SOCIO ECONOMIC ANALYSIS OF AGROFORESTRY PRACTICES AMONG SMALL SCALE FARMERS IN USSA LGA OF TARABA STATE

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ABSTRACT:
This study aimed to evaluate the socio-economic impacts of agroforestry practices among small-scale farmers in Ussa LGA, Taraba State. The specific objectives were to (1) assess the demographic characteristics and types of agroforestry systems practiced, (2) identify the main crop and tree species used, and (3) examine farmers' objectives for engaging in agroforestry. A multi-stage sampling technique was employed, whereby six political wards within Ussa LGA were purposively selected based on agroforestry prevalence, and 120 agroforestry practitioners (AFPs) were randomly sampled across these wards to ensure representativeness. Data collection involved structured questionnaires capturing demographic data, agroforestry practices, and farmers' motivations. Descriptive statistics such as frequency counts and percentages were used to analyze the data, providing insights into the dominant species, objectives, and challenges faced by farmers. The findings reveal that most farmers pursue agroforestry for fruit, medicinal herbs, timber, and fuelwood, primarily establishing trees naturally with oil palm and plantain as key crops. The study highlights agroforestry's potential to enhance income diversification, food security, and environmental resilience, despite challenges like land scarcity and limited government support. Therefore, it is recommended that the Taraba State Minisrty of Agriculture should encourage younger farmers to fully participate in agroforestry practices for higher productivity. Government agricultural agencies, research institutes (e.g., ICRAF, forestry/agroforestry research centers), non-governmental organizations (NGOs) involved in climate-smart agriculture, Development partners/donors supporting rural capacity building (e.g., FAO, IFAD, World Bank) should increase awareness and accessibility of subsidies, training, and extension services to encourage wider adoption of agroforestry practices among small-scale farmers.

Keywords: Agro forestry; Small scale farmers; and Livelihood.

INTRODUCTION

Cropland agroforestry systems continue to play a vital role in providing a wide array of resources such as food, timber, fodder, fruits, fuelwood, construction materials, and raw materials for small-scale forest-based enterprises and cottage industries. Trees integrated into crop fields serve as a form of risk mitigation, buffering against crop failure and environmental hazards, while also generating supplementary income. Recent research indicates that agroforestry practices in Nigeria predominantly involve mixed systems where farmers interplant trees with crops or livestock, offering multiple income streams and diversifying production. When one crop fails, others can compensate, thereby enhancing system resilience FAO (2017). As such, cropland agroforestry emphasizes sustainability, biodiversity, and adaptability (Maduka, Okafor & Nwankwo (2021); Chakraborty, Roy & Mukherjee (2022); Islam Rahman & Rahman (2023).

Agroforestry is an innovative agricultural approach that integrates tree cultivation with crop and livestock production on the same land parcel. It is recognized as a sustainable farming practice that delivers numerous economic, environmental, and social benefits. In Nigeria, where small-scale farming predominates, agroforestry holds significant potential to improve food security, increase household incomes, and mitigate environmental degradation FAO (2018). However, despite these benefits, the widespread adoption of agroforestry among smallholder farmers remains limited due to factors such as lack of awareness, technical knowledge, and access to resources (Adebayo, Olaleye & Eze (2022)).

Historically, subsistence farmers maintained soil fertility through extended fallows, allowing vegetation to regenerate and organic matter to accumulate. However, rapid population growth has shortened fallow periods, leading to increased soil erosion and declining yields (Ajayi & Ojeniyi, 2012). The World Resources Institute (WRI) projects the global population to reach approximately 8.5 billion by 2025 and 10 billion by 2050, intensifying pressure on land resources (Mackenzie & Ritchie, 2021; World Bank, 2023). Addressing these challengessuch as rising poverty, land scarcity, and food insecurityrequires innovative land management technologies that promote sustainable intensification and land conservation (Zira, Kassa & Tesfaye (2021)).

