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Assessment of Adoption of Integrated Pest Management Practices among Cowpea Farmers in Okpokwu Local Government Area of Benue State, Nigeria

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Abstract

The study was undertaken to determine the adoption of integrated pest management practices among cowpea farmers in Benue State, Nigeria. Primary data for the study were collected using structured questionnaire administered on 150 respondents (cowpea farmers) selected using simple random sampling during September - October of 2016. Data gathered were analyzed using descriptive statistics such as frequencies, percentages and Logit regression. Results indicated that majority of the respondents (56%) were age between 21-40 years, 67.3% were male, 93.3% were married with a household size of at least 5 persons (56%) and majority (81.3%) had either National Certificate in Education or National Diploma. The results further showed that a high (99.3%) proportion of the respondents were farmers, 78% had farming experience of between 5-15 years, while (42.7) had experience in pest management practice of at least 3 years, 91.3% obtained information on integrated pest management practices from friends and 68% adopted crop rotation. Results of Logit regression revealed that education (0.430) was significant at $P< 0.05$; experience in pest management techniques (0.579) was significant at $P\leq 0.1$, also level of adoption of integrated pest management practices was moderate (71.3%). It is recommended that proper and timely information on integrated pest management practices should be made known to farmers and extension workers should regularly visit farmers and educate them on integrated pest management practices to reduce the complications identified by farmers in adopting the practices.

Keywords: *Assessment, adoption, integrated, pest management, practices, cowpea*

Introduction

The practice of agriculture has been around for hundreds of years and it is a basic way of life for a majority of the world. Gradually over the years, agricultural processes have flourished and become more efficient. However, with new research and technological developments, scientists have found the negative effects that farms have had on the environment. All around the world, researchers have been discovering the problems by which farms have been ploughing our environment (Rodriguez *et al.*, 2004).

Prior to the 1920's, agriculture was a leading cause in the increase of carbon dioxide releases in the environment. While that is no longer the case, it is noted that current agricultural practices, while important to society, are causing detrimental effects to our environment both locally and globally. It is clear that agriculture causes harmful levels of pathogens and chemicals in our environment and increases levels of greenhouse gases in the air as a result of agriculture (Rodriguez *et al.*, 2004). As a species with an ever-growing population, humans have had to invent new ways to keep themselves nourished. Throughout recorded history, the feeding process has involved using agro chemicals to increase seasonal crop output. Since the development of the Haber-Bosch process, chemically produced fertilizers have come into widespread use (Rodriguez *et al.*, 2004). The increased use of agro chemicals to expand food supplies have come at a large cost to our environment (Litterman *et al.*, 2003).

The primary objective of agriculture is to produce a reliable supply of food for the increasing world population. It plays an important role as a source of food, of foreign exchange for imports and of exports, employment and imports for other sectors in the economies of many industrialized as well as developing countries (Kughur, 2012). Crop production has however, been threatened by various insects, weeds among others. The FAO has estimated pre-harvest crops losses due to weed infestation, plant diseases; arthropods (largely insects and termites) to be around 30 to 35%, and post-harvest losses (grain storage, etc.) amounted to an additional 10 – 20% (FAO, 1993).

In order to arrest these problems, agro chemicals have become an increasingly necessary operation in the consistent and economic production of crops. In addition to agricultural diversification and yield optimization, chemical weed control has formed an integral part of the policies of many governments world over (Kughur, 2012). With benefits of herbicides control ranking high, negative effects on the environment and human health generated mainly by lack of knowledge regarding safety parameters on the part of the users have made herbicides use in agriculture one of the most controversial issues (Miller, 2002).

