



CHALLENGES ENCOUNTERED IN THE IMPLEMENTATION OF SUPERVISED ENTERPRISE PROJECTS (SEPs) IN NORTH-EAST NIGERIA

¹Kangare, J. B., ²Madu, J.A., ¹Bello, K., ¹Madugu, A.J and ³Sanda, A.G

¹Department of Agricultural Economics and Extension, Adamawa State University, Mubi, , Nigeria

²Department of Agricultural Extension and Rural Development, Modibbo Adama, University, Yola, Adamawa State, Nigeria

³Department of Public Administration, Adamawa State University, Mubi, Nigeria

(Corresponding Author; Kangare, J.B; bandayikangare@gmail.com;
08060679035

ABSTRACT

Challenges faced in the implementation of Supervised Enterprise Projects (SEPs) beneficiaries in North-East Nigeria was evaluated in this study. Although SEPs are implemented in many communities in North-East Nigeria under the Sasakawa Africa Fund for Extension Education (SAFE) Programme of the Adamawa State University (ADSU), Mubi, there is limited evidence on the effectiveness of the SEPs in enhancing the livelihoods of farmers in the region. The study thus focused on the constraints faced by the beneficiaries. The survey was carried out in the operational areas of the SAFE Programme of ADSU, Mubi (Adamawa, Borno, Gombe, and Taraba States). A total of 690 respondents comprising 345 SEPs beneficiaries, and 345 non-beneficiaries were selected. Structured questionnaires were used to gather primary data from the respondents. The socio-economic characteristics of the respondents and the challenges faced. Educational attainment was found to have a positive and highly significant coefficient in influencing adoption ($\beta = 0.193$; $p < 0.001$). The research further revealed some factors that used to hinder effective agricultural investment had reduced significantly. Some of these were inadequate monitoring and supervision which was reduced from 16.0% to 6.0%, on the other hand, environmental constraints like climate variability and frequent changes in weather conditions increased from 16.2% to 18.0%. This study establishes that Supervised Enterprise Projects (SEPs) is an effective agricultural extension and capacity building tool which could promote adoption of technology, boost farm productivity and strengthen beneficiaries' farming livelihoods. However, the study calls for greater focus on affordable and context-specific adoptable technologies to promote the sustainability, scalability and inclusiveness of the SEP benefits.

Keywords; Adoption, Beneficiaries, Constraints, Improved Technologies, Socio/-economic

1.0

INTRODUCTION

Agriculture is among the most basic pillars in the development and sustainability of human societies. Hence, its importance to human sustenance cannot be overemphasized. It stands as the primary source of food for the global population and dietary needs of both humans and animals, it provides jobs and employment, raw materials and income, thereby playing a significant role in economic growth and poverty alleviation. These are done by providing crops, livestock and fishery products. It is also a major contributor to the Gross Domestic Product (GDP) of developing economies. Over 60% of the global population relies on agriculture for its livelihood.

Looking deeper at the enormous importance of agriculture and its roles, the Nigerian government has over the years attempted several programmes for the growth and development of agriculture. However, there is a lot that needs to be done. Agricultural extension has been one of the most useful tools with which governments has reached out to farmers. It played a critical role in bridging the gap between research, education and actual practice. Presently, farmers are provided with up-to-date knowledge on global best practices in the areas of techniques, technologies among others. These trends have boosted the capacity of farmers to make informed decision and to adopt innovative practices. They can now access innovative inputs and global markets. This enhanced sustainability has encouraged youth participation in agricultural production. Another area of improvement is agricultural extension which has promoted formation of cooperatives and farmer groups (Uche *et al.*, 2023).

The idea of the role of agricultural extension services looks so promising in current trends of agricultural development. Unfortunately, agricultural extension service delivery keep on dwindling in Nigeria over the years. This is a matter of significant concern and unarguably one that lacks the needed attention. Lack of effective agricultural extension services is a sure way to food insecurity and complex human crisis and no country should take this for granted, inefficiency in extension service delivery owing to insufficient budget allocation to extension services, low extension agent – farmer ratio, use of outdated methods and tools, weak linkages with research institutes have necessitated government interventions. In some cases, new policies have been formulated to boost efficacy in extension service delivery (Davis *et al.*, 2019).

Nevertheless, efforts of various governments to meet up with required standards of practice have not yielded substantial progress on agricultural development. And again,



the failure of government has attracted the attention of Non - Governmental Organisations (NGOs) to complement government's effort in many areas. These are in areas like innovative solutions, resources and expertise in order to improve agricultural practices and to enhance the livelihood of farmers. Various NGOs have intervened differently through capacity building, technology dissemination, financial and technical support, market access and linkage facilitation, policy influence advocacy, infrastructure provision, community mobilization and monitoring and evaluation. A number of NGOs have contributed directly to the development of agricultural extension namely, International Institute of Tropical Agriculture (IITA), Oxfam Nigeria, Action Aid Nigeria and Sasakawa Africa Association (SAA) among others (Idris *et al.*, 2023).

SAA is one of the active players in the development of agricultural extension, it has developed innovative strategies to improve the effectiveness and efficiency of extension service delivery. It collaborates with the private sector alongside government extension agents in areas that address new tools, approaches and models of extension service delivery. The prominent models developed by SAA include: Agro Processing Enterprise Centre (APEC) Model, the Private and Extension Service Provision (PESP) Model, Farmer Learning Platforms (FLPs), the Community Based Seed Multiplication (CBSM) Model, the Community Savings for Investment in Agribusiness (CSIA) Model. There are also some Digital Transformation Strategies that are powered by Information and Communication Technology (ICT), thereby offering inclusive chances to beneficiary farmers through the Sasakawa Africa Fund for Extension Education (SAFE), which is a Demand Driven Curriculum (SDDC) model. All these models are applied in an integrated approach along the entire agricultural value chain since they are interdependent of each other.

SAA implemented the SDDC model via affiliated agricultural colleges and universities. The SDDC curriculum promoted by SAFE outlines what knowledge the students should acquire. In this model, Mid-Career Extension Agents (EAs) are provided with opportunity to upgrade their extension capacity through SAFE's collaboration with universities and some colleges particularly in conducting their supervised enterprise projects (SEPs). Also, Demand-driven curriculum (DDC) focuses on stakeholders' interests in agricultural extension advisory services, involving academics and professionals from public and private sectors. This promises high-quality service, delivery, content and outcome for

learners. SDDC adapts to employer and student needs, community actors, and evolving global economies, thereby ensuring skills for both recent graduates and lifelong learners.

In the light of the above, the SDDC was developed by SAFE as a demand - driven process to meet the needs of stakeholders; that is, students, farmers, colleges, universities, private businesses, non-governmental organisations (NGOs), community-based organisations, public and international organisations, ministries, and Farmers. A majority of those involved in agricultural development are smallholder farmers; and for this reason, the curriculum for the agricultural sector must prioritise needs and cater to the changing demands of beneficiaries (SAA, 2023; SAA, 2024). SEPs are the most important components of SAFE programme. It requires students to work on action-based research with the aim of solving problems encountered by farming communities. Adamawa State University, Mubi, is one of the collaborating Universities for the implementation of SAFE. It commenced its first batch of SEPs in 2015 and has since then graduated several students who have carried out SEPs in their various communities. This study, therefore, focuses on assessing the impact of SEPs on the productivity of beneficiaries, in North - East Nigeria.

Agriculture is still a key industry in Nigeria in terms of economic development, food security and poverty alleviation. Agricultural productivity for most farmers, however, is still low, especially in North-East Nigeria and leading to high food insecurity, poverty and low standard of living. The ongoing insurgency in the area has further compounded these challenges, affecting agricultural production and livelihoods in rural areas. Farmers' low productivity is one of the major challenges in the sector, among others, attributed to poor provision of effective agricultural extension services which is critical to the dissemination of improved technologies, innovations, and management practices to farmers. Extension services play a vital role as a channel to facilitate farmers' access to relevant knowledge and innovations that can improve agricultural productivity and livelihoods. Several development partners and non-governmental organisations have started extension service strengthening programmes recognising that government extension systems have limitations. One such intervention is the Sasakawa Africa Fund for Extension Education (SAFE) which was created to increase the capacity of frontline extension staff, and to facilitate the transfer of demand-driven agricultural technologies to farmers. SAFE was introduced in Adamawa State University, Mubi in 2011 to tackle the extension manpower shortages in the North-East geopolitical zone of Nigeria. The



innovative element of the programme is the Supervised Enterprise Projects (SEPs) which allow students to recognise agricultural issues in the community and present innovations and technologies suitable to solve the needs of farmers. The SEPs component of SAFE is a mandatory requirement for graduation for students undergoing the Sasakawa Africa Fund for Extension Education Demand Driven Curriculum (SDDC) that is implemented by Adamawa State University, Mubi with the aim to help transfer technologies and boost agricultural enterprises of benefiting farmers.

The programme has graduated many students and has put into practice several SEPs in communities in North-East Nigeria since its inception. Though there has been a significant investment in the programme and it has been widely adopted, little empirical data exists about the effectiveness and impact on the farmers in the communities benefiting from it. Many of the existing studies have been mainly about agricultural extension programmes in general and the results of SAFE's Supervised Enterprise Projects in the region have received little or no attention. As a result, it becomes difficult to ascertain the impact the programme has had on technology uptake, productivity, income generation and beneficiaries' welfare.

