

2 SEPTEMBER 2025

AGRICULTURAL RESILIENCE IN NORTHERN SENATORIAL DISTRICT OF BAUCHI STATE: A NEEDS ASSESSMENT REPORT

REPORT

Agricultural Resilience in Northern Senatorial District of Bauchi State: A Needs Assessment Report

Executive Summary

The Foundation for Sustainable Smallholder Solutions (FSSS) conducted a comprehensive needs assessment involving 360 smallholder farmers, drawn from 16 farmer groups, as well as 10 key agricultural stakeholders across seven Local Government Areas (LGAs) in the northern region of Bauchi State.

The assessment revealed significant gaps in climate adaptation strategies, yield optimisation practices, access to agricultural extension services, and the availability of high-quality inputs. Findings further underscored the central role of women and youth, who collectively represent more than 60 per cent of the population, in advancing inclusive agricultural growth, strengthening community resilience, and enhancing regional food systems. This observation aligns with broader evidence indicating that smallholder farmers in sub-Saharan Africa face systemic barriers that limit productivity gains and adaptive capacity, particularly under changing climatic conditions (FAO, 2021).

The results of this study highlight critical entry points for targeted interventions designed to increase agricultural productivity, strengthen adaptive capacity, and improve household livelihoods. Such interventions have the potential to contribute not only to local food security but also to broader regional development objectives.

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INTRODUCTION

This report critically evaluates the pressing challenges confronting smallholder farmers in Northern Bauchi, with particular emphasis on issues of climate resilience and the pursuit of long-term agricultural sustainability. It further explores the latent opportunities which, if strategically harnessed, hold the potential to transform the region into a centre of agrarian innovation and inclusive economic growth. The analysis positions Northern Bauchi as a pivotal area within Nigeria's wider efforts to achieve national food security and foster sustainable rural development.

BACKGROUND OF THE STUDY

The Northern Bauchi Senatorial District comprises seven Local Government Areas (LGAs): Katagum (Azare), Giade, Itas-Gadau, Gamawa, Zaki, Shira, and Jama'are. These LGAs are situated within the ecologically diverse zones of the Sudan and Sahel savannahs. The Sudan savannah is characterised by relatively low rainfall and sparse vegetation, whereas the Sahel savannah benefits from higher precipitation levels and comparatively nutrient-rich (Mortimore, 2009). These ecological attributes facilitate the cultivation of a broad range of crops, including rice cultivated in fadama areas, as well as sorghum, millet, groundnut, maize, cowpea, sesame, vegetables, and wheat. In addition, crops such as tigernut, sunflower, and barley, although not widely grown at present, exhibit significant potential for introduction and commercial expansion within the region.

The Northern Bauchi Senatorial District plays a pivotal role in regional food distribution. It supplies legumes, grains, and vegetables across Bauchi State and to neighbouring regions such as Gombe and Kano. The area is equally notable for its livestock production, which sustains cattle markets across northern Nigeria and contributes substantially to meeting the protein requirements of rapidly growing populations.

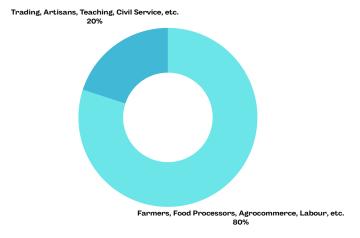
Agriculture constitutes the backbone of the regional economy, with an estimated 80% of the population engaged either directly or indirectly in agricultural value chain activities. These activities include primary production, input distribution, processing, transportation, and marketing. While this strong agricultural base presents considerable opportunities for intervention, investment, and innovation, the sector remains constrained by outdated practices, limited access to modern technologies, and a fragile support ecosystem.

Despite representing a demographic majority, women and youth remain under-represented in decision-making processes and agricultural leadership.

Their meaningful inclusion is not only a question of equity but also a crucial determinant of enhanced productivity, climate-smart innovation, and long-term resilience of farming communities (Fasakin et. al., 2022).

This report seeks to document these realities and provide strategic insights into how development partners, government institutions, and private sector actors can collaborate effectively to unlock the full agricultural potential of Northern Bauchi.

