Jher Vol. 33 No. 1 September 2026, pp. 20 – 31

Issues in Adoption of Organic Farming Operations by Crop Farmers in Abia State, Nigeria

[1]Asogwa, Vincent C., [2]Ali, Christian C., & [3]Isiwu, Edward C.
[1]Department of Agricultural Education and Extension,
University of Eswatini, Luyengo, Eswatini.
[2]Department of Agricultural Education, University of Nigeria, Nsukka.
[3]Department of Agricultural and Home Science Education,
Michael Okpara University of Agriculture, Umudike.
Corresponding Author: *christian.ali@unn.edu.ng*

Abstract

The study investigated issues in adoption of organic farming operations by crop farmers in Abia State, Nigeria. Specifically, the study determined organic farming operations common among crop farmers in the State; extent of adoption of these operations; and constraints to their adoption. A descriptive survey research design was employed. Population comprised crop farmers across the three agro-ecological zones of Abia State. A multistage sampling procedure was used to select a sample of 240 crop farmers. A 37-item structured questionnaire was used for data collection. Data were analysed using mean, standard deviation and independent sample t-test at 0.05 level of significance. Findings reveal 12 organic farming operations common among crop farmers the most common being mulching ($\overline{X}_g$ = 3.89), crop rotation ($\overline{X}_g$ = 3.78) and intercropping ($\overline{X}_g$ = 3.74). The extent of adoption of the operations was moderate overall minimal or zero tillage ($\overline{X}_g$ = 3.77) and mowing and cutting of weeds mechanically ($\overline{X}_g$ = 3.73) were, however, adopted to a high extent. Eleven constraints to adoption were identified, the most severe being inadequately trained extension specialists ($\overline{X}_g$ = 3.71) and inadequate storage facilities for organic crop products ($\overline{X}_g$ = 3.57). The t-test results showed no significant difference ($p \geq 0.05$) in the mean responses of male and female crop farmers in the three domains investigated; hence, the three null hypotheses were not rejected.

Keywords: Organic Farming, Adoption, Crop Farmers, Sustainable, Environment, Food, Security, Constraints

Introduction

Globally, the intensification of agricultural production through the use of synthetic inputs has contributed substantially to food production gains, yet it has simultaneously generated serious ecological and health consequences. Pesticide residues, soil degradation, water pollution, and greenhouse gas emissions attributable to inorganic farming practices have heightened concerns about the long-term sustainability of conventional agriculture (Ferdous et al., 2021; Mishra et al., 2023). Against this backdrop, organic farming has emerged as an approach that reconciles the imperative of food production with the need for environmental stewardship. According to Singh (2021), organic farming is an agricultural production system that relies on organic techniques such as the use of organic manure, crop rotation, and

appropriate tillage, explicitly excluding synthetic pesticides, growth regulators, livestock feed additives, and synthetic fertilisers. The system is further distinguished by its reliance on crop residues, off-farm organic wastes, green manure, compost, and biological pest control to maintain soil fertility and productivity (United States Department of Agriculture [USDA], 1980).

The case for organic farming rests on a body of evidence indicating multiple co-benefits. The International Federation of Organic Agriculture Movements (IFOAM, 2011) documented that organic systems conserve natural resources, reduce production costs and nitrate leaching, mitigate climate change, and generate more rural employment than conventional farming, while the Food and Agriculture Organization (FAO, 2008) reported that organic agriculture reduces greenhouse gas emissions and enhances the resilience of farming systems to climate change. Dhiman (2020) demonstrated that organic farming is more resilient to adverse weather, particularly drought, compared with conventional systems. The United Nations Environment Programme (UNEP, 2008) further posited that organic farming is more effective at ensuring food security in Africa than production systems relying on synthetic chemicals. Critically, foods produced through organic systems exhibit higher nutritive value, fewer chemical contaminants, and superior market demand (Oni, 2011; Kilcher, 2007). These documented benefits make organic farming a compelling strategy for simultaneously addressing food insecurity and environmental degradation in developing contexts.

The concept of a sustainable environment is central to this discourse. Igbabaka et al. (2015) explained that a resource utilised in a manner that prevents permanent depletion or damage is considered sustainable. Sustainable environment, as elaborated by Asogwa (2022) and Sadekin and Muhibbullah (2020), denotes the maintenance of environmental resources in ways that satisfy present human needs without compromising the capacity of future generations to meet theirs. Gillaspy (2017) defined environmental sustainability as the deliberate engagement with the environment so as to prevent the reduction or degradation of natural resources and to ensure long-term ecological quality. The deterioration of environmental health owing to excessive pesticide use under the green revolution model was identified by Suntanto (2015) as a problem requiring urgent resolution, with organic farming advanced as a critical corrective pathway.