The lack of evidence of effects of SEPs leads to a knowledge gap that hinders the development of informed decisions by policy makers, programme implementers and development partners on the sustainability, scalability and improvement of SEPs. It is against this backdrop that this study aims to assess the impact of the Supervised Enterprise Projects (SEPs) on the beneficiaries in the North-East Nigeria.

In order to achieve the goal of this study, the following research questions are herein stated:

- i. what are the socio-economic characteristics of Supervised Enterprise Projects (SEPs) beneficiaries in North-East Nigeria?
- v. what are the constraints faced by beneficiaries before and after Supervised Enterprise Projects (SEPs) implementation in North-East Nigeria?

The objective of this study is to

- i. describes the socio-economic characteristics of beneficiaries of Supervised Enterprise Projects (SEPs) beneficiaries in the North-East Nigeria;
- v. identify constraints faced by beneficiaries before and after Supervised Enterprise Projects (SEPs) implementation in North-East Nigeria.



Appropriate extension packages and effective delivery to rural farmers are very critical in enhancing agricultural productivity and improving the livelihood of rural dwellers. Rural development is not feasible without a vibrant extension programme. Therefore, it has become imperative to really assess the constraints to the effective implementation of SEPs in some communities in the North-East which indeed will be a viable tool to evaluate the relevance of implementing SEPs in North-east at large.

Information from this assessment will be very useful and will as well serve as a source of motivation to the donor agency. It shall further assist in policy amendments and implementation. It will influence the government and its agricultural policy makers to improve extension services in Nigeria. Another advantage is that the outcome of this research work would be useful for other non-governmental organisations that are interested in boosting agricultural production through extension programmes; because the results is going to furnish them with relevant strategies for improving extension service delivery to smallholder farmers.

2.0 LITERATURE REVIEW

2.1 Conceptual Overview

2.1.1 Definition and scope of supervised enterprise projects

Students investigate the actual issues facing the community or organization before working together to implement solutions. Providing students with the appropriate guidance is a crucial part of helping them overcome these problems. Academic Students benefit from the mentoring system because it helps them stay on track academically and learn efficiently so that they may complete projects to their full potential. Stakeholders in community-based projects are encouraged by the SEPs to work together, share information, and divide up tasks. In SEPs, students are able to connect with one another, practise their interpersonal skills, and acquire new ways of communicating (Syarifuddin et al., 2021). Participating in the SEP has numerous positive aspects. Through their participation in community businesses or organisational projects, students gain valuable hands-on experience in their chosen fields and the confidence to make a real impact. Working in the real world helps students in two ways: first, it validates what they've learned in class, and second, it gives their education purpose. According to Syarifuddin et al. (2021), SEPs help students gain practical experience and problem-solving abilities, which in turn make them more marketable to potential employers.



Independent work, effective project management, and the ability to solve complex problems are just a few ways that students can tailor their education through SEPs while also enhancing their technical abilities. Agricultural crop production improvements, sustainable farming practices, community sanitation programs, education initiatives, and marketing and operational enhancement initiatives focused on businesses are all part of the assortment of available Supervised Enterprise Project examples (Kroma, 2018). Students have the opportunity to graduate from school with tangible accomplishments through Supervised Enterprise Projects. These projects allow students to apply their knowledge to real-world challenges, allowing them to make a beneficial impact. As a fundamental pedagogical approach, an Accompanied Enterprise Project (AEP) enables students to apply theoretical concepts learned in the classroom to real-world work settings. Students can gain the problem-solving skills and industry-specific knowledge they need through organised activities. Because SEPs are grounded in real-world circumstances, students are required to apply their academic understanding to actual business challenges. According to Muerza et al. (2024), the primary distinction between SEPs and traditional classroom learning studios is the emphasis on hands-on, real-world experience.

The responsive character of SEPs is described by Kroma (2018), who also notes that these programs allow professionals to respond to community needs best. To overcome the uncertainties of real community development, SEPs integrate academic components with specific techniques to provide community-oriented interventions. Students are compelled to move beyond the acquisition of academic information and instead focus on addressing real-world challenges in their respective disciplines. In order to produce graduates who can not only comprehend theoretical concepts but also apply them in real-world contexts, SEPs place a focus on both theory and practice (Muerza et al., 2024). Therefore, SEPs include needs in the form of a structured collection of procedures. The three distinguishable phases of SEP structure are planning, implementation, and assessment (Muerza et al., 2024). Students can gain a better understanding of the intricacies of project management through the phases of project-based learning, which include initial design, execution, and final judgement. Throughout the four phases of each project, there are educational components that are unique to that particular project. The first phase entails project planning, and the second phase makes use of data research methodologies, allocates resources, and finally assesses the outcomes. The learning experience is

structured in a way that students can easily follow, ensuring that they acquire the necessary skills for their future careers.

2.1.2 Origin and purpose of supervised enterprise projects

Due of the difficulties smallholder farmers encounter in developing countries, such as a lack of technical expertise, resources, and market connections, the idea was created to help them. Traditional agricultural extension programs failed to address the threat of several agricultural issues because they concentrated on the dissemination of agricultural practices rather than their solutions. Although farmers gained knowledge of new technology or methods, they were unable to put them into effect due to financial constraints, shortage of resources, and problems in connecting to markets (1024).

The implementation of SEPs has been essential in enhancing smallholder production, which in turn has increased farm revenue and bolstered rural development efforts by addressing broader farmer concerns. With the addition of a market connect service package, these initiatives incorporate training, input access, and financial backer components. The integrated service packages provided by SEPs assist smallholder farmers in overcoming the challenges of low productivity, market uncertainty, and climate change (IFAD, 2023). Sustainable agricultural projects (SEPs) empower farmers with the information, capital, and tools they need to implement innovative practices and get government backing for their companies. The overarching goal of SEPs is to help beneficiaries transition from subsistence farming to more viable production systems so they can compete on a global scale (Sheahan & Barrett, 2017). In order for smallholder farmers to thrive in agricultural systems that are focused on the market, SEPs lay out the primary requirements. SEPs equip farmers with the means to enhance their revenue and productivity by teaching them modern farming methods, providing them with agricultural input, and facilitating relationships between suppliers and buyers. Programs like this fall under the umbrella of Special Economic Programs (SEPs), and they help farmers in susceptible regions become more resilient by using risk management strategies and climate-smart farming techniques (Ogu, 2024).

The primary goal of SEPs, as pointed out by Davis (2020), is to assist farmers in responding to price, market, and environmental volatility, in addition to increasing agricultural production growth. Adaptive operations are shaped by the use of solutions to preserve water, improve soil health, and reduce vulnerable input reliance (IFAD, 2024).

Promoting community development through collaborative efforts and Social Cooperation are two primary tenets of SEPs' goal. Ogundele and Olagunju (2021) found that rural smallholder farmers are unable to reach markets or negotiate higher prices because they lack bargaining power. By facilitating the formation of community organisations and cooperatives, Supervised Enterprise Projects help farmers improve their standing in the local market. As a result, these programs can't succeed without strong social capital, which allows smallholder farmers to pool their resources, save expenses, and take advantage of economies of scale.

2.2 Theoretical Framework

2.2.1 Human capital theory

Investments in education and skill development provide dividends in the form of increased production at the individual and societal levels, as Gary Becker demonstrated in the 1960s. Human capital theory describes this. According to this school of thought, there is a direct correlation between an individual's level of education and the monetary reward they reap. In order to successfully manage their agricultural operations, smallholder farmers depend on human capital, which includes their local expertise, knowledge, and experience (Adimassu et al., 2019). Farmers in Nigeria's northeast face low output due to a lack of knowledge, inefficient methods, and inadequate training, much as in other rural, impoverished regions throughout the world (Hamzat, 2022).

Human capital theory states that a mix of skilled and unskilled laborers may increase agricultural output. Knowledge of financials and the capacity to effectively plan and grow a company are crucial abilities (IFAD, 2024). Many smallholder farmers are unable to achieve their full agricultural potential due to a lack of knowledge in financial management and limited access to markets. Training and the supervision of farmer expert enterprise initiatives both contribute to enhanced business acumen, which in turn improves entrepreneurship and the longevity of businesses. Human Capital Theory provides the most compelling explanation for this phenomenon by arguing that improved agriculture and production results are most achieved via a combination of education and training (Uche et al., 2023).

2.2.2 Diffusion of innovation theory

Researched in 1962, Everett Rogers' Diffusion of Innovation Theory describes the process by which novel concepts or technology spread throughout communities via interactions

between individuals. Several factors, including the method's utility, simplicity of understanding, and the existence of demonstrated efficacy, are considered by farmers as they gradually embrace new ways according to this innovation hypothesis (Deola, 2024). New crops, advanced irrigation systems, and optimal farming practices for subsistence farmers are implemented through supervised enterprise initiatives, which incorporate these ideas. Better evaluations of the performance of these efforts are made possible by understanding how these innovations are transmitted within the agricultural sector. This knowledge can then be used to plan for similar interventions in the future.