Concerns about the safety and quality of food, combined with increased environmental awareness, have led to a need for sustainable agricultural production systems. One of the major goals of sustainable agricultural system is reducing use of chemical inputs in agriculture. Integrated pest management is one approach which deals with these issues. The potential negative environmental impacts of modern agricultural practices have long been recognized as major public health concerns. By official estimates, average of 23,000 tons of pesticides used in Nigeria each year (not including granules) and by unofficial calculations, $120 million spent on pesticides each year. Dependency on chemical pest control and improper pesticide use has resulted to crop and environmental contamination and detrimental effects on humans. Hence, many of the techniques or practices collectively referred to as integrated pest management (IPM) have been designed to address some of the health and environmental concerns of pesticide use and the problem of pest resistance to pesticides. In general, IPM is defined as a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks (Samiee *et al.*, 2009). In other words, IPM is a management approach that encourages natural control of pest populations by anticipating pest problems and preventing pests from reaching economically damaging levels. All appropriate techniques are used such as enhancing natural enemies, planting pest-resistant crops and using pesticides judiciously. While IPM practices emphasize minimal use of pesticides in controlling pests, their adoption by farmers can reduce the use of pesticides and their adverse impacts. It is important to recognize the fact that IPM involves “a complex set of behaviour, decision-making procedures and methods, technology and values organized to provide efficient alternative methods to pest management” (Apple and Smith, 1976). Generally, researchers and extension agents are often frustrated by slower than expected adoption levels for agricultural innovations. Slow rates of adoption cause a loss of potential benefit of sustainable practices to growers and the public. This is why so much attention has been given to try and understand what drives adoption of new technology among farmers (Pannell *et al.*, 2006 and Rogers, 2005).

Four main elements which influence the spread of new idea include the innovation itself, communication channels, time and social system. The innovation must be widely adopted in order to be self-sustain. Within the rate of adoption, there is a point at which an innovation reaches critical mass. However new agricultural technologies are often adopted slowly and several aspects of adoption remain poorly understood despite being seen as an important route out of poverty in most of the developing countries (Bandiera and Rasul, 2002).

Unarguably, pest management problem has always been a very costly aspect in any crop production process given the abundance of pest and susceptibility of most crops. Today, many pest management practices have been developed and made available to famers one of which is: integrated pest management system, nevertheless there seem to be a minimal level of adoption of the integrated pest management practice by farmers. Integrated pest management is a practice or technology which when adopted by famers would reduce the cost of buying pesticides and emphasizes the minimal use of pesticide which has potential negative effect on users, our food and environment (Korir *et al.*, 2015). Integrated pest management practices are usually adopted by farmers for the purpose of improved crop profitability due to better pest control measures and appropriate use of crop protection tools, stable, reliable and quality crop yields, decreased severity of pest infestations, reduced potential for problems of pest resistance or resurgence, increased consumer confidence in the safety and quality of food and fibre products. Integrated pest management (IPM) is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices and use of resistant varieties.

Materials and Method

The study was conducted in Okpokwu Local Government Areas (LGA) of Benue State. Okpokwu LGA was created in 1976 and takes its name from the Okpokwu stream; it has an area of 731 km² and a population of 176,647. The LGA is made up of Okpoga, Edumoga and Ichama districts with Okpoga as the headquarters. Okpokwu LGA lies between latitude 6°.45 and longitude 7°.15 (NPC, 2006)

The people of the area speak a dialect of Idoma and are predominantly farmers; crops like citrus, cassava, maize, cowpea and groundnut are the main produce from the area. Dry and rainy seasons are experienced in the area. The rainy season starts from late April to early November and dry season starts from November to March. The inhabitants of the area also engage in cloth weaving as well as poultry rearing. The LGA is bordered with Otukpo LGA to the North, Ado LGA to the East, Oju LGA to the west, Ohimini LGA and Enugu State to the South. The biggest town in Okpokwu LGA is Ugbokolo, which is home to Benue State Polytechnic; other towns in the Local Government Area include Eke-Nobi, Eke-Olengbecho, Eke-Agide, Ojigo, Ella, Amejo and Okonobo.

The population of the study consisted of all the rural farmers in the area. Due to the enormity of the population, 150 cowpea farmers (respondents) were selected as sample size using sample random sampling technique. Okpokwu Local Government is made up of twelve council wards. Five council wards were selected purposively based on adoption of integrated pest management (IPM) practices, the council wards were; Ingle, Okonobo, Amejo, Ojigo and Ugbokolo. Thirty (30) respondents were selected from each of the five council wards chosen given a total of one hundred and fifty (150) respondents randomly selected for the purpose of the study. Structured questionnaire was used for collection of data

Data gathered were analyzed using descriptive such as frequencies, percentages and Logit regression.

