 2025 season more than half of the farmers sampled cited this reason. The second reason farmers for not using fertilizers was because they were not available. An equal proportion expressed that fertilizer was not necessary or "profitable" for them (see Figures 25 and 26).

Figure 25: Reasons why farmer did not use mineral fertilizer in the 2024 season

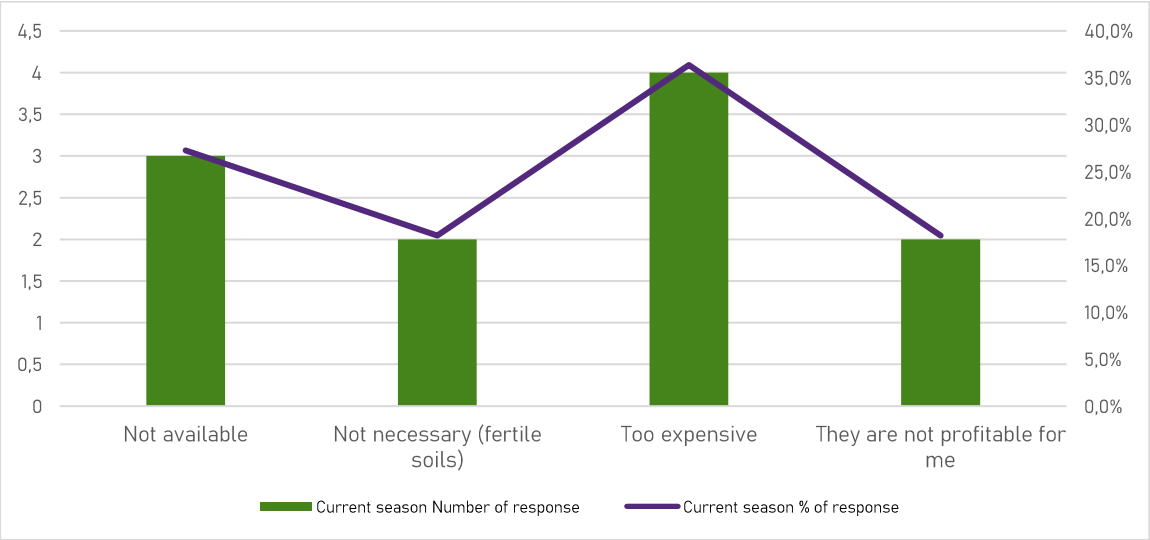
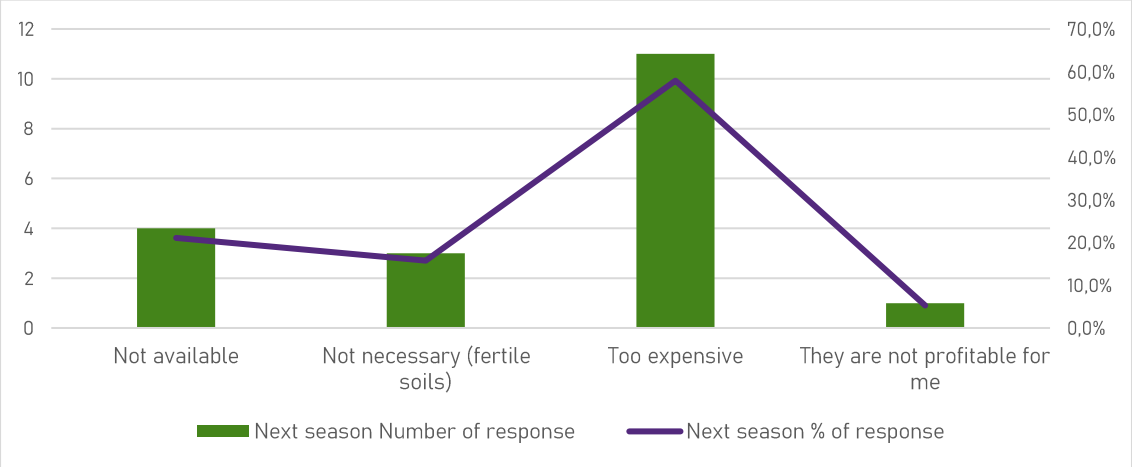


Figure 26: Reasons why farmer did not use mineral fertilizer in the 2025 season



Farmers Use of Compost and Manure

As indicated in Table 23 below, in terms of compost use, most farmers in both seasons used manure. As with fertilizer use, rice, sorghum, millet and maize were the crops for which most farmers used compost (see Table 24). Farmers commonly used large animal manure, small animal manure, and kitchen refuse in comparable amounts across both seasons, as shown in Table 25. The least preferred type of compost was kitchen refuse and poultry manure.

