Journal of Community & Communication Research
ISSN: 2635-3318
Volume 4, No. 2 December 2019
Pp. 165-174

Assessment of farmers' knowledge, attitude and practice of agronomic crop production among smallholder farmers in Imo State, Nigeria

Accessible at: https://jccr.sccdr.org.ng/index.php/jccr/issue/view/1

Obinna, Leo O.
Department of Agricultural Extension and Rural Development
Michael Okpara University of Agriculture, Umudike Nigeria
Corresponding Author's Email: obinna.leo@2gmail.com
Apu, Uchechi
Department of Agricultural Extension and Rural Development
Michael Okpara University of Agriculture, Umudike Nigeria

Review Process: Received: 28/11/19 Reviewed: 15/12/19 Accepted: 27/12/19

ABSTRACT
The study assessed the knowledge, Attitude and Practice (KAP) levels of the smallholder farmers in Best Agronomic Practices (BAP) in crop production in Imo State. A sample size of 120 respondents (66.7 % males and 33.3% females) was realized via a multi- stage simple random sampling technique. Data generated via structured questionnaire and interview schedule were analyzed using frequency, percentages, mean and Spearman's correlation coefficient. A mean age of 49 years, a mean household size of 6 persons, mean years of business experience of 16 years, a mean monthly income of ₦30,683.33, and a mean farm size of 0.7 hectares were recorded respectively by the respondents. Seventeen percent of the respondents never had any extension contacts, and 83 % had between once every 2 years and once every month of extension contacts. Results showed high (X= 55.6 %) knowledge level, a moderate (X= 2.3) attitude level and a low (X= 1.92) practice level respectively in BAPs crop production. There was no significant relationship between the knowledge level and practice level in BAP on Crop Production. The study recommends that Government and other stakeholders should improve upon funding and management of extension delivery services in the study area in order for extension to effectively raise the practice level of the respondents in BAPs on crop production as to ensure sustainability of the environment.

Keywords: ***Best Agronomic Practices (BAP), Crop Production, Smallholder Farmers.***

INTRODUCTION

The need to improve environmental performance for agriculture, by achieving eco - friendly situations through best agronomic practices in order to ensure sustainability of resource- base has severally been emphasized (Agbarevo, 2016 and Moswetsi, Fanadzo and Ncube, 2017). Agriculture is the most dominant land use and major user of land and water resources in Nigeria (NAERLS), 2017). It creates employment for about 70% of rural dwellers who engage in it and its' related activities, it produces primary materials for

industries, provides food for animals and humans, and also the second foreign exchange earner after oil for the country Nigeria (Ekong, 2010). Therefore, for agriculture to remain viable within the conservation needs of the farm, surroundings and management techniques must be able to preserve and restore the critical resource – base (soil and water) as to ensure sustainability

Similarly, Ekong (2010) noted that agriculture in the South Eastern Zone of Nigeria is mostly rain – fed, small- scale and fallow extractive in nature therefore, that any change in environment is bound to impact on productivity and other socio- economics activities of the farmers in the zone. On that note, Obinna (2015) observed that farmers in the South Eastern Zone of Nigeria are confronted with the problems of agricultural land scarcity caused by high population densities, diversion of agricultural lands to other uses, coupled with the soil that is structurally fragile and burdened with unfavourable land tenure situations, and over dependency of agricultural activities on the vagaries of the weather, aggravated by inconsistence in the onset of the rains and their distributions during the rainy season among other limiting factors have compelled the farmers in the zone to farm on marginal lands in an unsustainable manner thereby degrading the soil and polluting the water- resources.

In addition, Asiabaka (2012) noted that in Imo State due to pressure of population growth on lands and other factors that the traditional methods of maintaining soil fertility by organic fertilizers and use of trees in many parts of the State have disappeared partly or completely. As such soil degradation and erosion take place in a large scale, but also that traditional knowledge and skills as well as indigenous genetic resources practices are being eroded away. Several studies have equally, shown that in recent times, poverty level and hunger are in the increase in Nigeria and Imo state inclusive. This has been attributed to poor farm returns, high cost of labour, lack of funding for ADPs to carry out their extension work effectively, high inflation rates, and high cost for food items, which have made Imo state to be food insecure (Okoroh, Olaolu and Igbokwe, 2016).