Logit Regression Model

Logit regression of the form:

$Z = \alpha + b_1 x_1 + b_2 x_2 + \ldots\ldots\ldots. b_9 x_9$

Where z = probability that a farmer adopts integrated pest management practices (IPM)

(1= adopted and 0 = not adopted)
α = Constant
$b_1 - b_2$ = Coefficients of explanatory changes in Z caused by changes in X
1= Age, 2 = Sex, 3 = Household size, 4 = Education, 5 = Farming experience, 6 = Farm size
7 = Extension contact, 8 = Membership in Farmers' organization and 9 = Experience in pest management techniques.
Age: in years 1, 2, 3, 4, etc; education (dummy: more than secondary school =1, otherwise = 0); household size: 1, 2, 3, 4, etc; number of people in a family; farming experience: number of years 1,2,3,4, etc; major occupation: (dummy: farming =1 otherwise 0); farm size: (ha) 1, 2, 3, etc, extension contact: (dummy: 1= high and 0 = low); farmers membership of association (dummy 1= yes and No = 0) and experience in pest management technologies (years 1, 2, 3, etc.).

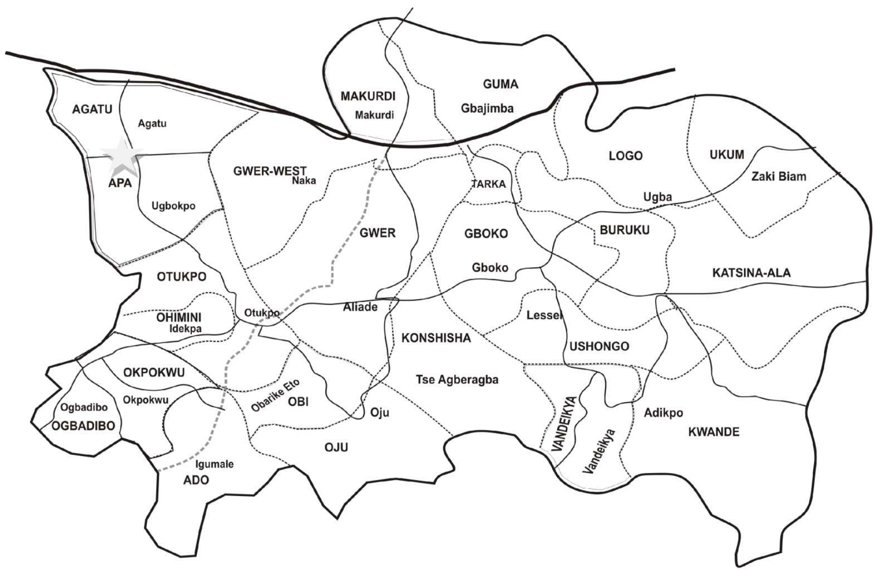

Fig .1 Map of Benue State indicating the study area with a star

Results and Discussion

Results in Table 1 show the age of the respondents 21-40, years 56.0%; 41-60 years, 40.0%; 61 years above, 3.3% and less than 20 years, 0.7%. Majority (56.0%) of the respondents were young people between 21-40 years. Young people are very active in all spares of life. Young farmers are more willing to adopt new technologies than elders because the young farmers are more open to innovations, access more information, willing to try new ideas and are not averse to risk. According to Bonabana-Wabbi (1998), age is typically found to be negatively correlated with adoption. This relationship is explained by the assumption that as farmers grow older, there is an increase in risk aversion and a decreased interest in long-term investment in the farm. Younger farmers are typically less risk-averse and are more willing to try new technologies (Adesina and Zinnah, 1993). It is expected that older farmers have more experience, but this may be counteracted by younger farmers being more innovative.