Table 23: Farmers' use of compost/manure in the 2024 and 2025 seasons

Current season		Next season	
Yes	89.4%	Yes	90.6%
No	10.6%	No	9.4%
Total N	160	Total N	159

Table 24: Farmer use of compost/manure by crop in the 2024 and 2025 seasons

If using compost/manure, on which crops?				
Crop	Current season		Next season	
	No of response	% of response	No of response	% of response
Maize	39	13.6%	46	17.0%
sorghum	96	33.6%	103	38.0%
Millets	50	17.5%	41	15.1%
Rice	67	23.4%	55	20.3%
Groundnut/peanut	12	4.2%	14	5.2%
Common beans	4	1.4%	2	0.7%
Cowpea	5	1.7%	2	0.7%
Sesame	10	3.5%	7	2.6%
TOTAL-all crops	207	100.0%	200	100.0%

Table 25: Type of compost/manure used by farmers in the 2024 and 2025 seasons

Type	Current season (2024)		Next season (2025)	
	No of Response	% of response	No of Response	% of response
Large animal (cow, horse, donkey)	78	52.0%	65	43.3%
Small animal (sheep, goats)	37	24.7%	45	30.0%
Poultry manure	11	7.3%	10	6.7%
Crop/field residue	2	1.3%	2	1.3%
Kitchen refuse	19	12.7%	23	15.3%
Other	3	2.0%	5	3.3%
total	150	100.0%	150	100.0%

A small proportion of farmers in both seasons did not use compost/manure. The reasons they cited for not using compost, which are similar to those for not using fertilizer, are presented in Table 26. The primary reason cited in both years is that it was not necessary (see Table 26 below). High costs of manure and compost was the second key reason cited in both seasons. The unavailability of compost/manure was another reason why farmers did not use or plan to use compost/manure.

Table 26: Reasons why farmer Did Not use compost/manure in the 2024 and 2025 seasons

Reason	Current/most recent season		Next season	
	N	%	N	%
Not available	5	29.4%	2	13.3%
Not necessary (fertile soils)	7	41.2%	6	40.0%
Too expensive	5	29.4%	5	33.3%
Other	0	0.0%	2	13.3%
total	17	100.0%	15	100.0%

Farmers Use of Pesticides

In Nigeria, as in many other contexts, insects and plant disease are major yield reducing factors threatening food security and farmers' incomes.[55] A study by Wei et al. (2018), found that farmers in Nigeria are aware of various pest control methods including chemical, biological and traditional methods. Despite this, it was not common for farmers to actively control for pests in their fields.[56] When farmers managed pests in their fields, they relied mainly on chemical insecticides. Wei et al (2018) found that the costs and availability of pesticides were constraining factors for farmers. The SSSA present similar findings. Also of note is that the proportion of farmers using pesticides is similar to that of those using fertilizer and compost.

As Figure 27 shows, in 2024 season, 72 percent used pesticides. In the same year a little less than a third of farmers did not use pesticides. A similar pattern is seen in 2025 season with an equally high proportion (68 percent) of farmers using pesticides (see Figure 28). Corresponding to crops for which farmers used fertilizer, use of pesticides was primarily the key crops rice, maize, sorghum and millet (see Table 27). The proportion of farmers using pesticides on maize and sorghum increased in the 2025 season, while its use on rice remained relatively high at 31 percent. In both seasons very few farmers used pesticides on their millet crop.

Pesticide use on sorghum in Nigeria is common, with pesticides used at various stages of the sorghum value chain.[57] Tagher et al.2024 found that in North central (Benue State), herbicides and insecticides were the main agro chemicals used by farmers for sorghum production. They found that for Benue State 83 percent of farmers used herbicides in sorghum production. Table 27 shows the proportion of farmers who did not use pesticides or plan to use them. The main reasons given in both seasons is that the pesticides were not necessary or that they found them too expensive (see Table 28). Of note is that only a small proportion of farmers in both seasons raised concern about costs.

Figure 27: Farmers use of pesticides in the 2024 season

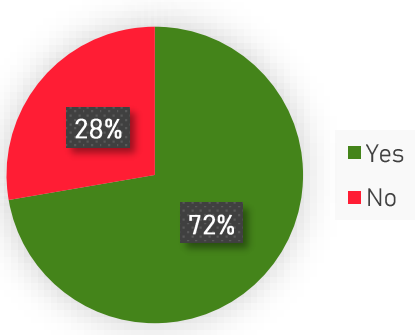
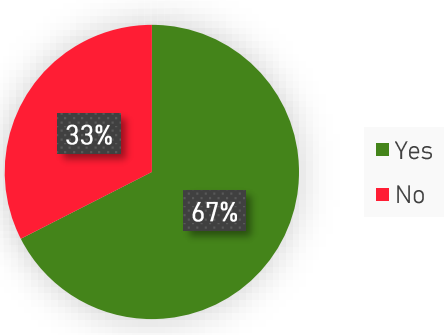


Figure 28: Farmers use of pesticides in the 2025 season



[55] Oerke (2006)
[56] Wei et al (2018)
[57] Tagher et.al.(2023)

Table 27: Farmers pesticide use by crop – in the 2024 and 2025 seasons

Crop	Current/most recent season		Next season	
	N	*%*	*N*	*%*
Maize	40	19.0%	43	**21.2%**
Sorghum	40	19.0%	43	**21.2%**
Millets	19	9.0%	18	8.9%
Rice	76	**36.2%**	63	**31.0%**
Groundnut/peanut	7	3.3%	9	4.4%
Common beans	4	1.9%	3	1.5%
Cowpea	10	4.8%	10	4.9%
Sesame	11	5.2%	9	4.4%
Pumpkin	0	0.0%	0	0.0%
Soya bean	1	0.5%	4	2.0%
Watermelon	1	0.5%	0	0.0%
Wheat	1	0.5%	1	0.5%
TOTAL-all crops	210	100.0%	203	100.0%

Table 28: Reasons farmer gave for not using pesticides - both current and next season

