

INVOLVEMENT OF ARABLE CROPS FARMERS IN ORGANIC AGRICULTURAL PRODUCTION IN ONDO STATE

ALADEKOMO Folasade Olaitan, ALE Adejumoike Bosede

Department of Agricultural Science, Faculty of Vocational and Technical Education,
Adeyemi Federal University of Education, Ondo

Corresponding Author: folasadek2014@gmail.com

ABSTRACT: Organic agriculture is widely recognised for its potential to improve soil fertility, protect the environment, and reduce health risks associated with synthetic agrochemicals. However, farmers' involvement in organic farming remains limited in Nigeria. This study assessed the involvement of arable crop farmers in organic agricultural production in Ondo State, Nigeria, focusing on socio-economic characteristics, perceptions, extent of involvement, influencing factors, and constraints. A descriptive survey design was adopted, and data were collected from 120 arable crop farmers selected through a multi-stage sampling procedure across six local government areas. Data were analysed using descriptive statistics, Pearson's Product Moment Correlation, and one-sample t-test, guided by the Diffusion of Innovations Theory and the Theory of Planned Behaviour. Results showed that respondents were predominantly male (71.7%), middle-aged (mean age = 49.33 ± 13.72 years), smallholder farmers with low formal education (47.5%) and mean farm size of 2.8 ± 1.6 ha. Farmers exhibited favourable perceptions of organic farming (grand mean = 3.99 ± 0.81), particularly regarding soil fertility improvement and reduced health risks. However, involvement in organic practices was low to moderate (grand mean = 2.54 ± 1.04), with higher participation in intercropping (4.00) and crop rotation (3.90) but minimal engagement in soil testing (1.89) and biofertilizer use (1.80). Access to information and training (mean = 4.32) was the most influential factor, while major constraints included limited organic inputs (71.7%) and lack of technical knowledge (68.3%). Awareness was positively correlated with involvement ($r = 0.612$, $p < 0.05$). The study concludes that positive perceptions alone are insufficient to drive organic farming involvement without adequate technical, institutional, and market support.

KEYWORDS: Arable Crop, Farmer Perception, Adoption, Organic Farming

I. INTRODUCTION

Organic agriculture has gained more and more worldwide attention as a sustainable alternative to the traditional way of farming because of its ability to improve soil quality, conserve biodiversity, and lower the negative impact on the environment. The Codex Alimentarius and IFOAM label organic farming as a man-made-systems-free production system that relies on nature for soil's fertility and insects' control while shunning off the use of synthetic fertilizers and pesticides [1,2]. The current global level assessments by the Food and Agriculture Organization (FAO) point out the organic agriculture as a significant factor in the fight against climate change and the mitigation of its adverse effects on food production and consumption; besides, the assessments also reveal the fast-growing trend of organic

agriculture in both the developed and developing areas [3]. Similarly, the global organic report by FiBL and IFOAM presents not only the continuous increase in the land under organic management but also the rising consumer demand for chemical-free food products all around the globe [4]. In sub-Saharan Africa, organic farming is being more and more propagandized as a solution for sustainability and farmers' health by reducing their exposure to poisonous agrochemicals. However, the adoption of organic farming is still very low mainly due to non-availability of institutions, technical know-how, and market support [5]. Nigeria is not different from the rest of the continent. There have been several studies which showed the growth in the awareness of organic farming among Nigerian farmers but at the same time the lack of practical adoption, mainly due to limited knowledge, shortage of organic inputs, labor intensiveness, and market uncertainties [6–8]. For example, Olabode and Ogunyemi (2022) discovered that even though the farmers engaged in vegetable production in southwestern Nigeria were cognizant of the environmental advantages of organic fertilizers, their adoption was still low because of the shortage of inputs and lack of training [6]. Similarly, the study done by Tijani and Omonona (2021) indicated that farmers' readiness to go for sustainable agricultural practices in Oyo State was strongly influenced by perceived profitability and access to extension services [7].

