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AGRICULTURAL INFORMATION ACCESS, KNOWLEDGE AND INVOLVEMENT IN SUSTAINABLE FARMING PRACTICES AMONG LIFE-ND WOMEN ARABLE-CROP FARMERS IN ONDO STATE, NIGERIA

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Abstract
This study examined agricultural information access, knowledge and involvement in sustainable farming practices among LIFE-ND women arable-crop farmers in Ondo State, Nigeria. A cross-sectional survey design and multistage sampling procedure were used to select 128 respondents from Owo, Okitipupa and Akure North Local Government Areas. Data were collected using a structured questionnaire and analysed with frequencies, percentages, means, standard deviations and regression. The findings showed that WhatsApp and extension agents were the most prominent information sources, each reported by 99.2% of the respondents. Seminars, fellow farmers, telephone calls, local leaders and workshops were also highly accessible. Respondents demonstrated strong knowledge of familiar practices such as improved cassava varieties, manure application, intercropping and agroforestry but had limited knowledge of precision farming, minimum tillage and crop diversity. The total involvement was low (grand mean = 2.85), with only intercropping (mean = 3.15) and manure application (mean = 3.12) recording high involvement. Knowledge had a moderate negative and significant relationship with involvement (R=-0.439), (R^2=0.193), (p<0.001)), indicating a knowledge–practice gap. Major constraints included high labour costs, insufficient funds, expensive inputs and unstable market prices. The study recommends combining gender-responsive extension and digital communication with practical demonstrations, affordable credit, subsidised inputs and labour-saving technologies.

Keywords: *Agricultural information, Knowledge, Sustainable farming, Women farmers, LIFE-ND, Ondo State*

Introduction

Agriculture is central to Nigeria's food security, employment and rural livelihoods, but it is increasingly threatened by soil degradation, declining fertility, climate variability and rising production costs. These challenges necessitate sustainable farming practices such as crop rotation, intercropping, manure application, minimum tillage, agroforestry, cover cropping, improved varieties and integrated pest management.

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Although these practices can enhance productivity and resilience while conserving natural resources, their adoption remains uneven because of differences in land ownership, education, finance and institutional support (Oyetunde-Usman *et al*., 2021; Adesida *et al*., 2021). Women contribute substantially to arable-crop production, processing and marketing in Nigeria. However, they often have limited access to land, credit, inputs, extension services, training and agricultural decision-making structures. Oyawole *et al*. (2020) found that women's empowerment significantly influenced the adoption of climate-smart agricultural practices in Nigeria. Women's involvement in sustainable agriculture must therefore be examined in relation to their access to information, knowledge, productive resources and institutional support.

Agricultural information is vital because sustainable farming is knowledge-intensive. Farmers require timely and understandable information on improved varieties, soil management, pest control, weather, conservation practices, inputs and markets. In Ondo State, arable-crop farmers obtained information from extension agents, mobile phones, radio, friends and neighbours (Olaniyi and Ogunkunle, 2018). The growth of information and communication technologies has further expanded access through mobile phones, WhatsApp, Facebook and other media. However, poor network coverage, high data costs, inadequate digital skills and limited extension support may restrict their effective use. Gbadebo (2020) identified poor ICT infrastructure and difficulty in operating digital devices as constraints among women farmers, while Ale *et al*. (2024) reported a gap between awareness and effective use of mobile applications among arable-crop farmers in Ondo State.

Access to information may improve knowledge, but knowledge does not necessarily result in involvement. Women may understand sustainable practices but be unable to apply them because of inadequate finance, labour, inputs, secure land rights or decision-making authority. Agricultural programmes, land ownership and institutional support influence the adoption of sustainable practices in Nigeria (Adesida *et al*., 2021), while inadequate information, weak extension services, limited credit and labour constraints also restrict women farmers' responses to production challenges (Agumagu *et al*., 2014). Examining information access, knowledge and involvement together can reveal where the progression from exposure to practical application is interrupted.

The Livelihood Improvement Family Enterprises Project in the Niger Delta (LIFE-ND) seeks to improve food security, income and employment opportunities among rural women and youths through enterprise development, training and institutional support. The programme operates in the Niger Delta states, including Ondo State (IFAD, 2018). Nevertheless, limited evidence exists on whether participating women farmers can access relevant agricultural information, understand sustainable practices and apply such knowledge effectively. This study therefore examined agricultural information access, knowledge and involvement in sustainable farming practices among LIFE-ND women arable-crop farmers in Ondo State, Nigeria. The findings will support gender-responsive extension strategies, effective communication

channels and improved LIFE-ND training interventions.

