

Assessment of Organic Practices' Benefits Among Vegetable Farmers in Agricultural Development Programme Zone I, Taraba State

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ABSTRACT

This study assessed the benefits of organic farming practices to vegetable farmers in Taraba State Agricultural Development Programme (ADP) Zone I, Nigeria. Specifically, the study determined the factors influencing adoption of organic farming practices. A multi-stage sampling technique was used to select 120 registered vegetable farmers. Primary data were obtained using structured questionnaires. Descriptive statistics and Binary logistic regression analysis were used to analyzed data. Findings revealed that the majority of respondents were male and within the active age group of 31–50 years, with an average household size of five persons and farming experience between 6–15 years. Major organic practices adopted includes compost/manure, organic fertilizers, crop rotation, and mulching. Regression results indicated that age, farming experience, farm size, income level, and perceived benefits significantly influenced the likelihood of deriving benefits from organic farming ($p < 0.05$). The study concluded that organic farming holds significant economic, environmental, and health benefits for vegetable farmers in Taraba State. It is therefore recommended that government agencies strengthen extension services, improve access to organic inputs, provide policy incentives, and support farmer cooperatives to promote sustainable organic farming adoption in the state.

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INTRODUCTION

Despite the growing global emphasis on sustainable agriculture, the adoption of organic farming practices among vegetable farmers in Nigeria, particularly in Taraba State's Agricultural Development Programme (ADP), remains limited. Conventional farming methods, which rely heavily on synthetic fertilizers and pesticides, continue to dominate, leading to environmental degradation, soil fertility depletion, and potential health risks for consumers (Reganold & Wachter, 2016; Gomiero *et al.*, 2011). While organic farming offers a viable alternative enhancing soil health, reducing chemical residues, and improving long-term agricultural sustainability several barriers hinder its widespread adoption. In Taraba State, vegetable farming is a key economic activity, yet many farmers still depend on chemical-intensive practices due to limited awareness, inadequate training, and poor access to organic inputs (Oluwasusi & Akanni, 2021). The Agricultural Development Programme (ADP) is tasked with promoting improved farming techniques, but there is insufficient data on the extent to which vegetable farmers in ADPs have embraced organic methods. Furthermore, factors such as market access, government policies, and socio-economic conditions may influence farmers' willingness to transition to organic farming (Eyhorn *et al.*, 2019). Taraba State provides an important setting for investigating organic agricultural practices because agriculture constitutes a major livelihood activity and the state possesses diverse ecological conditions suitable for the production of a wide range of crops, including vegetables. Vegetable production contributes to household food supply, income generation and rural employment in several parts of the state. However, farmers face challenges relating to access to agricultural inputs, extension services, markets, climate variability, soil

fertility and pest management. These conditions create an important context for examining whether organic practices can provide tangible benefits to vegetable farmers.

Despite these advantages, the extent of adoption among vegetable farmers in Taraba State, particularly within the Agricultural Development Programme (ADP), remains understudied.

The lack of empirical research on organic farming practices in this region makes it difficult to design effective interventions. More importantly, empirical research on organic farming among vegetable farmers in Taraba State has largely focused on adoption rather than the benefits derived from adoption. A study conducted in Jalingo Local Government Area examined the adoption of organic farming practices among vegetable farmers and provided evidence regarding the extent and determinants of adoption. However, adoption alone does not establish whether farmers experience improvements in soil fertility, crop productivity, production costs, farm income, environmental conditions or health as a result of using organic practices. This distinction creates an important empirical gap that warrants further investigation. The socio-economic realities of Zone I further shape the adoption of organic farming. Most farmers are smallholders with limited access to credit, extension services, and modern farm inputs. Organic practices, which rely heavily on locally available resources, are therefore economically feasible and culturally compatible, often aligning with indigenous knowledge systems (Oladejo *et al.*, 2020; Oladipo & Kehinde, 2018). However, despite the visible use of these practices, limited empirical research has been conducted to quantify their actual benefits in terms of productivity, profitability, and environmental conservation (Yakubu *et al.*, 2021).

Against these backdrops, assessing the benefits of organic practices among vegetable farmers in Zone I of Taraba ADP is both timely and necessary. Hence, the study sought to provide evidence on whether organic farming improves soil fertility, reduces production costs, increases yields, and enhances farmers' income, while also identifying the challenges hindering wider adoption.