It is in the light of the above that the study sought to assess the gap in knowledge, Attitude and Practice (KAP) levels of the respondents in Best Agronomic Practices (BAPs) in crop production in the study area. The following objectives guided the study:

(i) examine the socio- economic characteristics of the smallholder farmers;
(ii) ascertain the knowledge level of the respondents in BAPs in crop production;
(iii) ascertain the attitude level of the respondents in BAPs in crop production, and
(iv) ascertain the practice level of the respondents in BAPs in crop production.

It was hypothesized that there was no significant relationship between the knowledge level of the respondents and their practice level in BAPs in crop production in the study area.

METHODOLOGY

The study was conducted in Imo State, Nigeria. Imo State is located in the South- Eastern Ecological Zone of Nigeria. It lies between Longitude 6° 50' and 7° 25' East of the Greenwich Meridian and Latitude 4° 45'and 7° 15' North of the Equator. A multi- stage and simple random method was employed alongside purposive sampling technique in selecting a sample size of 120 respondents. Stage1; the 3 Agricultural Zones of the state were purposively selected. Stage 2, made use of simple random method, to select 2 Agricultural Blocks from each of the 3 Agricultural Zones to give 6 Agricultural Blocks. Stage 3, also made use of simple random method, to select 2 Agricultural Cycles from each of the 6 Agricultural blocks to give 12 cycles. Stage 4, equally, used simple random method with

the assistance of Extension Agents, to select 10 respondents from each of the 12 cycles to give a total of 120 respondents that were used for the study. Primary data were generated via the use of questionnaire and interview schedule and were analyzed using frequency counts, percentages, means, pooled means and Spearman's Coefficient of Correlation.

The gap in knowledge, Attitude and Practice (KAP) level of the respondents in BAPs in crop production in the study area stressed the need to provide strategic, critical, and "quality" information, which included non -technological information as the reasons why low practice level of best agronomic practices in crop production which might be related to socio- psychological, socio cultural, and socio economic factors. It was based on this that the respondents' KAP levels in BAPs were weighted and scored as follows: The knowledge level of the respondents was measured through a 16 item statements, where the respondents were asked to indicate if they were aware scored one point and if not aware scored zero point in all the 16 item statements in BAPs in crop production in the study area. A percentage score of all the positive responses of the respondents on the 16 item statements was computed based on the number scored divided by16 and multiplied by 100 to give percentage score for each of the BAPs.

A bench score of 50% was established. Any % score ≥ 50 % was regarded as a knowledgeable practice while any % score < 50 % was regarded as not knowledgeable practice. The Knowledge level of the respondent was categorized as follows: From 0% - 49 % = low knowledge level, and 50 % - 100% = high knowledge level. Attitude of the respondents in BAPs was measured on 16 item statements as well in BAPs through a 4 point Likert type scale of strongly agree, weighted 4 points, agree weighted 3 points, disagree weighted 2 points and strongly disagree weighted 1 point respectively. A bench mark of 2.5 was established and any of the BAPs that had any mean score ≥ 2.5 was regarded as positive attitude while on the other hand any mean score < 2.5 was regarded as negative attitude. The attitudinal level of the respondents in BAPs in crop production was categorized as follows: 0.0- 0.99 = very low attitude level. 1.00 – 1.99 = low attitude level 2.00 - 2.99 = moderate attitude level and 3.00 - 4.00 = high attitude level. The practice level was measured through a 4 point Likert type scale of always weighted 4 points, often weighted 3 points, sometime weighted 2 points and never weighted 1 point respectively. A mean of 2.5 was established in that any mean score ≥ 2.5 was regarded as practiced while any mean score < 2.5 was regarded as not practiced. The level of practice of the respondents was categorized as follows:

0.00 - 0.99 very low level of practice
1.00 - 1.99 low practice level
2.00 - 2.99 moderate practice level
3.00- 4.00 high practice level

RESULTS AND DISCUSSION

Socioeconomic Characteristics.