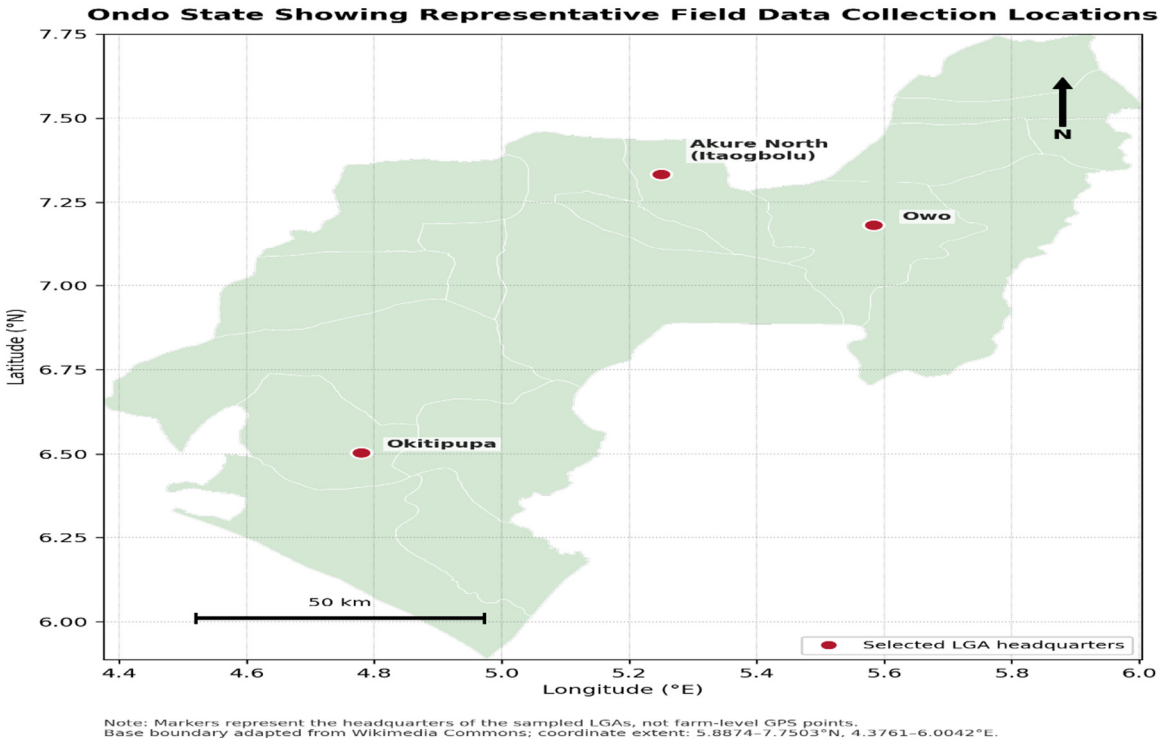
Sustainable agricultural practices can address declining soil fertility, land degradation, climate variability and unstable crop productivity in Nigeria. However, their application depends on farmers' access to relevant information and productive resources. Despite women's substantial contribution to arable-crop production, they often have limited access to extension services, training, land, credit, inputs and modern technologies. These constraints can limit their ability to acquire and apply knowledge of sustainable farming practices (Agumagu *et al*., 2014; Adesida *et al*., 2021).

The LIFE-ND programme provides rural women and youths with agricultural training, mentoring and enterprise support to improve their incomes and food security (IFAD, 2018). Nevertheless, exposure to information does not necessarily produce adequate knowledge or sustained involvement. Information may be irregular, technically complex or disseminated through inaccessible channels. Although farmers in Ondo State obtain agricultural information through extension agents, mobile phones, radio and interpersonal networks, poor ICT infrastructure and inadequate digital skills may limit its effective use (Olaniyi and Ogunkunle, 2018; Gbadebo, 2020). Previous Nigerian studies have examined agricultural information, ICT use, women's empowerment and sustainable-practice adoption largely as separate issues (Oyawole *et al*., 2020; Oyetunde-Usman *et al*., 2021). Consequently, limited evidence exists on the relationship among information access, knowledge and actual involvement among LIFE-ND women farmers. This study therefore examined agricultural information access, knowledge and involvement in sustainable farming practices among LIFE-ND women arable-crop farmers in Ondo State, Nigeria