Reason	2024 season		2025 season	
	No of response	% of response	No of response	% of response
Not available	3	6.8%	2	3.9%
not necessary	31	70.5%	29	56.9%
too expensive	6	13.6%	11	21.6%
They are not profitable for me	1	2.3%	0	0.0%
Use integrated/ biological methods	3	6.8%	1	2.0%
toxic / noxious	0	0.0%	4	7.8%
Other	0	0.0%	4	7.8%
Total	44	100.0%	51	100.0%

Post Harvest Management and Farmers Storage Losses

In adequate storage facilities lead to deterioration of saved seed and post-harvest losses. Such losses are estimated to decrease income of farmers by more than 15 percent for approximately 480m smallholder farmers.[58] For Bauchi state, the average zonal post-harvest losses were estimated to be 20 percent in 2024.[59]

The SSSA household survey indicates that 22 percent of farmers reported experiencing store losses in 2024, with the majority, 78 percent indicating they had no storage loss. At a

[58] Osabohiem, R(2024)
[59] NAERLS (2024)

crop level, most farmers experienced storage losses on their rice crop, amounting to 20 percent. Losses experienced on sorghum was 24 percent, on maize 33 percent (by a small number of farmers) and millet 14 percent also by a relatively small number of farmers as indicated in Table 29 and Figure 29.

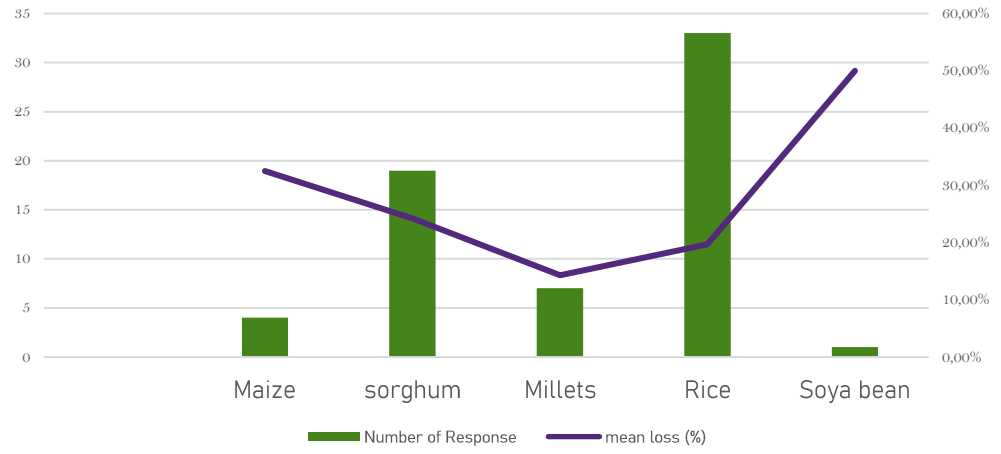
The common use of hermetic storage (PICS bags, double bagging with nylon) by farmers could explain the absence of cow pea storage losses in the findings. In the mixed focus group discussions farmers expressed that they have insufficient storage facilities and experiences challenges primarily due to the quality of their storage facilities.

Farmers also reported a lack of crop-specific storage management knowledge, in addition to limited understanding of general storage practices. Despite inadequate access to quality storage facilities, they sometimes convert seed into food to address food security needs, resulting in reduced seed quantities available for storage. Similarly, when seed aid is provided, farmers often use it as food due to distrust in its quality. These factors may partly explain the limited storage losses observed.

Table 29: Farmers' storage losses by crop – current season (2024)

Crop	Number of Response	mean loss (%)
Maize	4	32.50%
Sorghum	19	24.21%
Millets	7	14.29%
Rice	33	19.70%
Soya bean	1	50.00%
TOTAL-all crops	64	22.5%

Figure 29: Farmers' storage losses by crop – current season (2024)



Use of Storage Chemicals

The SSSA household data indicates that a little more than half of farmers sampled, 55 percent in 2024 used storage chemicals (see Figure 30). In the 2025 season, 54 percent of farmers indicated that they plan to use storage chemicals (see Figure 31). As Table 30 highlights, farmers prioritize the use of storage chemical for their four key crops.

When asked about their use of storage chemicals, in the 2024 season farmers indicated they used it primarily on rice, sorghum, maize and to a lesser extent on millet and common beans. In the 2025 season, a similar proportion of farmers plan to use storage chemicals (see Table 30).

Figure 30: Farmers use of storage chemical in the 2024 season

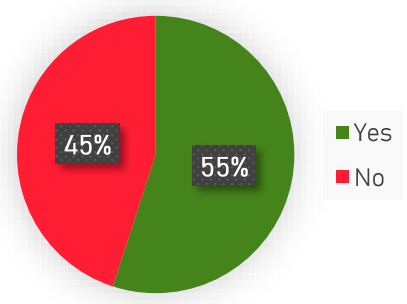


Figure 31: Farmers use of storage chemical in the 2025 season

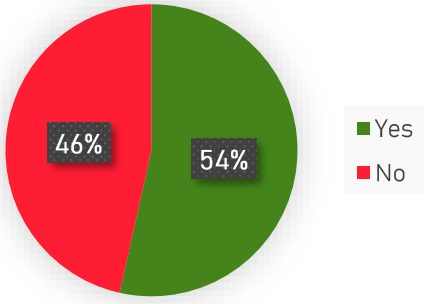


Table 30: Farmers use of storage chemicals by crop – both current (2024) and next season (2025)