Table 1: Demographic Characteristics of the Respondents

Variable	Frequency	Percentage
Age (years)		
21-40	84	56.0
41-60	60	40.0
61 and above	5	3.3
Less than 20	1	0.7
Total	**150**	**100**
Sex		
Male	101	67.3
Female	49	32.7
Total	**150**	**100**
Marital status		
Married	140	93.3
Single	9	6.0
Divorced	1	0.7
Total	**150**	**100**
Household size (Persons)		
At least 5 persons	85	56.0
6-10	60	40.0
11-15	5	3.3
16 and above	1	0.7
Total	**150**	**100**
Level of education		
NCE/National Diploma	122	81.3
Primary	24	16.0
Bachelor degree	4	2.7
Total	**150**	**100**
Farming experience (Years)		
6-15	117	78.0
16-25	18	12.0
26 and above	10	6.7
Less than 5	5	3.3
Total	**150**	**100**
Farm size (ha)		
2.51-4.00	64	42.7
5.00 and above	33	22.0
2.00-2.50	28	18.7
Less than 1	25	16.7
Total	**150**	**100**
Experience in pest management technologies (years)		
Less than 3	63	42.7
4-5	47	31.3
6-7	22	14.7
8-9	10	6.7
10 and above	7	4.7
Total	**150**	**100**
Major occupation		
Farming	149	99.3
Fishing	1	0.7
Total	**150**	**100**

Results in Table 1 show that male 67.3% and females 32.7%. Majority (67.3%) of the respondents were males, indicating that farming activities in the area was dominated by men. Farmers in female-headed households were less likely to use new technologies. Male heads of households have better access to resources needed to use improved technologies, for themselves and for their wives. In Nigeria in particular and Africa in general, customary laws limits ladies/females access to land, credit and other farm inputs making it very difficult for female headed households to access such inputs necessary for efficient agricultural production. The finding contradicts Oluwatayo (2014) who reported that a high proportion of rice farmers surveyed in rural south west Nigeria were females. Similarly, the finding also contradicts Kughur (2014) who stated that more than 50% of farming activities in Nigeria are carried out by women.

Results in Table 1 shows marital status married, 93.3%; single, 6.0% and divorced, 0.7%. Majority (93.3%) were married. Married people have responsibilities taking care of their families. In African culture, people of marriage age who are not married are not respected in their society because marriage is looked upon as a way of perpetuating life and an indication that one has become an adult and above all addition of responsibility. In contrast matured people who are not married are not respected the same way married people are respected and at times denied opportunity to speak in public places for not been responsible.

Results in Table 1 show household size (persons) less than 5, 56.0%; 6-10, 40.0 % and11-15, 3.3 %. Majority (56.0%) had at least 5 people in their household, this implies that the number of people living in most of the household was moderate and this could impede adoption because household size is directly related adoption. Larger households adopt new technologies more often than smaller households, holding other factors constant. This confirms Feder *et al.* (1985) who reported that households containing many members are able to participate in on-farm activities which enable farmers to adopt labour-intensive technologies. However, farmers with smaller family size will prefer labour saving device to avoid cost.

Results in Table 1 indicates level of education (Nigeria Certificate in Education) NCE, 81.3 %; primary, 16.0% and university, 2.7 %. A large portion of the respondents acquired NCE indicating reasonable literacy level among respondents. Education is very important in widening farmers' horizon especially in accepting innovations, it also make farmers receptive to innovations. It is expected that farmers with higher levels of education will be more likely to use improved technologies. The finding is similar to Ekwe and Nwachukwu (2006) who stated that educational status of farmers enables them to make better assessment of the technology. Education makes people change-oriented. Educated person believes that change is a vehicle for improvement in human conditions, whereas the uneducated is averse to change. The finding corroborates Feder and Slade (1984) who reported that formal education increases the farmer's ability to understand and respond to information concerning new technologies. Similarly Rahm and Huffman (1984) observed that education as a human capital increases the ability to think analytically, make practical adoption decisions and use a technology appropriately.