Study Area

The study was conducted in Ondo State, southwestern Nigeria. The state lies approximately between latitudes 5.8874° and 7.7503° N and longitudes 4.3761° and 6.0042° E, with a geographical centre around 7.167° N and 5.083° E. It is bordered by Ekiti and Kogi States to the north, Edo and Delta States to the east, Ogun State to the southwest, Osun State to the northwest, and the Atlantic Ocean to the south. Ondo State covers approximately 15,500 km², comprises 18 Local Government Areas and has Akure as its capital. The study specifically covered Akure North, Owo and Okitipupa LGAs.

The major land-use and land-cover categories in Ondo State include tropical rainforest, secondary forest, forest reserves, cultivated farmland, tree-crop plantations, fallow land, built-up areas, freshwater swamp, mangrove vegetation, wetlands, rivers and coastal water bodies. Forest and agricultural land dominate much of the central and northern parts of the state, while mangroves, freshwater swamps and coastal wetlands are prominent in the south. The map of Ondo State showing the study area is presented in Figure 1 below:



Note: Markers represent the headquarters of the sampled LGAs, not farm-level GPS points.
Base boundary adapted from Wikimedia Commons; coordinate extent: 5.8874–7.7503°N, 4.3761–6.0042°E.

Methodology

The study was conducted in Ondo State, southwestern Nigeria, using a cross-sectional survey design. The population comprised registered LIFE-ND women arable-crop farmers. Through multistage sampling, Owo, Okitipupa and Akure North LGAs were purposively selected because of their concentration of women arable-crop farmers, after which 128 women farmers were randomly selected from LIFE-ND registers. Data were collected using a validated structured questionnaire and interview schedule covering socioeconomic characteristics, agricultural information access, knowledge, involvement and constraints. Information sources included extension agents, television, radio, telephone, social media, newspapers, workshops, seminars, cooperatives and interpersonal networks. The instrument was validated by agricultural extension specialists, while Cronbach's alpha of at least 0.70 was accepted as evidence of reliability. Participation was voluntary, and responses were treated confidentially.

Information access was measured by identifying sources used and rating their accessibility as highly accessible (4), accessible (3), sometimes accessible (2) or not accessible (1). A mean of 2.50 was the decision point. Knowledge was assessed using four-point-scale statements on crop rotation, intercropping, improved varieties, precision farming, minimum tillage, crop diversity, integrated pest management, agroforestry, cover cropping and manure application. Negative statements were reverse-coded, and respondents were classified as having high or low knowledge relative to the overall mean. Involvement in the same practices was rated on a five-point scale, with a mean of 3.00 indicating high involvement. Composite scores were also used to classify respondents into high- and low-involvement categories.

Data Analysis

Data were analysed using frequencies, percentages, means, standard deviations and rankings. Pearson correlation examined the relationships among information access, knowledge and involvement, while simple linear regression determined whether knowledge significantly predicted involvement. The model was specified as:

$$\mathbf{Y_i = \beta_0 + \beta_1 K_i + \varepsilon_i}$$

where Y_i represents the involvement score of the ith respondent; β_0 is the regression constant; β_1 is the regression coefficient; K_i is the knowledge score of the ith respondent; and ε_i is the stochastic error term.

To determine the joint contributions of agricultural information access and knowledge to involvement in sustainable farming practices, a multiple linear regression model was specified as:

$$\mathbf{Y_i = \beta_0 + \beta_1 A_i + \beta_2 K_i + \varepsilon_i}$$

where Y_i is the involvement score; A_i is the agricultural information-access score; K_i is the knowledge score; β_0 is the intercept; β_1 and β_2 are the regression coefficients; and ε_i is the error term. Statistical decisions were made at the 5% level of significance

Results and Discussion

Sources of and Access to Information on Sustainable Farming Practices

The findings show that the respondents obtained agricultural information mainly through digital, institutional and interpersonal sources (Table 1). WhatsApp and LIFE-ND/ADP extension agents were each reported by 99.2% of the respondents. Other prominent sources were seminars (93.0%), fellow farmers or processors (92.2%), telephone calls or SMS (91.4%), local leaders (84.4%), friends and family members (70.3%) and workshops (64.8%). Conversely, Twitter/X (5.5%), Instagram (7.0%), television (38.3%) and Facebook (39.8%) were the least-used sources. Based on the mean cut-off of 2.50, seminars (x =2.95), fellow farmers (x=2.89), extension agents (x =2.86), local leaders (x =2.58)), WhatsApp and friends or family members (x =2.57) each), telephone calls/SMS (x =2.54) and workshops (x =2.51)) were highly accessible. Television, radio, Facebook, Instagram, Twitter/X, newspapers and cooperatives recorded low accessibility. The results indicate that direct, interactive and relationship-based channels were more accessible than conventional mass media and less familiar social-media platforms.

