



Level of Awareness of Traditional and Orthodox Methods of Pests Control Among Vegetable Farmers in Akwa Ibom State, Nigeria

I. J. Udousung^{1*}, I. A. Akpabio², I. U. Umoh¹, S. B. Akpan¹

¹Department of Agricultural Economics and Extension

kwa Ibom State University, Obio Akpa Campus, Akwa Ibom State, Nigeria

²Department of Agricultural Extension, University of Uyo, Nigeria

Published Online:
18 June 2025

Article DOI:

<https://doi.org/10.55677/CRB/I06-01-CRB2025>

License:

This is an open access article under the CC BY 4.0 license:

<https://creativecommons.org/licenses/by/4.0/>

ABSTRACT: Pest control poses a considerable challenge for vegetable producers in Akwa Ibom State, Nigeria, highlighting the necessity for an assessment of awareness regarding both traditional and orthodox pest management strategies. This research undertook a comparative analysis of these methods, collecting survey data from 120 vegetable farmers—60 practicing traditional methods and 60 employing orthodox techniques. The findings indicate a significant gender imbalance, with 65.00% of those using traditional methods being female, as opposed to 61.67% of those implementing orthodox methods. The average farming experience was recorded as 14.40 years for traditional farmers and 14.25 years for their orthodox counterparts, indicating a reliance on accumulated knowledge in making pest management decisions. The study demonstrated that vegetable farmers exhibited considerable awareness of certain orthodox techniques, particularly pesticides ($\bar{x} = 1.87$), biological control ($\bar{x} = 1.87$), fungicides ($\bar{x} = 1.80$), and rodenticides ($\bar{x} = 1.80$). In contrast, the most frequently employed traditional pest control methods among vegetable farmers in the region included hand-picking ($\bar{x} = 1.97$), wood ash ($\bar{x} = 1.88$), scarecrows ($\bar{x} = 1.80$), neem extracts ($\bar{x} = 1.75$), crop rotation ($\bar{x} = 1.53$), and companion planting ($\bar{x} = 1.52$). The study recommends the adoption of integrated pest management (IPM) strategies and enhanced access to extension services to foster sustainable agricultural practices.

KEY WORDS: Pesticide, farmers, vegetable, orthodox, awareness, Nigeria.

INTRODUCTION

Vegetables constitute a crucial element of human nutrition, offering a wealth of vitamins, minerals, and dietary fiber vital for maintaining health (Okonji et al., 2019; Akpan et al., 2022; Udousung et al., 2025a). Numerous vegetables are recognized as protective food items, effectively mitigating the risk of various diseases and health conditions. Consequently, patients suffering from chronic illnesses are often advised to adopt a vegetable-rich diet to alleviate the impact of these diseases. Generally, these crops are cultivated throughout the year, primarily as homestead crops in gardens or backyard farms, which yield significant economic and domestic benefits (Okonji et al., 2019; Ajayi et al., 2023; Udousung et al., 2025a; Udousung et al., 2025b). However, the high moisture content in vegetable crops makes them particularly susceptible to pest infestations, prompting farmers to resort to the application of pesticides (chemicals). Pesticides serve to prevent substantial crop losses and safeguard against a range of threats including insects, weeds, fungi, and other pests, thereby playing a critical role in food protection and yield enhancement (Udousung et al., 2025c). Nonetheless, these substances also pose potential toxicity risks to humans, with both acute and chronic health implications contingent on the level and modality of exposure.

Pests, defined as organisms such as insects and rodents that harm crops, livestock, or human health, encompass a wide range of species. This includes insects, ticks, mites, and other arachnids; nematodes and other parasitic worms; unwanted plants such as weeds; as well as harmful microorganisms like fungi, bacteria, and viruses. Certain vertebrates, including specific birds and rodents,

also fall under this categorization (Miriam, 2022). A significant number of insect species may function as external or temporary internal pests of humans and other animals, many of which have alternative hosts that complicate their eradication. Insect parasites generally compromise the health of their hosts, rendering them more vulnerable to infections from disease-causing organisms. Furthermore, the feeding activity of these pests can lead to irritation or lesions, increasing the risk of subsequent infections.

The worldwide economic losses attributed to various categories of pests are contingent upon the type of crop, geographical area, and climatic conditions. Despite the implementation of plant protection strategies designed to safeguard primary crops, it is estimated that over 40% of attainable yields are lost due to pest infestations (Agarwal and Verma, 2021; Rizzo et al., 2021; Benjamin et al., 2024). In the absence of any pest control measures, this loss could escalate to 69.8% (Miriam, 2022). To mitigate the harmful impacts of pests, farmers are compelled to utilize a range of pesticides. However, the improper use of many modern synthetic insecticides can have detrimental effects on both farmers and the environment.