An illustration of the occupational landscape within the district is presented below:



1.2 OCCUPATIONAL LANDSCAPE OVERVIEW

Northern Bauchi is predominantly inhabited by the Hausa–Fulani ethnic group, alongside smaller populations from various minority groups. Agriculture constitutes the principal livelihood activity, with the majority of residents actively engaged in farming and related value chain enterprises.

Smallholder farmers in the region cultivate an average landholding of 2.1 hectares. The principal crops produced include millet, sorghum, and rice, which are among the most extensively cultivated. These crops constitute the agricultural backbone of the regional food system, supporting both household subsistence and market supply.

To ensure accuracy and representativeness, data collection was undertaken through Focus Group Discussions (FGDs) in seven farming communities, each situated within one of the seven Local Government Areas (LGAs) of Northern Bauchi. Complementary data were gathered through Key Informant Interviews (KIIs) with ten agricultural stakeholders, including officers from the Agricultural Development Programme (ADP) and leaders of farmer cooperatives.

Data collection and analysis were facilitated through the KoboToolbox platform, which provided structured data management and ensured consistency. In total, 365 participants contributed to the study, comprising 190 male and 175 female respondents. Notably, youth accounted for 35 per cent of participants, underscoring both their significant involvement in agricultural activities and their potential to serve as a transformative force within the regional food system.

1.3 RATIONALE

Although Northern Bauchi possesses considerable potential for agricultural development and long-term sustainability, farming communities across the region continue to face a complex array of systemic and environmental constraints. Highly variable rainfall patterns, recurrent drought episodes, and other climate-induced stressors undermine productivity and exacerbate risks to food security (Ikpe et. al., 2025). These climatic challenges are further intensified by structural including weak market linkages, limited access to quality agricultural inputs, inadequate financial services, and insufficient dissemination of modern agronomic knowledge and practices.

In response to these multidimensional challenges, the Foundation conducted a comprehensive needs assessment to engage directly with smallholder farmers and other critical stakeholders. The primary objective was to identify priority constraints and to co-develop context-specific, locally appropriate interventions. This assessment represents a foundational step towards fostering inclusive and resilient agricultural transformation in Northern Bauchi.

The study is designed to achieve three principal outcomes. Firstly, it provides evidence-based recommendations for targeted interventions aimed at addressing the most critical gaps within the agricultural value chain. Secondly, it proposes a structured roadmap for establishing community-based Farmer Hubs, envisioned as integrated service platforms for input distribution, capacity-building, and market facilitation. Thirdly, it offers strategic guidance on the promotion and adoption of climate-smart and regenerative agricultural practices that both strengthen resilience and contribute to the restoration of degraded ecosystems.

Furthermore, the report establishes critical baseline data intended to inform the development of robust monitoring and evaluation frameworks. These frameworks will underpin the design, implementation, and assessment of subsequent agricultural development initiatives across the region, ensuring accountability and adaptive learning over time.

1.4 RESEARCH OBJECTIVES

The assessment establishes that Northern Bauchi encompasses more than one thousand farming communities distributed across seven Local Government Areas (LGAs). These communities are characterised by a wide range of agro-ecological conditions and farming systems. Data for the study were collected through 16 focus group discussions (FGDs) involving a total of 360 smallholder farmers, complemented by interviews with ten key stakeholders representing agricultural institutions and support agencies.

The primary objective of the study was to generate context-specific evidence to inform the design of interventions, guide resource mobilisation, and support the development of implementation strategies that are responsive to the distinctive needs of the region.

The predominant economic activities in the region are agriculture and trade, including petty trading, commodity exchange, grain market aggregation, and agricultural input dealership.

a. Economic Activities and Community Structure

Agriculture and trade constitute the principal economic activities in northern Bauchi. Trading practices span petty retailing and commodity exchange through to grain aggregation and the distribution of agricultural inputs, thereby complementing the region's predominantly agrarian orientation and consolidating its strategic role within local food systems (Bauchi State Government, 2023).