2.3 Empirical Review

A review of agricultural innovation systems was conducted by the World Bank (2012) across many countries. The main reasons that hindered the project's efficiency were poor coordination among stakeholders, insufficient market connections, and a lack of access to financial services. A lower project return was generally the result of beneficiaries' struggles with product marketing.

By using a systematic questionnaire to choose 240 participants, Adebayo and Adeola (2015) explored the limitations of a youth agricultural empowerment initiative in Nigeria. According to the descriptive statistics and regression analysis, the enterprise's performance was negatively affected by the issue of delayed project money release, inability to give training, and project monitoring. The need of continuous mentorship and supervision was emphasized by the recipients.

Right now, there is a dearth of studies that investigate SEPs from a gender and youth viewpoint. There is no indication that the programmes run by the Nigeria VCDP and the Sasakawa Africa Association have improved the revenue production, farm management, or empowerment of its participants, despite the fact that they have been effective in recruiting young people and women into agriculture (Ovharhe, 2020). The economic benefits of SEPs have been well-documented, but studies that focus on female and young agricultural investors have shown that these programmes are less useful due to the many barriers women face when trying to own property, get loans, or get training. Methods to increase youth involvement in agricultural enterprises should be developed, and studies should investigate the efficacy of gender-sensitive SEPs (Assa, 2023).

There is a lack of attention for regional climatic and agroecological variations in SEPs research in Nigeria. In the semi-arid parts of North-East Nigeria, for example, the APPEALS project employs climate-resilient farming techniques, although there is no



evidence that these approaches actually work (Garandi, 2025). Most SEPs utilize conventional approaches that likely don't work well in places with distinct agronomic and climatic characteristics, according to research undertaken by the African Development Fund (2024). Research is needed to find ways to tailor SEPs to specific needs in areas with little rainfall, soil degradation, and high climate change vulnerability, as pointed out by Adegbola *et al.* (2024).

3.0

METHODOLOGY

3.1 The Study Area

The Study Area, North - East Nigeria, is located between Latitudes 06°00'00"N to 14°00'00"N of the Equator to between Longitudes 09°00'00"E and 15°00'00"E of the Prime Meridian. It forms part of the Northeast Geopolitical zone of Nigeria, comprising of four states (Adamawa, Borno, Gombe and Taraba). It covers a total land area of about 182, 553 Km² Adamawa – 36, 917 Km²; Borno – 70, 898 Km²; Taraba – 54, 473 Km²; and Gombe – 20, 265 Km²). It is bordered to the North by Chad republic; to the east by the Republic of Cameroun; to the Southwest by Benue State; to the West by Bauchi and Plateau States and to the Northwest by Yobe State (Figure 1). (Abatcha *et al.*, 2024).

The Study Area falls within the tropical wet and dry or tropical savannah climatic zone of Nigeria coded as **Aw** (a dry winter) by the 1928 Koppen-Geiger world climates classification system. Based on this climatic zone and type, the area is characterized by distinct wet and dry seasons. However, slight variations in the climatic characteristics occur between the extreme northern state (Borno) and the extreme southern state (Taraba), while central parts (Adamawa and Gombe) exhibit slightly moderate characteristics of the two extremes (Garandi, 2025).

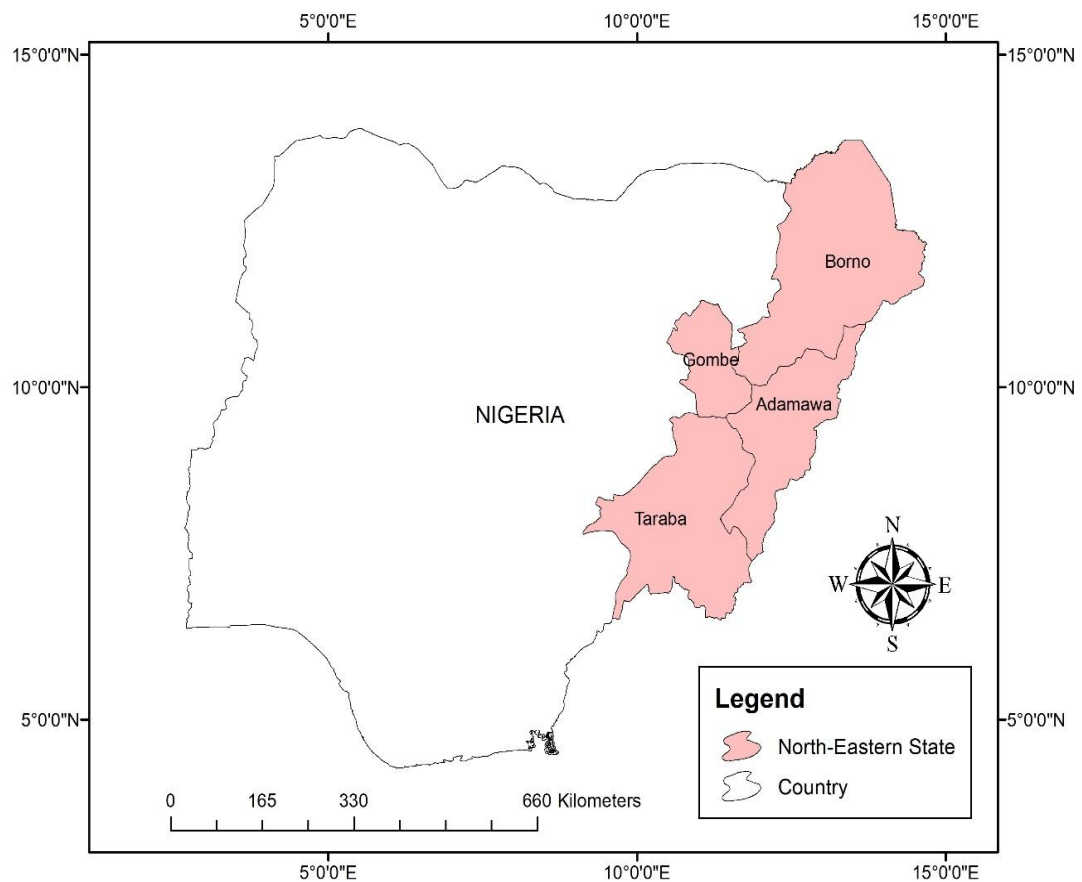


Figure 1: The Study Area

Source: GIS Laboratory, Department of Geography and Environmental Studies, ADSU Mubi, 2024.

3.2 Sampling Frame and Sample Size

The study focused on the North – East, Nigeria. The population for this study comprised the total beneficiaries of supervised enterprise projects (SEPs); that is farmers who participated in the SAFE programme of Adamawa State University (ADSU), Mubi. In addition, selected non-beneficiaries alike were considered for comparison purposes. Only the four states with participants in the programme were selected. These states were: Adamawa, Borno, Gombe, and Taraba. The study was conducted in communities that participated in SEPs as well as in adjoining communities. Table 3.1 represents the coverage of SAFE in Adamawa State University Mubi since its inception in 2011. It has graduated ninety-three (93) students from Adamawa, Borno, Gombe and Taraba states, within thirty-one (31) Local government areas (Adamawa: 20, Borno: 3, Gombe: 4 and Taraba: 4.) A total of Three Thousand, Four Hundred and Fifty (3,450) farmers directly

benefitted from SEPs to improve their techniques of production. Adamawa had 2756; Borno, 220; Gombe, 246 and Taraba: 228. This gave a total of 3450 beneficiaries spread across 93 communities.

3.3 Sampling Procedure and Sample Size

A multi-stage, simple random sampling technique were used for this research. The sampling procedure was carried out in stages to determine the sampling size for the study.

1st stage - all the four states that contained SAFE students were purposively selected

2nd stage - involves the selection of participating LGAs and communities within the selected states.

3rd stage - simple random sampling was used for selection of 10% of benefitting farmers

4th stage – The same number of non-beneficiaries were equally selected in adjoining communities. This gives a total sample size of six hundred and ninety (690) respondents.

Table 1: Total Number of Respondents Selected for the Study

States	Sample frame (Beneficiaries)	Sample Size (Beneficiaries)	Sample size (Non-Beneficiaries)
Adamawa	2756	276	276
Borno	220	22	22
Gombe	246	24	24
Taraba	228	23	23
Total	3450	345	345

Source: Field Survey, 2024.

3.4 Method of Data Collection

Questionnaire was used for data collection. The questionnaire consisted of both structured and semi-structured questions, with open-ended and close-ended response options. The instrument was prepared in English. The questionnaire was subjected to face validity by experts among the members of faculty and necessary modifications were made to improve the instrument.

3.5 Analytical Techniques

This study used both descriptive and inferential analytical techniques. Analysis of data were carried out in two main stages. First, all close-ended responses were coded and analysed, while responses from open-ended questions were compiled and grouped into relevant categories to capture the different types of answers provided by respondents.

Descriptive statistics using; tables, frequency counts, percentages, mean values and charts were used to describe the socio-economic characteristics of the respondents, technologies adopted and the constraints faced by SEPs participants, to achieve objectives i, ii, and v. The study also employed inferential statistical tools, specifically, logit regression analysis, Average Treatment Effect (ATE), and t-test to analyse objectives iii and iv respectively.