The prominence of extension agents confirms their importance in explaining technical recommendations and adapting information to local farming conditions. This agrees with Olaniyi and Ogunkunle (2018), who identified extension agents and mobile phones as major agricultural-information sources among arable-crop farmers in Ondo State. The extensive use of fellow farmers, local leaders and family networks also demonstrates the importance of trusted community relationships in agricultural knowledge exchange. WhatsApp, telephone calls and SMS emerged as important telecommunication channels because they permit rapid and relatively inexpensive sharing of production advice, market information and pest alerts. However, the limited use of Facebook, Instagram and Twitter/X suggests that access to social media does not automatically translate into agricultural use. Gbadebo (2020) similarly found that inadequate ICT infrastructure and difficulty in using digital devices constrained women

farmers' access to agricultural information. Ale *et al*. (2024) also reported that operating costs, technological complexity and insufficient extension support limited arable-crop farmers' effective use of mobile applications in Ondo State.

The low accessibility of radio, television and newspapers may reflect unsuitable programme schedules, limited agricultural content and the absence of immediate feedback. Surprisingly, cooperatives also recorded low accessibility despite being used by 53.1% of respondents, suggesting that many associations may focus more on credit and input mobilisation than agricultural information dissemination. LIFE-ND should therefore strengthen extension contact, seminars and farmer-to-farmer learning while using WhatsApp and telephone services to reinforce verified information on sustainable farming practices.

Table 1: Information sources and accessibility

	Sources		**Accessibility**		
Information source	**Freq, n = 128**	**%**	**Mean**	**Std. Dev**	**Decision**
Television	49	38.3	1.54	1.01	Low
Radio	69	53.9	1.55	0.98	Low
WhatsApp	127	99.2	2.57	0.91	High
Facebook	51	39.8	1.41	0.87	Low
Instagram	9	7.03	1.22	0.64	Low
Twitter/X	7	5.47	1.23	0.69	Low
Extension agents (ADP/LIFE-ND)	127	99.2	2.86	0.96	High
Fellow farmers/processors	118	92.2	2.89	0.73	High
Local leaders/community heads	108	84.4	2.58	0.88	High
Newspapers	68	53.1	1.26	0.76	Low
Workshops	83	64.8	2.51	0.82	High
Seminars	119	93.0	2.95	0.99	High
Telephone calls/SMS	117	91.4	2.54	0.88	High
Friends and family members	90	70.3	2.57	0.92	High
Cooperatives/farmers' associations	68	53.1	1.67	0.32	Low

Multiple responses were permitted; Decision rule: mean ≥ 2.50 = high accessibility

Determine the Knowledge of LIFE-ND Women Arable-Crop Farmers in Sustainable Farming Practices

Results in Table 2 show that respondents had strong knowledge of familiar and observable sustainable farming practices. The highest scores were recorded for identifying TME 419 as an improved cassava variety (x =3.85), recognising manure as an animal-waste fertiliser (x=3.45), and understanding the functions of cover crops (x =3.17), intercropping and agroforestry (x=3.15) each). Knowledge was also high concerning the benefits of improved varieties (x =3.10) and the meaning of crop rotation (x =3.05)). This suggests that LIFE-ND training and farmers' practical experiences improved their understanding of familiar and easily demonstrated practices. Adesida *et al.* (2021) similarly found that participation in agricultural

programmes enhanced farmers' exposure to sustainable innovations. However, respondents had limited knowledge of the ecological benefits of crop rotation (x=2.36)), avoidance of successive planting of crops from the same family (x=1.96)), precision farming (x =2.33), crop diversity (x=2.15)) and minimum tillage (x =2.08)). Thus, the farmers could identify some practices without fully understanding their principles and benefits. Oyetunde-Usman *et al.* (2021) noted that insufficient technical knowledge can limit farmers' ability to combine and apply sustainable practices effectively.