In Abia State, as in much of sub-Saharan Africa, most farmers cultivate crops such as cassava, maize, yam, plantains, pineapples, and cocoyam, predominantly through inorganic methods, with limited awareness of the ecological and health consequences. Although agricultural extension services have been active in disseminating knowledge about organic practices in the state, the utilisation of these operations by crop farmers appears low. To buttress the need for the present study, the researchers carried out two preliminary investigations in Abia State in 2021. The first was a market survey, the purpose of which was to ascertain the organic status of crop produce offered for sale in the state. The survey involved direct observation and

assessment of crop produce displayed at Orie Ugba and Ubani markets in Umuahia and Ndi Oro market in the Ikwuano area of the state. These are among the most prominent farm-produce markets in Abia State, attracting produce traders and buyers from rural farming communities across the three agro-ecological zones of the state and beyond. The survey revealed that approximately 88 per cent of the crop produce displayed characteristics consistent with inorganic production, including abnormally large pineapples and accelerated decay in stored cassava, yam, and cucumber. The second preliminary investigation involved informal interviews with seven crop farmers, the purpose of which was to establish the production methods employed by the farmers. All seven farmers confirmed using synthetic fertilisers and herbicides to maximise yields and income. This preliminary evidence, combined with literature documenting low organic farming adoption in Nigeria (Adebiyi et al., 2020; Adenegan & Fatai, 2016), points to a significant gap between the availability of organic farming knowledge and its practical adoption among crop farmers in the state.

Adoption, in the framework of Rogers (1983), is the decision to make full use of an innovation as the best course of action available. Feder et al. (1985) characterised farm-level adoption as the degree of acceptance and use of an innovation by a farmer once satisfied with its perceived benefits. Ikehi et al. (2022) and Heiman et al. (2020) noted that aggregate adoption, or diffusion, reflects the cumulative spread of an innovation across a geographical locale. This study is anchored in the Diffusion of Innovations (DOI) Theory developed by Rogers (1983), which explicates how a new idea, practice, or technology gains momentum and spreads across a social system. Within this framework, an innovation must be perceived as novel and advantageous by the adopter for uptake to occur. Applied to organic farming in Abia State, the DOI theory provides a basis for identifying the individual, social, and environmental determinants that shape crop farmers' decisions to adopt or reject specific organic practices. Despite the recognised potential of organic farming, no empirical study appears to systematically examine organic farming operations common among crop farmers in Abia State, hence this study.

Purpose of the Study

The general purpose of this study was to investigate issues in adoption of organic farming operations by crop farmers in Abia State, Nigeria. Specifically, the study determined:

1. socioeconomic characteristics of the crop farmers in Abia State;
2. organic farming operations common among crop farmers in Abia State;
3. extent of adoption of organic farming operations by crop farmers in Abia State
4. constraints to adoption of organic farming operations by crop farmers in Abia State.

Hypotheses (HOs)

The following null hypotheses were tested at the 0.05 level of significance. There are significant differences in the mean responses of male and female crop farmers on:

HO_1: organic farming operations common among crop farmers in Abia State.

HO_2: extent of adoption of organic farming operations by crop farmers in Abia State.

HO_3: constraints to adoption of organic farming operations by crop farmers in Abia State.

Methodology

***Design of the Study*:** The study adopted a descriptive survey research design.

***Area of the Study*:** The study was conducted in Abia State, South-East Nigeria. It comprises of 17 local government areas (LGAs) and grouped into three agro-ecological zones. Of the 17 LGAs, four are largely urban, while the remaining 13 LGAs are predominantly rural. It is in these rural LGAs and their farming communities that crop farming in the state is concentrated. Diverse food crops in the area include cassava, maize, yam, oil palm, and fruits (Chah et al., 2020).

***Population for the Study*:** The population for the study was 817 registered male and female farmers in the three agro-ecological zones of Abia State (Abia State Agricultural Development Programme, ASADP, 2015). They were predominantly middle-aged smallholder farmers cultivating mainly cassava, maize, yam, plantain, pineapple, and cocoyam on farm holdings of less than one hectare, with levels of formal education ranging from primary to tertiary.