Community sizes within the surveyed localities exhibit marked variation, ranging from c. 500 to c. 10,000 households. The demographic composition includes both indigenous groups and settler populations, the majority of whom subsist principally from smallholder farming. Agriculture remains the dominant source of cash income and underpins household food security, nutritional outcomes, school enrolment and broader socio-economic well-being in the State (National Bureau of Statistics, 2022; Bauchi State Government, 2023).

b. Current Farming Practices and Challenges

Farmers across the study area cultivate a broad portfolio of staple cereals, pulses, oilseeds and horticultural crops, principally rice, millet, sorghum, cowpea, groundnut, maize, assorted vegetables and wheat. These crops are predominantly produced on smallholder holdings; the present assessment records a mean farm size of approximately 2.1 hectares per household. Land-holding arrangements are heterogeneous: 62% of sampled households

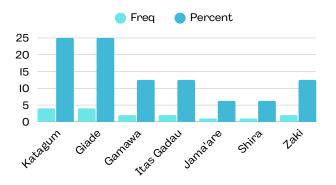
reported renting land for cultivation, while 37% reported ownership or inheritance of their cultivated plots.

Crop production is complemented by the cultivation of marketable cash crops — notably sesame and soybean, in addition to groundnut and surplus cereals for sale. Production systems remain predominantly low-input and largely traditional in structure, typified by limited mechanisation and constrained access to improved inputs. Land preparation, planting and soil fertility maintenance principally rely upon local techniques and organic amendments, including animal manure, farmyard compost and other organic matter.

The persistence of low-input practices is principally attributable to the high cost and limited spatial availability of critical agro-inputs (inorganic fertilisers, herbicides and certified improved seed), and to weaknesses in supply chains and agro-dealer networks. Consequently, smallholders are exposed to recurrent pest and disease episodes that materially diminish attainable yields and destabilise household livelihoods. Where external inputs are used, procurement is most commonly via local markets and small community agro-dealers; these channels frequently lack certified, quality-assured inputs and are subject to intermittent supply shortages and quality variability.

In response to pest pressure and constrained access to synthetic pesticides, a subset of farmers deploy traditional and botanically-derived control measures, such as neem-based powders and locally formulated herbal biopesticides. These practices are indicative of adaptive, resource-constrained pest management strategies but are not, in all instances, adequate substitutes for integrated pest management approaches that combine monitoring, resistant varieties and calibrated chemical or biological controls.

A breakdown of the proportion of the population engaged in the study is presented below:

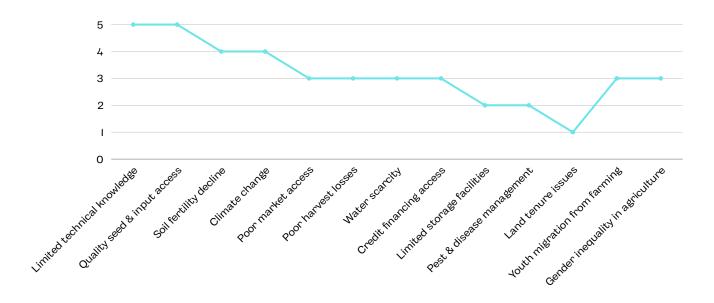


Constraints ranking and extension services

The assessment included a farmer-driven ranking exercise using a five-point severity scale (1 = least severe; 5 = most severe) to elicit perceived constraints to production, sustainability and income growth. Limited technical knowledge and agronomic expertise emerged as the highest-ranked constraint, commensurate with the documented scarcity of extension service provision in the study area. By contrast, land tenure issues were consistently rated as relatively low in their immediate influence on crop production within the sample population.

Seed systems: availability, quality and local production capacity

Seed availability and affordability were repeatedly identified by respondents as principal barriers to productivity. Access to certified seed of improved varieties is limited and frequently cost-prohibitive for smallholder producers. Although Local Seed Producers (LSPs) and community-based seed initiatives exist in parts of northern Nigeria, their spatial coverage and production capacity are currently insufficient to satisfy regional demand for



certified seed. Strengthening semi-formal and community-based seed production mechanisms is therefore an essential component of any strategy intended to increase the accessibility of quality seed and to enhance varietal turnover in smallholder systems (FAO, 2018).