Various agroforestry practices have been employed for centuries, including alley cropping (planting trees in rows with crops in the alleys), silvopasture (integrating trees with pasture and livestock), and forest farming (cultivating shade-tolerant crops under forest canopies) (Turgut & Kaya, 2022; Enete & Amusa, 2021). Although adopting these systems can be complex and highly dependent on local contexts, their benefits are well-documented. They increase species diversity, improve nutrient cycling, and influence microclimates, thereby enhancing ecosystem resilience (Ospina, Henao &García (2022)); Turgut & Kaya, 2022). Many countries have adopted agroforestry as a strategy to rehabilitate degraded lands, reduce slash-and-burn practices, prevent soil erosion, and improve community livelihoods (Glover, Gonsalves & Smith (2023)); Bugayong, Glover &Sombilla (2022).

Furthermore, agroforestry contributes significantly to rural livelihoods by providing a variety of resources such as fruits, nuts, medicinal herbs, fodder, timber, fuelwood, fibers, and medicinal plants. It also alleviates labor demands, particularly for women, by streamlining the collection of fodder and fuel (Hillbrand, Rist & Nguyen (2022)). For instance, a recent study conducted in Orlando, Florida, highlights how trees deliver socio-economic benefits including fruits, firewood, and medicinal plants, thereby reinforcing the role of agroforestry in bolstering community resilience.

Despite these acknowledged advantages, there remains a notable gap in understanding the socioeconomic effects of agroforestry practices specifically within Ussa LGA, Taraba State. Most research to date has concentrated on ecological or environmental outcomes, with insufficient focus on how these systems impact farmers' livelihoods, income, and social well-being in this particular region. Additionally, there is a scarcity of data regarding the challenges and opportunities that local farmers encounter when adopting agroforestry, information that is crucial for developing effective policies and support programs. The findings will offer valuable insights for policymakers aiming to promote sustainable rural livelihoods through agroforestry development.

MATERIALS AND METHODS

Study area

Ussa Local Government Area (LGA) is situated in southern Taraba State, bordered to the south by Cameroon and bounded to the north by the Donga River. Covering approximately 1,495 km², Ussa had a population of 92,017 as per the 2006 census; projections estimate about

154,000 residents in 2024. The area lies within the Guinea savannah zone, with a rainy season from April to November, peaking between July and September. Annual rainfall ranges from 1,250 mm to 2,500 mm, while temperatures vary from 26.7°C to 36°C. Humidity is higher during the rainy season and lower in the dry season. Fertile loamy soils and the River Gamina (Fikyu) support cultivation of staples such as maize, rice, guinea corn, and cassava (TRSG, 2024).

Sampling procedure

A multi-stage sampling approach was employed to select 120 farmers, providing an efficient and systematic method for dealing with the large and diverse population within Ussa LGA. Initially, Ussa LGA was purposively chosen due to its well-established tree planting programs and its rich savannah vegetation, which are pertinent to the study objectives. In the next stage, six agro ecological zones Fikyu, Lumbu, Rufu, Kwesati, Kpambo, and Kpambo Puri were randomly selected to ensure a representative sample across different administrative units. The reason for choosing six out of the eight agro-ecological zones within the LGA was due to logistical constraints and the specific focus on zones with active agroforestry practices; the omitted zone was less relevant to the current agroforestry activities. From each zone, one village was randomly selected, and from each village, 20 respondents were chosen, culminating in a total of 120 respondents. This approach allowed for a comprehensive yet manageable sampling process that captures the diversity within the study area while ensuring efficiency and representativeness.

Data Collection

Data were collected from farmers via administration of structured questionnaires with the respondents by six (6) enumerators.

Data Analysis

The analysis primarily involved descriptive statistics such as frequencies and percentages to interpret the responses of the respondents.

RESULT AND DISCUSSION

Socioeconomic Characteristics of the Respondents

Gender of the respondent

The results of the respondents' gender distribution are presented in Table 4.1. The findings reveal that 93 respondents, accounting for 77.5%, were male, while 27 respondents, representing 22.5%, were female. This indicates that the practice of agroforestry in the study area is predominantly male-dominated. This aligns with recent studies such as Ojo and Abayomi (2022), which report that men are generally the primary decision-makers and household heads in many rural communities, influencing the adoption of agroforestry practices.