***Sample for the Study*:** The sample for the study was 240 crop farmers of both genders drawn from the rural farming communities of the state. A multistage sampling procedure was employed in selecting the sample for the study. In the first stage, two predominantly rural LGAs were selected from each of the three agro-ecological zones through non-proportionate stratified random sampling, yielding six rural local government areas in total. In the second stage, two farming communities were selected from each of the six local government areas using simple random sampling, producing 12 communities. In the third stage, two villages were selected from each of the 12 communities, also through simple random sampling, resulting in 24 villages. In the fourth and final stage, ten farming households were randomly selected from each of the 24 villages, totalling 240 households that formed the sample size of 240 crop farmers comprised of 147 males and 93 females.

***Instrument for Data Collection*:** The instrument for data collection was a 37-item structured questionnaire. It was developed through literature review and based on the specific purposes of the study. The instrument was divided into two parts: Part I obtained respondents' socioeconomic data, while Part II focused on the specific purposes of the study. It had a four-point scale of Strongly Agree/High Extent (4), Agree/Moderate Extent (3), Disagree/Low Extent (2), and Strongly Disagree/Zero Extent (1). The instrument was validated by three university experts in Agriculture. The internal consistency of the questionnaire was established through a trial test involving 21 crop farmers in Anambra State, and a Cronbach Alpha reliability coefficient of 0.85 was obtained.

***Method of Data Collection*:** A total of 240 copies of the questionnaire were administered to the sampled 147 male and 93 female crop farmers by hand, with the help of three research assistance, over a period of approximately three months (November 2021 to February 2022). Of the

240 copies distributed, 232 copies, (141 from males and 91 from females) were properly completed and retrieved. This represents a return rate of 96.7 per cent.

***Method of Data Analysis*:** Data were analysed using mean, standard deviation (SD), and t-test to test the null hypotheses at 0.05 level of significance. Grand mean ($\bar{X}_g$) of 2.50 or above ($\bar{X}_g \geq 2.50$) was the cut-off point for decision making on common organic farming operations and on constraints to adoption. For the extent of adoption, the following real limits of numbers were applied on the four-point scale: High Extent (HE) = 3.50–4.00; Moderate Extent (ME) = 2.50–3.49; Low Extent (LE) = 1.50–2.49; and Zero Extent (ZE) = 1.00–1.49. A null hypothesis was rejected where the p-value was less than 0.05, and not rejected where the p-value was equal to or greater than 0.05.

Results

Data analysis on socioeconomic characteristics of respondents reveals that of the 232 farmers who completed the questionnaire, 141 (76.3%) were male and 55 (23.7%) were female. The majority (65.9%) were aged between 40 and 59 years, indicating a predominantly middle-aged farming population well placed to engage with agricultural innovations. In terms of educational attainment, 60% of adopters had completed tertiary education, compared with 33.3% of non-adopters, suggesting that higher education is associated with greater receptiveness to organic practices. Most respondents (65.7%) lived in households of 6–10 members, providing considerable household labour for farming activities. The dominant annual income bracket was ₦100,000–₦300,000, reported by 44% of adopters and 51.9% of non-adopters, with the majority cultivating farms of less than one hectare. Cassava was the most widely grown crop (46.7% of adopters; 80% of non-adopters), followed by sweet potato (36.7%) and rice (16.7%).

Table 1: Mean Responses, Standard Deviation and t-Test Analysis on Organic Farming Operations Common among Crop Farmers in Abia State

S/N	Organic Farming Operations	$\bar{X}_m$	SD_m	$\bar{X}_f$	SD_f	$\bar{X}_g$	t-value	p-value	Remarks
1	Crop rotation	3.84	0.40	3.62	0.48	3.78	0.78	0.88	Agreed, NS
2	Cover cropping	3.60	0.55	3.36	0.61	3.54	0.62	0.56	Agreed, NS
3	Bush fallowing	2.54	0.70	2.40	0.78	2.50	0.73	0.63	Agreed, NS
4	Mixed farming	2.78	1.12	2.58	1.20	2.73	1.15	0.69	Agreed, NS
5	Application of green manure	3.45	0.47	3.25	0.55	3.40	0.49	0.38	Agreed, NS
6	Application of compost manure	2.96	0.71	2.76	0.78	2.91	0.73	0.49	Agreed, NS
7	Application of farmyard manure	2.87	0.76	2.69	0.84	2.82	0.78	0.69	Agreed, NS
8	Minimal or zero tillage	3.41	0.78	3.20	0.86	3.36	0.80	0.84	Agreed, NS
9	Intercropping	3.79	0.53	3.59	0.60	3.74	0.55	0.88	Agreed, NS
10	Mulching	3.94	0.30	3.74	0.38	3.89	0.32	0.49	Agreed, NS
11	Integrated pest management (mechanical & biological control)	3.53	0.52	3.33	0.59	3.48	0.54	0.76	Agreed, NS