Results in Table 1 shows farming experience in years 6-15, 78.0%; 16-25, 12%; 26 above, 6.7% and less than, 5 3.3%. Majority (78.0%) had farming experience of between 6-15 years. This implies that the respondents have reasonable years of farming experience. Farming experience is a very important factor in adoption of agricultural innovations. Farmers who are experienced look forward in identifying certain basic facts of an innovation in terms of changes in output brought about by a new technology, inputs utilization among others to determine whether an innovation could be adopted or not. The findings confirms Idirisa *et al.* (2006) who reported that years of farming experience is important because management skills of farmers improve with experience which indicates good signal for adoption of improved technologies as experienced farmers tends to understand the importance of adoption technologies in farming.

Results in Table 1 show farm size in hectares 2.51-4.0ha, 42.7%; 5.0ha and above, 22%; 2.0-2.50ha, 18.7%; less than1.0ha, 16.7%. A reasonable proportion of the respondents had at least 4ha of farmland. The size of land owned by a farmer affects adoption. Size of individual landholding by farmers determines to a certain extent adoption of technologies; the larger the farm size the higher the probability to adopt innovations and vice versa. This corroborates Feder and Slade (1984) who reported that farmers with larger farms invest more in information acquisition and accumulate knowledge that leads to adoption.

Results in Table 1 show major occupation farming, 99.3% and fishermen, 0.7%. Majority (99.3%) of the respondents were farmers, a high proportion of people living in the rural areas are farmers. In few cases where residents of rural areas engage in other ventures, they practice farming on part time basis. For people of the study area farming is their mainstay, there is no doubt that Benue State is the ''food basket of the nation''. Benue State also has fertile soil and a good climate to produce crops that are not produce from the far north and in the southern part of Nigeria.

Table 2: Distribution of Respondents by Sources of Information on Integrated Pest Management Practices

Variable	Frequency	Percentage
Friends	137	91.3
Bulletins	98	64.076
Farmers' organizations	76	50.7
Neighbours	40	26.7
Radio	26	17.3
Extension agents	21	14.0
Newspapers	13	8.7
Non-Governmental Organizations (NGOs)	1	0.7

*Multiple Responses *

Results in Table 2 show sources of information bulletin, 91.3%; friends, 64.0%; farmers' organization, 50.7%; neighbours, 26.7%; radio, 17.3%; extension agents, 14.0%; newspapers, 8.7% and NGO, 0.7%. Majority (91.3%) obtained information on IPM practices from friends. IPM techniques are relatively complex and therefore require sufficient knowledge for successful implementation. This means friends who got information about IPM practices informed their co-farmers and continuously provided them with information concerning IPM practices. This finding is similar to Mauceri *et al.* (2005) who observed that complex messages on IPM practices include knowledge of the pest life cycle, understanding the use of traps and monitoring of pest populations, use of systemic versus protectant pesticides and use of different active ingredients to prevent build up of resistance in pests. The complexity of the IPM techniques requires someone that would provide constant information and teach the farmer who is making use of IPM practices for the first time carefully. Friends as a mean of obtaining information are very cheap which does not require any formal meeting before the information is told. Other messages can be understood with minimum explanation, such as early harvests, crop rotations, use of resistant varieties. Access to information affects farmers' perceptions of risk. The finding contradicts Feder *et al.* (2003) who stated that having sufficient knowledge about the technology enables farmers to optimize decision-making, farmers also consider other farmers to be the most important source of agriculture information, but prefer more specifically trained sources as the complexity of the message increases.

Table 3: Distribution of Respondents by Integrated Pest Management Practices Adopted

Variable	Frequency	Percentage
Crop rotation	102	68.0
Use of pest resistance varieties	93	62.0
Fallow cropping	89	59.3
Removal of weeds	66	44.0
Pesticides less toxic to beneficial insects	20	13.3
Pesticides with short residual activity	5	3.3

*Multiple Responses *

Results in Table 3 indicate IPM practices adopted that crop rotation, 68.0%; uses of pest resistant varieties, 62.0%; fallow cropping, 59.3%; removal of weeds, 44.4%; pesticide less toxic to beneficial insects, 13.3% and pesticide with short residual activity, 3.3%. Majority (68.0%) adopted crop rotation. Crop rotation is a farm practice that is very simple which does not cost anything. Farmers could only be introduce to the practice and taught the principles of crop rotation which are very safe to the environment, crops and human beings in addition to nutrients that are released to the soil as a result of the practice for proper crops growth and high yield. In terms of complexity of some of the techniques that are associated with IPM practices, crop rotation is one of the simplest techniques that could be adopted by the farmers.