Ondo State, a major producer of arable crops in southwestern Nigeria, provides a relevant context for examining farmers' involvement in organic agricultural production. Although the state benefits from agricultural extension services and national initiatives promoting climate-smart agriculture, empirical evidence on the extent of organic farming practices among arable crop farmers remains limited. Previous Nigerian studies have consistently shown that farmers' decisions to adopt sustainable or organic practices are influenced by socio-economic characteristics, perceived benefits, market opportunities, and institutional support [7–9]. The conceptual framework that underlines this research combines the theories of Diffusion of Innovations and Planned Behaviour. Diffusion of Innovations Theory defines the process of adoption of new approaches to agriculture, like organic farming, based on the characteristics of farmers and their perceptions of the new approach, along with support derived from the underlying structures of institutions [10]. In this relationship, characteristics and perceptions relate to adopter characteristics and innovation characteristics, while communication channels refer to support derived from institutions that promote adoption of innovations. In addition, the Theory of Planned Behaviour provides further explanation of farmers' involvement by linking perceptions to attitudes toward organic farming, institutional influences to subjective norms, and constraints to perceived behavioural control, all of which jointly determine behavioural outcomes [11]. Together, these theories provide a robust theoretical foundation for understanding the level of involvement of arable crops farmers in organic agricultural production in Ondo State. This framework is further explained diagrammatically in Figure 1:

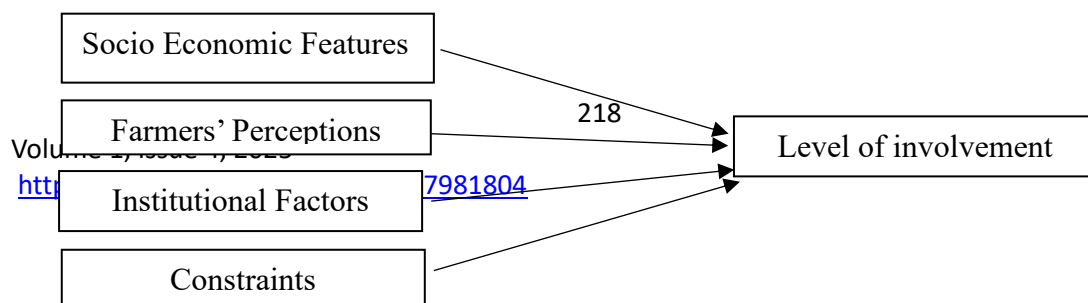


Figure 1: Conceptual Framework Showing the Relationship between the Variables and the Level of Involvement

Understanding farmers' perceptions and involvement is therefore crucial for identifying opportunities and constraints to scaling organic agriculture in Ondo State. This study addresses these gaps by examining farmers' involvement in organic agricultural production of arable crops in Ondo State. Specifically, the objectives were to:

- (a). ascertain the socio-economic characteristics of arable crop farmers in the study area,
- (b). evaluate the farmer's perception of organic farming of arable crops,
- (c). determine the extent of farmers' involvement in organic agricultural production of arable crops in Ondo State and
- (d). ascertain the constraints to organic farming of arable crops in the study area.

II. METHODOLOGY

The research method employed in this study was a descriptive survey that aimed to identify the factors, perceptions and the eventual constraints of the participation of arable crop farmers in organic agricultural production in Ondo State. The population from which the sample was drawn consisted of arable crop farmers residing in the local government areas (LGAs) selected from the state. The respondents were selected using a multi-stage sampling technique. Initially, six LGAs with the largest number of arable crop farmers were selected. Then, within each of the selected LGAs, five farming communities were randomly selected. Finally, extension agents provided a list of registered or identifiable arable farmers, and 40 individual respondents were selected using simple random sampling, bringing the total size of the sample to 120 farmers. Data collection was carried out through the primary source with a structured questionnaire which was meant to gather information on socio-economic characteristics, attitudes toward organic farming, level of participation in organic practices, and the constraints of adoption.

The perception items were rated on a Likert scale of five points measuring from 'strongly agree' (5) to 'strongly disagree' (1), while the participation in organic practices was rated on a scale from 'fully involved' (5) to 'not involved' (1). The factors that affected the level of participation were also rated using a five-point scale of influence. The content of the instrument was reviewed by experts in agricultural extension and organic farming, which ensured that the instrument was valid. The reliability was then established through a pilot test outside the study area, and Cronbach's alpha coefficients indicated that the internal consistency was above the acceptable threshold. The analysis of the collected data involved both descriptive and inferential statistical procedures. The results were presented as frequencies, percentages, means, and standard deviations for the descriptives.