4.0 RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of SEPs Beneficiaries and Non-Beneficiaries

The socio-economic characteristics of respondents involved in the Supervised Enterprise Projects (SEPs), are decided upon by the following characteristics: age, marital status, household size, educational levels, and primary occupation. These are important because they directly relate to the main objectives of this study. The result is as presented in Table 2 a and b

Table 2a: Socio-economic Characteristics of the SEPs Beneficiaries

Variable	Frequency	Percentage (%)
Gender		
Male	271	78.5
Female	74	21.5
Marital Status		
Married	132	38.5
Single	71	20.6
Divorced	53	15.5
Separated	65	18.9
Widowed	24	6.5
Educational Attainment		
Non-formal	59	17.3
Primary	76	22.0
Secondary	102	29.7
Diploma/NCE	45	13.0
HND/B.Sc.	53	15.5
M.Sc.	10	2.5
Primary Occupation		
Crop Cultivation	169	48.9
Animal husbandry	91	26.3
Grain storage	37	10.7
Agro processing	34	9.9
Wages/Salary employment	14	4.2

Membership of cooperative			Source: Field Survey, 2025.
Member	188	54.5	
Non-member	157	45.5	

Table 2b Socioeconomic Characteristics of the SEPs Beneficiaries (Continued)

Variable	Frequency	Percentage (%)
Age (Years)		
<20 years	25	7.3
21- 30 years	79	22.9
31 - 40 years	113	32.8
41 - 50 years	86	24.9
50+ years	42	12.1
Household Size (Numbers)		
1 – 4	102	29.7
5 – 8	125	36.2
9 – 12	85	24.5
12+	33	9.6
Farming Experience (Years)		
less <10 years	74	21.5
10 - 15 years	141	41.0
16 - 20 years	75	21.7
20 years +	55	15.8
Farm size (Ha)		
1 – 3	55	16.0
4 – 6	93	27.0
7 – 9	123	35.7
10+	74	21.3
Extension contacts (Yearly)		
1 – 2	110	31.9
3 – 4	112	32.5
5 – 6	114	33.0
7+	9	2.6

Source: Field Survey, 2025.

4.1.1 Gender

Gender served as one of the major indicators of socioeconomic variables that determines to a large extend the decision of individuals to participate in agriculture and general life ventures. As the results indicates in Table 4.1, (78.5%) of beneficiaries were male, while (21.5%) were female. This means that male farmers dominated SEPs and also general

agricultural activities in North-East Nigeria. This aligns with earlier findings of Osman *et al.* (2020), who reported that cultural and household norms in certain regions place farming responsibility primarily on men. Similarly, Berry and Brown, (2021) found that women in many developing countries play supportive but less visible roles in agricultural enterprises. However, the presence of nearly one-quarter females as participants of SEPs programme contradicts their submission that women rarely participate in agricultural enterprise development. This covers activities such as production, processing, marketing, and enterprise management, where women often play active roles.

It therefore holds that SEPs has demonstrated social inclusion by accommodating farmers irrespective of their gender. Such an approach would in turn lead to broader enterprise outcomes within the society.

This finding suggests that inspite of the fact that male farmers dominated the SEPs programme, the programme still provides opportunities for women to learn more and to effectively engage in agricultural value chain activities at the grassroots level. The result agrees with Wang and Mitchell (2020), who reported increasing participation of women in agricultural value chains in several regions of China. This differs from earlier patterns known as male-exclusive, where male determine every farming activity. The significant participation of female as reported in this study demonstrates the inclusive nature of SEPs.

4.1.2 Marital status

The results on marital status on table 4.1 shows that (38.5%) of respondents were married and (20.6%) were single. While (15.5%) were divorcees, (18.9%) live separately from their spouses, and (6.5%) were widowed.

This shows a wide spread of farmers of different marital backgrounds. This further points to the socially diverse nature of farming populations. Marital status often influences enterprise engagement because married individuals tend to have more dependents and are therefore more motivated to participate in programmes like SEPs which promise better income opportunities in their preferred business. The idea supports the submission made by Masud and Lawrence (2021) who linked marital responsibilities with stronger commitment to productivity-enhancing initiatives. However, the current finding differs from the study by Kazmierczak and Edwin (2019). The scholars found no link between marital status and engagement in agricultural support programmes in Torgiano, Italy. The findings of the current study may be attributed to the structure of SEPs where enterprise

planning, supervision, and long-term operations may appeal more to individuals with stable households because they seek consistent income improvement and self-reliance from paid employment.

4.1.3 Educational attainment

Results on educational levels of respondents as presented in Table 4.1a indicates that (17.3%) have no formal education, (22.0)% of the respondents have completed primary education. While (29.7%) have acquired secondary school certificate. Respondents with either Diploma or NCE certificates made up (13.0%), while (15.5%) were respondents had obtained either a BSc or an HND certificates. The remaining (2.5%) have MSc or its equivalent.

This means that majority had either basic, secondary or tertiary education. This is important because SEPs requires knowledge that enables one to read through guidelines or manuals and written documents such as extension materials, enterprise budgeting, record-keeping, and participation in supervised stages of production. It is also good that the majority of non beneficiaries were also relatively educated, which makes it easier for them to relate and also learn fast from the benefitting SEPs participants. This submission agrees with Ebewore (2019) who observed that education increases understanding of agricultural training and strengthens capacity for enterprise management. However, the study differs from Thomas and McWhorter (2019) who found successful participation of non-literate farmers in technology adoption programmes.

As observed in this study, there a need for at least basic educational attainment. The reason is that SEPs is a product of an educational process and not a mere technology demonstration model. It covers business planning, enterprise justification, monitoring, and evaluation. These components naturally require some level of literacy than programmes that focus entirely on technical adoption or introduction of new farming practices.

Beyond these observations, the distribution of educational attainment in the study area further reflects the nature of SEPs as a knowledge-intensive intervention. While the programme accommodates participants with diverse literacy backgrounds, the relatively higher representation of respondents with basic and post-basic education (primary to tertiary) suggests that literacy still plays a supportive role in navigating programme requirements. This is consistent with the position of Adereti *et al.* (2020) who argued that

enterprise-based agricultural initiatives tend to attract individuals with the ability to interpret training manuals, to follow enterprise budgeting procedures, and to complete periodic supervisory documentation. Nevertheless, the presence of a sizable proportion (18.8%) of respondents without formal education shows that literacy is not an absolute barrier but rather a factor that may influence the ease and speed of benefiting from SEPs participation. This justifies a similar conclusion by Gadanakis (2024) who reported mixed literacy levels among participants in agrarian empowerment projects. The study also stated that non-formal knowledge, experiential learning, and peer-group coaching can partly compensate for low educational backgrounds. The findings of the current study, therefore, reinforce the idea that while SEPs can accommodate a range of educational categories, some levels of educational attainment may enhance participants' ability to maximize the programme's training, enterprise planning, and record-keeping components of farming enterprise.

4.1.4 Primary occupation

The result on the primary occupation as indicated on table 4.1a showed that most of the respondents (48.9%) were crop producers. Another (26.3%) who were involved in animal husbandry. (10.7%) of the respondents were primarily engaged in grain storage, while about (9.9%) were into agro-processing. The remaining (4.2%) were engaged in different wage or salary employments.

This shows that respondents were primarily agricultural workers, indicating that SEPs ensures that it targets the appropriate population. In reality, programmes aimed at enterprise development such as SEPs have to target participants who are already engaged in farming or agro-related activities; this ensures participants' interest and overall effectiveness. The approach here aligns strongly with Osman *et al.* (2020) who argued that matching programme with participants' primary occupation in mind is key for achieving meaningful outcomes. In the same vein, Masud and Lawrence (2021), reported that agricultural interventions fail when targeted at people who are not active farmers. In many programmes, such mismatch occurs when individuals who are not active farmers enroll primarily for the financial benefits granted under such initiatives. In other instances, local selection committees may inadvertently include participants without adequate knowledge of the programme's objectives. Such challenges have been widely documented as a factor that weakens programme outcomes and reduces the overall impact of agricultural interventions (Horvath *et al.*, 2023).

The dominance of agriculture-related occupations among the respondents provides an important contextual basis for interpreting SEPs' effectiveness in the study area. Nearly nine out of every ten participants were already involved in crop production, livestock rearing, storage, or agro-processing. The programme operated among participants that possess prior experience, understand production challenges, and are grounded in farming systems. This existing engagement is critical because enterprise-based interventions tend to yield greater impact when participants can directly integrate new skills into their ongoing activities with great ease. Such a position as this study holds, agrees with Akinagbe and Ogundele (2019) who discovered that agricultural support programmes delivered to already-practicing farmers lead to faster adoption, higher retention of training outcomes, and more measurable improvements in productivity. However, the present findings differ from those of Alabi *et al.* (2023) who found out that enterprise programmes in parts of West Africa deliberately included non-farm youths with the expectation of attracting new entrants into agriculture. This may not be far from the fact that SEPs, unlike youth-transition programmes are designed primarily to strengthen existing farm enterprises rather than recruit new farmers. The occupational profile observed in this study therefore, reflects a correct alignment between the programme's objectives and the livelihood backgrounds of its beneficiaries; thereby increasing meaningful enterprise growth and sustained adoption of introduced practices.