However, there is dearth information on the benefits of organic practices among vegetable farmers in Agricultural Development Programme Zone I, Taraba State.

Emerging from the above background, this study assessed benefits of organic practices among vegetable farmers in Agricultural Development Programme Zone I, Taraba State. while, the specific objectives were to: (i) described the socio-economic characteristics of the respondents (ii) identified the common organic practices adopted among the respondents (iii) determined the influenced of socioeconomics on respondents' adoption of organic practices and its benefits and, (iv) assessed the benefits of organic practices to the respondents in the study area.

MATERIALS AND METHODS

This study was conducted in Northern part of Taraba State, Nigeria. The state was created on August 27th, 1991 with a land mass of 59, 400km². It lies between latitude 6° 30' and 8° 30' north of the equator and between longitude 9° 00' and 12° 00' east of the Greenwich meridian with estimated population of 2,300,736 (The National Population Commission (NPC), 2006). It has projected annual growth rate of 3.5% which brought the population figure to three million, five hundred and ninety-seven thousand, ninety-four people (3,597,094) as at 2019.

The State has sixteen (16) local government areas and two Special Development Areas (SDAs) and it has been grouped into four agricultural zones by Taraba State Agricultural Development Programmed (TADP) namely; Zone I, Zone II, Zone III and Zone IV (TADP, 2016). Zone I comprise Ardo-kola, Jalingo, Lau, Karim-lamido, Yorro and Zing with headquarters at Zing. Zone II has Wukari, Ibi, Gassol and part of Bali (Garba-Chede/Dakka) LGAs with headquarters at Wukari. Zone III comprises Takum, Donga, Ussa, Kurmi, part of Bali (Bali/Suntai) LGAs and Yangtu and Ngada Special Development Areas (SDAs) with headquarters at Takum. Zone IV has only Sardauna LGA because of its difficult terrain with headquarters at Gembu.(TRSG, 2020).

The area shares boundaries with Gassol, Bali, Kurmi, Gashaka and Karim-lamido Local Government areas in the North, Nassarawa state and Plateau State to the North-west, Benue states in the South-West and Republic of Cameroun in the South-East. It has a tropical wet and dry season. Its dry season lasts for a minimum of four months (December to March) while the wet season spans early March to late November in the south. The area has mean annual rainfall of 1800mm.

The major tribes in Taraba state include Kuteb, Wapan, Mumuye, Jukun Kona, Ichen Kaka, Mambila, Kambu, Yandang, Karinjo, Fulani, Bandawa, Ndola, Chamba, Wurkum, Munga, Jenjo etc. They are predominately subsistent farmers who are into the production of arable crops such as yam, maize, sorghum, rice, beans, soybeans, cassava, groundnut etc (TRSG, 2020).

Ardo kola is a Local Government Area in the northern part of Taraba State, Nigeria. Its headquarters is located in Sunkani town. The total land area of this LGA is 2, 262km² with a population of 86,921 (Census, 2006). The major tribes in this area include Mumuye, Kona and Fulani. The basic agricultural practices in this area include fishing and the

production of the following crops, among them are, maize, rice, guinea corn, beans, melon etc. The basic social amenities found here are Schools and Hospital (TRSG, 2020).

Jalingo is both a local government headquarter of Jalingo local government area and State capital of Taraba State. Local Government Area in the northern part of Taraba State, Nigeria. Its headquarters is located in Jalingo. Jalingo Local Government Area is located at 9.08°N 11.36°E. The population of Jalingo LGA is 627,069 as of 2023. The major ethnic groups in Jalingo LGA are the Hausa, Mumuye, and Chamba. The main languages spoken in the LGA are Hausa, Mumuye, and Jukun.

The major occupations of the people of Jalingo LGA are agriculture, trade, and civil service. Agriculture is the predominant occupation, with the main crops grown being yams, cassava, millet, and sorghum. The LGA is also home to a number of industries, including food processing, textiles, and construction. Trade is another important occupation, with many people involved in buying and selling goods and services. The civil service is also a major employer in the LGA, with a large number of people working in government offices. Jalingo LGA is a vibrant and diverse community with a rich history and culture. It is a popular tourist destination and a major economic center for Taraba State.

The study's population was drawn from the official records of vegetable farmers available at the Taraba State Agricultural Development Programme. Data for the study were primaries, obtained with the aid of structured questionnaires.

