Sustainable Agricultural Practices among arable crop farmers in Oyo state, Nigeria

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ABSTRACT

The study investigated the utilisation of Sustainable Agricultural Practices (SAP) by arable crop farmers in Oyo State, Nigeria. A total of 152 respondents were sampled using a multi-stage sampling procedure. Descriptive statistics were used to summarise the data and inferential statistics were used to describe the relationship and differences that exist between the variables. Results reveal that majority were male (79.6%), married (82.9%), had secondary education (70.0%) with a mean age of 38.73 years. Also, majority (52.0%) of the respondents had a favourable attitude towards the use of SAPs. Mixed farming (x = 1.47) was the SAP utilised most by the respondents. Level of utilisation of SAPs was low among majority (41.4%) of the respondents. A significant relationship existed between ownership of farmland (chi-square = 16.302, p = 0.000), membership of organisation (chi-square = 121.754, p = 0.000), years of farming experience (r = 0.215, p = 0.008), and the utilisation of SAPs by the respondents. The study concluded that the level of utilisation of SAPs is low and recommended the institutionalisation of digital extension services to enhance outreach to a broader spectrum of farmers on various uses of sustainable agricultural practices.

Keywords: *Sustainable agricultural practices, Mixed farming, Farming experience, Arable crop farmers.*

INTRODUCTION

Sustainable agriculture is the comprehensive approach to the cultivation of plants and rearing of animals designed to meet human food and fibre needs over the long term, while enhancing environmental quality and the natural resource base essential to the agricultural economy (National Sustainable Agricultural Coalition, 2023). Addressing the global challenge of food security amidst constraints such as population growth, evolving food preferences, risks of natural resource degradation, and climate change impacts necessitates a fundamental reassessment of current agricultural production systems. The adoption of various SAPs such as mixed farming, zero/minimum tillage, irrigation, drainage, and bush fallowing can improve food security, increase farm productivity, protect ecosystems, and alleviate poverty.

Nigeria's agricultural system is faced with numerous constraints including a poor system of land ownership, limited irrigation agriculture, climate change, and soil degradation. The government has launched multiple projects to increase food production, including the Agriculture Promotion Policy (APP), the Presidential Economic Diversification Initiative (PEDI), the REDD+ programme, and the Nigeria Erosion and Watershed Management Project (NEWMAP) (FAO, 2023). Several studies have been conducted to investigate sustainable agricultural practices in Oyo State, including Gbadebo et al. (2022) who assessed climate-smart agriculture among cassava farmers, and Kehinde et al. (2022) who studied agricultural organisations and adoption of soil conservation practices. However, much consideration has not been given to the utilisation of SAPs among arable crop farmers in Oyo State. The specific objectives of the study were to:

i. describe the socio-economic characteristics of the respondents in the study area;
ii. determine the enterprise characteristics of the respondents;
iii. determine the attitude of the respondents towards the use of SAPs; and
iv. determine the level of utilisation of SAPs among the respondents.

The study hypothesised that there is no significant relationship between the respondents' enterprise characteristics and utilisation of SAPs.

METHODOLOGY

This research was conducted in Oyo State, located in the southwestern region of Nigeria, situated between latitudes 7 degrees 3 minutes and 9 degrees 12 minutes north of the equator and longitudes 2 degrees 47 minutes and 4 degrees 23 minutes east of the Meridian, with an average temperature of 27 degrees C. The state is divided into thirty-three Local Government Areas (NPC, 2009). A multi-stage sampling technique was employed. In the first stage, 50% of the zones in Oyo State were randomly selected (Oyo and Saki zones). The second stage involved the random sampling of 40% of the blocks in the sampled zones. The third stage involved the random selection of one cell each from the sampled blocks. Subsequently, 20% of the registered arable farmers in the cells were randomly sampled.

Table 1: Summary of sampling procedure and sample size

Sampled Zones	Number of Blocks	Sampled Blocks	Sampled Cells	Registered farmers	Sampled farmers (20%)
Oyo	6	Iseyin	Idiya	70	14
		Afijio	Ilora	200	40
		Atiba	Onire are-ago	54	11
Saki	9	Kajola	Elewure	156	31
		Atisbo	Corner-owo	78	16
		Iwajowa	Oguneleji	150	30
		Saki-West	Aroje	51	10
Total					152

Data were collected from respondents through a structured questionnaire. The dependent variable, level of utilisation of SAPs, was measured on a three-point scale: always (2), occasionally (1), and never (0). Data were analysed using descriptive and inferential (Chi-square, Pearson Product Moment Correlation) statistical tools.