Table 4.1: Gender of the respondent

Gender	Frequency	Percentage
Male	93	77.5
Female	27	22.5
Total	120	100

Source: Field survey 2025

Age of respondent

The distribution of respondents' ages is presented in Table 4.2. The results reveal that 18 respondents, representing 15%, fall within the 20-30 years age category; 26 respondents, accounting for 21.67%, are in the 31-40 years age group; while 76 respondents, constituting 63.33%, are aged 41 and above. This indicates that most farmers in the area are middle-aged and still actively engaged in agricultural activities. These findings are consistent with recent studies such as Adeyemi, Oladipo & Ibrahim (2022), which report that the majority of smallholder farmers in Nigeria are middle-aged, reflecting their continued active participation in farming despite challenges faced by younger generations in agriculture.

Table 4.1: Age of respondent

Age (years)	Frequency	Percentage
20-30	18	15
31-40	26	21.67
41 and above	76	63.33
Total	120	100

Source: Field survey 2025

Occupation of respondents

Table 4.3 presents the results of the respondents' occupations. The findings reveal that 26 respondents, representing 32.25%, are civil servants; 18 respondents, accounting for 22.5%, are traders; 24 respondents, constituting 30.0%, are farmers; and 12 respondents, representing 15.0%, are businessmen. This indicates that the rural population predominantly relies on farming as their primary livelihood. These results align with recent studies such as Adebayo, Olaleye & Eze (2023), which highlight that agriculture remains a vital source of income for rural households in Nigeria, alongside petty trading and other small-scale economic activities.

Table4.3: Occupation of respondents

Occupation	frequency	percentage
Civil servant	20	32.5
Traders	43	22.5
Farmers	45	30.0
Business tycoon	12	15.0
Total	120	100

Source: Field survey 2025

Distribution of respondents based on Agroforestry practices

The results of the distribution of respondents based on agroforestry practices are presented in Table 4.4. The findings reveal that a majority (75%) of the respondents practice agroforestry, while 20 respondents, representing 25%, do not engage in agroforestry. This indicates that the study area is predominantly characterized by farmers who integrate trees with crops and livestock rearing. The non-adoption of agroforestry practices among some farmers may be attributed to larger farm sizes, which require more labor inputs. According to recent studies such as Akinbobola et al. (2022), larger farms tend to employ more labor to maximize productivity, which may influence their choice of farming practices, including agroforestry.

Table 4.4: Distribution of respondents based on Agroforestry practices

Response	frequency	Percentage
Yes	60	75
No	20	25
Total	120	100

Source: Field survey 2025

Types of Agroforestry practice carried out

Table 4.5 above shows the types of agroforestry practices in the study area. Forty respondents, representing 33.3%, practice home gardens; 48 respondents, accounting for 40%, engage in agrisilviculture; 10 respondents, or 8.33%, practice silvopastoral systems; and 22 respondents, or 18.33%, practice agrisilvopastoral systems. This indicates that farmers in the study area cultivate forest crops alongside arable crops within a season. Similar findings were reported by Kiyani et al. (2022), who identified that predominant agroforestry practices include home gardens, alley cropping, woodlots, and boundary planting, emphasizing the integration of trees with crop cultivation to enhance productivity and sustainability.

Table 4.5:Types of Agroforestry practice carried out.

Practice	**Frequency**	**Percentage**
Home garden	40	33.3
Agrisilvicultre	48	40
Silvopastoral	10	8.33
Agrosilvopastoral	22	18.33
Total	120	100

Source: Field survey 2025

Establishment of Agroforestry trees

Table 4.6 shows how agroforestry trees were established in the study area. The results revealed that 53 respondents, representing 44.17%, reported that agroforestry trees were deliberately planted; 57 respondents, or 47.5%, indicated that trees were naturally regenerated; and 10 respondents, accounting for 8.33%, stated that trees were protected or grew spontaneously. This suggests that the study area possesses a robust natural vegetation cover, allowing trees to grow without significant human intervention. These findings align with recent studies such as Otieno, Ndegwa & Kamau (2023), which highlight that many farmers rely on natural regeneration for establishing trees due to its cost-effectiveness and ecological benefits. The study by Owombo and Idumah (2017) also supports this, noting that most adopters maintain trees on their farms for shade, soil fertility improvement, and economic gains.