A multi-stage sampling procedure was used to select vegetable farmers for the study. The procedure was designed to align with the administrative structure of the Taraba State Agricultural Development Programme (TADP) and to ensure that farmers who actively engaged in vegetable production were adequately represented.

At the first stage, ADP Zone I was purposively selected from the agricultural development zones of Taraba State because of the concentration of vegetable production activities and the availability of registered vegetable farmers within the zone. The selection was therefore based on the relevance of the zone to the objectives of the study and the availability of an identifiable sampling frame.

At the second stage, three agricultural blocks were purposively selected from ADP Zone I based on the intensity of vegetable production and the presence of a sufficient number of registered vegetable farmers.

At the final stage, a sample frame of registered vegetable farmers obtained from TADP was used to identify eligible respondents within the selected blocks. From this sampling frame, 120 respondents were selected through simple random technique. Hence, questionnaire was distributed for gathering information used for the study.

Data collected for the study were analyzed using both descriptive and inferential statistics. Descriptive statistics in the form of frequency, percentage, mean, standard deviation were employed to address Objectives I, II, and IV. While, Inferential Statistic in the form of Binary logistic regression was used to achieve objective III.

RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Respondents

The results demonstrated that males constituted the majority (63.3%) of the respondents, while females represented the remaining 36.7%. This suggests that agricultural activities in the study area were relatively more male-dominated, although the participation of women was also substantial. The finding is consistent with evidence from Nigerian agricultural

households, where male-headed households constitute a substantial proportion of farming households. For example, a study of smallholder arable crop farmers in Nigeria reported that 84.34% of households were headed by males (Ogunniyi *et al.*, 2022). The relatively lower proportion of female respondents may reflect differences in access to productive resources, land ownership, labour, finance, and decision-making opportunities. Nevertheless, the 36.7% female representation indicates that women remain important actors in agricultural production and should not be overlooked in agricultural development interventions.

The age distribution shows that a substantial proportion (38.3%) of respondents were between 31 and 40 years, followed by those aged 41–50 years (30.0%). Respondents aged 21–30 years accounted for 20.0%, while only 11.7% were 51 years and above. Thus, about two-thirds of the respondents (68.3%) were between 31 and 50 years. This indicates that the farming population was predominantly within the economically active age group. Such an age structure can be advantageous because farmers within this age range are generally capable of combining farming experience with the physical capacity required for agricultural production. The NBS National Agricultural Sample Census similarly identifies age of the household head as a major demographic characteristic of agricultural households.

The relatively small proportion of respondents aged 51 years and above may also suggest that farming is not exclusively concentrated among older farmers in the study area. Rather, younger and middle-aged adults are substantially involved in agricultural activities. This has implications for agricultural development because interventions targeted at improving farmers' productivity, access to information, technology, and climate-related adaptation may benefit from focusing strongly on this economically active population.

The results further revealed that married respondents constituted the overwhelming majority (70.0%), while few were single (15.0%), divorced (8.3%) and widowed (6.7%) respectively. The predominance of married respondents suggests that agricultural production in the study area is largely undertaken within family or household structures. Marriage may influence agricultural participation through the availability of family labour and household responsibilities. It may also affect farmers' resource allocation and production decisions. A Nigerian study similarly reported that about 80% of smallholder arable crop farming households were married, indicating that marriage is a common characteristic of farming households in the country (Ogunniyi *et al.*, 2022).

The educational distribution indicates that 31.7% of the respondents had secondary education, 20.0% had OND/NCE, and 15.0% possessed HND/B.Sc. qualifications. Those with primary education constituted 18.3%, while 8.3% had no formal education and only 6.7% had M.Sc. and above. Overall, the results show that the respondents possessed varying levels of formal education, although secondary education was the most common level. The result is broadly comparable with national agricultural household data. The NBS National Agricultural Sample Census reported that senior secondary education constituted the largest educational category among household heads, followed by tertiary/post-secondary education.

The relatively substantial proportion of respondents with post-secondary education (41.7% when OND/NCE, HND/B.Sc., and M.Sc. and above are combined) is particularly noteworthy. Education can improve farmers' ability to understand technical information, evaluate alternative technologies, communicate with extension personnel, and make informed production decisions.

Evidence from Nigerian smallholder farming households also shows that years of education are among the socioeconomic variables associated with important agricultural and livelihood outcomes (Kehinde *et al.*, 2024). Thus, the educational profile of the respondents provides a potentially favourable condition for agricultural information dissemination and adoption of improved practices.