The low scores for negatively worded statements should not be interpreted as inadequate knowledge. Respondents correctly rejected the claims that intercropping necessarily reduces yield (x =1.74), IPM involves repeated use of the same pesticide (x =2.09)), agroforestry does not support food security (x=1.99)), and cover crops reduce soil water-holding capacity (x =2.13). These items should therefore be reverse-coded when calculating the composite knowledge score. Knowledge of intercropping, manure and agroforestry may reflect their long-standing use in indigenous farming systems, consistent with Oyawole *et al.* (2020). Conversely, limited knowledge of precision farming reflects its dependence on digital tools, capital and technical support. This agrees with Ale *et al.* (2024) and Gbadebo (2020), who identified technological complexity, operating costs and weak ICT infrastructure as barriers to digital agricultural information. LIFE-ND should therefore strengthen practical demonstrations, farmer field schools, local-language materials and continuous extension support, particularly for precision farming, minimum tillage, crop diversity and integrated pest management.

Table 2: Determine the Knowledge of LIFE-ND Women Arable-Crop Farmers about Sustainable Farming Practices

Sustainable practice/knowledge statement	Mean	Std. Dev	Assessment
Crop rotation			
Growing different crops on the same land across successive seasons constitutes crop rotation	3.05	1.04	High knowledge
Crop rotation improves soil fertility and helps to control soil erosion	2.36	0.95	Low knowledge
Intercropping			
Intercropping increases labour requirements and generally reduces crop yields	1.74	0.79	Correctly rejected
Intercropping involves growing two or more crops in close proximity	3.15	1.01	High knowledge
Improved crop varieties			
Benefits of improved varieties include higher yields and resistance to diseases	3.1i	0.96	High knowledge
TME 419 is an example of an improved cassava variety	3.85	0.31	High knowledge
Precision farming			
Precision farming may increase inputs, labour requirements and production costs	2.08	0.84	Correctly rejected

Precision farming can improve productivity and reduce environmental risks	2.33	1.16	Low knowledge
Minimum tillage			
Minimum tillage involves limited soil disturbance outside the planting area	2.08	0.94	Low knowledge
Minimum tillage always requires herbicides for weed control	2.21	0.84	Correctly rejected
Increased crop diversity			
Crop diversity helps to control weeds and crop-specific pests	2.15	0.88	Low knowledge
Crops belonging to the same family should not be cultivated in regular succession	1.96	0.87	Low knowledge
Integrated pest management			
IPM involves applying the same pesticides at the same time every year	2.09	0.8	Correctly rejected
Applying a pre-emergence herbicide is an example of cultural pest control	2.02	0.1	Correctly rejected
Agroforestry			
Agroforestry involves integrating trees with crops on the same land	3.15	0.99	High knowledge
Trees compete with crops; therefore, agroforestry does not contribute to food security	1.99	0.91	Correctly rejected
Cover cropping			
Cover crops can suppress weeds and soil-borne pests	3.17	0.93	High knowledge
Cover crops reduce the water-holding capacity of the soil	2.13	0.96	Correctly rejected
Manure application			
Animal manure is not a cost-effective source of nutrients for crops	2.08	0.9	Correctly rejected
Manure is a natural fertiliser obtained from animal waste	3.45	1.06	High knowledge

Decision rule for positively worded statements: mean ≥ 3.00 = high knowledge

Determine the Level of Involvement of LIFE-ND Women Arable-Crop Farmers in Sustainable Farming Practices

Table 3 shows that respondents' overall involvement in sustainable farming practices was low, with a grand mean of 2.85. Only intercropping (x=3.15) and manure application (x=3.12) met the 3.00 cut-off. Crop rotation (x=2.96), improved varieties and crop diversity (x=2.90) each), and integrated pest management (x=2.89)) were practised moderately but inconsistently. Agroforestry (x=2.48), minimum tillage (x =2.59)), precision farming (x =2.77)) and cover cropping (x =2.78)) recorded the lowest involvement. The high involvement in intercropping and manure application may be attributed to their familiarity, low cost and compatibility with women-managed smallholder farms. Intercropping promotes efficient land use and reduces production risks, while manure is often locally available and improves soil fertility. This agrees with Oyetunde-Usman *et al.* (2021), who found

that Nigerian smallholders' adoption of sustainable practices was shaped by farm resources and household circumstances. Oyawole *et al.* (2020) also reported women's involvement in green and organic manure practices in Nigeria.