III. RESULTS AND DISCUSSION

A. Socio-economic Characteristics

The characteristics of the respondents based on socio-demographic factors reveal the situation among smallholder farmers in Nigeria. The majority of the farmers were males (71.7%), which is in line with the situation in the country where men usually have the control over the land and decide on the main production, this fact is well recognized in gender studies of the agricultural system in Nigeria [12]. The average age of the farmers being 49.33 years indicates that the middle-aged and older adults are the ones mainly involved in farming in the area under investigation. This is corroborated by the national reports which have mentioned that the farming population in Nigeria is getting older and the youth are hardly involved in the primary crop production [13]. The high percentage of respondents who did not have formal education (47.5%) is indicative of the literacy problems faced by the rural population in Nigeria. Farmers with low formal education may not have easy access to extension services and may not be able to adopt knowledge-intensive practices, such as organic and sustainable agriculture, that require high levels of knowledge [14]. The majority of the respondents (85%) who stated farming as their main occupation also fit the national picture, where crop production is still the main source of income for rural households [13]. The membership in cooperatives of 61.7% is a sign of moderate participation in farmers' organizations. Even though this percentage is less than in some places, where the cooperatives are closely tied to the extension and input delivery activities, the cooperatives are still viewed as the major means to get information, credit, and marketing collectively [14]. The size of the household (5.23) and the experience in farming (15.6 years on average) are typical for smallholders in Nigeria, where family labour and learning time through several years of farming play a decisive role in production and innovation adoption [14]. The average landholdings of 2.8 hectares place the farmers within the smallholder range. Very small farming plots are a common practice throughout Nigeria and have been considered the main reason why the country could not fully adopt better farming technologies or shift to high-value production systems like the certified organic one [6]. In summary, these socio-demographic characteristics are consistent with the wider national profiles and they provide a very important context for understanding the farmers' perceptions, the limitations and their participation in the organic farming sector.

Table 1: Socio-demographic Characteristics of Respondents (N = 120)

Variable	Category	Frequency	Percentage (%)	Mean (\bar{x})
Sex	Male	86	71.7	
	Female	34	28.3	
	Total	120	100.0	
Age (years)	25-34	18	15.0	
	35-44	30	25.0	
	45-54	32	26.7	
	55-64	22	18.3	
	65-74	12	10.0	
	75-84	6	5.0	
	Total		120	100.0
Education	No formal	57	47.5	
	Primary	34	28.3	
	Secondary	22	18.3	
	Tertiary	7	5.9	

Variable	Category	Frequency	Percentage (%)	Mean (\bar{x})
	Total	120	100.0	
Main occupation	Farming	102	85.0	
	Trading	8	6.7	
	Civil service	6	5.0	
	Others	4	3.3	
	Total	120	100.0	
Cooperative membership	Yes	74	61.7	
	No	46	38.3	
	Total	120	100.0	
Household size	1 - 4	42	35.0	
	5 - 8	68	56.7	
	> 8	10	8.3	
	Total	120	100.0	5.23 (± 1.77)
Farming experience (years)	1 - 5	18	15.0	
	6 - 10	26	21.7	
	11 - 15	29	24.2	
	16 - 20	27	22.5	
	> 20	20	16.6	
	Total	120	100.0	15.6 (± 3.12)
Farm size (ha)	< 1.0	14	11.7	
	1.0 - 1.9	28	23.3	
	2.0 - 2.9	36	30.0	
	3.0 - 3.9	26	21.7	
	4.0 and above	16	13.3	
	Total	120	100.0	2.8 (± 1.6)

Source: Field survey, 2025

B. Arable Crop Farmers' Perception of Organic Farming

Table 2 shows that arable crop farmers in Ondo State generally hold favourable perceptions of organic farming, as indicated by the grand mean of 3.99 ± 0.81 . The strongest agreement is observed for statements relating to soil fertility improvement (Mean = 4.62), improved healthfulness of produce (Mean = 4.41), reduced chemical pollution (Mean = 4.38), and reduced health risks for farmers (Mean = 4.53). These perceptions align with widely documented benefits of organic agriculture, particularly its positive effects on soil quality, environmental safety, and farmer health, as emphasized in Codex and FAO guidelines [1,3] and global organic farming assessments [4]. Farmers also recognize broader ecological advantages, such as biodiversity conservation (Mean = 3.89) and long-term sustainability (Mean = 4.12), which reflect established evidence that organic farming enhances ecosystem resilience and supports agro-ecological balance [4]. However, respondents also acknowledge key challenges. A large proportion agree that organic farming requires more labour (Mean = 4.20), which is consistent with findings from sustainable agriculture studies in Nigeria showing that labour intensity remains a barrier to wider adoption [12]. Similarly, farmers perceive organic pest and disease control as slower and less immediate than conventional

methods (Mean = 3.40), a concern supported by literature indicating that organic pest management can be time-intensive and knowledge-heavy [4]. Economic perceptions show the weakest support. Respondents' express uncertainty regarding profitability (Mean = 3.95), better market prices (Mean = 3.01), and consumer willingness to pay premiums for organic products (Mean = 3.36). This reflects well-documented market limitations in Nigeria, where the organic value chain remains poorly developed and farmers lack access to certification and premium markets [14].