A significant number of insecticides employed in agricultural ecosystems target insect pests indiscriminately, including beneficial organisms and natural predators. Effective insecticides should not only reduce pest populations but also pose minimal risk to their natural enemies. The application of pesticides during the flowering period of crops can be particularly harmful to honeybees, which are essential pollinators. Therefore, it is critical to evaluate insecticides before their incorporation into integrated pest management programs. Such screening is crucial for protecting beneficial species from the adverse effects of these chemicals (George and Ambrose, 2024). Certain beneficial insects, which are economically valuable as biological control agents, may be adversely affected by the indiscriminate application of insecticides, leading to disturbances in their physiological and behavioural functions. Consequently, understanding the impact of insecticides on non-target beneficial species is vital for both researchers and farmers in order to select the most appropriate insecticides that cause minimal harm to beneficial organisms (George and Ambrose, 2021).

Traditional pest control methods, often referred to as indigenous medicine, have utilized both plants and animals as sources of medicine since the pre-civilization era (Udousung et al., 2025d). Even in contemporary practice, plants and animals remain essential in pest and disease management. Various parts of plants and animals serve as key components in the formulation of medicines that can be either curative or preventive. As a result, a substantial proportion of currently available non-synthetic and/or semi-synthetic pharmaceuticals utilized within the Orthodox Method derives from higher plants, followed by microbial and animal mineral products. Conversely, the Orthodox Method is characterized as medicine grounded in scientific principles and taught in Western medical institutions.

The global economic losses attributed to various categories of pests are contingent upon the type of crop, geographical area, and climatic conditions. Despite the implementation of plant protection strategies designed to safeguard primary crops, it is estimated that over 40% of attainable yields are lost due to pest infestations (Agarwal and Verma, 2021; Rizzo et al., 2021; Benjamin et al., 2024). In the absence of any pest control measures, this loss could escalate to 69.8% (Miriam, 2022). To mitigate the harmful impacts of pests, farmers are compelled to utilize a range of pesticides. However, the improper use of many modern synthetic insecticides can have detrimental effects on both farmers and the environment.

A significant number of insecticides employed in agricultural ecosystems target insect pests indiscriminately, including beneficial organisms and natural predators. Effective insecticides should not only reduce pest populations but also pose minimal risk to their natural enemies (Udousung et al., 2025e). The application of pesticides during the flowering period of crops can be particularly harmful to honeybees, which are essential pollinators (Cornell University, 2020). Therefore, it is critical to evaluate insecticides before their incorporation into integrated pest management programs. Such screening is crucial for protecting beneficial species from the adverse effects of these chemicals (George and Ambrose, 2024). Certain beneficial insects, which are economically valuable as biological control agents, may be adversely affected by the indiscriminate application of insecticides, leading to disturbances in their physiological and behavioural functions. Consequently, understanding the impact of insecticides on non-target beneficial species is vital for both researchers and farmers in order to select the most appropriate insecticides that cause minimal harm to beneficial organisms (George and Ambrose, 2021).

Traditional pest control methods, often referred to as indigenous medicine, have utilized both plants and animals as sources of medicine since the pre-civilization era. Even in contemporary practice, plants and animals remain essential in pest and disease management. Various parts of plants and animals serve as key components in the formulation of medicines that can be either curative or preventive. As a result, a substantial proportion of currently available non-synthetic and/or semi-synthetic pharmaceuticals utilized within the Orthodox Method derives from plants, followed by microbial and animal mineral products. Conversely, the Orthodox Method is characterized as medicine grounded in scientific principles and taught in Western medical institutions.

Nigerians have predominantly relied on traditional methods for pest and disease management, supported by a sufficient diversity of plants to facilitate these practices. With the endorsement and financial backing of orthodox methods by governmental agencies, there has been a prevailing belief that these modern approaches offer superior alternatives to traditional practices (Nwakwasi, 2014). Consequently, colonial authorities labeled traditional methods as hazardous and detrimental to health. Furthermore, certain limitations inherent in traditional practices, such as the absence of standardized dosages, have led an increasing number of educated individuals to regard them with skepticism. As a result, traditional practices of pest control have been left disorganized and

scientifically undeveloped. Traditional method of pest control is deeply embedded in the cultural framework of its users, reflecting their belief systems over time. The majority of practitioners of traditional methods of pest control in Nigeria are individuals lacking formal Western education, who have inherited their knowledge through informal training, oral transmission, and folklore.

A considerable portion of Nigerian farmers, especially those located in remote rural areas, continues to employ various traditional pest control methods. This persistence can be attributed to several factors, including inadequate rural infrastructure, the effects of climate change, ongoing conflicts between herders and farmers that hinder access to urban regions, a conservative mindset among farmers, and limited financial resources (Mafimisebi and Oguntade, 2010; Effiong et al., 2018; Udousung et al., 2024a and 2024b). Although traditional pest control methods remain in use, there is an observable trend among younger rural farmers who are becoming increasingly reluctant to adopt these techniques. This shift may be influenced by the growing commercialization of agriculture and the implementation of innovative practices, driving younger farmers towards modern strategies for addressing pest infestations. In light of these considerations, the current study aims to evaluate the levels of awareness regarding both traditional and modern pest control methods among vegetable farmers in Akwa Ibom State, Nigeria.