The comparatively low involvement in crop rotation, improved varieties and IPM may reflect limited land, high input costs and inadequate technical support. Precision farming also requires digital tools, capital and specialised skills that may be inaccessible to resource-constrained women. This supports Ale *et al.* (2024) and Gbadebo (2020), who identified technological complexity, operating costs and poor ICT infrastructure as barriers to farmers' use of digital agricultural technologies. Agroforestry was the least-practised method, possibly because it requires long-term land control and produces delayed benefits. Adesida *et al.* (2021) found that land ownership significantly influenced the adoption of sustainable practices in Nigeria. The findings further reveal a knowledge–practice gap: respondents understood practices such as agroforestry, cover cropping and improved varieties but applied them inconsistently. Thus, knowledge alone is insufficient; women farmers also require secure land, affordable inputs, credit, labour, demonstrations and continuous extension support.

Table 3: Determine the Level of Involvement of LIFE-ND Women Arable-Crop Farmers in Sustainable Farming Practices

Sustainable farming practice	**Mean**	**Standard deviation**	**Rank**	**Level of involvement**
Intercropping	3.15	1.07	1st	High
Manure application	3.12	1.21	2nd	High
Crop rotation	2.96	1.13	3rd	Low
Improved crop varieties	2.9	1.08	4th	Low
Increased crop diversity	2.9	1.19	4th	Low
Integrated pest management	2.89	1.31	6th	Low
Cover cropping	2.78	1.02	7th	Low
Precision farming	2.77	1.05	8th	Low
Minimum tillage	2.59	0.99	9th	Low
Agroforestry	2.48	1.18	10th	Low
Grand mean	**2.85**			**Low**

Decision rule for high involvement: mean ≥ 3.00

Relationship between Knowledge and Involvement in Sustainable Farming Practices

Table 4 shows that knowledge had a moderate negative and significant relationship with involvement in sustainable farming practices ((R=-0.439), (R^2=0.193), (B=-0.225), (t=-5.488), (F=30.12), (p<0.001)). Knowledge explained 19.3% of the variation in involvement; therefore, the null hypothesis was rejected. The negative relationship indicates a knowledge–practice gap rather than a harmful effect of knowledge. Respondents demonstrated knowledge of agroforestry, cover cropping and improved varieties but applied them inconsistently. This suggests that knowledge alone could not overcome limitations relating to finance, labour,

inputs, land tenure, extension support and decision-making authority.

This finding agrees with Adesida *et al.* (2021), Oyawole *et al.* (2020) and Oyetunde-Usman *et al.* (2021), who found that land ownership, women's empowerment and household and institutional conditions influenced the adoption of sustainable practices in Nigeria. Similarly, Ale *et al.* (2024) reported that awareness of agricultural applications did not guarantee their use because of cost, technological complexity and inadequate extension support. The negative relationship should, however, be interpreted cautiously. If negatively worded knowledge items were not reverse-coded, the composite score and direction of the relationship may be distorted. LIFE-ND should therefore verify the coding and complement information delivery with demonstration plots, credit, subsidised inputs, labour-saving technologies and continuous extension support.

Table 4: Regression Analysis of the Relationship between Knowledge and Involvement in Sustainable Farming Practices

Variable	Unstandardised coefficient (B)	Std. Error	Std. Coeff (Beta)	t-value	p-value	Decision
Constant	30.357	3.09	—	9.824	0.001	Significant
Knowledge of sustaina	−0.225	0.041	−0.439	−5.488	0.001	Significant

Dependent variable: involvement in sustainable farming practices.
Significant at $p < 0.05$; $R = 0.439$; $R^2 = 0.193$; Adjusted $R^2 = 0.187$.

Constraints to Involvement in Sustainable Farming Practices

Table 5 shows that high labour cost was the most serious constraint to women farmers' involvement in sustainable practices ($\bar{x}=3.10$). This was followed by insufficient funds ($\bar{x}=2.89$), high input costs ($\bar{x}=2.72$) and market-price fluctuations ($\bar{x}=2.70$). Insecurity, theft and poor government policy were also considered serious constraints. Although extension contact and technical knowledge fell marginally below the cut-off, their mean scores demonstrate that inadequate information and institutional support remained relevant challenges. The findings show that women farmers' involvement was constrained primarily by financial and production-related difficulties rather than an absolute lack of interest. Sustainable practices may require labour, improved planting materials, pest-management inputs and other investments that resource-constrained women cannot readily afford. This supports Adesida *et al.* (2021), who found that access to agricultural programmes, productive resources and land influenced the adoption of sustainable practices in Nigeria.