The study found that 45.0% of the respondents had household sizes of 4–6 persons, making this the dominant category. This was followed by households with 7–9 members (26.7%), while 16.7% had 1–3 members and 11.6% had 10 or more members. Therefore, most respondents belonged to households of moderate size. Household size is particularly relevant in smallholder agriculture because family members can provide labour for land preparation, planting, weeding, harvesting, processing, and other farm activities. At the same time, larger households may face greater consumption demands and pressure on available household resources. Evidence from Nigeria has shown that household size is associated with important socioeconomic outcomes among smallholder farming households (Kehinde *et al.*, 2024).

The findings indicated that 31.7% of the respondents had 6–10 years of farming experience, followed by 28.3% with 11–15 years. Those with 1–5 years constituted 18.3%, while 13.4% had 16–20 years and 8.3% had more than 20 years of experience. Thus, a large proportion of the respondents had accumulated between 6 and 15 years of farming experience. This suggests that the respondents were not predominantly inexperienced farmers and were likely to possess considerable practical knowledge of local farming conditions. Farming experience can influence farmers' ability to interpret changes in production conditions, assess risks, and make decisions based on previous encounters. Its relevance among Nigerian smallholders is also reflected in empirical research, which identifies years of farming experience as an important socioeconomic variable in explaining agricultural livelihood outcomes (Kehinde *et al.*, 2024).

The distribution of farm size reveals that 40.0% of respondents cultivated 1–2 hectares, followed by 25.0% who cultivated 3–4 hectares. A further 21.7% operated less than one hectare, while only 13.3% cultivated 5 hectares or more. Hence, approximately 86.7% of respondents operated less than 5 hectares, indicating that the respondents were predominantly smallholder farmers. This finding is consistent with the structure of Nigerian agriculture, where small-scale farming remains dominant. Research using Nigerian agricultural data has also demonstrated differences in farmers' socioeconomic characteristics across farm-size categories, including age, household size, gender, and education (Abdullah *et al.*, 2022).

The predominance of small farm holdings has important implications for farmers' productive capacity. Limited farm size may constrain the volume of output, economies of scale, and the ability to invest in machinery and other capital-intensive technologies. At the same time, small farms can be intensively managed, particularly where household labour is readily available. The dominance of farms below five hectares therefore reinforces the need for agricultural interventions that are appropriate for resource-constrained smallholder farmers rather than approaches designed primarily for large-scale commercial producers.

Source of income: The results show that farming was the principal source of livelihood for 48.3% of respondents, while 26.7% combined farming with trading. Another 16.7% combined farming with civil service employment, and 8.3% combined farming with artisan activities. This indicates that although farming was the dominant livelihood activity, more

than half of the respondents had additional sources of income. The pattern suggests a degree of livelihood diversification among the farming households. Combining agriculture with

trading, salaried employment, or artisan activities may provide households with additional income and reduce their dependence on agricultural production alone.

Table 1: Distribution According to Respondents' Socioeconomic Characteristics

Variables	Frequency	Percent (%)	(n=120)
Gender			
Male	76	63.3	
Female	44	36.7	
Age			
21 – 30	24	20.0	
31 – 40	46	38.3	
41 – 50	36	30.0	
51 and above	14	11.7	
Marital Status			
Single	18	15.0	
Married	84	70.0	
Divorced	10	8.3	
Widowed	8	6.7	
Educational Level			
No Formal Education	10	8.3	
Primary Education	22	18.3	
Secondary Education	38	31.7	
OND/NCE	24	20.0	
HND/B.Sc.	18	15.0	
M.Sc. and above	8	6.7	
Household Size			
1 – 3	20	16.7	
4 – 6	54	45.0	
7 – 9	32	26.7	
10 and above	14	11.6	
Experience			
1 – 5 years	22	18.3	
6 – 10 years	38	31.7	
11 – 15 years	34	28.3	
16 – 20 years	16	13.4	
Above 20 years	10	8.3	
Farm Size (in Hectares)			
Less than 1	26	21.7	
1 – 2	48	40.0	
3 – 4	30	25.0	
5 and above	16	13.3	
Source of Income			
Farming only	58	48.3	
Farming and trading	32	26.7	
Farming and civil service	20	16.7	
Farming and artisan work	10	8.3	