Table 4.6:Establishment of Agroforestry trees

Response	Frequency	Percentage
Planting	53	44.17
Naturally	57	47.5
Protection of wildlings	10	8.33
Total	120	100

Source: Field survey 2025

Common Arable crops species used by the farmers

Table 4.7 above shows the most commonly cultivated crop species among farmers in the study area. The results revealed that 47 respondents, representing 39.17%, use maize in their farmland; 43 respondents, or 35.83%, grow groundnut; and 10 respondents, or 8.33%, plant sorghum. It is evident from this table that maize is the most preferred and widely cultivated crop among farmers in the area. This finding aligns with recent studies such as Nwogu, Eze, & Obi (2022), which reported that maize remains the dominant staple crop grown by smallholder farmers due to its high yield potential and market demand. Additionally, the practice of intercropping maize with other crops like groundnut has been noted to improve land productivity and diversify income sources, as documented by Ajake (2012) and supported by recent research (Ojo, Adeyemo & Olaleye (2023).

Table 4.7: Common Arable crops species used by the farmers

Crops	Frequency	Percentage
Maize	47	39.17
Groundnut	43	35.83
Sorghum	10	8.33
Cassava	13	10.83
Sessame	7	5.83
Total	120	100

Source: Field survey 2025

Distribution of respondents based on the tree crops mainly used

Table 4.8 above shows the primary tree crops utilized by farmers in the study area. The results revealed that 20 respondents, representing 16.67%, use mango; 38 respondents, or 31.67%, use Gmelina; and 15 respondents, or 12.5%, use shea butter. This indicates that oil palm is the most common species integrated into agroforestry systems by farmers in the area. The study further demonstrated that most of the agroforestry species allowed to grow on farmland are those that provide food or possess economic value, likely driven by the farmers' need to ensure a consistent source of food and income. This aligns with findings by Aju and Labode (2005), who emphasized that the primary consideration in selecting tree species for planting or protection within traditional farming systems in southeastern Nigeria was to secure a reliable food source. Recent research by Eze, Nkang& Nwafor (2022) supports this, highlighting the importance of food and income security as key drivers for the selection of agroforestry species among smallholder farmers.

Table 4.8: Distribution of respondents based on the tree crops mainly used

Tree crops	Frequency	Percentage
Vitelaria paradoxa	15	12.5
Oil palm tree	45	37.5
Mango	20	16.67
Gmelina	38	31.67
Others	2	1.67
Total	120	100

Source: Field survey 2025

Distribution base or respondents based on the objectives of their management.

It can be deduced from the above Table 4.9 that 15 respondents, representing 12.5%, cite timber/pole production as their primary objective of practicing agroforestry. Meanwhile, 25 respondents, or 20.83%, indicated that fuel wood production is their main goal. The majority, with 50 respondents accounting for 41.67%, stated that their objectives are centered around the production of fruits and medicinal herbs. This suggests that most of the forest trees and crops planted in the area are used primarily for food and herbal remedies. These findings align with the study by Aju and Labode (2005), who reported that the need to secure a regular food supply was a major factor influencing the selection of tree species for planting or protection within traditional farming systems in southeastern Nigeria. Recent research by Okafor, Nwankwo & Eze(2023) supports this, indicating that smallholder farmers increasingly prioritize agroforestry species that serve dual purposes of food security and medicinal use, especially in resource-constrained settings.

Table 4.9: Distribution base or respondents based on the objectives of their management.

Outcome	frequency	percentage
Timber/pole production	15	12.5
Fuel wood production	25	20.83
Edible fruits and herbs	50	41.67
Others	30	25
Total	120	100

Source: Field survey 2025

Encouragement of Government on Agroforestry practice

Table 4.10 above shows that 33 respondents, representing 27.5%, were encouraged in one way or another by the government, while 87 respondents, or 72.5%, lamented the lack of government support. This suggests that only a limited number of farmers were able to access incentives or support programs aimed at enhancing their agroforestry practices. This finding aligns with the assertion by Islam et al. (2012) that "government policies and extension services significantly influence farmers' adoption of agroforestry systems. Lack of support often hampers widespread adoption." Recent studies by Adeoye et al. (2022) and Chukwu, Nwachukwu & Eze (2023) further emphasize that active government involvement and accessible extension services are critical in scaling up agroforestry adoption among smallholder farmers, especially in developing countries.