Similarly, the results on socioeconomic characteristic of participants shows that most respondents had substantial experience in farming. Experienced farmers may welcome SEPs because it builds on what they already know by adding enterprise planning, improved management, and supervised production, rather than replacing their knowledge outright. The results agree with Ebewore (2019), who found that years of experience influence openness to structured agricultural programmes. However, the study differs from Thomas and McWhorter (2019) who observed considerable resistance among very experienced farmers in technology-adoption programmes. The difference arises because SEP is not strictly a technology adoption system. It is a multi-stage enterprise development programme, and experienced farmers may be more comfortable with enterprise supervision than with sudden introduction of new technologies.

4.1.5 Membership of cooperative society

The result in table 4.1 revealed that (54.5%) of SEPs beneficiaries were members of a

cooperative society, while (45.5 %) of SEPs are do not belong to any cooperative society. This results indicates that majority of the respondents had access to group based agricultural support systems. Cooperative societies help the farmers to share resources, avail farm inputs at comparatively lower price, avail credit facilities, acquire information of agriculture and sell their produce in groups. Membership can also enhance the bargaining power and extension services of the farmers and increase their access to better technologies and training. Several studies in Nigeria have reported that cooperative membership is associated with greater awareness and adoption of agricultural innovations among farmers. Previous research has found that farmers' awareness and uptake of innovations in agriculture correlates with their cooperative membership. The outcome of this study too suggests that cooperative societies can provide enablers to the beneficiaries to avail the opportunities offered under Supervised Enterprise Projects (SEPs). Organised groups can help project implementers with the dissemination of information, training, monitoring of beneficiaries, distribution of inputs, and peer learning. Studies have shown that participation in agricultural cooperatives has a positive effect on improved technology adoption and productivity of farmers in Nigeria. For instance, Kehinde (2021) found that cooperative membership influenced the adoption of improved technologies among cocoa-based smallholder farmers, while Akinola et al., (2023) reported a beneficial effect of cooperative membership on tomato yield among smallholder farmers in Nigeria. A relatively high percentage (45.5 %) of non-membership of cooperatives, however, suggests that many beneficiaries may not be gaining the collective benefits of co-operatives. This could be because of ignorance, shortage of trust in cooperative leadership, restrictive membership criteria, and poor performance of the cooperatives or farmers' preference for individual farming methods.

4.1.6 Age

In this criterion, the beneficiaries were asked to respond on their ages, and as the results in table 4.1 show; there is a fair representation across different age categories with 32.8% of beneficiaries beign within 31–40 years, 24.9% were within 41–50 years, and 22.9% within 21–30 years, only 7.3% of the respondents were below 20 years, while 12.1% were above 50 years.

Thus, the middle-aged group constituted the major participants in SEPs and also in agricultural activities in general, all across the North-East. This may be attributed to the

fact that farming population composed mainly of active individuals who are physically agile and economically ambitious. Age structure is important for SEPs because the programme involves enterprise planning, hands-on training, resource management, and close supervision across production stages. Consequently, this finding is consistent with Dahya *et al.* (2023), who discovered that middle-aged farmers are more willing to participate in structured agricultural programmes because of their accumulated experience and household responsibilities. Similarly, Amanda *et al.* (2022) found out that individual farmers between 30–45 years show strong engagement in community-based agricultural initiatives in Akure, Ondo State, South-West Nigeria.

4.1.7 Household size

The result on household size is also presented in Table 4.1. It indicates that 29.7% of respondents had household size ranging between 1-4 persons. 36.2% had between 5-8 persons, while 24.5% were with 9-12 persons. Whereas 9.6% were with more than 12 persons in their household.

Larger households often supply abundant family labour. This situation is beneficial for SEPs because the programme involves multiple enterprise tasks, land preparation, stocking, processing, marketing, and record-keeping, which may require labour flexibility. Results on household size support the findings of Berry and Brown (2021) who noted in their study that larger households often engage actively in agricultural enterprises to expand their income base. In a study by Deressa *et al.* (2019), family size is strongly related to farming enterprises such as planning, planting, farm management, harvesting, sorting and marketing. This does not agree with Wheaton and Kulshreshtha, (2019), who found a weak correlation between household size and enterprise participation. The difference here may be linked to SEPs' demands on multi-stage labour involvement. Hence, households with large size could offer available labour that may enhance the implementation of farming enterprises at different stages along the value chain.

4.1.8 Farming experience

The distribution of the respondents by farm experience reveals that majority of the beneficiaries were experienced farmers, the highest proportion (41.0%) had farming experience of 10-15 years with the second highest proportion (21.7%) having experience of 16-20 years, followed by less than 10 years (21.5%) and above 20 years (15.8%).

This finding suggests that there was at least 10 years of experience in farming in most of the respondents in both groups which means that they have extensive practical knowledge in agricultural production, farm management, local climatic conditions and agricultural marketing activities. This experience can enable farmers to better gauge innovation relevance and benefits brought by Supervised Enterprise Projects (SEPs). Farmers' experiences are likely to differ with the use of the new practices, and may be more likely to use project-supported technologies appropriately when compared to traditional technologies. The higher percentage of beneficiaries with 10–15 years of farming experience (41.0%) may indicate that SEP participation was higher among the farmers who had acquired a reasonable level of farming knowledge but were willing to learn how to improve their farming practices. The category of farmers that can be more motivated to benefit from SEPs training and extension services, better inputs, and enterprise-management skills, may be especially responsive. In a study of participants and non-participants by Ogunjovi, 2024 in the USAID MARKETS II agricultural technology project in south-west Nigeria, farming experience was identified as one of the factors influencing adoption of project-introduced technologies. In addition, the finding indicates that the large numbers of beneficiaries (37.6%) had over 15 years of farming. The study showed that the farmers who had been involved in farming activities for a relatively long time. Drawing on their experience, a farmer can bring their indigenous knowledge and practical skills to the SEP activities. Adoption of improved practices, however, may not be automatic, as there may be a relationship between farming experience and extension service, training, credit, access to farm inputs, markets, and farmer groups. Research in Nigeria by Kehinde, 2021 found that extension contact and cooperative membership are important factors associated with the adoption of improved agricultural technologies. Extension contact and cooperative membership have been identified as some important factors affecting the adoption of improved agricultural technology in Nigeria.

Beneficiaries' farming-experience profiles are also quite comparable to those of non-beneficiaries, which is significant for the study. Conversely, Onuoha, and Umebali, E, (2021) argued that, instead of being attributed to major differences in farming experience, differences in productivity, income, welfare or technology adoption between the two groups might be more reasonably explained by SEP participation and related support. However, farm experience should be considered as a control variable in the impact

assessment as it could have a bearing on the farmers' production decisions, the uptake of technologies and farm performance in future impact analysis.

4.1.9 Farm size

The result in table 4.1 showed the farm size of the SEPs beneficiaries and it revealed that 16.0% of the respondents had a farm size of 1-3 hectares, 27.0% had a farm size of 4-6 hectares, (35.7%) had a farm size of 7-9 hectares and only 21.3% had a farm size of 10 and above hectares of farmland.

The beneficiaries became divided into the various groups: the highest percentage (35.7%) farmed 7 to 9 ha. This was followed by those who cultivated 4-6 hectares which amounted to (27.0%), and those with 10 hectares and above were (21.3%). Only (16.0%) of the beneficiaries were engaged in relatively smaller farms that are 1-3 hectares in size.

This could mean that farmers that have relatively larger farm sizes were more likely to be involved in, selected for, or to have received the SEPs' intervention.

The increased proportion of beneficiaries in the 7-9 ha size group could reflect the ability of medium and large scale farmers to access agricultural innovations offered via the SEPs. Increased farm size can give farmers the opportunity to better implement improved technologies, including better seeds, fertiliser, mechanisation, irrigation methods, and modern farm-management techniques. One approach is hence to enhance the potential of beneficiaries to convert SEPs' training, technical assistance and production assistance into output and income through farm size.

The result of this study is similar to that of Fidelugwuowo and Omekwu (2023) which stated that the size of the farms is one of the most important factors influencing the adoption and sustainability of agricultural techniques and innovations among smallholder farmers in Nigeria. Larger farm holdings may reduce the perceived risk of adopting new technologies because farmers can allocate part of their land to new practices while maintaining their traditional production activities on the remaining portion. The findings also support those of Amadi et al. (2013) which reported that the farm size in Nigeria was also shown to increase with the availability of irrigation facilities and agricultural loans, while extension agents had a positive effect on the adoption of mechanised farming technologies. This suggests that SEP interventions may contribute indirectly to farm expansion by improving beneficiaries' access to extension information, production resources, credit opportunities, and modern farming practices. Moreover, the relatively

small share of beneficiaries who run farms with 1-3 hectares of land may suggest that very small farmers are not able to fully take advantage of the SEPs activities. These constraints may be due to small amounts of capital, insecure access to land, lack of labour, and high cost of inputs and risks of using new agricultural technologies. Even with training and extension services, small-scale farming can be challenging to grow when land acquisition and credit access issues persist. But there were beneficiaries found in all size categories of farms, which suggests that SEPs were not exclusive to large-scale farmers. The programme was carried out to reach out to farmers who have small, medium and relatively large farm holdings. This is crucial since agri-extension interventions must be inclusive and responsive to various categories of farmers. However, further specific assistance for smaller farmers (such as credit, group farming, subsidised inputs, land development assistance, and technologies that save labour) may be required.