Table 2: Perception of Organic Farming Among Arable Crop Farmers in Ondo State

Statement	Response Frequency {and Percentage (%)}					Mean (\bar{x})	S.D
	SA	A	U	D	SD		
Organic farming improves soil fertility	78 (65.0)	33 (27.5)	7 (5.8)	2 (1.7)	0 (0.0)	4.62	0.58
Organic produce is healthier for consumption	65 (54.2)	38 (31.7)	12 (10.0)	5 (4.1)	0 (0.0)	4.41	0.63
Organic farming reduces chemical pollution	63 (52.5)	40 (33.3)	11 (9.2)	6 (5.0)	0 (0.0)	4.38	0.66
Organic farming requires more labour than conventional	55 (54.8)	44 (36.7)	15 (12.5)	6 (5.0)	0 (0.0)	4.20	0.64
Organic farming is profitable for arable crop production	40 (33.3)	38 (31.7)	22 (18.3)	15 (12.5)	5 (4.2)	3.95	0.92
Organic farming takes a longer time to control pests and diseases, compare to convectional method	25 (20.8)	28 (23.3)	32 (26.7)	22 (18.3)	13 (10.8)	3.40	1.05
Organic farming helps preserve biodiversity on the farm	42 (35.0)	46 (38.3)	20 (16.7)	10 (8.3)	2 (1.7)	3.89	0.84
Organic farming increases long-term sustainability	52 (43.3)	42 (35.0)	18 (15.0)	8 (6.7)	0 (0.0)	4.12	0.70
Organic farming products attract better market prices	15 (12.5)	26 (21.7)	28 (23.3)	30 (25.0)	21 (17.5)	3.01	1.06
Consumers are willing to pay more for organic produce	25 (20.8)	34 (28.3)	30 (25.0)	22 (18.3)	9 (7.5)	3.36	0.97
Organic farming reduces health risks for farmers, compared to synthetic chemical use	70 (58.3)	28 (23.3)	10 (8.3)	7 (5.8)	5 (4.2)	4.53	0.91
Grand Mean(\pmSD)	48 (40.0)	36 (30.0)	19 (15.8)	12 (10.0)	5 (4.2)	3.99	0.81

Source: Field survey, 2025

C. Involvement of Arable Crop Farmers in Organic Farming

The results in Table 3 show that arable farmers’ involvement in organic practices varies widely, with an overall grand mean of 2.54 ± 1.04 , indicating low to moderate engagement. The highest participation is observed in intercropping (Mean = 4.00) and crop rotation (Mean = 3.90). These practices are traditionally common among Nigerian smallholder farmers and are widely recognized as ecologically beneficial techniques that farmers adopt even outside certified organic systems. Reports from FAO and FiBL confirm that such low-input agroecological practices remain prevalent across African smallholder farming systems [3,4]. Moderate involvement is seen in composting (Mean = 3.78), which aligns with evidence that farmers tend to use compost and organic residues when these materials are accessible and when chemical fertilizers become costly or scarce [7]. However, involvement declines for mulching and crop residue recycling, suggesting constraints relating to labour, competing uses of residues, and limited extension guidance patterns similarly noted in studies on sustainable practice adoption in southwestern Nigeria [6]. The lowest involvement is recorded for practices that require greater technical knowledge, specialized inputs, or investment. These include natural pest control, cover cropping, soil testing, bio-fertilizers, drip irrigation, and no-till farming, all with mean scores below 2.20. Prior empirical evidence shows that Nigerian smallholders often face barriers such as high input cost, weak extension systems, limited access to irrigation technologies, and insufficient knowledge about biological pest management [2,7]. These factors may explain the low rates of participation observed. Overall, the pattern shows that farmers are more involved in traditional, low-cost organic practices but participate less in knowledge-intensive or technology-driven organic methods, consistent with broader findings in sustainable agriculture literature in Nigeria.