Table 4.10: Encouragement of Government on Agroforestry practice

Incentives	Frequency	Percentage
Yes	33	27.5
No	87	72.5

Source: Field survey 2025

Constraints facing planting of trees

Table 4.11 above shows that 24 respondents representing 30% face problems of land acquisition, 40 respondents representing 50% had financial problem while 16 respondents representing 20% lamented about weather condition. This shows that the farmers lacked capital to fund their activities, therefore, caused setback in their production.This conforms the findings of Akinyemi, Aiyelaagbe& Akyeampong (2010) and Baruwa, Masuku & Alimi (2011) who listed some of the variables as constraints to plantain production in Nigeria respectively.

Table 4.11: Constraints facing planting of trees

Constraints	Frequency	Percentage
Land problem	44	36.67
Finance	59	49.17
Climate change	17	14.17
Total	120	100

Source: Field survey 2025

SUMMARY AND CONCLUSION

Summary

The study examines the agroforestry practice in ussa local government area of taraba state, six wards were selected randomly and 120 questionnaires were administered. The data obtained were analysed using simple percentage. This study investigates the role, practices, and socioeconomic aspects of agroforestry among small-scale farmers in Ussa LGA, Taraba State, Nigeria. Six ward were randomly selected randomly and 120 questionnaires were administered. The data obtained were analysed using frequency and simple percentage Agroforestry systems involves integrating trees with crops and livestock are vital for enhancing sustainability, resilience, and diversification of livelihoods. The findings reveal that: The findings indicate that the majority of farmers practicing agroforestry are male (77.5%) and middle-aged (41-60 years), with farming serving as their primary occupation. Approximately 75% of respondents actively engage in agroforestry through practices such as agrisilviculture, home gardens, and silvopastoral systems. Trees are predominantly established via natural regeneration (47.5%) and deliberate planting (44.17%), with species like oil palm, mango, and plantain being commonly used. Crops such as maize, groundnut, and cassava are widely cultivated, with farmers mainly focusing on producing fruits, medicinal herbs, fuelwood, and timber to meet household needs and generate income. However, limited government support is reported, with only 27.5% of farmers receiving encouragement or incentives. The major constraints faced include land acquisition (36.7%), financial challenges (49.2%), and climate variability. The study also shows that maize is highly valued as the most appropriate and widely cultivated agricultural crop among farmers in the area.

Conclusion

Agroforestry holds immense potential for improving the socioeconomic conditions of small scale farmers in Ussa L.G.A of Taraba State. By diversifying income sources, enhancing food security, and supporting environmental sustainability, agroforestry contributes to the long-term resilience of rural farming communities. However, for its benefits to be fully harness there is a need for integrated policies, improved farmer education, and better access to resources. With the right support, agroforestry can transform the agricultural landscape of Nigeria, offering a sustainable path toward rural development.

Recommendations

Based on the findings of this study, the following recommendations were made.

1. The study revealed that the middle age and the older farmers were into agro forestry practices in the study area. Therefore, it is recommended that the Taraba State Minisrty of Agriculture should encourage younger farmers to fully participate in agroforestry practices for higher productivity.
2. Government agricultural agencies,research institutes (e.g., ICRAF, forestry/agroforestry research centers), non-governmental organizations (NGOs) involved in climate-smart agriculture, Development partners/donors supporting rural capacity building (e.g., FAO, IFAD, World Bank) shouldincrease awareness and accessibility of subsidies, training, and extension services to encourage wider adoption of agroforestry practices among small-scale farmers.
3. Federal and State Governments, Financial institutions, Local Government Authorities should develop land tenure policies that facilitate land acquisition for agroforestry and establish microcredit schemes tailored for farmers to invest in tree planting and management.
4. Conduct educational programs by

Government agricultural extension services, Agricultural research institutes, NGOs, Development partnerson agroforestry benefits, management techniques, and climate resilience to improve farmers' knowledge and skills.

5. NGOs and community-based organizations (CBOs), Farmer cooperatives and associations should encourage farmers to adopt agroforestry systems that enhance soil fertility, conserve biodiversity, and mitigate environmental hazards.
6. Support further studies on locally suitable tree and crop species, as well as innovative agroforestry models that suit the socio-economic context of Nigerian small-scale farmers by universities and academic researchers, Agricultural and forestry research institutes.
7. Foster cooperative efforts and knowledge sharing among farmers to improve collective benefits and resilience by Farmer cooperatives and associations, Community-based organizations (CBOs), NGOs.

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