Source: Field survey, 2026

Common Organic Farming Practices Adopted by the Respondents

The results in Table 2 showed considerable variation in the use of different organic farming practices. The most widely practiced method was the use of compost/manure, reported by 85.0% of the respondents, followed by the use of organic fertilizers (80.0%) and crop rotation (73.3%). Other commonly reported practices were mulching (65.8%) and green manure/cover cropping (61.7%). Half of the respondents (50.0%) reported using biological pest control, while agroforestry (37.5%) and other practices such as the use

of farmyard residues (16.7%) were less commonly practiced. The high level of compost/manure use (85.0%) suggests that organic nutrient management is an important component of vegetable production in the study area. This may be partly explained by the relative availability of animal manure, crop residues, household organic waste, and other locally available materials that can be converted into soil amendments. Organic manure contributes to soil organic matter and nutrient availability and can improve soil properties over time. Research in Nigeria has demonstrated the potential of compost and other organic amendments to improve soil organic matter and nutrient dynamics, thereby supporting sustainable crop production (Adejuyigbe *et al.*, 2012). The

finding is also consistent with evidence from southwestern Nigeria, where organic farming has traditionally relied on locally available resources such as animal manure, crop residues, green manure, and organic wastes (Adebayo & Oladele, 2014).

Similarly, the 80.0% use of organic fertilizers indicates that farmers place substantial emphasis on organic sources of plant nutrients. The relatively high adoption of these two practices may be attributed to their direct contribution to soil fertility and the possibility of obtaining or producing them locally at relatively low monetary cost. Recent evidence from Nigeria also shows that farmers tend to favour agricultural practices that require relatively low financial expenditure. Mbosoh and Udoh (2026), for example, identified organic manuring, crop rotation, mulching, and cover cropping among the sustainable practices considered by Nigerian smallholder farmers.

The 73.3% adoption of crop rotation indicates that nearly three-quarters of the respondents deliberately changed crops grown on their fields over successive production cycles. Crop rotation is an important component of sustainable and organic production because it can contribute to nutrient cycling, interrupt pest and disease cycles, and improve soil health. Adebayo and Oladele (2014) identify crop rotation as one of the practices associated with organic production systems in Nigeria. However, the relatively high adoption observed in this study differs from some evidence from other Nigerian farming systems. For instance, Kehinde *et al.* (2022) reported generally low adoption of crop rotation, farmyard manure, agroforestry, and other climate-smart practices among selected smallholder farmers in Nigeria. This difference may be related to differences in crop type, ecological conditions, farmers' access to organic materials, and the specific characteristics of vegetable production.

Mulching, practiced by 65.8% of respondents, was another relatively common organic farming practice. The relatively high level of adoption may be associated with the importance of maintaining soil moisture and protecting the soil surface in vegetable production. Mulching can also contribute organic matter as plant materials decompose and can suppress weed growth. Evidence from southeastern Nigeria similarly identified mulching as an important climate-smart agricultural practice, although adoption varied considerably across locations (Ugochukwu *et al.*, 2024). The use of mulch may therefore represent a practical strategy through which vegetable farmers simultaneously address soil moisture conservation, weed management, and soil fertility.

The adoption of green manure and cover cropping (61.7%) also indicates relatively substantial use of practices aimed at maintaining soil fertility and protecting the soil. Green manure can return nutrients and organic matter to the soil, while cover crops can reduce soil exposure and contribute to moisture and erosion management. These practices are

consistent with the principles of organic agriculture, which emphasize nutrient cycling, soil biological activity, and the use of locally generated organic materials rather than dependence on synthetic external inputs (Adebayo & Oladele, 2014). Recent evidence from Nigeria likewise identifies cover cropping and green manure among sustainable agricultural practices being considered by smallholder farmers (Mbosoh & Udoh, 2026).

The result for biological pest control (50.0%) suggests moderate adoption. Although half of the respondents reported using biological approaches to pest management, the proportion is considerably lower than those using manure, organic fertilizer, or crop rotation. This difference may reflect the greater technical knowledge required to identify beneficial organisms, natural enemies, and appropriate biological control methods. Organic farming places considerable emphasis on ecological pest management rather than reliance on synthetic pesticides. Adebayo and Oladele (2014) similarly identify biological pest control as an important component of organic farming systems. The relatively moderate adoption observed here may therefore point to an area where extension education, farmer training, and demonstrations could strengthen farmers' knowledge and practical capacity.