Table 3: Extent of Arable Farmers’ Involvement in Organic Farming

Organic Practice	Response Frequency {and Percentage (%)}					Mean (\bar{x})	S.D
	FI	HI	MI	LI	NI		
Intercropping	45 (37.5)	38 (31.7)	20 (16.7)	12 (10.0)	5 (4.1)	4.00	0.95
Crop rotation	42 (35.0)	36 (30.0)	22 (18.3)	14 (11.7)	6 (5.0)	3.90	0.96
Composting	38 (31.7)	34 (28.3)	26 (21.7)	14 (11.7)	8 (6.6)	3.78	1.02
Mulching	15 (12.5)	22 (18.3)	30 (25.0)	32 (26.7)	21 (17.5)	2.72	1.05
Crop residue recycling	12 (10.0)	20 (16.7)	34 (28.3)	32 (26.7)	22 (18.3)	2.60	1.03
Organic fertilizers (manure, bone meal)	10 (8.3)	18 (15.0)	32 (26.7)	34 (28.3)	26 (21.7)	2.45	1.10
Natural pest control (neem, botanicals)	8 (6.7)	12 (10.0)	28 (23.3)	36 (30.0)	36 (30.0)	2.12	1.18
Cover cropping	6 (5.0)	12 (10.0)	28 (23.3)	37 (30.8)	37 (30.8)	2.05	1.20

Soil testing	5 (4.1)	10 (8.3)	24 (20.0)	36 (30.0)	45 (37.5)	1.89	1.05
Biofertilizers (commercial microbes)	4 (3.3)	8 (6.7)	22 (18.3)	38 (31.7)	48 (40.0)	1.80	1.08
Drip irrigation	3 (2.5)	6 (5.0)	20 (16.7)	38 (31.7)	53 (44.1)	1.65	0.95
No-till farming	2 (1.7)	5 (4.1)	16 (13.3)	37 (30.8)	60 (50.0)	1.50	0.85
Grand Mean(±SD)	16 (13.3)	18 (15.0)	25 (20.8)	30 (25.0)	31 (25.9)	2.54	1.04

Source: Field survey, 2025 (Scale: FI- Fully Involved; HI- Highly Involved; MI- Moderately Involved; SI- Slightly Involved; NI- Not Involved)

D. Factors Influencing Adoption of Organic Farming by Arable Crop Farmers

Table 4 shows that farmers consider several factors important in influencing their adoption of organic farming. Access to information and training emerged as the most important factor, suggesting that farmers rely heavily on guidance and technical support to implement organic practices. Cost of organic inputs and market demand also ranked highly, indicating that economic considerations strongly shape adoption decisions. Government or NGO support was similarly viewed as important, reflecting the role of institutional assistance in reducing barriers. Personal health and environmental beliefs had moderate influence, showing that while farmers recognise the benefits of organic farming, practical and financial factors weigh more heavily. Peer influence and availability of labour were the least influential factors, suggesting that social encouragement and labour capacity play smaller roles in determining adoption. Overall, the results highlight that adoption of organic farming is driven mainly by access to knowledge, input affordability, market incentives, and institutional support.

Constraints to Farmers' Involvement in Organic Agriculture

Table 5 summarises the major constraints limiting arable farmers' engagement in organic farming. The most frequently reported challenge is the limited availability of organic inputs (71.7%), followed closely by lack of technical knowledge (68.3%). These constraints reflect a well-documented pattern in Nigeria and other parts of sub-Saharan Africa, where farmers face shortages of quality organic inputs such as compost, manure, and botanical pesticides, alongside inadequate access to training and advisory services necessary for adopting organic methods [6,7]. Low market access for organic produce (65.0%) also appears as a major barrier. This aligns with FAO and FiBL reports indicating that organic value chains in most African countries remain underdeveloped, with limited certification systems, poor consumer awareness, and weak price incentives for farmers [3,4]. As a result, farmers may not perceive organic production as economically rewarding.