METHODOLOGY

Study Area

The study was carried out in Akwa Ibom State, which formed a part of the core States in the “oil palm belt” of the Niger Delta region of Nigeria. The State is situated between Latitudes 4°32' and 5°33' North and Longitudes 70°35' and 80°25' East, bordered by Rivers State to the East, Cross River State to the West, Abia State to the North, and the Gulf of Guinea to the South. It encompasses a total land area of 8,421 square kilometers. The region experiences two distinct seasons: the rainy and dry seasons, with rainfall occurring evenly throughout the year, diminishing from over 3,000 mm in the southern areas to approximately 2,700 mm in the northern regions (Udofia and Inyang, 1987). According to the National Population Commission (NPC, 2006), the estimated total population is 3,920,203 individuals. The principal occupation of the local population is agriculture, characterized by rain-fed cultivation of tree crops and food crops, including oil palm, alongside livestock rearing, while fishing activities are prevalent in the riverine regions of the State. Vegetable production is prominent among inhabitants and is cultivated all year round.

Sampling Techniques/Analytical Techniques

A multi-stage sampling methodology was utilized for the research. In the initial stage, a simple random sampling approach was employed to select three agricultural zones from the six ADP zones within Akwa Ibom State. In the subsequent stage, a simple random sampling technique was again applied to choose 12 extension blocks from each of the selected zones. The third stage involved purposively selecting two cells from each of the chosen 12 blocks, resulting in a total of 24 cells. To complete the sampling process, five vegetable farmers were randomly chosen from each cell, culminating in a total of 120 vegetable farmers as respondents, which constituted the sample size. Among the total respondents, sixty were vegetable farmers who employed traditional pest control methods, while the remaining participants utilized orthodox methods. The prominent vegetables considered in the study were, waterleaf (*Talinum triangulare* (Jacq.)), fluted pumpkin (*Telfairia occidentalis*), okra (*Abelmoschus esculentus*), bitter leaf (*Vernonia amygdalina*), tomato (*Solanum lycopersicum*), *Amaranthus* spp., garden egg (*Solanum melongena*) among others.

THEORETICAL FRAMEWORK

The present study is based on the theory of Diffusion of Innovations, which was introduced by Everett M. Rogers in 1962. This theory elucidates the mechanisms through which new ideas and technologies propagate across cultures, examining the underlying reasons and the velocity of their dissemination. Rogers categorizes adopters into five distinct groups: innovators, early adopters, early majority, late majority, and laggards. Additionally, the theory delineates the adoption process through five stages: knowledge, persuasion, decision, implementation, and confirmation. Crucial determinants influencing the adoption of innovations comprise relative advantage, compatibility, complexity, trialability, and observability. This theoretical framework is particularly pertinent for evaluating pest control strategies among vegetable farmers in the designated study area. A comprehensive understanding of how farmers integrate new pest control methodologies can inform the development of impactful extension programs and interventions. For instance, the identification of early adopters within the farming community can enhance the dissemination of innovative and sustainable pest management practices. Extension services may capitalize on these early adopters to showcase the advantages and feasibility of novel techniques to the wider agricultural community, consequently increasing the overall rate of adoption.

Theory of Planned Behavior (TPB)

The Theory of Planned Behavior was introduced by Icek Ajzen in 1985. This theory suggests that an individual's actions are primarily determined by behavioral intentions, which are shaped by three key factors: attitudes toward the behavior, subjective norms, and perceived behavioral control. Attitudes encompass the favorable or unfavorable evaluations regarding the behavior in question. Subjective norms pertain to the social pressure individuals feel to engage in or refrain from that behavior. Perceived behavioral control denotes one's perception of the ease or difficulty associated with executing the behavior, informed by previous

experiences and anticipated challenges. The Theory of Planned Behavior serves as a valuable framework for examining the determinants that influence vegetable farmers' decisions to adopt specific pest control strategies. By evaluating farmers' attitudes toward various control techniques, understanding the social norms prevalent within the agricultural community, and assessing their perceived control over the implementation of these strategies, extension agents and policymakers can effectively customize their approaches to mitigate the identified obstacles and enhance adoption rates. For example, if farmers regard biological control methods as challenging to utilize, providing specialized training and assistance could bolster their confidence and competence in this area.

Analytical framework

In order to measure respondents' level of awareness, thirteen (13) traditional and twelve (12) orthodox methods of pest control were presented. The levels of awareness were measured through the aid of 2 point categorization of aware (2) and not aware (1). Each of the frequency was multiplied by the categorization code i.e. $(f \times 1) + (f \times 2) = T$

Where:

F = frequency of the respondent

T = Total

Mean(x) = $T \div \text{sample size}$. The mean score of 1.5 and above was adjudged aware and mean score below 1.5 was adjudged not aware.