Crop	Current season		Next season	
	Number of responses	% of response	Number of responses	% of response
Maize	28	15.7%	29	17.5%
sorghum	51	28.7%	49	29.5%
Millets	12	6.7%	12	7.2%
Rice	53	29.8%	42	25.3%
Cassava	0	0.0%	0	0.0%
Groundnut/peanut	3	1.7%	0	0.0%
Common beans	14	7.9%	10	6.0%
Cowpea	10	5.6%	14	8.4%
Soya bean	3	1.7%	2	1.2%
TOTAL-all crops	178	100.0%	166	100.0%

5.2.5 MARKETS AND SPENDING ON SEED IN NINGI AND SHIRA LOCAL GOVERNMENT AREAS

This section of the report provides insights into the extent to which seed/grain markets in Shira and Ningi are functioning. Is seed desired by farmers readily available, at what price and in what quantities is this seed available? The section draws from interviews with traders and farmer buyers.

Local Market Trader Management Practices and Potential Seed

Ten (10) traders were interviewed to gain insight into their practices in terms of how they manage grain that is to be used as seed. Interviews held with local market traders in Ningi and Shira confirm that the informal seed system is active and plays a significant role in supplying potential planting material for major crops including millet, sorghum, cowpea, groundnut, sesame, rice, maize, and soybean. As Table 31 indicates, the traders interviewed commonly maintain varietal separation, grade stocks, preserve freshly harvested material separately, and respond to farmer demand for named varieties.

Many sell seed at higher prices during planting seasons, demonstrating clear recognition of seed as a distinct product. Traders indicated that farmers showed strong varietal awareness, frequently requesting specific varieties that are visually clean, pure stocks. This suggests that local knowledge systems around seed selection and adaptation are well developed. When compared to the average practices in 10 other SSSA in Africa, the findings Ningi and Shira indicate better practices when it comes to requesting specific varieties, keeping varieties pure, maintaining pure stocks and grading (see Table 31).

In terms of seed security dimensions, availability and physical purity generally appear to be strong. Local markets provide accessible sources of planting material, and traders routinely remove debris and damaged grains, especially during threshing and pre-sale preparation. Varietal identity is maintained through naming and separation practices. Sourcing from specific regions reflects attention to local adaptation. However, physiological seed quality is a critical weakness. Germination testing is almost entirely absent, storage conditions are basic, and quality assurance relies heavily on visual inspection and trust. This creates vulnerability, particularly under erratic rainfall conditions where seed viability becomes crucial.

Overall, the key informant interviews suggest that the local markets are functioning effectively under normal conditions but remain vulnerable due to limited quality control mechanisms and weak linkage with the formal seed sector. Targeted interventions—such as simple germination testing training, improved storage practices, and strengthening selected traders as community seed producers—could substantially enhance seed quality assurance and system resilience without disrupting the existing structure that farmers rely upon.

Table 31: Local market traders grain/local seed management practices (N=10)

Feature	Ningi and Shira LGA	Average of 10 other SSSA in Africa[60]
Number of traders	10	211
Get grain from specific regions believed to have grain that will grow in local area (adapted)?	60%	80%
Seek out specific varieties to buy (which can be planted)?	80%	75%
Buy from specific growers who are known for high quality seed?	33%	48%
Keep varieties pure—as single variety?	80%	73%
Keep freshly harvested stocks apart?	93%	71%
Grade stocks (which grain/which seed)?	100%	39%
Do germination tests?	7%	10%
Have special storage conditions (to help with seed viability)?	53%	45%
Sort out 'waste' (pebbles, dirt, dust)?	60%	71%
Sort out 'bad grains/seed'-that is broken, or immature, or discoloured?	40%	65%
Sell seed and grain separately, at different prices?	40%	43%

Buyers Seed Access and Perception of Seed from Local Markets

As part of the SSSA, a small sample of buyers (10) across four local markets[61] were also interviewed to gain insights into their perception of seed availability and access in their local markets. These interviews confirm that the local seed/grain markets farmers use are largely functional and play a central role in their access to seed. Farmers interviewed sourced seed/planting material for a diverse range of crops including rice, maize, cowpea, groundnut, millet, soybean, sorghum, and watermelon, with strong demand for specific improved rice varieties such as FARO 42, FARO 44 and hybrid maize. These findings suggest that availability is generally good throughout much of the season, with some farmers reporting difficulty accessing pure varieties or specific types during peak planting periods.

Interviews with buyers confirms that access to seed is broadly adequate in physical terms, with most farmers located within 10–40 minutes of a market, although a minority travel significantly longer distances. Financial access varies: seeds are sold in flexible units (bags, mudu, kwano, small packages), which supports inclusivity for smallholders, yet improved and hybrid varieties fetch premium prices that constrain poorer farmers during high-demand periods. The farmers interviewed demonstrate strong varietal awareness and make deliberate choices based on performance traits such as early maturity, drought tolerance, grain size, yield potential, and market value, indicating a market-oriented and climate-responsive production strategy although this was not evident in the findings of the household survey as discussed in section 5.15.