Table 4: Factors Influencing Adoption of Organic Farming

Factor	Response Frequency {and Percentage (%)}					Mean (\bar{x})	S.D
	VI	I	N	LI	NI		
Access to information and training	58	38	14	7	3	4.32	0.88

	(48.3)	(31.7)	(11.7)	(5.6)	(2.5)		
Cost of organic inputs	48 (40.0)	38 (31.7)	16 (13.3)	12 (10.0)	6 (5.0)	4.05	0.95
Market demand for organic produce	45 (37.5)	38 (31.7)	20 (16.7)	12 (10.0)	5 (4.1)	4.01	0.90
Government/NGO Support	40 (33.3)	40 (33.3)	22 (18.3)	12 (10.0)	6 (5.0)	3.92	0.99
Personal beliefs about health/environment	32 (26.7)	36 (30.0)	24 (20.0)	10 (8.3)	18 (15.0)	3.70	1.05
Influence of other farmers	28 (23.3)	34 (28.3)	26 (21.7)	18 (15.0)	14 (11.7)	3.50	1.10
Availability of labour	20 (16.7)	30 (25.0)	32 (26.7)	22 (18.3)	16 (13.3)	3.20	1.08
Grand Mean(±SD)	39 (32.5)	36 (30.0)	22 (18.3)	13 (10.8)	10 (8.4)	3.81	0.99

Source: Field survey, 2025. (Scale: VI- Very Important; I- Important; N- Neutral; LI- Less Important; NI- Not Important)

Lack of capital or credit facilities (58.3%) further constrains adoption, consistent with evidence showing that smallholders in Nigeria often struggle to access financial services needed to invest in improved or alternative production practices [8]. High labour requirements (55.0%) and difficulties managing pests and diseases without synthetic chemicals (48.3%) were also reported, echoing findings that organic farming is labour-intensive and relies on knowledge-based pest management systems that many farmers are not yet equipped to implement effectively [7]. Open-ended responses highlight additional concerns such as poor market access, need for training, and lack of credit, further reinforcing the structural challenges captured in the quantitative results.

Table 5: Constraints to Organic Farming of Arable Crops in the Study Area

Constraint	Frequency	Percentage (%)
Limited availability of organic inputs	86	71.7
Lack of technical knowledge	82	68.3
Low market access for organic produce	78	65.0
Lack of capital / credit facilities	70	58.3
High labour requirements	66	55.0
Pests and disease control difficulties	58	48.3
Other (open-ended responses)	18	15.0

Source: Field survey, 2025 *Open-ended responses: "Market access & water," "Need for training," "Credit for inputs."*

Relationship between Farmers' Awareness of Organic Farming and their Involvement in Organic Farming Practices in Ondo State.

The relationship between the farmers' awareness and their level of involvement was determined via Pearson's Product Moment Correlation, as shown in Table 6 below. The coefficient of the correlation between these two variables is 0.612 which indicates a strong positive relationship between them. This relationship is significant at $p < 0.05$. This results into a decision that the level of involvement of the farmers in organic farming would

definitely increase if awareness increases. This is in line with Padel (2001) that, “farmers with higher awareness and understanding of organic agriculture are more likely to remain involved in organic production system.”

Table 6: Pearson Correlation Between Farmers’ Awareness and Involvement in Organic Farming

Variable Pair	r-Value		
	Awareness	Involvement	p-value
Awareness	1.000	0.612	0.001
Involvement	0.612	1.000	0.001

Source: Field survey, 2025

E. Significance of the Factors Influencing the Involvement of Arable Crop Farmers in Organic Farming in Ondo State.

One-sample t-test was carried out to examine whether the stated factors influencing the involvement of arable crop farmers are significant. The results from this test, as shown in Table 7 below, indicate that all the examined factors were statistically significant ($p < 0.05$). This finding shows that the involvement of farmers in organic farming is shaped by multidimensional factors.

Table 7: One-Sample t-Test on Factors Influencing Involvement Arable Crop Farmers in Organic Farming in Ondo State.

Factor	Mean	SD	t-value	p-value	Decision
Access to information	3.78	0.82	9.62	0.001	Significant
Cost of organic inputs	3.56	0.91	6.40	0.027	Significant
Market demand	3.69	0.88	7.23	0.031	Significant
Influence of other farmers	3.42	0.95	5.01	0.002	Significant
Government/NGO support	3.17	0.97	2.11	0.037	Significant
Personal health/environment beliefs	3.91	0.79	11.54	0.001	Significant
Availability of labour	3.33	0.86	4.43	0.020	Significant

Source: Field survey, 2025 Against test mean = 3.00 (neutral point)