RESULTS AND DISCUSSION

Socioeconomic characteristics of the respondents

The socio-economic characteristics of the respondents are presented in Table 2. The majority (79.6%) of the respondents were male, indicating that men were more engaged in arable farming than women. This finding aligned with previous studies such as Adeyemo *et al*. (2017), which reported male dominance in crop production in Ogun State, and Aworinde (2018), who also observed a higher proportion of male maize farmers in Oyo State. More than half (52.0%) of the respondents were between 41 and 50 years old, with a mean age of 38.73 years. This suggested that most farmers were in their economically active years and capable of sustaining productive agricultural activities. This result corroborated Taiwo *et al.* (2023), who reported a mean age of 45.36 and concluded that cassava farmers in Oyo State were young, experienced subsistence farmers.

The majority (82.9%) of the respondents were married, implying that farmers had family responsibilities requiring steady income. This finding was consistent with Eforuoku (2018), who reported high proportions of married farmers in rural areas, as well as Ademola and Olujide (2014), who noted similar patterns in Atisbo Local Government Area and suggested that household labour might support farm operations. Kehinde *et al.* (2022) also reported a predominance of married farmers in Oyo State. In terms of educational attainment, 46.1% of the respondents had completed secondary education, indicating a relatively high level of formal schooling. This corroborated the report of Gbadebo *et al.* (2022), who found that most farmers in Oyo State had primary or secondary education, with only a minority attaining tertiary degrees.

Household size results showed that 62.5% of the farmers had between 5 and 8 members, with a mean household size of 5.66. This finding was consistent with Taiwo *et al*. (2023), who reported a mean household size of 5.76 among farmers in Ibarapa communities, and with Ademola and Olujide (2014), who noted that most households in Atisbo Local Government Area consisted of 4–6 members. The vast majority (88.8%) of the respondents were primarily engaged in farming, suggesting strong reliance on agriculture as the major source of livelihood. This observation supported the findings of Gbadebo *et al*. (2022), who similarly reported that most farmers in Oyo State practiced farming as their primary occupation. Furthermore, 71.8% of the farmers engaged in trading as a secondary occupation, indicating that many diversified their income sources to improve financial stability.

Income distribution showed that 44.1% of the respondents earned between ₦51,000 and ₦100,000 monthly, suggesting that cassava and maize farmers in Oyo State were earning above the national minimum wage of ₦30,000 and were therefore in relatively stable economic conditions. However, this contrasted with Eniolorunda (2016), who found that farmers in Bauchi and Gombe States earned between ₦11,000 and ₦20,000 from maize sales in the preceding year. Additionally, results showed that 96.1% of the respondents had no contact with extension workers during the 2022 farming year. This sharply contrasted with the findings of Kehinde *et al.* (2022), who reported that many farmers in Oyo State received extension visits that positively influenced their adoption of conservation practices.

Table 2: Distribution of respondents by their socioeconomic characteristics (N = 152)

Variables	Frequency	Percentage (%)	Mean
Age			45.36
< 40	66	43.4	
41-50	79	52.0	
> 50	7	4.6	

Variables	Frequency	Percentage (%)	Mean
Sex			
Male	121	79.6	
Female	31	20.4	
Marital status			
Married	126	82.9	
Single	10	6.6	
Divorced/Widowed	16	10.5	
Educational level			
No formal education	5	3.3	
Primary education	38	25.0	
Secondary education	70	46.1	
Tertiary education	39	25.7	
Primary occupation			
Farming	135	88.8	
Non-farming	17	11.2	
Monthly income (Naira)			
<= 50,000	60	39.5	
51,000-100,000	67	44.1	
101,000-150,000	63	41.4	
> 150,000	8	5.3	
Extension visits			
Yes	6	3.9	
No	146	96.1	

Source: Field survey, 2023

Enterprise characteristics of the respondents

The results in Table 3 show that majority (61.8%) of the respondents had between 11 and 20 years of farming experience, with a mean of 12.76 years. This finding corroborated with the report of Ademola and Olujide (2014), who stated that crop farmers in Atisbo Local Government Area had a mean farming experience of 16 years, suggesting that most farmers in the present study were experienced and capable of adapting to changing agricultural practices as well as managing production-related constraints.

More than half (52.6%) of the respondents operated farms measuring between 6 and 10 hectares, indicating that crop production in Oyo State was largely practiced on small- to medium-scale holdings. This aligned with Adeola and Adetunbi (2015), who reported a mean farm size of 4.4 hectares among farmers in southwestern Nigeria. The majority (86.6%) of the farmers owned their farmlands, supporting the findings of Aworinde (2018), who observed that most maize farmers in Oyo State were landowners.