RESULT AND DISCUSSIONS

The socioeconomic characteristics of vegetable farmers using Traditional and Orthodox pest control methods within the study area is presented in Table 1. The analysis of sex distribution indicates that a predominant proportion of vegetable farmers utilizing the traditional (61.00%) and orthodox (65.00%) methods are females. This finding aligns with the research of Udousung et al. (2016), which suggested that female farmers predominantly engaged in arable crop production in Akwa Ibom State. Additionally, Akpan et al., (2019) and Nkeme et al., (2022) reported that women constituted the majority of the farming population in Akwa Ibom State. Consequently, this suggests that vegetable farming in the study area is female-dominated, aligning with the a priori expectation that women are significantly involved in vegetable production in this locality (Akpan et al., 2021, 2022 and 2023). Moreover, a study conducted by the FAO (1998) underscores that women play a crucial role in food production and processing in rural communities, particularly in sub-Saharan Africa; however, their limited access to resources and decision-making authority often hinders their productivity.

The age distribution of vegetable farmers utilizing traditional and orthodox pest control methods reveals that the majority of respondents (41.67% and 38.3%, respectively) fall within the 41-50 year age bracket. Vegetable farmers aged 31-40 years represent 31.67% and 21.7% of traditional and orthodox vegetable farmers, respectively. Those in the 20-30 year age category constitute a minor segment of the population (3.33% and 8.33% for traditional and orthodox vegetable farmers, respectively). This indicates that a considerable number of vegetable farmers employing both methods are within their active farming age. The mean ages recorded for vegetable farmers utilizing the traditional and orthodox methods are 37.3 and 36.2 years, respectively. Notably, there is no significant age difference between vegetable farmers employing Traditional and Orthodox pest control methods within the study area. This finding corresponds with Udousung et al. (2019), which indicated that younger, more energetic respondents were active in farming, enabling them to engage in demanding agricultural activities.

The analysis of the marital status of the respondents indicates that the majority of vegetable farmers employing traditional (38.33%) and orthodox (46.67%) pest control methods were married, whereas those who were divorced represented 6.67% in both categories. This suggests a higher likelihood of having additional or more children and enhancing available labour to support farming activities in the study area. Furthermore, the predominance of married individuals in vegetable production aligns with the objectives of income generation, job creation, and food provision for the community. The results underscore the significance of marriage as a social institution in the study area; the substantial number of married individuals engaged in vegetable production may facilitate greater family cohesion in decision-making regarding agricultural practices. These findings are consistent with the assertions of Udousung et al., (2015), who reported that the majority of farmers in Akwa Ibom and Cross River States were married.

Table 1: Socioeconomic Characteristics of Respondents

	Traditional		Orthodox	
Variable	Frequency (60)	%	Frequency (60)	%
Sex				
Male	23	38.33	21	35.00
Female	37	61.00	39	65.00
Age ($\bar{x} = 37.3$)			($\bar{x} = 36.2$)	
20-30	2	3.33	5	8.33

“Level of Awareness of Traditional and Orthodox Methods of Pests Control Among Vegetable Farmers in Akwa Ibom State, Nigeria”

31-40	19	31.67	13	21.67
41-50	25	41.67	23	38.33
51-60	12	20.0	16	26.67
>60	2	3.33	3	5.00
Marital Status				
Single	23	38.33	22	36.67
Married	23	38.33	28	46.67
Widowed	7	11.67	4	6.67
Widower	3	5.00	2	3.33
Divorced	4	6.67	4	6.67
Education				
No formal	8	13.33	4	6.67
Primary	13	21.67	10	16.67
Secondary	25	41.67	32	53.00
Tertiary	14	23.33	14	23.33
Farming Experience ($\bar{x} = 14.4$)			($\bar{x} = 14.25$)	
1—5	7	11.67	6	10.00
6—10	13	21.67	12	20.00
11—20	27	45.00	30	50.00
>20	13	21.67	12	20.00
Monthly Income				
<10,000	22	36.67	18	30.00
10,000-50,000	28	46.67	30	50.00
50,000 - 100,000	7	11.67	8	13.33
>100,000	3	5.00	4	6.67
Extension contact				
None	22	36.67	18	30.00
Occasionally	15	25.00	14	23.33
Frequently	15	25.00	20	33.33
Most frequently	8	13.33	8	13.33

Source: Field Survey, 2024.