Table 1 Continues

S/N	Organic Farming Operations	$\bar{X}_m$	SD_m	$\bar{X}_f$	SD_f	$\bar{X}_g$	t-value	p-value	Remarks
12	Agro-forestry operations	1.42	0.76	1.28	0.84	1.39	0.78	1.31	Disagreed, NS
13	Mowing, uprooting, and cutting of weeds mechanically	3.78	0.43	3.58	0.51	3.73	0.45	0.29	Agreed, NS

$N = 232$; $N_m = 141$ (males); $N_f = 91$ (females); $\bar{X}_m$ = Mean of males; $\bar{X}_f$ = Mean of females; SD_m = Standard deviation of males; SD_f = Standard deviation of females; $\bar{X}_g$ = Grand mean; t = t-test value; p = probability value; Df = 230; NS = Not significant ($p \geq 0.05$).

Table 1 shows that 12 of the 13 items on organic farming operations had grand mean values ($\bar{X}_g$) ranging from 2.50 to 3.89, exceeding the cut-off point of 2.50 on the four-point scale. These 12 operations were therefore regarded as organic farming operations common among crop farmers in Abia State. Item 12 (agro-forestry operations) returned a grand mean of 1.39, below the cut-off point, and was thus not regarded as a common operation. The standard deviations of all 13 items ranged from 0.30 to 1.20, indicating that respondents' views were relatively homogeneous. All 13 items returned t-test p-values greater than 0.05, confirming no statistically significant difference in the mean responses of male and female farmers. Accordingly, HO_1 was not rejected.

Table 2: Mean Responses, Standard Deviation and t-Test Analysis on the Extent of Adoption of Organic Farming Operations by Crop Farmers in Abia State

S/N	Organic Farming Operations	$\bar{X}_m$	SDm	$\bar{X}_f$	SDf	$\bar{X}_g$	t-value	p-value	Remarks
1	Crop rotation	2.49	0.93	2.30	1.01	2.44	0.95	0.31	ME, NS
2	Cover cropping	1.78	0.14	1.57	0.22	1.73	0.16	0.25	LE, NS
3	Bush fallowing	1.46	1.08	1.28	1.16	1.42	1.10	0.38	ZE, NS
4	Mixed farming	1.39	1.12	1.19	1.20	1.35	1.14	0.34	ZE, NS
5	Application of green manure	1.23	0.98	1.04	1.06	1.19	1.00	0.44	ZE, NS
6	Application of compost manure	2.85	1.17	2.64	1.25	2.80	1.19	0.36	ME, NS
7	Application of farmyard manure	2.92	1.06	2.71	1.14	2.87	1.08	0.87	ME, NS
8	Minimal or zero tillage	3.82	1.40	3.61	1.48	3.77	1.42	0.67	HE, NS
9	Intercropping	2.78	0.84	2.57	0.92	2.73	0.86	0.79	ME, NS
10	Mulching	2.59	1.18	2.38	1.26	2.54	1.20	0.54	ME, NS
11	Integrated pest management (mechanical & biological control)	1.83	1.19	1.62	1.27	1.78	1.21	0.65	LE, NS
12	Agro-forestry operations	1.12	1.09	0.92	1.17	1.08	1.11	0.55	ZE, NS
13	Mowing, uprooting & cutting of weeds mechanically	3.78	1.04	3.57	1.12	3.73	1.06	0.62	HE, NS
	Cluster / Grand Mean	2.39	1.01	2.19	1.09	2.36	1.03	0.52	ME, NS

N = 232; N_m = 141 (males); N_f = 91 (females); $\bar{X}_m$ = Mean rating of males; $\bar{X}_f$ = Mean rating of females; SD_m = Standard deviation of males; SD_f = Standard deviation of females; $\bar{X}_g$ = Grand mean; t = calculated t-test value; p = probability value; Df = 230; HE = High Extent (3.50–4.00); ME = Moderate Extent (2.50–3.49); LE = Low Extent (1.50–2.49); ZE = Zero Extent (1.00–1.49); NS = Not significant at 0.05 level of significance.