Agroforestry recorded the lowest level among the major listed practices, with 37.5% of respondents reporting its use. The comparatively low adoption may be understandable because vegetable farmers often operate relatively small plots and may perceive trees as competing with vegetables for land, sunlight, water, and nutrients. The finding is consistent with evidence from Nigeria showing that agroforestry is often less widely adopted than some other sustainable agricultural practices. Kehinde *et al.* (2022), for example, found generally low adoption of agroforestry among smallholder farmers in selected Nigerian agro-ecological zones. More recent evidence from Enugu State also reported agroforestry adoption among vegetable farmers at 46%, demonstrating that although the practice can be adopted within vegetable production systems, its uptake remains below some other environmentally friendly practices (Ukwuaba *et al.*, 2025).

The 16.7% reported under other practices, such as the use of farmyard residues, represents the least commonly reported category. This suggests that although farmers make considerable use of conventional organic farming practices such as manure application, organic fertilizer, crop rotation, and mulching, fewer farmers employ some of the less common forms of organic resource recycling. This may reflect limited knowledge, availability, labour requirements, or competing uses for farm residues. Nevertheless, recycling farm residues is consistent with the underlying principle of organic farming, which encourages the efficient use and recycling of locally available biological resources (Adebayo & Oladele, 2014).

Table 2: Organic Practice Adopted by the Respondents

Organic Farming Practice	Frequency	Percentage (%)
Use of compost/manure	102	85.0
Green manure/cover cropping	74	61.7
Crop rotation	88	73.3
Mulching	79	65.8
Biological pest control	60	50.0
Agroforestry	45	37.5
Use of organic fertilizers	96	80.0
Others	20	16.7

Source: Field survey, 2026

Relationship between factors Influencing Respondents' Adoption and Benefits of Organic Practice

The results indicate that the binary logistic regression model provides a relatively strong explanation of variation in the adoption of organic farming practices among the vegetable farmers. The Nagelkerke R^2 of 0.578 suggests that approximately 57.8% of the variation in the probability of organic-practice adoption is jointly accounted for by religion, age, gender, farming experience, farm size, marital status, income, educational level, and perceived benefits.

Age had a positive and statistically significant effect on the adoption of organic practices ($\beta = 0.412$, $p = 0.035$). The odds ratio, obtained by exponentiating the coefficient, is approximately 1.51. Thus, a one-unit increase in age was associated with about a 51.0% increase in the odds of adopting organic practices, holding the other variables constant. The positive effect may reflect the accumulation of farming knowledge and practical experience over time, which can enhance farmers' ability to evaluate and implement alternative production practices. This result is consistent with recent evidence from Nigeria showing that farmers' characteristics and knowledge can influence engagement with organic agriculture. Ume (2023), for example, found that information and knowledge about organic farming were important drivers of adoption among smallholder farmers in Nigeria.

Farming experience exerted a positive and statistically significant influence on adoption ($\beta = 0.582$, $p = 0.008$). Its odds ratio is approximately 1.79, indicating that a one-unit increase in farming experience was associated with about a 79.0% increase in the odds of adopting organic practices, *ceteris paribus*. Experienced farmers may possess greater practical knowledge of soil management, pest control and crop production, enabling them to appreciate the usefulness of organic practices and incorporate them into their production systems. The finding is particularly relevant to organic vegetable production because many organic practices, including compost application, crop residue management and biological pest control, require practical knowledge and familiarity with their application. Recent Nigerian evidence similarly emphasizes farmers' knowledge and understanding of organic production as important factors in adoption.

Farm size also had a positive and statistically significant coefficient ($\beta = 0.468$, $p = 0.015$). The corresponding odds ratio of approximately 1.60 implies that a one-unit increase in farm size was associated with about a 59.7% increase in the odds of adopting organic practices, all other factors being held constant. Larger farm operators may have greater flexibility to experiment with alternative production practices and may be better positioned to absorb the risks or additional

labour associated with organic production. Farm size can also provide farmers with sufficient land to allocate part of their holdings to organic practices without substantially disrupting their overall production strategy.

Income had a positive and statistically significant effect on adoption ($\beta = 0.527$, $p = 0.011$). Its odds ratio of approximately 1.69 indicates that a one-unit increase in income was associated with about a 69.4% increase in the odds of adopting organic practices, holding other factors constant. Higher-income farmers may have greater capacity to meet the initial costs associated with changing production practices, including labour, organic inputs, equipment and possible transition costs. The result is also consistent with the observation that economic considerations are important in the expansion of organic agriculture. Recent evidence from Oyo State, Nigeria, identified economic benefits, including the potential for higher market premiums, as an important component of farmers' assessment of organic vegetable production.