Education is defined as the process of acquiring knowledge that broadens an individual’s perspective and enhances their understanding of life’s complexities. It plays a crucial role in shaping the behaviours and personalities of both individuals and groups (Akpabio, 2005). In this context, the educational status of the respondents was also examined. The analysis of educational attainment indicates that a notable percentage of vegetable farmers employing Traditional (23.33%) and Orthodox (23.33%) pest control methods possess tertiary education, suggesting a relatively high literacy rate among these groups. This finding challenges the common belief that individuals who adhere to traditional therapies or practices are often less educated and exposed. This result stands in contrast to the findings of Akpan et al., (2023), who noted that the majority of farmers in the region ceased their formal education after reaching the secondary level.

The analysis of the respondents' farming experience reveals that most vegetable farmers utilizing traditional methods (45.00%) and orthodox methods (50.00%) of pest control have between 11 and 20 years of farming experience. This suggests that these farmers are seasoned practitioners, having engaged in vegetable farming and pest control for a considerable duration. This assertion is supported by Udousung and Okoro (2019), who argued that years of farming experience contribute to the acceptance of new innovations. Additionally, Ainembabazi and Mugisha, (2014) and Akintayo et al., (2022) found that experienced farmers are better positioned to address production challenges effectively and utilize resources optimally.

The examination of farm income among vegetable farmers employing Traditional and Orthodox pest control methods indicates that a significant proportion of traditional method users (46.7%) and orthodox method users (50.00%) earn between ₦10,000 and ₦50,000 monthly. Approximately 36.67% of traditional farmers and 30.00% of orthodox farmers in the study area reported earnings of less than ₦10,000. Those earning between ₦50,000 and ₦100,000 constituted 11.67% and 13.33% of traditional and orthodox farmers, respectively. Only 5.00% and 6.67% of traditional and orthodox farmers reported earnings exceeding ₦100,000 monthly. This data corroborates the findings of Udousung et al., (2015), who asserted that a significant portion of rural residents live in poverty, and that wealth and social power disparities, coupled with rising poverty levels, hinder business expansion. Consequently,

it can be inferred that a substantial number of respondents fall below the poverty line. Poverty is particularly acute in rural regions, where seven out of ten rural inhabitants are impoverished in Nigeria, as opposed to six out of ten urban residents (Yusuf and Omonoma, 2002). The World Bank report indicates that 2.5 billion individuals globally, live on less than \$2 a day, while one billion survive on less than \$1 a day. Over the years, the Nigerian government has implemented various initiatives aimed at poverty alleviation within the country (Aibieyi and Dirisu, 2010). These initiatives include the Operation Feed the Nation in 1971, the Green Revolution in 1979, the Directorate of Food, Roads and Rural Infrastructure (DIFFRI) in 1986, the Better Life Programme for Rural Women in 1987, the People's Bank of Nigeria in 1989, the National Agricultural Land Development in 1993, the Family Economic Advancement Programme (FEAP) in 1997, the Poverty Alleviation Programme in 2000, and the National Poverty Eradication Programme (NAPEP) in 2001, along with the Economic Empowerment Development Strategies (NEEDS) in 2004, among others. The analysis of the distribution of respondents based on extension contacts indicates that a significant proportion of vegetable farmers employing Traditional (36.67%) and Orthodox (30.00%) pest control methods did not receive visits from extension agents. This suggests that the outreach efforts directed towards these farmers were notably insufficient, likely resulting in a decreased awareness of innovative practices. This conclusion is consistent with the findings of Odjebor et al. (2024), who argued that a lack of adequate extension services impedes the dissemination of knowledge regarding improved farming techniques. Additionally, this observation is supported by Udousung et al. (2018), who noted that minimal extension outreach to arable crop farmers adversely affects their awareness of innovations, further highlighting the necessity for increased implementation of sustainable pest control practices.

Awareness of Traditional Methods of Pest Control in the Study Area

The assessment of vegetable farmers' awareness regarding traditional pest control methods is presented in Table 2. The average ratings indicate that a majority of these farmers possess knowledge of the various traditional pest control strategies presented. The results highlight a particularly high recognition or awareness of the hand-picking technique ($\bar{x} = 1.97$), identified as the most commonly adopted traditional method of pest control among vegetable farmers in the region. Additionally, the utilization of wood ash is prevalent ($\bar{x} = 1.88$), deeply embedded in the cultural practices of rural communities. Given that firewood is the primary cooking energy source for rural inhabitants, wood ash and charcoal are readily available to the vegetable farmers. Other traditional pest control methods include the use of scarecrows ($\bar{x} = 1.80$), neem extracts ($\bar{x} = 1.75$), crop rotation ($\bar{x} = 1.53$), and companion planting ($\bar{x} = 1.52$). Many of these practices have been passed down through generations, with the conservative tendencies of some farmers perpetuating their continued use. Conversely, vegetable farmers exhibit a relatively low level of awareness of several traditional pest control techniques, such as row covers ($\bar{x} = 1.45$), plant extracts ($\bar{x} = 1.37$), burning of crop residues ($\bar{x} = 1.28$), sticky traps ($\bar{x} = 1.27$), garlic and hot pepper sprays ($\bar{x} = 1.25$), intercropping ($\bar{x} = 1.22$), and the employment of natural predators like ladybugs ($\bar{x} = 1.17$). The mean ratings indicate that vegetable farmers demonstrate a significant awareness of certain traditional pest control methods in the study area; however, the findings also suggest that some traditional practices are at risk of becoming obsolete, as their application continues to decline among arable crop farmers in the region.