In addition, most respondents (91.4%) operated 3–4 farm locations, implying fragmented landholdings that might increase production costs and limit the full utilization of Sustainable Agricultural Practices (SAPs) due to financial constraints.

The findings further revealed that hired labour (50.7%) constituted the predominant source of labour among the respondents. This contrasted with Oluwatayo and Adedeji (2019), who reported that farmers in Oyo State mainly relied on household labour for both farm and non-farm activities. The results also showed that a majority (62.7%) of respondents did not belong to any farming association, indicating low membership in such groups within the study area. This contradicted the findings of Oluwatayo and Adedeji (2019), who reported that most farmers in their study area were members of agricultural organisations. Among those who belonged to associations, 75.9% did not hold leadership positions. Similarly, 60.5% of the respondents reported that they were not members of any cooperative society, reflecting a generally low participation rate in cooperative structures.

Furthermore, 62.5% of the farmers lacked access to credit, a situation that may be linked to their low association membership, given that such groups often serve as channels for financial support. This finding differed from Oluwatayo and Adedeji (2019), who found that 64.4% of farmers had access to credit facilities in their study of Oyo State.

Table 3: Enterprise characteristics of respondents (N = 152)

Variables	Frequency	Percentage (%)	Mean
Years of farming experience			12.76
1-10	55	36.2	
11-20	94	61.8	
21-30	2	1.3	
41 and above	1	0.7	
Farm ownership			
Yes	132	86.8	
No	20	13.2	
Farm size (ha)			3.29
1-5	12	7.9	
6-10	66	43.4	
11-15	80	52.6	
> 15	5	3.3	
Source of farm labour			
Hired labour	77	50.7	
Family labour	63	41.4	
Self-labour	12	7.9	
Membership of farmers association			
Yes	55	36.7	
No	94	62.7	
Membership of cooperative association			
Yes	60	39.5	
No	92	60.5	
Access to credit			
Yes	57	37.5	
No	95	62.5	
Number of farming locations			
3-4	139	91.4	
5-6	10	6.6	
> 6	3	2.0	

Source: Field survey, 2023

Respondents' attitude towards the use of SAPs

Results in Table 4a indicate that respondents agreed that embracing SAPs can lead to improved soil health (x = 4.09), SAPs have potential to address food security (x = 3.89), adopting SAPs supports rural livelihoods (x = 3.88), and they are open to adopting SAPs to produce healthy foods (x = 3.84). However, respondents disagreed that traditional farming methods do not affect the environment (x = 2.68). The weighted mean was 3.53, indicating an overall moderately favourable attitude. Results in Table 4b show that a slight majority (52.0%) had a favourable attitude toward SAPs.

Table 4a: Distribution of respondents based on attitude towards the use of SAPs (N = 152)

Statements	SA F (%)	A F(%)	N F (%)	D F (%)	SD F (%)	Mean
I believe that embracing SAPs can lead to improved soil health.	70(46.1)	48(31.6)	20(13.2)	6(3.9)	8(5.3)	4.09
I feel optimistic about the potential of SAPs to address food security.	42(27.6)	74(48.7)	16(10.5)	15(9.9)	5(3.3)	3.89
I think adopting SAPs supports rural livelihoods and well-being.	54(35.5)	55(36.2)	20(13.2)	17(11.2)	6(3.9)	3.88
I am open to adopting SAPs to produce healthy foods.	43(28.3)	63(41.4)	32(21.1)	7(4.6)	7(4.6)	3.84
Adopting SAPs will take too much time and effort.	12(7.9)	27(17.8)	2(1.3)	44(28.9)	67(44.1)	3.84
I am open to adopting SAPs to protect the environment.	46(30.3)	49(32.2)	42(27.6)	6(3.9)	9(5.9)	3.77

Statements	SA F (%)	A F(%)	N F (%)	D F (%)	SD F (%)	Mean
I think adopting SAPs can enhance farming sustainability.	23(15.1)	71(46.7)	37(24.3)	6(3.9)	15(9.9)	3.53
I believe in conventional practices since I have enough knowledge.	8(5.3)	8(5.3)	71(46.7)	41(27.0)	24(15.8)	3.43
I do not think that traditional farming methods affect the environment.	24(15.8)	56(36.8)	38(25.0)	13(8.6)	21(13.8)	2.68
Weighted Mean						3.53

Source: Field survey, 2023

Table 4b: Categorisation of respondents based on attitude towards the use of SAPs