Table 2 indicates that the cluster grand mean of all 13 items is 2.36, denoting a moderate overall extent of adoption on the four-point scale. Items 8 and 13 (minimal or zero tillage, and mowing/uprooting/cutting of weeds mechanically) were adopted to a high extent ($\bar{X}_g$ = 3.77 and 3.73, respectively). Items 6, 7, 9, and 10 (application of compost and farmyard manure, intercropping, and mulching) were adopted to a moderate extent. Items 2 and 11 (cover cropping and integrated pest management) were adopted to a low extent, while items 3, 4, 5, and 12 (bush fallowing, mixed farming, application of green manure, and agro-forestry) were adopted to zero extent. The cluster p-value was 0.52, which exceeds the alpha level of 0.05, indicating no statistically significant gender difference in the extent of adoption. Accordingly, HO_2 was not rejected.

Table 3: Mean Responses, Standard Deviation and t-Test Analysis on Constraints to Crop Farmers' Adoption of Organic Farming Operations in Abia State

S/N	Organic Farming Operations	$\bar{X}_m$	SD_m	$\bar{X}_f$	SD_f	$\bar{X}_g$	t-value	p-value	Remarks
1	Fluctuation in the price of organic farming products	3.04	0.38	2.84	0.45	2.99	0.40	0.71	Agreed, NS
2	Inadequate technical know-how of crop farmers in organic farming	2.73	1.37	2.52	1.44	2.68	1.39	0.42	Agreed, NS
3	Low output of organic farming operations	3.03	1.43	2.82	1.50	2.98	1.45	0.83	Agreed, NS
4	Lack of standard measures for organically produced crops	3.01	0.90	2.80	0.97	2.96	0.92	0.72	Agreed, NS
5	Poor transportation of organically produced crops	3.05	1.45	2.84	1.52	3.00	1.47	0.44	Agreed, NS
6	Inadequate processing facilities for organic crop products	3.39	0.46	3.18	0.53	3.34	0.48	0.18	Agreed, NS
7	Inadequate storage facilities for organic crop products	3.62	1.38	3.41	1.45	3.57	1.40	0.77	Agreed, NS
8	Inadequately trained extension specialists on organic farming	3.76	0.56	3.55	0.63	3.71	0.58	0.97	Agreed, NS

Table 3 Continues

S/N	Organic Farming Operations	$\bar{X}_m$	SD_m	$\bar{X}_f$	SD_f	$\bar{X}_g$	t-value	p-value	Remarks
9	Lack of access to credit facilities for organic farming	3.26	0.58	3.05	0.65	3.21	0.60	0.26	Agreed, NS
10	High incidence of pests and disease pathogens in organic farming	3.49	0.51	3.28	0.58	3.44	0.53	0.85	Agreed, NS
11	Insufficient land space to practise organic farming	2.98	1.49	2.77	1.56	2.93	1.51	0.28	Agreed, NS

$N = 232$; $N_m = 141$ (males); $N_f = 91$ (females); $\bar{X}_m$ = Mean rating of males; $\bar{X}_f$ = Mean rating of females; SD_m = Standard deviation of males; SD_f = Standard deviation of females; $\bar{X}_g$ = Grand mean; t = calculated t-test value; p = probability value; Df = 230; HE = High Extent (3.50–4.00); ME = Moderate Extent (2.50–3.49); LE = Low Extent (1.50–2.49); ZE = Zero Extent (1.00–1.49); NS = Not significant at 0.05 level of significance.

Table 3 reveals that all 11 items on constraints had grand mean values ranging from 2.68 to 3.71, all exceeding the cut-off point of 2.50. All 11 items were therefore regarded as constraints to crop farmers' adoption of organic farming operations in Abia State. The most severe constraints were inadequately trained extension specialists on organic farming ($\bar{X}_g$ = 3.71) and inadequate storage facilities for organic crop products ($\bar{X}_g$ = 3.57). Standard deviations ranged from 0.40 to 1.51, indicating moderate variability in responses. All 11 items returned t-test p-values greater than 0.05, confirming no statistically significant gender difference. Accordingly, HO_3 was not rejected.