Table 2: Awareness of Traditional Methods of Pest Control in the Study Area

Traditional farmers							
S/N	Variables	Aware	Not Aware	Total	Mean	Rank	Dec.
1	Hand Picking	58	2	118	1.97	1 st	A
2	Use of wood ash	53	7	113	1.88	2 nd	A
3	Using scarecrows	48	12	108	1.80	3 rd	A
4	Use of Neem extracts	44	17	105	1.75	4 th	A
5	Crop rotation	32	28	92	1.53	5 th	A
6	Companion planting e.g. Basils	31	29	91	1.52	6 th	A
7	Row covers	27	33	87	1.45	7 th	NA
8	Use of plant extracts e.g. nicotine	22	38	82	1.37	8 th	NA
9	Burning crop residues	17	43	77	1.28	9 th	NA
10	Use of sticky traps	16	44	76	1.27	10 th	NA
11	Garlic and hot pepper sprays	15	45	75	1.25	11 th	NA
12	Intercropping	13	47	73	1.22	12 th	NA
13	Use of natural predators like ladybugs	10	50	70	1.17	13 th	NA

Source: Field Survey, 2024 *Benchmark = 1.5*

Awareness of Orthodox Methods of Pests Control in the Study Area

Table 3 illustrates the level of awareness regarding orthodox pest control methods among vegetable farmers in the study area. The findings reveal that there is a considerable preference for various orthodox pest control strategies, with a mean rating indicating a high level of awareness in the use of pesticides ($\bar{x} = 1.87$), biological control ($\bar{x} = 1.87$), fungicides ($\bar{x} = 1.80$), rodenticides ($\bar{x} = 1.80$), bio pesticides ($\bar{x} = 1.67$), Integrated Pest Management (IPM) ($\bar{x} = 1.67$), insecticides ($\bar{x} = 1.67$), and genetically modified organisms (GMOs) ($\bar{x} = 1.67$). Conversely, there was minimal awareness among vegetable farmers regarding specific orthodox pest control methods such as heat treatment ($\bar{x} = 1.47$), nano pesticides ($\bar{x} = 1.43$), drone technology ($\bar{x} = 1.33$), and pheromone traps ($\bar{x} = 1.33$).

Table 3: Awareness of Orthodox Methods of Pests Control in the Study Area

Orthodox Farmers							
S/N	Variables	Aw are	Not Aware	Total	Mean	Rank	Dec.
1	Pesticides	52	8	112	1.87	1 st	A
2	Use of biological control	52	8	112	1.87	1 st	A
3	Use of fungicide	48	12	108	1.80	2 nd	A
4	Rodenticides	48	12	108	1.80	2 nd	A
5	Bio pesticides	40	20	100	1.67	3 rd	A
6	Integrated Pest Management (IPM)	40	20	100	1.67	3 rd	A
7	Insecticides	39	21	99	1.65	4 th	A
8	Genetically modified organisms (GMOs)	39	21	99	1.65	4 th	A
9	Heat treatment	38	12	88	1.47	5 th	NA
10	Nano pesticides	26	34	86	1.43	6 th	NA
11	Drone Technology	20	40	80	1.33	7 th	NA
12	Use of pheromone traps	20	40	80	1.33	7 th	NA

Source: Field Survey, 2024; *Benchmark* = 1.5

CONCLUSION

The study has demonstrated the importance of both traditional and orthodox pest control methods as expressed by vegetable farmers in Akwa Ibom State. The findings underscore the persistence and sustainability of certain traditional pest control strategies in the rural areas of Akwa Ibom State, Nigeria. This indicates the effectiveness of these techniques in addressing pest prevalence in crop production within the region. Additionally, the orthodox pest control methods have continued to diversify and expand their relevance over the years. The vegetable farmers exhibit a high rate of adaptation to specific orthodox methods, likely due to their demonstrated efficiency. Furthermore, farmers are increasingly becoming cognizant of global trends in pest control, including the utilization of genetically modified organisms (GMOs) among other approaches.

RECOMMENDATIONS

Drawing from the key findings of the study, the following recommendations are proposed:

- There is a necessity to standardize certain traditional pest control methods within the state.
- It is essential to increase the number of extension agents to facilitate the dissemination of information regarding both traditional and orthodox pest control methods, thereby significantly enhancing pest management practices.
- Extension agents, research institutions, and other agricultural stakeholders should actively advocate for government policies that support farmers by subsidizing sustainable pest control strategies, such as integrated pest management (IPM) and biological control methods.
- Agricultural development programs (ADPs) ought to implement training and capacity-building initiatives for extension agents to empower farmers with the requisite knowledge and skills to effectively employ both traditional and modern pest control methods.