F. Discussion of Findings

This study reveals a consistent pattern in which arable crop farmers demonstrate favourable perceptions of organic farming but exhibit low to moderate levels of actual involvement, particularly in technically demanding practices. The gap between perception and practice has been widely documented in empirical studies on organic and agroecological farming systems in developing countries [16–18]. The fact that farmers strongly agree on the benefits of organic farming for soil fertility, environmental protection, and reduced health risks aligns

with scientific evidence that organic systems improve soil organic matter, enhance biodiversity, and reduce farmers' exposure to hazardous agrochemicals [19,20]. Similar studies report that smallholder farmers often recognise these environmental and health benefits, even when adoption remains limited [17]. This suggests that awareness of organic farming benefits is not the primary constraint to involvement. Despite positive perceptions, farmers' participation was largely confined to traditional practices such as intercropping, crop rotation, and composting. These practices are widely recognised as low-cost, low-risk agroecological techniques that are compatible with existing smallholder farming systems [18,21]. In contrast, very low involvement in practices such as biofertilizer use, soil testing, cover cropping, drip irrigation, and no-till farming reflects structural and technical barriers. Previous studies demonstrate that such practices require higher levels of technical knowledge, reliable access to inputs, and institutional support, which are often lacking among smallholder farmers in sub-Saharan Africa [16,22].

Access to information and training emerged as the most influential factor shaping farmers' involvement in organic farming. This finding is consistent with recent empirical evidence showing that extension contact and technical training significantly increase the likelihood of adopting organic and sustainable agricultural practices [17,23]. Economic factors, including the cost of organic inputs and uncertainty about market demand, were also significant determinants. Studies have shown that when price premiums and reliable markets are absent, farmers are reluctant to invest additional labour and resources in organic production systems [19,24]. Limited availability of organic inputs, inadequate technical knowledge, weak market access, and limited credit also mirror constraints reported in comparable studies across Africa and Asia [18,22]. The significant positive relationship between awareness and involvement confirms that awareness is a necessary condition for adoption. However, consistent with behavioural and innovation adoption studies, awareness alone is insufficient without supportive institutional, economic, and market structures [16,23]. Overall, the findings reinforce the view that scaling organic agriculture among smallholders requires integrated interventions that combine knowledge dissemination, input accessibility, financial support, and market development

IV. CONCLUSION

To conclude, arable crop farmers in Ondo State hold generally positive perceptions of organic farming, recognising its benefits for soil fertility, environmental health, and long-term sustainability. However, their actual involvement in organic practices remains low to moderate, with higher participation observed only in traditional, low-input methods such as inter-cropping, crop rotation, and composting. Adoption of more specialised organic techniques is limited by constraints including scarce organic inputs, inadequate technical knowledge, weak market structures, limited access to credit, and high labour requirements. Overall, enhancing technical capacity, resource access, and economic incentives will be crucial in expanding organic agriculture among arable farmers in the state. The following recommendations are therefore made:

- (a). Extension training should provide practical, continuous training on key organic practices to address farmers' technical knowledge gaps.
- (b). Availability of Organic Inputs should be improved by supporting the local production and distribution of compost, manure, bio-fertilizers, and botanical pesticides to reduce input scarcity.

- (c). Organic Markets should be encouraged to create better market linkages and awareness to improve profitability, including support for local certification and premium-price aggregation systems.
- (d). The Government should expand farmer-friendly credit schemes through cooperatives and microfinance institutions to enable investment in organic inputs and labour.

The present research adds to the existing knowledge about organic agriculture and presents a very recent case concerning organic arable crop farmers' participation in Ondo State, Nigeria, an area not widely studied before. It further proves the point made in the literature that there is a visible gap between farmers' good opinion of organic agriculture and their low to moderate participation, especially in the advanced practices. The paper is not restricted to a binary adoption study in which it simply shows farmers are extensively engaged in traditional and low-cost methods like intercropping, crop rotation, and composting while having very limited engagement in the cutting-edge methods such as soil testing, biofertilizer use, drip irrigation, and no-till farming. Also, it quantitatively substantiates a considerable positive relationship between being informed and the adoption of organic practices, thus proving that being informed is a necessary but not sufficient condition for adoption. The integration of the Diffusion of Innovations Theory and the Theory of Planned Behaviour leads to a very strong theoretical explanation of how knowledge access, economic considerations, and institutional support together influence organic farming involvement, thus offering evidence-based insights for policy and extension interventions.

FUNDING

This study is part of extensive research and the researchers sincerely appreciate the Tertiary Education Trust Fund (TETFund), Nigeria, for its invaluable support in funding this research. The provision of financial assistance through the TETFund Institutional-Based Research (IBR) grant made it possible to undertake this study on the organic farming practices among arable crop farmers in Ondo State.