Implications for intervention

The combined evidence from the assessment indicates three interlinked priorities for targeted interventions:

- improve access to quality, affordable inputs particularly certified seed and balanced fertiliser – through strengthened supply chains and agrodealer networks;
- expand accessible technical assistance and extension services that provide site-specific agronomic recommendations and integrated pest management guidance; and
- bolster local seed production capacity and formalise linkages between LSPs, certification bodies and input markets to reduce supply gaps and quality uncertainty.

c. Economic Situation and Market Access

Agriculture constitutes the principal livelihood activity for smallholder households across Northern Bauchi. In addition to staple crop production, households routinely diversify income through onfarm and non-farm activities, including manual groundnut oil extraction, home-based baking, smallscale food processing, small ruminant and poultry rearing, petty trading, and other micro-enterprises. livelihood diversification represents risk-management strategy under customary conditions of seasonal agricultural variability.

Notwithstanding intensive labour inputs, the majority of smallholder households subsist at a low income level. Data from the Foundation's household survey indicate average seasonal earnings of approximately #300,000 per household. On this income base, households lack sufficient liquidity to maintain adequate consumption, reinvest in productive agricultural assets, or absorb common livelihood shocks. Financial exclusion is pronounced: the Foundation's survey found that roughly 75 per cent of smallholder households do not access formal credit facilities, government-backed loan schemes, or subsidised inputs. Only 12.5 per cent reported receipt of loans under government programmes, while a further 12.5 per cent accessed farm inputs on credit from local agro-dealers, frequently under onerous repayment terms. These patterns are consistent with wider evidence of constrained smallholder access to financial services in Nigeria's agricultural sector (Steemers, 2022).

Market participation by smallholders is highly atomised. Approximately 70 per cent of surveyed

producers market their produce independently in proximate rural markets, relying on motorcycles, tricycles, hired vehicles or animal-drawn conveyances. This fragmented marketing structure increases transaction costs and substantially reduces farmers' bargaining power. Low levels of collective action and limited penetration of organised marketing channels further impede price discovery and value capture. Weak rural access and inadequate market infrastructure compound these constraints and have been identified as systemic obstacles to efficient agricultural marketing in Nigerian states with similar rural geographies.

Smallholder productivity is constrained by several interacting structural and biophysical factors. Farmers consistently cite nutrient-depleted soils and erratic rainfall regimes as principal drivers of low yields. Price volatility and market power asymmetries -exacerbated by intermediary behaviour-amplify household vulnerability to income shocks. Seasonal supply gluts, which arise when production is geographically concentrated and storage processing capacities are limited, depress farm-gate prices at harvest. Deficiencies in transport infrastructure and elevated haulage costs further erode margins and raise the effective cost of market participation. Empirical investigations in Bauchi's oilseed value chains similarly identify lack of access to credit, inadequate capital and high labour costs as constraints to income generation for groundnut producers (Idi et al., 2019).

The combined effect of low productivity, constrained finance, fragmented marketing and deficient infrastructure results in pervasive livelihood insecurity. A substantive share of households are unable to generate sufficient output to satisfy both household consumption and marketable surplus. Consequently, recurrent pre-harvest food shortages are common, reinforcing seasonal food insecurity and perpetuating inter-temporal poverty traps.

d. Climate and Environmental Assessment

Respondents from farming communities in Northern Bauchi reported heightened exposure to the adverse impacts of climate change on agricultural production systems. Over the past decade, farmers have observed increasing variability in rainfall patterns, recurrent droughts, and severe flooding events, each of which has compounded existing constraints on productivity. Estimates provided by respondents suggest that approximately 34 per cent of total harvests are lost annually as a direct consequence of climate-related stressors.

A majority of smallholder farmers in the region operate with minimal or no access to weather-related information, including forecasts, early-warning systems, and environmental data. This informational deficit significantly increases their

vulnerability to unpredictable climatic shocks and undermines their adaptive capacity. Although farmers generally lack detailed knowledge of the scientific mechanisms underpinning climate change, many have become cognisant of its tangible effects, particularly the progressive shrinking of Lake Chad and the escalating frequency and intensity of both flooding and prolonged dry spells.