[60] ADRA et al., (2025)
[61] The Sara (Gwaram LGA), Tsangaya Market (Dirya), Sambuwal, and Gadan Maiwa markets

Buyers interviewed perceived seed quality in the various markets as high, with most farmers expressing satisfaction due to strong yield performance and adaptability. However, farmers raised concern regarding varietal purity, pest susceptibility (especially in groundnut), and input dependency for hybrid maize. Farmers quality assessment being largely based on observed physical quality rather than formal certification or germination testing, presents hidden risks of varietal degeneration or mislabelling.

Farmers Spending on Seed from Markets and Input Shops

Based on the household survey, an analysis of farmers' spending on seed from markets and input shops for their three (3) most important crops was obtained. Key informant interviews with traders in various markets also sought to gain an understanding of market trends, farmers access to seed and their buying behavior. For the three most important crops to farmers (sorghum, rice, and millet) the household survey indicates that availability of these crops has remained stable across seasons through both local markets and agro-dealers. Key informant interviews with traders in the local markets[62] in turn indicate commercially vibrant and physically accessible markets that, as discussed, provide some degree of varietal diversity.

Analysis of the data reveals key differences in price dynamics and affordability. Findings from the household survey highlight price disparities between informal and formal channels, with agro-dealer shop prices consistently and increasingly higher than local market prices (see Tables 32 and 33). For instance, while local market prices for sorghum and millet declined, agro-dealer shop prices rose sharply, suggesting tightening margins in the formal sector. The survey further indicates that spending is increasingly concentrated on rice, which accounts for over three-quarters of total seed expenditure. Meanwhile, reliance on agro-dealer shops has grown substantially, even as overall seed spending declines (see Figures 32 and 33).

Over the past two years, favorable rice prices have driven its increased production,[63] potentially signalling emerging liquidity constraints and risk concentration in a single crop. Additionally, traders report highly localized and contrasting price trends: significant price declines in Sara and Gwaram for crops such as sorghum, maize, and soybean, but sharp increases in Giade. Traders attribute these fluctuations to broader market forces, including export demand, inflation, fuel costs, and agro-processing activity, underscoring systemic price volatility and sensitivity to macroeconomic and demand-side factors.

From an affordability perspective, seed costs remain relatively low as a proportion of annual household income and are in line with the norm among smallholder farmers in Nigeria.[64] According to Musa et al. (2023), the estimated average annual income in Bauchi state is ₦712,375[65] (US$470). Total seed expenditure during the wet and dry season for this income bracket was found to be roughly 3–5%[66] of farmers' annual income. While this suggests that seed is not the largest cost component in absolute terms, this interpretation should be treated with caution. Farmers often face liquidity constraints, seasonal income

[62] Namely Sara, Gwaram, Tsangaya Market (Dirya), and Giade markets
[63] NAERLS (2024)
[64] This is about US$470.
[65] This is about US$470.
[66] This relates to seed purchase ranging from approximately ₦24,000 to ₦33,000 across the two seasons.

variability, and multiple competing input costs, including fertilizer, labour, and land preparation. As such, even relatively small increases in seed prices—particularly in agro-dealer channels—can influence purchasing decisions and limit access to improved varieties.

Table 32: Typical seed prices per kg of for farmers 3 most important crops in the 2024 and 2025 seasons

Crop	Typical price / kg			
	Local Market (₦)	Local Market ($)	Agro-dealer (₦)	Agro-dealer ($)
Sorghum	520	$0.34	1200	$0.79
Rice	600	$0.40	700	$0.46
Millet	560	$0.37	1300	$0.86

Note: Prices were collected in Nigerian Nira (₦). The US dollar amounts are based on an average rate of US$0.0006593 per ₦1 for July 2025.

Table 33: Typical seed prices per kg for farmers 3 most important crops in the 2025 seasons

Crop	Typical price / kg			
	Local Market (₦)	Local Market ($)	Agro-dealer (₦)	Agro-dealer ($)
Sorghum	400	$0.26	1700	$1.12
Rice	700	$0.46	1000	$0.66
Millet	440	$0.29	2000	$1.32

Note: Prices were collected in Nigerian Nira (₦). The US dollar amounts are based on an average rate of US$0.0006593 per ₦1 for July 2025.

Figure 32: Analysis of spending on seed from markets and input shops for 3 most important crops in the 2024 season