Low extension contact and inadequate technical knowledge may also explain the weak involvement recorded for precision farming, minimum tillage and integrated pest management. Agumagu *et al*. (2014) similarly identified inadequate information, poor extension support, limited credit, and land and labour problems as constraints affecting women arable-crop farmers in Nigeria. LIFE-ND should therefore combine information and training with affordable credit, subsidised inputs, practical demonstrations and more regular extension contact.

Table 5: Constraints to Involvement in Sustainable Farming Practices

Constraint	Mean	Std Dev.	Rank	Decision
High cost of labour	3.1	1.34	1st	Serious
Insufficient funds	2.89	1.13	2nd	Serious
High cost of inputs	2.72	0.99	3rd	Serious
Fluctuation in market prices	2.7	0.94	4th	Serious
Insecurity	2.53	1.08	5th	Serious
Theft	2.53	0.98	5th	Serious
Poor government policy	2.5	1.03	7th	Serious
Bad road network	2.48	1.13	8th	Less serious
Low contact with extension agents	2.48	1.06	8th	Less serious
Unpredictable climate conditions	2.48	1.09	8th	Less serious
Lack of storage facilities	2.43	0.97	11th	Less serious
Bureaucracy in accessing loans	2.41	1.02	12th	Less serious
Inaccessibility of farm inputs	2.34	1.03	13th	Less serious
Inadequate labour	2.33	0.89	14th	Less serious
Inadequate technical knowledge	2.32	0.98	15th	Less serious
Lack of functional markets	2.23	1.01	16th	Less serious

Decision rule: mean ≥ 2.50 = serious constraint

Conclusion and Recommendations

The study concludes that LIFE-ND women arable-crop farmers accessed sustainable agricultural information mainly through WhatsApp, extension agents, seminars, fellow farmers, telephone services, local leaders and family networks. These interactive and relationship-based channels were more accessible than conventional mass media and less frequently used social-media platforms. Although the women possessed considerable knowledge of familiar practices such as intercropping, manure application, improved cassava varieties, cover cropping and agroforestry, their understanding of more technical practices, including precision farming, minimum tillage, crop diversity and integrated pest management, remained limited. Despite their exposure to information and knowledge of some sustainable practices, the respondents' overall involvement was low. Intercropping and manure application were the only practices with high involvement, while agroforestry, minimum tillage, precision farming and cover cropping were used inconsistently. The significant inverse relationship between knowledge and involvement further revealed a knowledge–practice gap, indicating that knowledge alone was insufficient to stimulate sustained application. High labour costs, inadequate funds, expensive farm inputs, unstable market prices, insecurity and weak institutional support constrained the women's ability to translate their knowledge into practice. Therefore, improving women farmers' involvement in sustainable agriculture requires the integration of effective information delivery with practical training, financial support, productive resources and sustained institutional assistance

Recommendations

Based on the findings of the study, the following recommendations are made:

1. The LIFE-ND programme and Ondo State Agricultural Development Programme should strengthen gender-responsive extension services through regular farm visits, demonstration plots, farmer field schools, seminars and practical workshops. Particular attention should be given to precision farming, minimum tillage, crop diversity, integrated pest management, agroforestry and cover cropping.
2. Extension organisations should integrate interpersonal and digital communication channels by combining extension-agent contact, farmer-to-farmer learning, local leaders, WhatsApp groups, telephone calls and text messages. Information shared through these channels should be timely, technically accurate and presented in simple language that women farmers can understand and apply.
3. LIFE-ND and relevant financial institutions should facilitate women farmers' access to affordable credit, grants and flexible agricultural financing. Loan procedures should be simplified, while repayment schedules should reflect the production and marketing cycles of arable crops.
4. Government agencies and agricultural development partners should provide subsidised improved planting materials, organic soil amendments, pest-management inputs and appropriate labour-saving technologies. This intervention would reduce the financial and labour constraints limiting the application of sustainable farming practices.
5. Women farmers should be organised into functional cooperatives and learning groups to facilitate bulk input purchases, access to credit, shared use of equipment, collective marketing and exchange of practical agricultural knowledge.

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