Discussion

The study identified 12 organic farming operations common among crop farmers in Abia State, with mulching ($\bar{X}_g$ = 3.89), crop rotation ($\bar{X}_g$ = 3.78), and intercropping ($\bar{X}_g$ = 3.74) recording the highest mean ratings. These findings accord with Paull and Hennig (2016), who, in a global mapping study aimed at charting the distribution of organic agriculture, documented that organic farming is characterised by composted manure, biological pest control, crop rotation, and mixed cropping as its cornerstone practices. The USDA (2007) similarly recommended crop rotation, cover crops, and buffering as fundamental organic strategies. Nath and Athinuwat (2021), in a survey conducted to determine the information sources and organic practices used by women farmers in Chiang Mai Province, Thailand, confirmed that compost, vermicompost, and green manuring were the most practised organic measures among the farmers. Relatedly, Adesope et al. (2012), in a study of farmers in southern Nigeria which examined the effect of socioeconomic characteristics on the adoption of organic farming operations, found that farmers were already familiar with several organic practices, particularly organic manuring and crop rotation. The convergence of these findings across widely differing geographical and socioeconomic contexts attests to the universality of these practices and suggests that farmers in Abia State are not operating in complete ignorance of organic principles. The non-adoption of agro-forestry operations ($\bar{X}_g$ =

1.39) may be attributed to its long gestation period, the high upfront investment in tree planting, and farmers' orientation towards annual crop systems, consistent with observations in the broader African smallholder literature (Adebiyi et al., 2020).

The overall extent of adoption of organic farming operations was moderate, with a cluster grand mean of 2.36. Whilst minimal or zero tillage ($\overline{X}_g$ = 3.77) and mechanical weed control ($\overline{X}_g$ = 3.73) were adopted to a high extent, practices such as application of green manure and bush fallowing were adopted to zero extent. This pattern of selective adoption is consistent with Ravi et al. (2021), who, in a study conducted in Telangana State, India, to determine the extent of adoption of agri-waste management practices, found that approximately 45.8% of the farmers were medium adopters, with only 26.7% classified as high adopters. Adebiyi et al. (2020), using a livelihood approach to examine the drivers of and constraints to organic vegetable production in Nigeria, documented low organic farming system adoption across much of Africa, with the notable exceptions of Tunisia, Uganda, and Tanzania. Adenegan and Fatai (2016) specifically noted that organic farming adoption in Nigeria remained low owing to small and underdeveloped markets. Similarly, Dhraief et al. (2018), in a study of livestock farmers in the arid areas of Tunisia which sought to establish the factors affecting the adoption of innovative technologies, reported that adoption was shaped by access to information, income, and institutional support rather than awareness alone. In contrast, Oyewole and Sennuga (2020) recorded remarkably high adoption (95.41%) of improved crop varieties among smallholder farmers in Ogun State, Nigeria, highlighting that adoption rates are highly context- and practice-specific. Ntshangase et al. (2018) likewise found, in a survey of smallholder farmers in South Africa, that favourable perceptions of the immediate benefits of no-till agriculture strongly predicted its adoption. The variance in adoption levels observed in the present study therefore suggests that easily accessible, low-cost practices with demonstrable and immediate results such as mulching, minimal tillage, and mechanical weed control are more readily adopted than knowledge-intensive or capital-requiring operations.

Eleven constraints to adoption were identified, with inadequately trained extension specialists ($\overline{X}_g$ = 3.71) and inadequate storage facilities ($\overline{X}_g$ = 3.57) rated most severely. These findings are consistent with Adebiyi et al. (2020), who linked low organic farming adoption in Nigeria to limited extension support and physical capacity constraints. Mamuya (2011), in a comparative doctoral study assessing the impacts of organic farming on domestic and exporting smallholder farming households in Tanzania, found that farmers were similarly hindered by financial incapacity to procure organic inputs. Sierra et al. (2008), investigating the factors associated with deregistration among organic farmers in California, identified the absence of lucrative markets and monetary support for labour as critical structural constraints to organic farming viability. Egyir et al. (2011), in a study of plantain farmers in Ghana, showed that ready access to agrochemicals and their perceived yield advantages reinforced farmers' dependence on synthetic inputs, thereby constraining the shift to organic

alternatives. Obayelu et al. (2014) drew attention to gender-related and livelihood vulnerability dimensions of low adoption in Nigerian contexts. These findings underscore that constraints to organic farming adoption in Abia State are multi-layered, encompassing inadequate extension services, weak market structures, limited processing and storage infrastructure, and restricted access to credit. Addressing any single constraint in isolation is unlikely to produce sustained improvements in adoption rates.