Table 4: Effects of Selected Socio-economic Characteristics on Adoption of Integrated Pest Management Practices

Variable	B.	Wald	Sig.
Age	-.047	242	.623
Sex	-.887	1.143	.282
Household size	-.100	.169	681
Education	.430	4.016**	.045
Farming experience	.074	.370	.543
Farm size	0.693	2.859***	.091
Extension contact	24.219	.000	.998
Farmers' organization	6.977	13.411*	.000
Experience on pest management techniques	.570	3.320***	.068
Hosmer and Lemeshow =8.373 Nagelkerke R^2=0.519	-8.270	7.061	.008

*, **, *** Wald test significance at 1%, 5%, 10%.

Results in Table 4 reveal non-significance of hosmer and lemeshow statistics (chi-square = 8.373, P >0.05) implying that the model is not significantly different from the standard model. The significance of chi-square (X^2) test of the model coefficient (x^2 = 41.747<0.01) indicated that the socio-economic variables included in the model were significantly related to adoption of integrated pest management practices. Hence the null hypothesis that selected socio-economic characteristics do not significantly influence level of adoption of integrated pest management practice is therefore rejected.

Results of the coefficient show that education (0.430) was statistically significant at P> 0.05 implying that increase in education level by farmers would increase the probability of high adoption of integrated pest management practices, farm size (0.693), farmers' organization (6.977) was statistically significant at P> 0.01, farm size and farming experience were statistically significant at P> 0.00 and experience in pest management techniques (0.579).They were positive

(+) and statistically significant (P ≤ 0.1) specifically the positive (+) and significant coefficient of education at 1%.

Table 5: Level of Adoption of Integrated Pest Management Practices

Level of Adoption	Frequency	Percentage
Moderate	107	71.3
High	16	10.7
Low	15	10.0
Very high	12	0.8
Total	**150**	**100**

Results in Table 5 indicate adoption level of the respondents moderate, 71.3 %; high, 10.7 %; low, 10.0% and very high, 8.0 %. A high (71.3 %) proportion of the respondents' adoption level of IPM practices was moderate. This implies that farmers were reluctant in adoption of IPM practices. IPM practices involve some complex technologies and techniques, farmers who have been exposed to the technology at the first time may not adopt the technology readily because most farmers are risk-averse. New technologies that are complex are gradually adopted by the farmers and are compared with the already existing technologies over time to ascertain the advantage of the new technology over the old one. This confirms finding Bonabana-Wabbi (1998) who reported that complex technologies are adopted in such a way that normal adoption curve could be observed if an adoption graph is plotted, this is because the farmers would observe the technology first leaving the innovators to adopt first and it will be followed by other set of adopters.

Table 6: Descriptive Statistics of Determinants of Adoption of Integrated Pest Management Practices

Variable	Frequency	Percentage
Level of diseases attack	149	96.7
Level of insects/pests problems	142	94.7
Previous knowledge of the farmer on IPM practices	139	92.7
Years of farming experience	139	92.7
Contact with extension agent	133	88.7
Membership in farmers' organization	131	87.3
Level of education	115	76.7
Farm size	99	66.0
Sex	98	65.3
Income of the farmer	91	60.7
Age	73	48.7
Availability of biological control agents	37	24.7
Access to credit	19	12.7
Farmers confidence in practicing IPM	11	7.3

*Multiple responses *

Results in Table 6 depict determinants of adoption level of diseases attack, 96.7%; level of insects/pests problems, 94.7%; previous knowledge of the farmer on IPM practices, 92.7%; years of farming experience, 92.7%; contact with extension agents, 88.7%; membership in farmers' organization/association, 87.3%; level of education, 76.7%; farm size, 66.0%; sex, 65.3%; income of the farmer, 60.7%; age, 48.7%; availability of biological control agent, 24.7%; access to credit, 12.6% and farmers confidence in practicing IPM, 7.3%. Majority (96.7%) of the respondents, level of disease problems was a major determinant of adoption of IPM practices. One of the main reasons for adopting IPM practices is to reduce/prevent diseases/pest infestation on crops. Since the farmer's primary objective of adopting IPM practices is to reduce/prevent disease/pest problems most of the farmers will looked at the level of diseases infestation as the major thing that could make them to employ IPM practices.