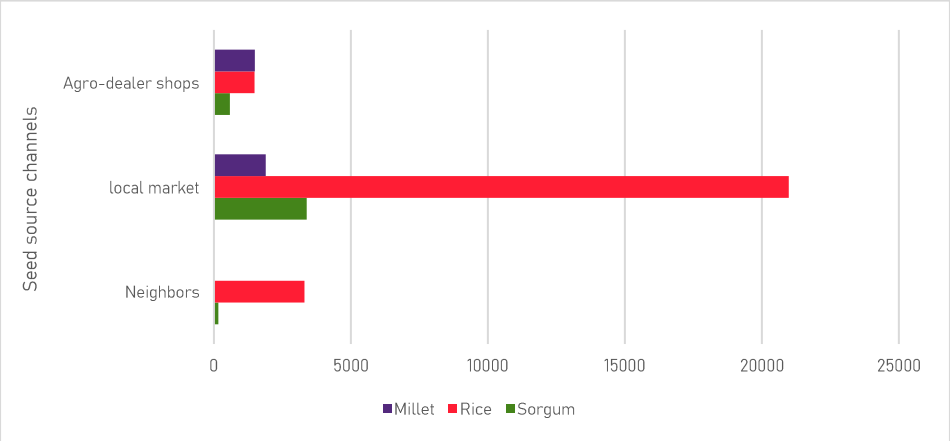
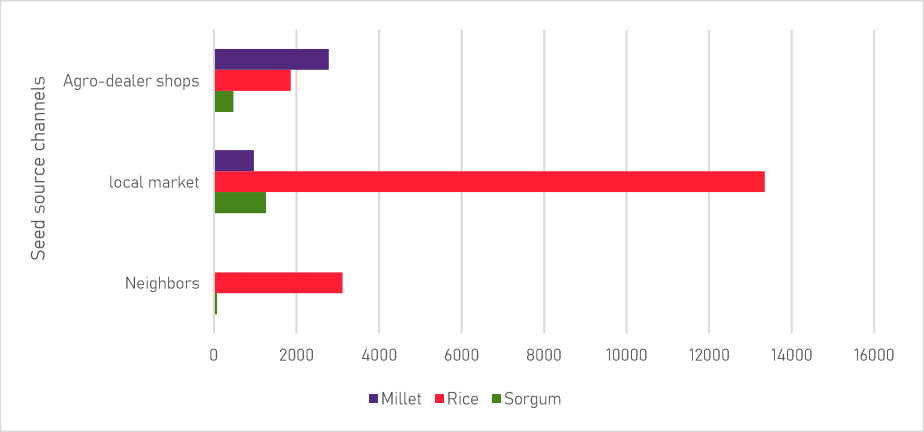


Figure 33: Analysis of spending on seed from markets and input shops for 3 most important crops in the 2025 season



Summary of grain/seed market functioning in Ningi and Shira

From a seed security perspective, the data suggest that availability is not the primary constraint farmers face. Instead, economic access is emerging as a critical vulnerability. These findings align with those presented in Section 5.1.5.

The system reflects a mixed structure, where informal grain markets, local traders, and a small number of formal hybrid seed suppliers coexist. The findings indicate a seed system that is supply-secure but economically fragile—one where volatility, rising formal-sector prices, and narrowing crop diversification may heighten smallholder vulnerability to both market and climatic shocks. Unless diversification and local seed system strengthening are prioritized, these risks could intensify.

These findings underscore the importance of assessing not only availability but also affordability and market variability when evaluating seed system performance and farmer decision-making. Overall, the seed system can be classified as "functioning but structurally fragile"—secure under normal conditions yet vulnerable to seasonal shortages, price shocks, and quality control weaknesses.

Box 7: Understanding the "no money for seed" paradox

Farmers' statements that they "have no money to buy seed," despite not perceiving seed as expensive, reflect a broader cash flow and prioritization challenge rather than a pricing issue. In many smallholder systems, limited and highly seasonal income forces farmers to make difficult trade-offs at the start of the planting season. Inputs such as fertilizer and agrochemicals are often prioritized because they are seen as less substitutable and more immediately critical to crop performance. By contrast, seed—especially when grain can be recycled or used as a substitute—is treated as a flexible cost. As a result, even when farmers recognize the value of improved seed, they may still allocate scarce funds elsewhere and rely on retained grain or informal sources for planting.

This dynamic is further reinforced by a cycle of low productivity and constrained reinvestment. Farmers who lack access to quality seed often experience poor yields, which limits their ability to generate sufficient income for the next season. This perpetuates a situation where they continue to "not have money" for seed, even though the underlying issue is not the seed price itself but insufficient returns from previous harvests. In this sense, access to quality seed could be both a technical and financial constraint—without improved inputs, productivity remains low, and without improved income, investment in better inputs remains out of reach.

Trust, information, and market reliability also play a critical role. In some contexts, farmers are hesitant to invest in seed due to concerns about quality, including experiences with mislabelled or low-quality seeds through direct seed distribution through formal or NGO channels. This has led to a preference for locally saved or community-based seed systems, which are perceived as more reliable by farmers. At the same time, limited understanding of the distinction between certified seed and grain contributes to practices such as consuming (discussed in section 5.2.4) or selling distributed seed. Addressing this paradox therefore requires a combination of interventions: improving livelihood opportunities and access to affordable finance (e.g., credit or revolving funds), strengthening seed system quality assurance, and investing in farmer training and demonstration to build trust in the value of improved seed.

Source: Stakeholder discussions on validation of SSSA findings

5.2.6 GENDER AND DECISION-MAKING: INFLUENCES ON ACCESS TO QUALITY SEED IN BAUCHI STATE

As discussed in section 4.4, gender gaps exist in seed systems developments affecting breeding, production and selection. Although women play a central role in seed management, they often lack decision making power over what crops to grow and also lack control over income from crop sales.[67] The household survey further indicates a male dominance in both LGA making it difficult to analyze seed sourcing strategies of women in the two LGAs. However, this sub sections zooms in on gender and decision-making influences on access to quality seed for women in Ningi and Shira LGA.

[67] Kramer, B., & Galiè, A. (2020).

Building on the discussion in section 4.4, focus group discussions with women in Ningi and Shira LGA suggests that the barriers women face in accessing quality seeds are due to socio-economic constraints and gender norms that are reinforced in the two communities. In both Ningi and Shira, women repeatedly reported lacking access to improved seeds which they attributed to climate impacts and market limitations. In both communities' men decide which crops to produce and often control seed-related decisions. In addition, women rely on men's movements to markets or information sources. However, in Ringya (Ningi), women report more autonomy in deciding what to plant and in controlling their own parcels. Further barriers women face include financial constraints (lack of money for fertilizers, business capital, or seed purchase). Interviews with local traders revealed that in the few instances where credit was provided, this was only for men. Discussions in Ringya (Ningi) corroborates this situation where the women stated that access to credit is available to men, but not to women.