The results are also comparable with the Agunloye et al. (2017) who in their study found and reported that participation in the National Fadama III Programme expanded the magnitude and extent of the farming activities of beneficiaries in south-western Nigeria. According to their research, the programme had contributed to the beneficiaries' increased productivity in crop farming, animal husbandry, agro-processing and income, nutrition and general well-being. This supports the argument that well-implemented agricultural intervention programmes can enhance farmers' production capability and encourage scaling up of farm operations. This further reinforces the claim that agricultural intervention programmes, with good design and effective implementation, can help to improve farmer's production capacity and stimulate growth in farm size.

4.1.10 Contact with extension agents

The result in table 4.1 indicated that 31.9% of SEPs beneficiaries had contact with extension agents only 1-2 times per annum, 32.5% had 3-4 contacts with extension agents, whereas, 33.0% had 5-6 times contacts with extension workers in a year and only 2.6% of the respondents had 7 or more contacts with extension workers in a year.

This can indicate that beneficiaries' interactions with extension agents, project facilitators or technical staff were increased through participation in Supervised Enterprise Projects (SEPs). The interaction is necessary because SEPs typically require ongoing training, supervision, advice, monitoring and feedback in order for the beneficiaries to implement the recommended practices of the enterprise. Extension contact is a key component of SEP implementation because it offers access for beneficiaries to information on improved

production methods, input use, enterprise planning, record keeping, disease and pest management, marketing, and financial management. Frequent contact also allows extension personnel to detect beneficiaries' constraints at an early stage, and give immediate technical advice. Therefore, the higher level of exposure to 5-6 contacts per year among beneficiaries might have led to better knowledge and technology adoption, productivity and livelihood outcomes among SEP participants.

Very intensive extension supervision was rare, with low percentages of beneficiaries (2.61 %) having seven or more annual extension contacts. This could be due to insufficient extension staff, poor logistics, insufficient funding, high farmer to extension agent ratios or the scattered farmer population in rural areas. In certain cases, where contact is limited, farmers will not receive adequate follow-up support for the technologies adopted through SEP to solve production problems and help them sustain their practices. This is because interventions in agriculture are not only dependent on the presence of inputs but also on ongoing technical support and supervision. This is consistent with studies that have indicated that extension contact plays an important role in explaining agricultural technology adoption. In Nigeria, for instance, Onuoha and Umebali (2021) determined that extension contact frequency was an important institutional factor influencing the adoption of agricultural technologies by the farmers. Likewise, in Nigeria farmers' adoption of improved rice technologies was significantly positively associated with extension contact, according to (Tologbonse, 2006).

In addition, farm visits and home visits, contact farmers, and method demonstrations were among the significant extension communication practices among the farmers in Oyo State, Nigeria (Yekinni and Afolabi, 2019). This implies that SEP implementers are expected to combine other contact approaches like periodic individual visits, group meetings, demonstration plots, farmer field days, and peer-learning in order to expand their reach to more beneficiaries effectively.

4.2 Constraints Faced by Farmers before and after SEPs Implementation

The results on Table 3 and Figure 1 respectively present the changes in farming challenges faced by beneficiaries before and after SEPs.

Table 3: Changes in farming constraints among Supervised Enterprise Projects (SEPs) beneficiaries in North-East Nigeria

Major Challenges	10 Years ago, Fx (%)	Now Fx (%)	% Change	Direction
Lack of enough fund	289(15.84)	118(6.47)	-9.4	↓
Inadequate supervision & guidance	291(15.95)	102(5.59)	-10.4	↓
Insufficient technical knowledge	197(10.79)	111(6.08)	-4.7	↓
Lack of access to resources	228(12.49)	112(6.14)	-6.4	↓
Cultural and social barriers	157(8.6)	82(4.49)	-4.1	↓
Poor infrastructure	101(5.53)	95(5.21)	-0.3	↓
Poor market access	267(14.63)	212(11.62)	-3.0	↓
Weather related issues	295(16.16)	329(18.03)	1.9	↑

Frequency (Fx), values in parentheses are in percentage (%), (↑ = negative changes, ↓ = positive changes)

Source: Field Survey, 2025.

4.2.1 Inadequate funds

In particular, the study reveals that lack of enough fund reduced drastically by 9.4%. This sharp decline in financial constraint suggests that SEPs improved beneficiaries' access to revolving funds, grants, or enterprise support. This finding aligns with Varyvoda *et al.* (2025) who reported that structured agricultural programmes reduce financial constraints by providing enterprise support packages. Conversely, Adeyanju *et al.* (2021) found out that funding challenges persist in many rural interventions due to poor sustainability planning. In the current study, the reduction in fund challenges may be attributed to SEPs' emphasis on enterprise development and guided financial support, which differs from general extension programmes and offers farmers other alternatives to funding sources.

4.2.2 Inadequate supervision

The results show that inadequate supervision and guidance are major problems before SEPs implementations which significantly reduced by 10.4% (↓) after intervention. This represents the largest reduction among the challenges, indicating that SEPs enhanced field monitoring and facilitation. Oduwole and Sennuga (2022) found that improved extension contact strengthens farmers' confidence and reduces supervision gaps. While Msuya (2021) noted that poor extension coverage remains common in North-East Nigeria due to insecurity.

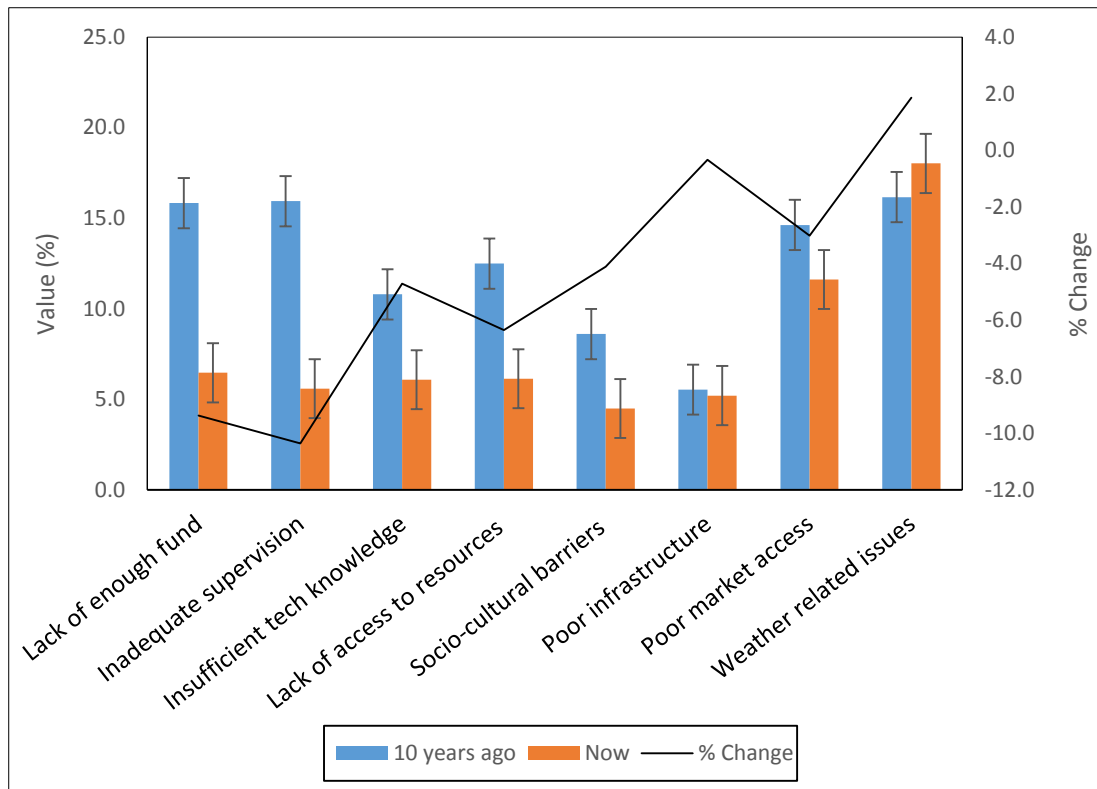


Figure 1: Changes in Farming Constraints among SEPs Beneficiaries

Source: Field Survey, 2025.

The finding of this study suggests that SEPs' use of clustered, supervised project groups mitigates mobility challenges, resulting in a significant improvement in guidance and supervision.

More so, the results show that insufficient technical knowledge, which was a notable problem before SEPs, reduced by 4.7% (↓). This decline reflects the effectiveness of SEPs training in building beneficiaries' technical capacity. As Habtewold (2023) found that structured training reduces knowledge gaps in enterprise management.