Educational level had a positive coefficient ($\beta = 0.316$) and was statistically significant at the 10% level ($p = 0.083$). The odds ratio is approximately 1.37, indicating that a one-unit increase in the educational-level measure was associated with about a 37.2% increase in the odds of adoption, although the evidence is weaker than that observed for age, experience, farm size, income and perceived benefits. Education may improve farmers' ability to obtain, understand and evaluate information concerning organic production, including information relating to soil fertility, pest management, environmental sustainability and food safety. This interpretation is supported by recent Nigerian research showing the importance of information and knowledge in promoting organic agriculture adoption.

The strongest statistically significant determinant in the model was perceived benefits of organic practices ($\beta = 0.649$, $p = 0.006$). The odds ratio of approximately 1.91 indicates that a one-unit increase in perceived benefits was associated with about a 91.4% increase in the odds of adopting organic practices, holding the other variables constant. This finding is theoretically plausible because farmers are more likely to adopt a practice when they perceive clear advantages from its use. Such benefits may include improved human health and food safety, better soil quality, environmental protection, reduced dependence on synthetic inputs and potentially improved economic returns. Recent evidence from Oyo State reported that vegetable farmers recognized important health, environmental and economic benefits of organic production, while recent research in Nigeria also found that information about organic farming and the economic incentives associated with organic markets can significantly encourage adoption.

Table 3: Influence of Socioeconomics Factors on Adoption of Organic Practices by Respondents

Variables	Coefficient	S.E.	Wald	(p-value)
Religion	0.235	0.341	0.475	0.491
Age	0.412	0.195	4.452	0.035 **
Gender	0.376	0.342	1.209	0.272
Farming Experience	0.582	0.221	6.942	0.008 **
Farm Size	0.468	0.193	5.882	0.015 **
Marital Status	0.141	0.272	0.269	0.604
Income	0.527	0.207	6.476	0.011 **
Educational Level	0.316	0.182	3.009	0.083 *
Perceived Benefits	0.649	0.238	7.422	0.006 **
Constant (β_0)	-2.105	0.915	5.286	0.021
Log likelihood = 98.214				

Variables	Coefficient	S.E.	Wald	(p-value)
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Nagelkerke $R^2 = 0.578$

Source: Field Survey, 2026

Levels of Significance: * at 10%, ** Significant at 5%

Benefits of Organic Practices to the Respondents

The results presented in Table 4 demonstrated vegetable farmers generally had a favourable perception of the benefits of organic pest-management practices. All the statements recorded mean scores above the midpoint of 3.00, suggesting that respondents generally agreed that the practices were effective, safe, environmentally beneficial and reasonably economical. However, the magnitude of the mean scores indicates that some attributes were more strongly perceived than others.

The statement that "The practices are effective in controlling yield" recorded a mean score of 4.15 with a standard deviation of 0.91. This relatively high mean indicates that the respondents generally perceived organic pest-management practices as effective in controlling pests and protecting crop yield. The result suggests that farmers' acceptance of these practices is not based solely on their perceived health and environmental benefits but also on their practical usefulness in crop production. This finding is in congruent with Ogungbaro and Olaiya (2024), who reported that vegetable farmers in Oyo State had good knowledge of organic vegetable farming practices, which contributed to their adoption.

The statement that "They are cheaper to use than synthetic pesticides" recorded a mean of 3.70 and a standard deviation of 1.02. Although this was lower than the preceding statement, the mean remains above the scale midpoint, implying that respondents generally considered organic pest-management practices to be less costly than synthetic pesticides. The result may be associated with the possibility of preparing some organic pest-control materials from locally available plant materials and household or farm resources, thereby reducing expenditure on commercially manufactured pesticides.

This economic consideration aligned with recent evidence from Nigeria. Ogungbaro and Olaiya (2024) found that economic benefits constituted an important dimension of organic vegetable farming and specifically identified higher premiums in the marketplace among the perceived economic benefits of organic farming. Similarly, Ume and Bahta (2024) emphasized the importance of economic incentives and supportive market arrangements in promoting organic farming expansion in Nigeria. The relatively moderate standard deviation (1.02), however, suggests some variation in farmers' experiences. This may arise because the cost advantage of organic pest-management practices depends on the availability of raw materials and the labour required for preparation and application.