Attitude to SAPs	Frequency	Percentage (%)	Mean	SD
Unfavourable (range: 64-94.53)	73	48.0	94.53	5.98
Favourable (range: 95-109)	79	52.0		

Source: Field survey, 2023

Level of utilisation of SAPs among respondents

Results in Table 5a reveal that mixed farming (x = 1.47) ranked highest among SAPs utilised by respondents. Bush fallowing (1.394) and crop rotation (1.388) ranked 2nd and 3rd respectively. The respondents did not utilise irrigation systems, mulching, and water harvesting at all. Results in Table 5b reveal that most of the farmers (58.6%) had low utilisation of SAPs.

Table 5a: Distribution of respondents by utilisation of SAPs (N = 152)

SAPs	Always (%)	Occasionally (%)	Never (%)	Mean	Rank
Mixed farming	54.6	38.2	7.2	1.473	1st
Bush Fallowing	51.3	36.8	11.8	1.394	2nd
Crop Rotation	44.1	50.1	5.3	1.388	3rd
Use of Drainage systems	48.0	38.2	13.8	1.342	4th
Composting/use of crop residues	39.5	44.1	16.4	1.230	5th
Contour cropping	21.7	51.3	21.0	0.947	6th
Manual weeding/Reduced herbicides	9.9	68.4	21.7	0.881	7th
Use of improved planting materials	19.7	36.8	43.4	0.763	8th
Organic Manuring	2.0	57.2	40.8	0.611	9th
Ridging	3.9	41.4	54.6	0.493	10th
Integrated Pest Management (IPM)	11.2	25.7	63.2	0.480	11th
Agroforestry	8.6	13.2	78.3	0.302	12th
Avoiding fossil burning	2.6	24.3	73.0	0.296	13th
Afforestation/Reforestation	6.5	8.6	84.9	0.217	14th
Zero/Reduced tillage techniques	2.0	9.2	88.8	0.131	15th
Planting of cover crops	0.0	4.6	95.4	0.046	16th
Use of Irrigation systems	0.0	0.0	100	0.000	17th
Mulching	0.0	0.0	100	0.000	17th
Water Harvesting	0.0	0.0	100	0.000	17th

Source: Field survey, 2023

Table 5b: Categorisation of respondents based on level of utilisation of SAPs (N = 152)

Utilisation of SAPs	Frequency	Percentage (%)	Mean	SD
Low utilisation (range: 6-12)	89	58.6	12.0	2.65
High utilisation (range: 13-18)	63	41.4		

Source: Field survey, 2023

Relationship between enterprise characteristics and utilisation of SAPs

Results in Table 6a reveal that a significant relationship exists between ownership of farmland (x^2 = 16.302, p = 0.000), membership of organisation (χ^2 = 121.754, p = 0.000), and utilization of Sustainable of Agricultural Practices. This implies that owning the land used for farming can increase the tendency of farmers to adopt SAPs. This can be related to the financial commitment that can come with adoption as farmers are more willing to invest in a land that is

completely theirs. Moreover, farming association (s) can aid the adoption of SAPs since it is an avenue for farmers to share important farming knowledge and skills among themselves.

Table 6a: Chi-square analysis of the relationship between enterprise characteristics and utilisation of SAPs

Variables	Chi value	df	p-value	Remark
Ownership of farmland	16.302	1	0.000	Significant
Membership of farming association(s)	121.754	1	0.000	Significant
Leadership of association(s)	0.689	1	0.407	Not Significant
Access to credit facilities	0.219	1	0.640	Not Significant
Source of labour	0.097	2	0.953	Not Significant
Source: Field survey, 2023. Significant at p <= 0.05				

Source: Field survey, 2023.
NOTE: df = Degree of Freedom, Significant at $p \leq 0.05$

Results in Table 6b show that there was a significant relationship between years of farming experience ($r = 0.215$, $p = 0.008$) and utilization of Sustainable Agricultural Practices. This implies that, farmers with more experience tend to adopt SAPs since they have practiced the occupation for a longer period and have tried several farming methods.

Table 6b: Pearson Product Moment Correlation (PPMC) analysis between enterprise characteristics and utilisation of SAPs

Variables	r-value	p-value	Remark
Years of farming experience	0.215	0.008	Significant
Farm size	-0.072	0.378	Not significant
Number of farming locations	0.050	0.543	Not significant
Source: Field survey, 2023. Significant at p <= 0.05			

Source: Field survey, 2023.
NOTE: r-value = Correlation coefficient, Significant at $p \leq 0.05$.