REFERENCES

1. Agarwal, M., & Verma, A. (2021). Modern Technologies for Pest Control: A Review. *IntechOpen*. doi: 10.5772/intechopen.93556.
2. Ainembabazi, J. H., & Mugisha, J. (2014). The Role of Farming Experience on the Adoption of Agricultural Technologies: Evidence from Smallholder Farmers in Uganda, *Journal of Development Studies*, 50(5), 666-679, DOI: 10.1080/00220388.2013.874556.

3. Aibieyi, S., and Dirisu, E. O. (2010). National Poverty Eradication Programmes in Nigeria: Problems and Prospects. *Journal of Contemporary Research*, 7(2), 236-248.
4. Ajayi, E. O., Akin-Idowu, P. E., Aderibigbe, O. R., Ibitoye, D. O., Afolayan, G., Adewale, O. M., Adesegun, E. A., and Ubi, B. E. (2023). Nigeria Root Vegetables: Production, Utilization, Breeding, Biotechnology and Constraints. *IntechOpen*. doi: 10.5772/intechopen.106861.
5. Akintayo O.I., Oyedokun M.O. and Akindele M. O. (2022). Agricultural productivity and access to market among farmers in Ekiti State, Nigeria. *Agro-Science*, 21 (2), 79-84. DOI: <https://dx.doi.org/10.4314/as.v21i2.9>
6. Akpabio, I.A. (2005). ‘Beneficiary Participation and Sustainable Agricultural Development in Akwa Ibom State, Nigeria’, in IVO Modo (ed.), *Sustainable Development in Africa*, pp. 292–314. Uyo: Cultural Research Publishers.
7. Akpan, S. B., and Monday I. (2021). Factors Productivity in small scale upland Vegetable Production in the South – South region of Nigeria. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, Vol. 21, Issue 1, PP. 35 – 45.
8. Akpan, S. B., Antia, E. J., Nkanta, V. S. (2022). Sustainable technical efficiency: evidence from vegetable (waterleaf: *Talinum triangulare*) production in southern Nigeria. *Journal of Agribusiness and Rural Development*, 66(4), 297–309.
9. Akpan, S. B., Udoh, E. J., Nkanta, V. S. (2023). The Pull and Push Factors of Farm Income Diversification among Fluted Pumpkin (*Telfairia occidentalis* Hook) Farmers in Akwa Ibom State, Southern Nigeria. *Yuzuncu Yil University Journal of Agricultural Sciences*, 33(2): 207-218. DOI: <https://doi.org/10.29133/yyutbd.1177296>.
10. Akpan, S. B., Uwemedimo E. O. and Ima-abasi S. A. (2019). Poverty coping strategies of oil palm farmers in Akwa Ibom State, Nigeria. *Nigerian Journal of Agriculture, Food and Environment*; 15(1):20-30.
11. Benjamin, J., Idowu, O., Babalola, O.K. et al. Cereal production in Africa: the threat of certain pests and weeds in a changing climate—a review. *Agric & Food Secur*, 13, 18 (2024). <https://doi.org/10.1186/s40066-024-00470-8>.
12. Effiong, U. U., Udousung, I. J., and Udoh, E. R. (2018). Herdsmen/Farmers Crisis and Rehabilitation of Victims: A study of middle belt – Nigeria. *Uyo Journal of Sustainable Development*, 3(2), 163-169.
13. FAO. 1998. Village Chicken Production Systems in Rural Africa. Household Food Security and Gender Issues, by A.J. Kitalyi. The Food and Agriculture Organization, Rome.
14. George, R. W., & Ambrose, D. K. (2024). Innovative pest management strategies for sustainable vegetable farming. *International Journal of Agriculture and Biology*, 20(1), 34-50.
15. Mafimisebi, T. E, and Oguntade, A. E (2010). Preparation and use of plant medicines for farmers’ health southwest Nigeria Socio-cultural, magico-religious and economic aspects. *Journal of Ethnobiology and Ethnomedicine*, 6:1doi10.1186/1746-4269-61.
16. Miriam, J. T. (2022). Assessment of methods of pest control among vegetable farmers. *Journal of Agricultural Research*, 15(2), 145-158.
17. National Population Commissions (2006). National Population Commission Report on 2006 Census Result. 31st December, Abuja, Government Press.
18. Nkeme, K. K., Okon, U. E., and Asuquo, S. E. (2022). Female Cassava Farmers Awareness and Perception of Hiv/Aids Infection in Uyo Agricultural Zone, Akwa Ibom State, Nigeria. *AKSU Journal of Agriculture and Food Science*, 6(2) 24-34.
19. Nwakwasi R. N (2014). Evaluation of Traditional and Orthodox Methods of Malaria Treatment for enhanced Rural Household Food Security in South-East Nigeria. Ph.D thesis, Michael Okpara University of Agriculture. Umudike. Abia State, Nigeria.
20. Odjebor, U. Giweze, E., Alex O., Bishop, O., Ebewore, O. S. (2024). Challenges of extension services delivery of arable farmers in Delta State, Nigeria. *Int’l journal of agric., and rural dev.* 27(1): 6938-6945 2024.
21. Okonji C. J., Alonge. G. S., and Ajayi E, O. (2019). Analysis of vegetable production among rural household in Ekiti State, Nigeria. *Nigerian Journal of Horticultural Science*, 24 (2); 109-120.
22. Rizzo, D.M., Lichtveld, M., Mazet, J.A.K. et al. Plant health and its effects on food safety and security in a One Health framework: four case studies. *One Health Outlook* 3, 6 (2021). <https://doi.org/10.1186/s42522-021-00038-7>.
23. Udofia, W. E. and O. B. Inyang (1987), “Land and People of Akwa Ibom State and Cross River State” In: M.B. Abasiatai, Akwa Ibom and Cross River States: The Land, People and Culture, Calabar: Wusen Press Pp. 1-10.
24. Udousung, I. J, Umoh, O. T. and Etuk, U. R (2015). Level of Utilization of Traditional and Orthodox Methods of Poultry Disease Control among Farmers in Akwa Ibom State and Cross River States, Nigeria. *Nigeria Journal of Agriculture, Food and Environment*, 11(4) 1-5.
25. Udousung, I. J and Okoro, U. S (2019). Factors influencing the Adoption of indigenous methods of malaria treatment among cassava farmers in AKS, Nigeria. *AKSU Journal of Agriculture and Food Science* Pp. 277 – 288.