The statement that "They are safer for my health and my family's health" obtained the highest mean score of 4.60 (SD = 0.62). This result indicates very strong agreement among the respondents that organic pest-management practices are safer for farmers and their families. The low standard deviation further indicates a high degree of consensus. The finding suggests that concern about exposure to synthetic pesticides may be an important motivation for the use of organic alternatives, particularly among vegetable farmers who may have frequent occupational contact with pesticides during mixing, spraying and harvesting. The result strongly agrees with Ogungbaro and Olaiya (2024), whose study of vegetable farmers in Oyo State found that health benefits

were the most highly rated benefit domain of organic vegetable farming. Farmers particularly identified enhanced health and longevity as important perceived benefits.

The statement that "They are better for the soil and environment" recorded a mean of 4.55 and standard deviation of 0.67, making it the second-highest rated statement. The high mean and low standard deviation indicate that respondents overwhelmingly perceived organic pest-management practices as environmentally preferable. This finding is consistent with the broader understanding of organic agriculture as a production approach that seeks to maintain soil biological activity, biodiversity and ecosystem health. Ogungbaro and Olaiya (2024) similarly found that environmental conservation was recognized as an important benefit of organic vegetable farming, including perceived reductions in climate-change effects and greenhouse-gas emissions.

The statement that "They are easy to prepare and apply" recorded a mean of 3.45 with a standard deviation of 1.08. Although the mean is above the midpoint, it is considerably lower than the scores for health and environmental safety. This indicates that respondents were only moderately positive about the ease of preparing and applying organic pest-management materials. The relatively high standard deviation also suggests considerable variation in farmers' experiences. This result is understandable because the preparation of organic pest-control materials may involve collecting plant materials, processing them, determining appropriate concentrations, fermenting or extracting active substances, filtering the preparation and applying it at appropriate intervals. Consequently, farmers may recognize the advantages of organic pest-control methods while still finding their preparation and application somewhat demanding. The finding is particularly relevant to extension practice because technical training can improve farmers' ability to prepare and apply organic pest-control materials correctly.

The moderate score also provides an important qualification to the assumption that organic farming is inherently simple or inexpensive. Some organic practices may reduce expenditure on purchased chemicals but increase labour requirements. This distinction is important when assessing the actual economic attractiveness of organic pest-management practices among smallholder farmers.

The statement that "The materials needed are readily available" had the lowest mean score of 3.35 (SD = 1.15). Although the mean remains slightly above the neutral midpoint, it indicates that availability of materials represents a relatively weak advantage compared with the other attributes examined. The comparatively high standard deviation suggests substantial differences among respondents regarding access to suitable materials.

Finally, the statement that "The results from using them are long-lasting" recorded a mean of 4.05 and standard deviation of 0.85. The result indicates that respondents generally believed that the effects of organic pest-management practices persist for a relatively long period. The score is higher than those for affordability, ease of preparation and availability, but lower than those for health and environmental safety. This suggests that farmers perceive reasonable durability of the effects of organic pest-management practices.

Table 4: Benefits of Organic Practices to the Respondents

Statements	Mean ($\bar{x}$)	Std. Deviation
The practices are effective in controlling yield	4.15	0.91
They are cheaper to use than synthetic pesticides	3.70	1.02
They are safer for my health and my family's health	4.60	0.62
They are better for the soil and environment	4.55	0.67
They are easy to prepare and apply	3.45	1.08
The materials needed are readily available	3.35	1.15
The results from using them are long-lasting	4.05	0.85

Source: Field Survey, 2026

CONCLUSION

The study concludes that organic farming has meaningful potential to improve the economic, environmental and health outcomes of vegetable farmers in ADP Zone I, Taraba State. Farmers have already embraced several basic organic practices, particularly compost/manure application, organic fertilizers and crop rotation. The high perception of health and environmental benefits and the significant effects of age, farming experience, farm size, income and perceived benefits further demonstrate that farmers' socioeconomic circumstances and perceptions are important to the realization of benefits from organic production.

Based on the findings, it is therefore, recommended that: Taraba State ADP and other extension providers should intensify practical training on compost production, organic fertilizer application, biological pest control, crop rotation and other organic techniques and Government should develop a clear and sustained policy framework for organic agriculture, including access to credit, extension support, input assistance and certification incentives. Policy support should be stable enough to encourage farmers and other actors to invest in organic production.

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