Informal seed systems are particularly important for women smallholder farmers who face significant barriers in accessing quality seed from other channels.[68] In both communities, women were highly dependent on own saved seed and social networks for seed, indicating access primarily through the informal sector. Both groups indicated reliance on neighbour-to-neighbour exchange, indicating strong community seed sharing systems that compensate for limited market or institutional seed supply.

Although generally satisfied with the quality of their own seeds, in both communities women lamented on their limited access to improved/resilient seed varieties in order to improve seed quality and cope with emerging climatic stresses. Overall, gender inequalities identified weakens household resilience and perpetuate seed insecurity in respective communities.

5.2.7 SUMMARY OF CHRONIC SEED SECURITY FINDINGS

Farmers in Ningi and Shira local government area did not face acute seed insecurity in the 2024 and 2025 seasons. However, they do face ongoing structural and systemic challenges that indicate chronic stress and consequently chronic seed insecurity.

Chronic stresses faced by the two communities include:

- Slow uptake of new varieties: This is due to lack of availability and relative high cost of seed. Very limited new varieties have entered communities since 2019. Manpower and funding constraints of the national research appears to have negatively impacted their outreach.
- Accessibility barriers, poverty and affordability: Affordability is the single biggest barrier that farmers face in accessing seed, especially certified seed which is expensive. Overall households are vulnerable to economic shocks in the context of increasing food prices driven by inflation.
- Chronic dependence on the informal seed system with insufficient varietal diversity and weak quality assurance mechanisms.
- A lack of a formal seed system to complement the informal: Agro-dealers and private seed companies are almost non-existent in the two local government areas.

[68] Kramer, B., & Galiè, A. (2020).

- Weak storage facilities negatively impacting seed quality and yield: Even when improved varieties exist, sustainability will be undermined by weak post-harvest management.
- Gender and social barriers where women are excluded from land, credit and extension. The conversion of seed to food in communities suggests household level stress, where women often bear responsibility for food security.

5.3 CONCLUSIONS

The main findings of the SSSA based on the household survey, focus group discussions and key informant interviews indicate that communities in Ningi and Shira LGA did not experience acute seed insecurity. However, seed sourcing trends point to chronic insecurity. In summary the overall findings of the assessment are:

1. Home saved seed are a major seed source: Farmers depend mainly on informal systems primarily home saved for wide range of crops.

2. Local markets are an important source: the local markets are functioning effectively under normal conditions but remain vulnerable due to limited quality control mechanisms and weak linkage with the formal seed sector. Targeted interventions—such as simple germination testing training, improved storage practices, and strengthening selected traders as community seed producers—could substantially enhance seed quality assurance and system resilience without disrupting the existing structure that farmers rely upon.

3. Formal sector linkages are weak: The formal sector is almost nonexistent in the two local government areas. Sourcing through the formal seed system is limited to certified seed primarily of maize.

4. Adoption of new varieties is low: Adoption is low due to limited introduction of new varieties in communities despite availability of new varieties. Given the importance of the informal/famer managed seed systems, there is a need to deliver new varieties through local markets and farmer-managed systems.

5. Seed quality perceptions- mixed: Farmers generally consider their seeds "good" or "average," but technical assessments highlight the need for training in seed technology to encompass for example germination, viability, and seed health.

6. Access great constraint than availability: Seed availability is less of an issue. Rather affordability and purchasing power emerge as challenges, highlighting access are the main constraint.

7. Community-based seed production (CBSP), relatively new: This model is still new in Nigeria. Sustainability depends on strong marketing and linkage strategies.

8. Storage constraints (some): Losses occur, especially with cowpea. Hermetic storage (PICS bags, double bagging with nylon) helps, but affordability remains a barrier.

9. Gender constraints- key: Women's participation in agriculture and seed systems is limited by cultural norms. Village Savings and Loan Associations (VSLA) groups and nutrition-focused farmer field schools (FFS) are potentially effective entry points to begin to address gender disparities.

10. Seed security perceptions- fluctuate: Despite seed being available in markets, many households are seed insecure due to inability to retain seed or afford seed purchases at planting time.

11. Heavy reliance on fertilizers: Highlights challenges with poor soil health and resilience that need to be addressed in the context of climate change with the emergence of new pests and diseases. Addressing these issues requires a shift towards integrated soil fertility management (ISFM) practices that combine judicious fertilizer use with organic amendments, crop diversification, and soil conservation practices.

6 RECOMMENDATIONS AND IMPLICATIONS FOR ACTION

Recommendations towards strengthening farmers' seed security (availability, access, quality) especially in areas affected by instability and insecurity are outlined in the form of an Action Plan as outlined in Table 34 below. The objective of this course of action is to strengthen communities and their local organizations to produce and disseminate appropriate seed and information at scale by their own members in the context of the Crop Diversity for Food Security in West Africa project.