4.2.3 Insufficient technical knowledge

Result in table 4.6 indicates that ten years ago, 10.79% of the farmers felt that technical knowledge was a limiting factor in using the technologies introduced by the SEPs while it is only 6.08% in the present scenario. This came down from 4.7 percentage points, a positive shift in farmers' technical knowledge and ability to apply the promoted technologies, which were part of the Supervised Enterprise Projects (SEPs).

The overall decrease implies that SEPs activities might have helped to enhance the awareness of beneficiaries about recommended agricultural practices. Farmers could have

developed skills to apply better technologies through training, demonstrations, visits, farm programmes and interaction with extension staff. overtime, as farmers learn more about the technologies, their doubt about applying these technologies decreases, and the number of farmers who report that lack of technical knowledge is a big problem decreases. The results are in line with the result of Adebo and Ewuola, (2006) who hold that educating farmers and training them is critical to consolidate their knowledge and motivate them to adopt better farming practices. Training delivered as an extension service proved to be effective in promoting adoption of better farm inputs in Nigeria. Similarly, Kazeem *et al.*, (2017) noted that the attitude of the farmers towards the extension training affected the adoption of improved agricultural technologies among cassava farmers of Ogun State, Nigeria.

The problem is, however, that 6.08% of respondents still said they did not have enough technical knowledge, indicating that this challenge has not been completely overcome. Some farmers will need further specific advice, especially on technologies that depend on the correct timing, dosage, spacing, pest management, machinery operation, and record keeping, or general technical procedures. Recent evidence also emphasises that effective agricultural extension should focus on skilled, relevant, and two-way communication rather than merely passing information to farmers. To sum up, technical knowledge was not as important a constraint in the last 10 years as it was in the first 10 years, falling from 10.79% of the beneficiary farmers to 6.08%. This implies that SEPs and extension support enhanced farmers technical capacity, but further trainings and technical backstopping is required to make all beneficiaries have capacity to adopt and sustain the technologies introduced.

4.2.4 Lack of access to resources

The results in this study further show that lack of access to resources, which was a major challenge before SEPs programme, declined by 6.4% (↓) after interventions. This reduction, therefore indicates that beneficiaries gained better access to inputs, land-sharing arrangements, or equipment through the programme. This agrees with Mardenli *et al.* (2023) who found that donour-supported agricultural initiatives improve access to resources. Conversely, Varyvoda *et al.* (2025) noted that resource access remains limited in many regions due to weak supply chains. The findings in this study suggest that SEPs' enterprise-specific support formula enabled beneficiaries to overcome input barriers more effectively than conventional programmes.

4.2.5 Socio cultural barriers

The results show that socio-cultural barriers, which was previously a significant constraint, reduced by 4.1% (↓). This decline reflects increased acceptance of SEPs practices and a shift toward market-oriented farming. This is similar to Khan *et al.* (2024) who reported that youth-focused programmes help reduce cultural resistance over time. However, Raman (2025) argued that cultural norms, particularly gender roles, remain strong barriers in most regions of developing nations.

The findings in this study suggest that SEPs' group-based supervised enterprises facilitated shared norms among participants, reducing cultural barriers to adoption.

4.2.6 Poor infrastructure

The results show that poor infrastructure, which was previously a challenge for beneficiaries, decreased minimally by 0.3% (↓). This indicates that issues such as roads, storage facilities, and water access remain largely unresolved. It agrees with World Bank (2021a) report on infrastructural deficits in Nigeria, especially North-East despite series of interventions. This was attributed to failure or weak state capacity to implement policy amidst gross corrupt practices. Also, Bashir *et al.* (2025) emphasized that rural infrastructure continues to constrain agricultural activities. Their findings suggest that SEPs had limited influence on poor infrastructure because it largely depends on government investment rather than programme interventions.

4.2.7 Poor market access

This study shows that poor market access, which was previously a significant constraint for farmers, declined slightly by 3.0% (↓). This modest improvement suggests that SEPs may have contributed to strengthening market linkages for participants through the formation of cooperatives, aggregation models, and organized enterprise groups that facilitate collective marketing and bargaining power. Through these mechanisms, farmers may gain better access to buyers, improved negotiation leverage for prices, and reduced exploitation by middlemen. Mardenli *et al.* (2023) reported similar improvements in market access among farmers involved in organized group structures, highlighting that cooperative arrangements can improve timely access to input and output markets, reduce transaction costs, and provide better market information. Such structures often enable

farmers to coordinate production, synchronize supply, and aggregate outputs for larger buyers, thereby enhancing their market presence.

However, despite the slight improvement observed, challenges remain. Bashir *et al.* (2025) emphasized that market access continues to be weak in areas affected by insecurity, poor road networks, and underdeveloped transport infrastructure, all of which are persistent problems in the North-East. In these contexts, even organized groups may face logistical difficulties in reaching urban markets or accessing high-value buyers, and the benefits of SEPs may be constrained by external structural limitations. Furthermore, market access is influenced not only by farmer organisation but also by policy and institutional support, such as government investment in rural infrastructure, road networks, storage facilities, and access to market information systems. International and regional interventions, such as donor-supported market linkage programs, regional trade facilitation initiatives, and private-sector partnerships, could complement SEPs efforts by providing additional channels for reliable input supply, distribution, and value chain integration. The findings in this study suggest that SEPs' enterprise clustering likely enhanced collective bargaining and improved access to markets.

4.2.8 Weather related issues

Results from this study indicate that weather-related issues, which were initial among major concern for beneficiaries, increased by 1.9% (↑), despite SEPs participation. This makes weather-related issues the only challenge that remain unaddressed after SEPs implementation. Thus, the results pointed at the growing impact of climate variability, unpredictable rainfall, and other extreme weather events on farming activities. Manda *et al.* (2019) observed in their study that there are intensifying climate challenges across regions of Nigeria, including prolonged dry spells, flash floods and erratic rainfall patterns that directly impact on farming variables such as crop yields, livestock productivity, and overall farm performance. The increase is expected because SEPs programme are not meant to directly influence climatic conditions. SEPs scope is broadly limited to improving technical capacity among farmers, ensure access to various farm inputs, and management of farming enterprise.

Moreso, the fact that beneficiaries of SEPs remain largely dependent on rainfed agriculture and this makes them vulnerable to climate-induced risks despite improved knowledge and enterprise skills. This finding indicates the need for broader, multi-level

interventions that goes beyond SEPs scope. Such interventions must include coordinated efforts by regional and international agencies in collaboration with other government bodies. Generally, efforts to address climatic-related problem in farming especially in developing countries must include provision of early warning systems, irrigation infrastructure, and climate-resilient seed varieties along with targeted extension support on adaptive practices. Integrating SEPs with climate-smart agricultural policies and partnerships can also assist the beneficiaries to mitigate the adverse effects of weather variability on their farming activities. Thus, while SEPs significantly reduce most operational and institutional challenges, weather-related constraints highlight its limitations in addressing some salient challenges that have to be tackled globally.

5.0 CONCLUSION AND RECOMMENDATIONS

.5.1 Conclusion

Many challenges were encountered by beneficiaries in the implementation of SEPs in North east Nigeria, some of the challenges were , sociocultural , financial, ,weather and climate , extension contacts, poor infrastructures, poor market access

5.2 Recommendations

Based on the findings and conclusions of this study, the following recommendations are pertinent:

- i. Technology training packages should be developed in cognisance with the beneficiaries' ability to adopt and sustain techniques for better farm performance.
- ii. Future SEPs' training should as well include modules on effective communication and peer-to-peer guidance, with opportunities for farmers to demonstrate practices during field trials to enhance information dissemination among communities.
- iii. Institutions of government and other stakeholders should be involved in technology and innovative programme planning to minimise administrative bottlenecks and policy contradictions.