REFERENCES

1. Codex Alimentarius Commission. Guidelines for the Production, Processing, Labelling and Marketing of Organically Produced Foods. Rome: FAO/WHO; 2021.
2. IFOAM – Organics International. The IFOAM Norms for Organic Production and Processing. Bonn: IFOAM; 2022.
3. Food and Agriculture Organization (FAO). The State of Food and Agriculture 2022: Leveraging Agricultural Innovation. Rome: FAO; 2022.
4. Willer H, Trávníček J, Meier C, Schlatter B. The World of Organic Agriculture: Statistics and Emerging Trends 2023. FiBL & IFOAM–Organics International; 2023.
5. UNEP. Organic Agriculture in Africa: Approaches and Challenges. Nairobi: United Nations Environment Programme; 2021.
6. Olabode AD, Ogunyemi IO. Adoption of Organic Fertilizer Among Vegetable Farmers in South-West Nigeria. *Int J Agric Ext Rural Dev.* 2022;9(2):45–53.
7. Tijani AA, Omonona BT. Determinants of Farmers' Willingness to Adopt Sustainable Agricultural Practices in Oyo State, Nigeria. *Heliyon.* 2021;7(6):e07399.
8. Adewuyi SA, Adefalu LL. Awareness and Willingness to Adopt Organic Farming Practices among Farmers in Kwara State, Nigeria. *J Agric Ext.* 2022;26(4):80–92.
9. Yusuf SA, Balogun OL. Factors Influencing Adoption of Sustainable Crop Production Practices in Southwestern Nigeria. *Agric Trop Subtrop.* 2020;53(3):133–141.
10. Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.
11. Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211

12. Food and Agriculture Organization (FAO). Gender and Agriculture in Nigeria: Country Gender Assessment. Rome: FAO; 2021. Available from: <https://www.fao.org>
13. Food and Agriculture Organization (FAO). Nigeria: Country Programming Framework 2022–2026. Rome: FAO; 2022.
14. Ogunniyi LT, Oladejo JA. Rural farmers' cooperative membership and its contribution to livelihood improvement in Nigeria. *J Dev Agric Econ*. 2021;13(2):85–94. doi:10.5897/JDAE2020.1245
15. Padel, S. (2001). Conversion to organic farming: A typical example of the diffusion of an innovation? *Sociologia Ruralis*, 41(1), 40–61. Meemken EM, Qaim M. Organic agriculture, food security, and the environment. *Annu Rev Resour Econ*. 2018;10:39–63. doi:10.1146/annurev-resource-100517-023252
16. Ntshangase NL, Muroyiwa B, Sibanda M. Farmers' perceptions and factors influencing adoption of conservation agriculture by smallholder farmers in South Africa. *Agric Syst*. 2018;161:20–29. doi:10.1016/j.agsy.2018.01.002
17. Van Asten PJA, Wairegi LWI, Mukasa D, Uringi NO. Agronomic and economic benefits of organic farming systems for smallholders in sub-Saharan Africa. *Agroecol Sustain Food Syst*. 2021;45(7):1017–1036. doi:10.1080/21683565.2020.1868575
18. Reganold JP, Wachter JM. Organic agriculture in the twenty-first century. *Nat Plants*. 2016;2:15221. doi:10.1038/nplants.2015.221
19. Gomiero T. Food quality assessment in organic vs. conventional agricultural produce: findings and issues. *Appl Soil Ecol*. 2018;123:714–728. doi:10.1016/j.apsoil.2017.10.014
20. Altieri MA, Nicholls CI. The adaptation and mitigation potential of traditional agriculture in a changing climate. *Clim Change*. 2017;140:33–45. doi:10.1007/s10584-013-0909-y
21. Panneerselvam P, Halberg N, Vaarst M, Hermansen JE. Adoption of organic farming in developing countries: a review. *Agron Sustain Dev*. 2012;32:311–330. doi:10.1007/s13593-011-0065-1
22. Dessart FJ, Barreiro-Hurle J, van Bavel R. Behavioural factors affecting the adoption of sustainable farming practices. *J Agric Econ*. 2019;70(3): 640–660. doi:10.1111/1477-9552.12312
23. Kleemann L, Abdulai A, Buss M. Certification and access to export markets: adoption and return on investment of organic-certified pineapple farming in Ghana. *World Dev*. 2014;64:79–92. doi:10.1016/j.worlddev.2014.05.005