CONCLUSION AND RECOMMENDATION

The study concluded that the level of utilisation of Sustainable Agricultural Practices was low. Mixed farming, bush fallowing and crop rotation were the SAPs mostly utilised by the respondents, and majority of the respondents had a favourable attitude towards the use of SAPs. The study recommended that extension services be strengthened with adequate training opportunities and access to resources provided to enhance the utilisation of SAPs. In particular, the institutionalisation of digital extension services should be pursued to enhance outreach to a broader spectrum of farmers.

REFERENCES

Ademola, A.O., & Olujide, M.G. (2014). Soil conservation practices of crop farmers in Atisbo Local Government Area of Oyo State, Nigeria. Advances in Research, 2(12), 879-888.

Adeola, R.G., & Adetunbi, S.I. (2015). Farmers' perception of sustainable agriculture in South-Western Nigeria. International Journal of Applied Agricultural and Apicultural Research, 11(1&2), 86-92.

Adesoped, O. (2025). Farmers' attitude and cultural perception toward agroforestry practices as an adaptive strategy to climate variability in Southeast Nigeria. International Journal of Research and Innovation in Social Science, 9(2), 321-335.

Adeyemo, R.A., Oladoja, A.M., Famakinwa, M., & Alabi, D.L. (2017). Assessment of utilisation of soil management practices among crop farmers in Ogun State. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, 17(3).

Ajeet Kumar & Pathak, K. (2025). Sustainable farming practices: A comprehensive review. International Journal of Environment and Climate Change, 15(8), 372-383.

Akinnagbe, O.M., & John, A.M. (2023). Use of conservation practices among crop farmers in Oyo State, Nigeria. Journal of Agricultural Science, 27(2).

Aworinde, K.B. (2018). Effects of diversification on the incomes of small-scale maize farmers in Oyo State, Nigeria. Project research, Federal University of Technology, Minna.

Eforuoku, F. (2018). Determinants of Dietary Intake among Rural Farming Households in North Western, Nigeria. Unpublished PhD Thesis, University of Ibadan, Nigeria.

Emmanuel, F.G., Oreoluwa, F.T., & Rebecca, A.T. (2023). Sustainable land management practices and its correlates among smallholder food crops farmers in Ogbomoso agricultural zone of Oyo State. Canadian Journal of Agriculture and Crops, 8(1), 12-21.

FAO (2023). Nigeria at a glance. Food and Agriculture Organization of the United Nations. Available at: https://www.fao.org/nigeria/en/

Gbadebo, O.V., Oyewole, A.L., Anifowose, T.O., & Iselobhor, F. (2022). Adoption and utilisation of climate smart agricultural practices by cassava farming households in Ido LGA, Oyo State, Nigeria. FUDMA Journal of Sciences, 6(4), 107-111.

Kehinde, M.A., Akinola, A., Kehinde, A.D., & Ogundeji, A.A. (2022). Agricultural organisations and adoption of soil conservation practices among smallholder farmers in Oyo State, Nigeria. Tropical and Subtropical Agroecosystems, 25(3).

National Population Commission (NPC) (2009). Population distribution by sex, state, Local Government Area and senatorial district: 2006 census priority tables (Vol. III). Abuja, Nigeria.

National Sustainable Agricultural Coalition (2023). Available at: https://sustainableagriculture.net/

Nwokobia, D.O., & Ayoola, J.T. (2025). Assessing the extent of adoption of climate-smart agriculture practices by farmers in Delta State, Nigeria. Direct Research Journal of Agriculture and Food Science, 13(2), 62-72.

Oke, O.O., Adeoye, S.A., & Aderounmu, F. (2024). Sustainable utilisation of agroforestry-related land use practices among farmers in Akinyele LGA, Oyo State. Journal of Integrated Sciences (Special Issue).

Okonta, O.W., Ogunjimi, S.I., Adejumo, A.A., Ajala, A.O., & Kolawole, E.A. (2023). Willingness to adopt organic farming practices among crop farmers in Oyo State, Nigeria. Journal of Agricultural Extension, 27(3), 86-92.

Renzaho, A.M.N., Abdulai, R., & Rahaman, K.S. (2025). The impact of sustainable organic agriculture on food security in sub-Saharan Africa. Agriculture & Food Security, 14, Article 31.

Taiwo, A.O., Adeniyi, R.T., Adebayo, O.A., & Ajiboye, I.E. (2023). Sustainable information needs of cassava farmers in Ibarapa communities of Oyo State. ACU Journal of Social Sciences, 1(1).