REFERENCES



- Abatcha, I., Mustapha, A., & Barkindo, A. (2024).** Comprehensive analysis of rainfall variability in urban Maiduguri, Nigeria: Implications for climate resilience and sustainable development. *International Journal of Environment and Climate Change*, 14(3), 149–159. <https://doi.org/10.9734/ijecc/2024/v14i34027> journalijecc.com
- Abdullahi, Z. A., Abdullahi, A., & Sulieman, A. (2025).** Analysis of factors influencing work motivation among extension agents in the Kano Agricultural Development Programme (ADP). *African Journal of Agricultural Research*, 17(2), 35–51. <https://doi.org/10.5897/JAERD2023.1377>
- Adegbola, A., Ampitan, J., Akande, O., Adewuyi, O., Mgbeahuruike, E. & Adebajo, A. (2024),** A Convolutional Neural Network Model for Crop Disease Detection System. *British Journal of Computer, Networking and Information Technology* 7(4), 94-102. DOI: 10.52589/BJCNTZ1BLVYO8
- Adeyanju, D., Mburu, J. & Mignouna, D. (2021).** Youth agricultural entrepreneurship: Assessing the impact of agricultural training programmes on performance. *Sustainability*, 13(4), 1697. <https://doi.org/10.3390/su13041697>
- Akinagbe, O. M. & Ogundele, E. O. (2019).** Challenges of youth participation in agricultural activities in Ondo State, Nigeria. *Nigerian Journal of Rural Sociology*, 19(2), 7–15.
- Akinola, A., Kehinde, A., Tijani, A., Ayanwale, A., Adesiyan, F., Tanimonure, V., Ogunleye, A., & Ojo, T. (2023).** Impact of membership in agricultural cooperatives on yield of smallholder tomato farmers in Nigeria. *Environmental and Sustainability Indicators*, 20, 100313. <https://doi.org/10.1016/j.indic.2023.100313>
- Amanda, J. S., Brett Q. F., Floerke, A. V. & Idris, B. M. (2022).** Getting better with age: The relationship between age, acceptance, and negative affect. *Journal of Personal Social Psychologist*. 104(4): 734–749.
- Anderson, J. R., & Feder, G. (2007).** Agricultural extension. In Evenson R., & Pingali, P., (Eds.), *Handbook of Agricultural Economics* (Vol. 3, pp. 2343–2378). Elsevier.
- Dahya, R., Bungati, I. & Witjaksono, J. (2023).** Farmers' responses of introducing technology and its production sustainability. *Earth and Environmental Science*, 2(09), 123 – 145
- Davis, K. (2020).** *Investing in agricultural knowledge and innovation: A synthesis of main findings*. [Missing Publication Details]
- Davis, K., Lion, K. & Arokoyo, T. (2019)** Organisational Capacities and Management of Agricultural Extension Services in Nigeria: Current Status. *South African Journal of Agricultural Extension* Vol. 47 No. 2, 2019: 118 – 127. <http://dx.doi.org/10.17159/2413-3221/2019/v47n2a508>
- Deola, N., (2024).** Documentary of the Sasakawa Africa Fund for Extension Education (SAFE) in Nigeria. <https://www.saa-safe.org/news/news.php?nt=2&vid=560&lng=usa>
- Deressa, T.T, Hassan R.M., Ringler, C., Alemu, T. & Yusuf, M. (2019).** Determinants of Farmers' Choice of Adaptation Methods to Climate Change in Nile Basin of Ethiopia. *Global Environmental Change* 19 (1): 248-255.



- Ebewore, S.O. (2019).** The Role of Farmer Field School Training in Improving Farmers' Knowledge of Selected Cocoa Cultivation Practices in Edo State, Nigeria. *Journal of Natural Science Research*, 3(1): 41 – 50
- Fidelugwuowo, U. B. & Omekwu, C. O. (2023).** Information survey on adoption and persistence of agricultural technology innovations by smallholder crop farmers of Benue State, Nigeria. *Information Development*, 41(4), 1391–1406. <https://doi.org/10.1177/02666669231196852> □
- Gadanakis, Y. (2024).** Advancing farm entrepreneurship and agribusiness management for sustainable agriculture. *Agriculture*, 14(8), 1288. <https://doi.org/10.3390/agriculture14081288>
- Garandi, D.I. (2025).** *Perception of rural farmer on indigenous knowledge system and its implications for attaining food security in Mubi North L.G.A, Adamawa State, Nigeria.* Unpublished Ph. D thesis, Modibbo Adama University, Yola.
- Habtewold, T. M. (2023).** Impacts of improved agricultural technologies on food security and productivity. *Cogent Social Sciences / Agricultural Systems*, 2(09), 41 – 54.
- Hamzat, A. A. (2022).** *A Community Knowledge-Based Assessment of Smallholder Farmers' Perception of Cluster Farming and its Potential Role in Sustainable Accessibility to Farmer-Centric Support in Nigeria* (Master's thesis). Mohammed VI Polytechnic University.
- Horvath D. P., Clay S. A., Swanton C. J., Anderson J. V. & Chao W. S. (2023).** Weed-induced crop yield loss: a new paradigm and new challenges. *Trends Plant Sci.* 28 (5), 567–582. 10.1016/j.tplants.2022.12.014 [DOI] [PubMed] [Google Scholar]
- Idris, S. P., Bose, A. A. & Idi, S. (2023).** Assessment of the impact of Non-Governmental Organisation on training needs of extension agents in Yobe State, Nigeria. *Nigerian Journal of Agriculture and Agricultural Technology*, 3(2), 218–227. njaat.com.ng
- Kazmierczak, J. & Edwin, G. R. (2019).** Economic impacts of extension integrated pest management programmes in several states of Italy. *Journal of Economic Entomology*, 81(1), 251-256.
- Kehinde, A. D. (2021).** Agricultural cooperatives and improved technologies adoption among smallholder farmers in cocoa-based farming systems of Southwestern Nigeria. *International Journal of Agricultural Management and Development*, 11(3), 467–483. <https://doi.org/10.22092/ijamad.2021.358556.467> □
- Khan, F. U., Nouman, M., Negrut, L., Abban, J., Cismas, L. M. & Siddiqi, M. F. (2024).** Constraints to agricultural finance in underdeveloped and developing countries: A systematic literature review. *International Journal of Agricultural Sustainability*, 22(1), Article 2329388. <https://doi.org/10.1080/14735903.2024.2329388>
- Kroma, M.M. (2018).** Participation and social learning: Supporting farmer's innovations in Central Ghana. *International Journal of Agricultural Economics and Extension Education*, 10 (1): 43-49.



- Mohammed, H. Y., Teferra, T. F. & Sime, G. (2024).** Indigenous knowledge and nutritional and morphological characterization of okra (*Abelmoschus esculentus* (L.) Moench) varieties in Western Ethiopia. *Food Science & Nutrition*, 12(1), e3936. <https://doi.org/10.1002/fsn3.3936>
- Muerza, V., Gargallo, P., Salvador, M. & Turón, A. (2024).** Impact of problem-based learning on the perception, understanding, and application of statistical concepts in business administration and management students. *Sustainability*, 16(4), 1591. <https://doi.org/10.3390/su16041591>
- Ogu, B. (2024)** *Compost manure production ensures food security 10 communities in Benue State: SEPs intervention.* <https://www.stories-undpnigeria.org/farmers-in-nigeria-improve-productivity-through-sustainable-farming-methods>
- Ogundele, F. O. & Olagunju, K. O. (2021).** Adoption of improved agricultural practices and its impact on productivity in Northern Nigeria. *Journal of Agribusiness in Developing and Emerging Economies*, 11(4), 623–640.
- Osman, T.D., Isaac, G, K., Samuel, A.D. & Mark A, T. (2020).** Strengthening value chain along agricultural practices. *Technology & Society*. 62 2020 101294.
- Ovharhe, O. J. (2020). Evaluation of Fadama III Project in the Niger Delta Area of Nigeria: Constraints and strategies perceptions. *Asian Journal of Agriculture and Rural Development*, 10(2), 541–549. <https://doi.org/10.18488/journal.ajard.2020.102.541.549>
- Sasakawa Africa Association. (2012).** Feeding the future: Strategic plan for smallholder farmers. Issue 28.
- Sennuga, S., Alabuja, F., Bamidele, J., Maisule, S. & Sennuga, S. (2023).** Rural youth participation in agriculture-based livelihood activities in Abuja, Nigeria. *International Journal of Postharvest Technology and Innovation*, 10, 45–62.
- Sheahan, M. & Barrett, C. B. (2017).** *Ten striking facts about agricultural input use in Sub-Saharan Africa.* *Food Policy*, 67, 12–25. (Overview of which input/technologies are actually used across SSA — useful as comparative evidence for what SEPs typically promote). [PubMed](#) (regional / global)
- Syarifuddin, N., Abu Samah, A. B., Burhan, N. A. S. & Shah, J. A. (2021).** The role and competence of agricultural development officers as community developers: A scoping review. *International Journal of Academic Research in Business and Social Sciences*, 11(12). <https://doi.org/10.6007/IJARBSS/v11-i12/11439>
- Thomas, H. & McWhorter, G.M. (2019).** Organisation and implementation of an integrated pest management system: FFS in scope. *The Southwestern Entomologist*. 06(04). 145 – 167.
- Tologbonse, E. B., Mesini, O., & Tsado, J. H. (2006).** Farmers’ perception of sources of information in relation to adoption of improved rice technology by farmers in the inland valley swamps of Middle-Belt zone of Nigeria. *Journal of Agricultural Extension*, 9, 1–8.



- Uche, C. C., Nwogwugwu, E. N. & Victor, A. O. (2023).** The Role of Agriculture in Economic Development in Nigeria. *Journal of International Economic Relations and Development Economics*. 3(01), 20 – 23.
- Varyvoda, Y., Thomson, A. & Bruno, J. (2025).** Factors influencing the adoption of sustainable agricultural practices in the U.S.: A social science literature review. *Sustainability*, 17(15), 6925. <https://doi.org/10.3390/su17156925>
- Wheaton, E. & Kulshreshtha, S. (2019).** Environmental sustainability of agriculture stressed by changing extremes of drought and excess moisture: A conceptual review. *Sustainability*, 9(6), 1–14. <https://doi.org/10.3390/su9060970>.
- World Bank. (2021c).** Commercial agriculture development project: Enhancing agricultural production. World Bank Report.
- Yekinni, O. T., & Afolabi, C. O. (2019).** Farmers' assessment of the effectiveness of extension communication methods used in Ogbomoso Agricultural Zone of Oyo State, Nigeria. *Journal of Agricultural Extension*, 23(3), 126–134.