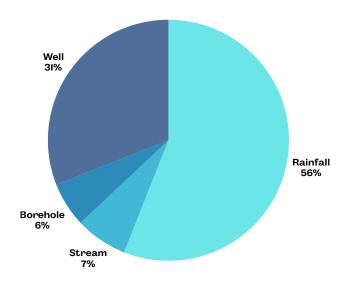
Some farmers have begun to implement indigenous adaptive practices such as agroforestry and cover cropping, aimed at mitigating soil erosion and reducing flood-related damage. However, the adoption and scaling of such climate-smart agricultural practices remain limited within the region. The principal crops identified as highly susceptible to climate stress include millet, sorghum, rice, soybeans, maize, and cowpea. In addition, livestock production is increasingly at risk, as flood events have previously led to significant animal mortality and disruptions in feed availability and grazing systems.

e. Soil Health and Water Management

Access to water remains a critical constraint for smallholder farmers in Northern Bauchi State. Survey findings indicate that approximately 57 per cent of respondents rely exclusively on rainfall for crop production, while 43 per cent depend on shallow wells primarily for drinking water and household consumption. The absence of sustainable and reliable water infrastructure severely limits opportunities for dry-season cultivation, thereby constraining annual farm income. Evidence suggests that nearly 64 per cent of smallholder farmers do not participate in off-season farming due to inadequate water availability.

Although rudimentary water conservation strategies are practised in certain locations, they remain highly localised and insufficient to address regional irrigation needs. These practices include the construction of grass barriers and manually excavated water holes, particularly within Zaki, Itas-Gadau, and Giade Local Government Areas (LGAs). However, the scale and effectiveness of these interventions remain limited.

From a geomorphological perspective, Northern Bauchi is characterised predominantly by flat lowlands, which account for approximately 80 per cent of the terrain, while the remaining 20 per cent consists of plateau regions. The prevailing soil type is sandy loam, which is moderately suitable for a variety crops but requires consistent nutrient of replenishment to sustain productivity. Fertility management is largely dependent on locally sourced organic inputs, mainly animal manure, owing to the prohibitive cost and limited availability of inorganic fertilisers. Consequently, a substantial proportion of agricultural land remains nutrient-depleted,



A breakdown of water sources for farming in Bauchi State.

contributing to progressive yield decline.

Land preparation practices remain heavily reliant on manual labour and traditional implements, such as animal-drawn ploughs.

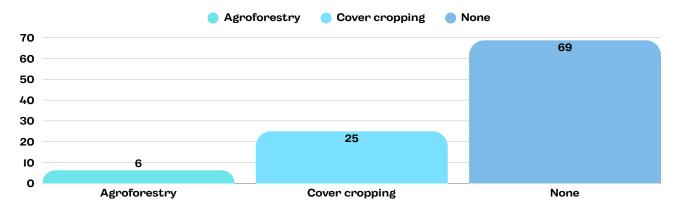
The adoption of mechanised equipment is severely constrained, as tractors and related machinery are prohibitively expensive and largely inaccessible to rural farming communities. Although elements of regenerative agriculture—such as cover cropping and agroforestry—are present, uptake remains sporadic and largely experimental, with minimal impact at scale

f. Social Organisation and Gender Dynamics

Women and young people constitute approximately 60 percent of the active farming population in Northern Bauchi. Despite their numerical significance, they continue to encounter entrenched structural barriers, including restricted access to land tenure, limited availability of financial capital, and inadequate exposure to modern agronomic knowledge and practices. These constraints significantly undermine their agency in agricultural decision-making processes and suppress their overall productivity potential.

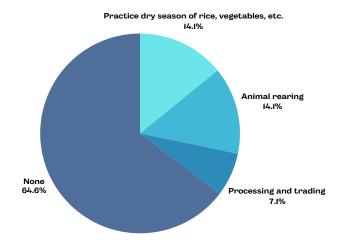
Although many communities exhibit near parity in male and female participation in primary agricultural production, notable variations are observed. For instance, in specific communities within Gamawa agricultural LGA. women's engagement concentrated predominantly in livestock husbandry agro-processing, and with relatively involvement in arable crop cultivation. By contrast, in sections of Giade LGA, women's direct participation in farming is estimated at less than 10 per cent.