Conclusion

Crop farmers in Abia State are familiar with organic farming operations, yet familiarity has not translated into full adoption. Adoption remains selective, skewed towards low-cost, low-skill practices with immediate returns, while knowledge-intensive and capital-demanding operations are neglected. This selective pattern is sustained not by farmers' unwillingness but by institutional and structural barriers, principally weak extension support, inadequate storage, processing, and transportation infrastructure, and restricted access to credit. Unless these barriers are systematically dismantled, the potential of organic farming to secure a sustainable environment and enhance household food security in Abia State will remain largely unrealised. Since male and female crop farmers did not differ significantly in any of the domains investigated, interventions can be designed and delivered uniformly to both genders. Deepening organic farming adoption in the state therefore requires a coordinated response by extension agencies, government, and policymakers, rather than isolated interventions.

Recommendations

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

1. Agricultural extension agencies should train crop farmers on the organic farming operations adopted to low or zero extent, such as green manuring, bush fallowing, and agro-forestry.
2. Government and relevant stakeholders should provide adequate storage, processing, and transportation facilities for organic crop products.
3. Policymakers should provide credit facilities, subsidies, and grants to enable crop farmers to procure inputs and labour for organic farming operations.
4. Agricultural educators should integrate the skills required for the 12 common organic farming operations into agricultural training curricula in Abia State.
5. Further research should be conducted on the causes of the zero and low extent of adoption of specific organic farming operations in the state.

References

Adebiyi, J.A., Olabisi, L.S., Richardson, R., Liverpool-Tasie, L.S. & Delate, K. (2020). Drivers and constraints to the adoption of organic leafy vegetable production in Nigeria: A livelihood approach. *Sustainability;* 12(1), 1–21.

Adenegan, K.O. & Fatai, R.A. (2016). Market potentials for selected organic leafy vegetables. *International Journal of Vegetable Science;* 22(3), 251–258.

Adesope, O.M., Nathews-Njoku, E.C., Oguzor, N.C. & Ugwuja, V.C. (2012). Effect of socio-economic characteristics of farmers on their adoption of organic farming operations. In *Crop production technologies*. INTECH.

Anyiro, C.O., Ezeh, C.I., Ijioma, J.C. & Udensi, A.I. (2014). Local institutions' micro credit delivery and effects on rural farm households' poverty in Abia State, Nigeria. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development;* 14(1), 21–28.

Asogwa, V.C. (2022). Environmental education in agricultural extension: Eswatini perspective. In A.O. Ajayi (Ed.), *Agricultural extension in Eswatini: Learning from experience*. In press.

Chah, J.M., Anugwa, I.Q. & Nwafor, I.M. (2020). Factors driving adoption and constraining the non-adoption of biofortified orange fleshed sweet potatoes among farmers in Abia State, Nigeria. *Journal of Agriculture and Rural Development in the Tropics and Subtropics;* 121(2), 173–183.

Dhiman, V. (2020). Organic farming for sustainable environment: Review of existing policies and suggestions for improvement. *International Journal of Research and Review;* 7(3), 22–31.

Dhraief, M.Z., Bedhiaf-Romdhani, S., Dhehibi, B., Oueslati-Zlaoui, M., Jebali, O. & Ben, S. (2018). Factors affecting the adoption of innovative technologies by livestock farmers in arid areas of Tunisia. *FERA Research Report;* 23(1), 1–22.

Egyir, I.S., Owusu-Benoah, E., Anno-Nyako, F.O. & Banful, B. (2011). Assessing the factors of adoption of agrochemicals by plantain farmers in Ghana. *Journal of Enterprising Communities: People and Places in the Global Economy;* 5(1), 83–97.

Ezeh, C.I., Anyiro, C.O., Ehiemere, I.O. & Obioma, N.Q. (2012). Gender issues on poverty alleviation programmes in Nigeria: The case of the National Fadama 1 Development Project in Abia State. *Agris Online Papers in Economics and Informatics;* 4(1), 16–25.

Feder, G., Just, R.E. & Zilberman, D. (1985). Adoption of agricultural innovations in developing countries: A survey. *Economic Development and Cultural Change;* 33(2), 255–298.