Table 7: Distribution of Respondents According to Extension Contact

Rate of extension contact	Frequency	Percentage
Low	133	88.7
Fair	8	5.3
High	6	4.0
Do not know	3	2.0
Total	**150**	**100**

Results in Table 7 indicate rate of extension contact low, 88.7%; fair, 5.30%; high, 4.0% and do know, 3.0%. A major (88.7%) proportion of the respondents extension contact was low. The low level of contact between extension agents and farmers could be attributed to a very few number of extension agents available in the field covering a relatively large number of farmers in the study area. The ratio of extension worker to farmers in some places in Nigeria is 1: 5000, while in some places like in the Southwest is 1: 1850. In some states in Nigeria including Benue State extension workers have not been recruited for the past 10 years the result of which has created a vacuum that has left many farmers dwindling with a very little or no level of agricultural education that could facilitate adoption. Farmers must have information about new technologies before they can consider adopting them. Since extension service is an important means for farmers to get information on new technologies, variables about extension services are often used as a measure of access to information.

The findings of the study corroborates Grieshop *et al.* (1988) who reported that growers sources of information and previous experience with IPM, are important socio-economic considerations that affect the decision making process and the eventual adoption rate of the IPM programme. Escalada and Heong (1993) attributed the slow spread of IPM techniques to lack of knowledge among growers and concluded that farmer field schools would accelerate adoption by providing growers with the opportunity for experiential learning of IPM skills. On the contrary, Rogers (2005) and Okunade (2006) stated that characteristics of change agents or advocates for the innovation, such as competency, credibility, communication ability and confidence are identified as factors which influence adoption.

Table 8: Problems Encountered By Adoption of Integrated Pest Management Practices

Problems encountered	Frequency	Percentage
Inadequate information on IPM practices from extension agents	85	56.7
Inadequate extension visits generally	82	54.7
Other sources of information on IPM practices are limited	61	40.7
IPM practices cannot be adopted easily	50	33.3

*Multiple responses *

Results in Table 8 show problems encountered inadequate information on IPM practices from extension agents, 56.7%; inadequate extension visits generally, 54.7%; other sources of information on IPM are limited, 40.7% and IPM practices cannot be adopted easily 33.3%. Majority (56.7%) of the respondents stated that inadequate information on IPM practices was one of the major problems affecting the adoption of IPM practices. Access to information affects farmers' perception of risk. Having sufficient knowledge about technologies enable farmers to optimize decision-making processes. This confirms Kughur, *et al.* (2015) who stated that information plays a pivotal role in the society at all times. Information is very crucial for everyday living of people all over the world and it enables people to relate with one another including farmers. Similarly, Feder *et al.* (2004) found that farmers consider other farmers to be the most important source of agriculture information, but prefer more specifically trained sources as the complexity of the message increases.

Conclusion and recommendations

Integrated pest management practices are friendly agricultural practices that are capable of reducing environmental degradation brought about by application of agro-chemicals. IPM approach emphasizes the use of non-chemical inputs and judicious use of chemical inputs in production to reduce pest incidence on crops, thereby increasing farmers' yields and returns. This approach is recommended globally for increasing agricultural production without upsetting the balance of nature while controlling pests. Farmers in many communities are not aware of the effects of the practices hence always make use of agro-chemicals even when the level of damage by pests/diseases does warrant the application of such chemicals, the education of farmers in this direction would go a long way in reducing the hazards impose in our environment by application of chemicals for weeds control. It is recommended that more agricultural extension workers should be trained in the area of integrated pest management practices to provide more information to the farmers, information provided by extension workers should be very explicit and more extension workers should regularly visit farmers and educate them on IPM practices to reduce the complications identified by farmers in adopting IPM practices.

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