Climate Smart Practices Adopted among farmers in Bauchi State



A substantial proportion of women across the region engage in ancillary segments of the agricultural value chain. These activities encompass food processing, animal husbandry, and commodity trading. While such roles may not directly involve land preparation or crop cultivation, they nonetheless constitute integral components of the regional agricultural economy and remain pivotal to household income security and rural livelihoods.

formal knowledge or practical competencies in yield-enhancing applying modern, techniques. this demonstrated Despite skills their gap, enthusiasm represents a latent potential for agricultural development. With targeted training interventions and strengthened extension support systems, this demographic cohort could play a pivotal role in catalysing large-scale agricultural transformation across Northern Bauchi.



A breakdown of activities carried out during dry season in Northern Bauchi.

g. Learning Preferences and Capacity

The assessment revealed that approximately 87 per cent of respondents do not have access to agricultural extension services or formal training opportunities. The absence of structured capacity-building mechanisms constitutes a substantial constraint on agricultural productivity, technological adoption, and long-term sustainability.

The deficit disproportionately affects women and young people, many of whom have expressed considerable interest in agricultural activities but lack

CONCLUSION AND RECOMMENDATIONS

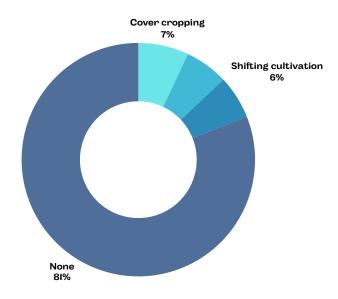
The findings of this needs assessment indicate that Northern Bauchi possesses considerable agricultural potential, yet remains constrained within a cycle of persistent underperformance. underperformance is shaped by systemic neglect, limited institutional capacity, environmental stressors, and inadequate support structures. Within this context, smallholder farmers—particularly women and youth-form the backbone of food production. Despite their centrality to local and regional food systems, they remain excluded from the resources, technical knowledge, and institutional opportunities required for agricultural transformation (FAO, 2018).

Viewed through the Sustainable Livelihoods Approach (SLA), the constraints in Northern Bauchi reflect deficiencies across livelihood capitals. Financial capital is undermined by weak credit systems; human capital is constrained by inadequate extension and training; physical capital is limited by poor infrastructure and storage; and natural capital is increasingly threatened by soil degradation and climate variability. Social capital, particularly for women and youth, is weakened by marginalisation and restricted participation in decision-making processes.

The assessment also highlights fragile market linkages and information gaps, consistent with Inclusive Value Chain (IVC) analysis, which shows that smallholders in marginalised regions are often locked into the least profitable segments

of agricultural value chains (Federal Ministry of Agriculture and Rural Development, 2021). Limited access to improved inputs and technologies further increases vulnerability to environmental and market shocks.

Nonetheless, the region presents considerable opportunities. Northern Bauchi has diverse agroecological zones, a committed farming population, and traditional knowledge systems that can be strengthened with modern agronomic practices. Climate-Smart Agriculture perspective, the adoption of drought-tolerant seed varieties, water-use efficiency measures, integrated soil fertility management could increase productivity while building resilience to climate risks (Lipper et al., 2014).



A breakdown of regenerative farming practices adopted by farmers in Northern Bauchi.

The findings therefore underscore the necessity of coordinated. inclusive. and multi-stakeholder interventions. As the pathway forward requires Development actors, government agencies, and private-sector stakeholders must collaborate to design and implement evidence-based, scalable, and locally anchored solutions. Recommended strategies include:

- Establishing community-based Farmers' Hubs to strengthen input distribution, aggregation, and collective bargaining power.
- Expanding access to climate-resilient inputs and innovations in alignment with CSA principles.
- Enhancing extension and advisory services through participatory and gender-sensitive methodologies.
- Providing capacity development programmes for women and youth, enabling them to assume leadership roles within agricultural value chains.

 Strengthening market systems and value chain governance to reduce transaction costs, increase transparency, and improve farmer incomes.

This report therefore extends beyond a diagnostic exercise to present a strategic roadmap for agricultural transformation in Northern Bauchi. With sustained investments in people, practices, and enabling policy frameworks, the region can transition vulnerability resilience, to subsistence-based survival strategies towards inclusive, sustainable agricultural prosperity. The Foundation reaffirms its commitment to working collaboratively with research development partners, and community stakeholders to realise this vision.

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