Ferdous, Z., Zulfiqar, F., Datta, A., Hasan, A.K. & Sarker, A. (2021). Potential and challenges of organic agriculture in Bangladesh: A review. *Journal of Crop Improvement;* 35(3), 403–426. https://doi.org/10.1080/15427528.2020.1824951

Food and Agriculture Organization (2008). *Organic agriculture and climate change*. Food and Agriculture Organization of the United Nations.

Gillaspy, R. (2017). *Environmental sustainability: Definition and application*. http://www.study.com

Heiman, A., Ferguson, J. & Zilberman, D. (2020). Marketing and technology adoption and diffusion. *Applied Economic Perspectives and Policy;* 42(1), 21–30.

Igbabaka, I., Asogwa, V.C. & Onuh, D.O. (2015). Requisite skills needed by youths to partner with government in land reclamation for empowerment in agriculture and sustainable environment in Benue State. *Nigeria Vocational Association Journal;* 20(1), 308–316.

Ikehi, M.E., Ejiofor, T.E., Ifeanyieze, F.O., Nwachukwu, C.U. & Ali, C.C. (2022). Adoption of agricultural innovations by farmers in Enugu State, Nigeria. *International Journal of Agricultural Technology;* 18(1), 123–140.

International Federation of Organic Agriculture Movements (2011). *Definitions of organic agriculture*. http://www.ifoam.org

Kilcher, L. (2007). How organic agriculture contributes to sustainable development. *Journal of Agriculture and Rural Development in the Tropics and Subtropics, Supplement;* 89, 207–218.

Mamuya, W.B. (2011). *Assessing the impacts of organic farming on domestic and exporting smallholder farming households in Tanzania: A comparative analysis* (Doctoral thesis). Bangor University.

Mishra, R.K., Kumar, D.J.P., Narula, A., Christie, S.M. & Naik, S.U. (2023). Production and beneficial impact of

biochar for environmental application: A review. *Fuel;* 343, 127353.

Nath, T.D. & Athinuwat, D. (2021). Information sources and organic practices used by women farmers in organic farming of Chiang Mai province, Thailand. *Kasetsart Journal of Social Sciences;* 42(2), 369–376.

National Population Commission (2006). *Census report*. NPC.

Ntshangase, N.L., Muroyiwa, B. & Sibanda, M. (2018). Farmers' perceptions and factors influencing adoption of no-till conservation agriculture. *Sustainability;* 10(2), 555–565.

Obayelu, O.A., Agboyinu, O.M. & Awotide, B.A. (2014). Consumers' perception and willingness to pay for organic leafy vegetables. *European Journal of Nutrition and Food Safety;* 4(2), 127–133.

Oni, A.O. (2011). *The impact of organic agriculture on food quality*. http://www.organicagric.org

Oyewole, S.O. & Sennuga, S.O. (2020). Factors influencing sustainable agricultural practices among smallholder farmers in Ogun State, Nigeria. *Asian Journal of Advances in Agricultural Research;* 14(1), 17–24.

Paull, J. & Hennig, B. (2016). Atlas of organics: Four maps of the world of organic agriculture. *Journal of Organics;* 3(1), 25–32.

Ravi, G., Savitha, B., Sreenivasulu, M. & Vidyasagar, C.G.E. (2021). Extent of adoption of agri-waste management practices. *Asian Journal of Agricultural Extension, Economics & Sociology;* 39(4), 125–133. https://doi.org/10.9734/ajaees/2021/v39i430567

Rogers, E.M. (1983). *Diffusion of innovations* (3rd ed.). Free Press.

Sadekin, M.N. & Muhibbullah, M. (2020). Local and global environmental sustainability. In W. Leal Filho et al. (Eds.), *Affordable and clean energy: Encyclopedia of the UN Sustainable Development Goals*. Springer. https://doi.org/10.1007/978-3-319-71057-0_46-1

Sierra, L., Klonsky, K., Strochlic, R., Brodt, S. & Molinar, R. (2008). *Factors associated with deregistration among organic farmers in California*. California Institute for Rural Studies.

Singh, M. (2021). Organic farming for sustainable agriculture. *Indian Journal of Organic Farming;* 1(1), 1–8.

Suntanto, I.R. (2015). Sustainable organic farming for environmental health. *International Journal of Scientific and Technology Research;* 4(2), 5–11.

United Nations Environment Programme (2008). *Organic agriculture*. http://www.unep.org

United States Department of Agriculture (1980). *Report and recommendations on organic farming*. US Government Printing Office.

United States Department of Agriculture (2007). *Organic farming operations*. http://www.onlyorganic.org