Working in collaboration with national research, extension teams and the national Agricultural Seeds Council (NASC), Oxfam and ICRISAT will be the main institutions responsible for implementation of this Action Plan through the Crop Diversity for Food Security in West Africa project. Given the gender disparities that exist, particular attention will need to be given to ensuring women's meaningful participation in seed systems developments in the short, medium and long term.

Table 34: Recommended Action Plan Matrix

Recommendation	Key Activities	Timeline
1. Strengthen Farmer-Managed Seed Systems	*Promote participatory variety selection (PVS)*: Facilitate on-farm testing and evaluation of released and advanced varieties with farmers to identify those that are acceptable to a range of farmers, and best meet local preferences, agro-ecological conditions, and market needs. This will require strong linkages with national research facilitated through ICRISAT.	Short to Medium Term (1–3 years)
	Expand community seed production: Support farmer field schools (FFS) to engage in community-based seed production and marketing groups, focusing on legumes, sorghum, millet, maize.	
	Enhance seed quality knowledge: Train community seed producers on germination testing, seed health (pathogens, pests), and storage best practices etc. Here particular attention will be focused on establishing strong linkages with NASC ensuring institutionalisation and sustainability.	
	Monitoring variety diffusion: Track how quickly and widely new varieties spread within communities. FFS groups will be supported to multiply market oriented varieties coming out of PVS work.	
	Improve soil health and resilience: Through increased knowledge and capacity in soil health management and sustainable agricultural practices in FFS.	
2. Improve Seed Access and Affordability	*Leverage VSLAs (Village Savings & Loans Associations):* Use them as revolving funds for seed access and sustainability.	Medium Term (2–4 years)
	Introduce small seed packs: Promote 50–100g packs to make improved seed affordable. This will be strategic for groups that will be supported to become registered CBSP/local seed businesses.	
	Community seed banks (multi-functional): Establish seed banks not only for conservation but also as bulking and sales points.	

	Explore seed loan schemes: Pilot models where farmers can access seeds at planting and repay after harvest, where possible linked to community seed banks.	
3. Strengthen Market Linkages	*Support formal registration of FFS groups to CBSP:* Groups will be supported and trained to become CBSP/local seed businesses who produce certified seed increasing supply of quality seed within communities.	Ongoing, review every 2 years
	Capacity building in business skills: Train community groups in labelling, branding, pricing, and market negotiation.	
	Promote farmer-to-farmer seed sales: Encourage diffusion within communities to complement formal seed company linkages.	
	Marketing strategy for community seed producers: Link them to seed companies and government procurement (out grower/contract farming models).	
4. Address Seed Security and Vulnerability	*Enhance resilience:* Focus on introducing resilient and locally adapted varieties.	Medium to Long Term (3–5 years)
	Target access constraints: Build interventions around purchasing power rather than just seed availability.	
	Income generation through seed businesses: Ensure seed production groups capture price premiums (~10% above grain price).	
5. Gender and Social Inclusion	*Nutrition-focused farmer field schools (women-led):* Establish FFS with nutrition and income-generation goals, creating safe spaces for women.	Short to Medium Term (1–3 years)
	Two-in-one FFS model: Combine variety testing and nutrition/processing work to attract women's participation.	
	Use VSLA groups as entry points: Build seed interventions around existing women's groups.	
	Male engagement: Involve men in discussions to prevent women-focused initiatives from being overtaken.	
6. Storage and Post-Harvest Management	*Train on drying and moisture control:* Build modules into FFS on ensuring seed is sufficiently dry before storage.	Short Term (1–2 years)
	Promote affordable local innovations: Support farmer-led adaptations (e.g., double bagging with nylon sacks, jerrycans).	
	Promote low-cost hermetic storage (PICS bags, local innovations): Encourage local adaptations where bags are costly.	

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APPENDIX: DATA COLLECTION TEAM

S/No	Name	Designation	Organization/Community
1	Connie Formson	Seed Systems and Markets Advisor	OXFAM Novib
2	Henry Ushie	Ag. Head of program & Influencing	OXFAM
3	Mohammed Jada	Ag. Humanitarian Coordinator	OXFAM
4	Yetunde Adeyoola	Finance Officer	OXFAM
5	Jerom Jonah	Research Supervisor	ICRSAT
6	Iliyasu Shu'aibu	Dir. Extension Service Bauchi State	Bauchi State Agricultural development Program (BSADP)
7	Mohammed Ahmad Ya'u	State Certification officer	National Agricultural Seed Council (NASC)
8	Ado Bawa	Extension Agent Ningi LGA	Bauchi State Agricultural development Program (BSADP)
9	Khamilu Lawan Faggo	Extension Agent Shira LGA	Bauchi State Agricultural development Program (BSADP)
10	Bilyaminu Isa	FFS Community Facilitator Shira	Sawi
11	Khadija Bala Dawisu	FFS Community Facilitator Shira	Ziggau
12	Khamisu Abdullahi	FFS Community Facilitator Ningi	Unguwan Jakin
13	Fatima Aminu	FFS Community Facilitator Ningi	Kafin Lemu
14	Naziru Umar	FFS Community Facilitator Gumel	Mele
15	Hafsatu Haruna	FFS Community Facilitator Taura	Taura
16	Madalla Dauda	Project Officer	Care Nigeria
17	Abdullahi Isa Mohammed	Security Officer	Cooperazione Internazionale (COOPI)
18	Hanafi Sagir	Scientific Officer	National Centre for Genetic Resources and Biotechnology (NACGRAB)