26. Udousung, I. J., Nkeme K. K and Isaac K. U (2016). Level of awareness of indigenous methods of organic farming practices among cassava farmers in AKS, Nigeria. *Journal of Community and Communication Research* Vol. 1. No. 1 Pp. 51-55.
27. Udousung, I. J., Udoumoh I. D and Effiong, U. U (2018). Extent of Adoption of Indigenous Methods for the Treatment of Malaria among Cassava Farmers in Akwa Ibom State, Nigeria. *AKSU Journal of Agricultural Economics, Extension and Rural Development* Vol. 1 (1): 49 – 56.
28. Udousung, I. J., Umoh, I. and Sylvanus, B (2024a). Climate Change and adoption of indigenous methods of coping strategies among cassava farmers in Akwa Ibom State, Nigeria. *AKSU Annals of Sustainable Development, Vol. 2 No. 1 Pp. 80 – 93.*
29. Udousung, I. J., Umoh, I. U and Sylvanus, B (2024b). Indigenous methods of adapting to climate change impact among cassava farmers in Akwa Ibom State, Nigeria. *Journal of Community & Communication Research*, Vol. 9 No. 1 Pp. 112-120.
30. Udousung, I. J., Akpabio, I. A., Umoh, I. U., and Akpan, S. B. (2025a). Fadama Vegetable Farmers Attitude and Utilization of Organic Farming Practices in Akwa-Ibom State, Nigeria. *Agricultural Development*, 10(5), 1-5.
31. Udousung, I. J., Umoh C. E., Akpabio I.A., and Akpan, S. B. (2025c). Factors Militating against Pesticides use Among Farmers in Akwa Ibom State, Nigeria. *International Journal of Agricultural Extension and Rural Development Studies*, Vol.12, No.1, pp.1-13.
32. Udousung, I. J., Umoh C. E., and Akpan, S. B. (2025d). Factors Influencing the Adoption of Traditional and Orthodox Methods of Pests Control Among Vegetable Farmers in Akwa Ibom State, Nigeria, *Global Journal of Agricultural Research*, 13 (1), 19-35.
33. Udousung, I. J., Umoh, C. E. and Umoh, O. T, (2019). Perceptions of factors affecting adoption of sustainable agricultural practices among cassava farmers in Akwa Ibom State, Nigeria. *Journal of Community and Communication Research*. Vol. 4 No.2 Pp.175-181.
34. Udousung, I. J., Umoh, C. E., and Akpan, S. B. (2025b). Factors militating against the adoption of organic and inorganic manures among waterleaf farmers in Akwa Ibom state, Nigeria. *International Journal of Agriculture Extension and Social Development*, 8(4), 490-496.
35. Udousung, I. J., Umoh, C. E., and Akpan, S. B. (2025e). Utilization of pesticides by farmers in Akwa Ibom state, Nigeria. *International Journal of Agriculture Extension and Social Development*, 8(4), 482-489.
36. Yusuf, S. A.; Omonona B. T. (2002). Agricultural research and poverty alleviation. In: Okunmadewa, F. (ed.), *Poverty reduction and the Nigeria agricultural sector*. 145–178.