The Socio- Economic Characteristics is as presented in Table 1. Table 1 shows that the mean age of the respondents was 49 years, 66.7 % were males and 33.3 % females and 15 % were single, 75 % married, 4.2 % divorced / separated and 5.8 % widows respectively. This implied that the respondents were mature, responsible and at the peak of their socio-economic activities (Ekong, 2010). About 91.7 % of the respondents were literates. This implied that a very high proportion (91.7 %) of the respondents could read and write. Table 1 equally shows that 41.7 % of the respondents were farmers, 48.3 % traders, 1.7 % civil

servants and 8.3 % other professions. The higher percent (58.3 %) of the respondents that were involved in non- farming activities confirmed that there is problem of farm- land scarcity and poor farm returns confronting them in the study area which have forced them to go into non- farming activities in order to make ends meet. A mean household size of 6 persons was recorded. This is very typical of the rural households in the Southern part of Nigeria as postulated by Ekong (2010). A mean monthly income of ₦ 30,683.33 was equally recorded. This could be due to the fact that a reasonable proportion (58.3%) of the respondents were involved in non- farming activities which gave higher monthly returns. Table 1 further recorded a mean farm size of 0.7 hectares. This could be due to scarcity of farm- lands because of population pressure and diversion of agricultural land to other uses. About 16 years of mean years of business experience was recorded and 25% of the respondents were into mixed-farming, and 50 %, 6.3 %, 8.3% and 3.3% were into crop-production, livestock production, bee-keeping, fisheries, snailery respectively. The implication was that the respondents were into all these types of farming activities due to scarcity of farm land that is characteristic of the Zone and also to diversify as safety net measures since returns from farming are poor and inconsistent (Obinna, 2015). About 12.5% of the respondents practiced shifting cultivation, 16.7%, 37.5 %, 12.5 % and 20.8% were into fallow / crop rotation, continuous cultivation, alley – farming, and agro- forestry respectively. Respondents in the study area practiced all these types of cultivations as to find solution to the problem of soil degradation that is very common. Table 1 finally shows that 16.7 % of the respondents had no extension contacts, and about 83.3% had between once every 2 years and once every month of extension contacts. This might be due to poor funding of Extension by the ADP in the study area which has made the extension not to carry out its function effectively.

Table 1: Distribution of the Respondents According to Socio- economic Characteristics (n= 120)

Variables	Frequency	Percentage	Cumulative Frequency	Mean
Age in years				
≤ 25	08	6.67	6.67	
26 - 36	15	12.50	19.17	
37 - 47	28	23.33	42.50	49 years
48 - 58	32	26.67	69.17	
59 - 69	25	20.83	90.00	
70 & above	12	10.00	100.00	
Sex				
Male	80	66.67	66.67	
Female	40	33.33	100.00	
Marital Status				
Single	18	15.00	15.00	
Married	90	75.00	90.00	
Separated/ Divorced	5	4.17	94.17	
Widow	7	5.83	100.00	
Educational Attainment				
No formal education	10	8.33	8.33	
Primary school completed	60	50.00	58.33	
Sec School completed	40	33.33	91.66	
Higher education completed	10	8.33	99.99	
Table 1 continued				

Variables	Frequency	Percentage	Cumulative Frequency	Mean
Occupation				
Farming	50	41.67	41.67	
Trading	58	48.33	90.00	
Civil service	02	1.67	91.67	
Other profession	10	8.33	100.00	
Household Size				
≤ 4	30	25.00	25.00	
5 - 7	60	50.00	75.00	6 persons
8 & above	30	25.00	100.00	
Monthly income (₦)				
≤ 20,000.00	30	25.00	25.00	
21,000.00 – 31,000.00	40	33.33	58.33	
32,000.00 – 42,000.00	30	25.00	83.33	
43,000.00 – 53,000.00	10	8.33	91.66	₦30,683.33
54,000.00 - 64,000.00	08	6.67	98.33	
65,000.00 & above	02	1.67	100.00	
Farm size in hectares				
≤ 0.1	30	25.00	25.00	
0.2 - 0.7	40	33.33	58.33	
0.8 - 1.3	30	25.00	83.33	0.79 hectares
1.4 & above	20	16.67	100.00	
Farming Experience in yrs				
≤ 10	10	8.33	8.33	
11 - 21	30	25.00	33.33	
22 - 32	40	33.33	66.66	16.17 years
34 & above	40	33.33	99.99	
Type of Farming				
Mixed Farming	30	25.00	25.00	
Crop Production	60	50.00	75.00	
Livestock Production	08	6.33	81.33	
Fisheries	10	8.33	89.66	
Bee- keeping	08	6.33	95.99	
Snailery	04	3.33	100.00	
Farming System				
Shifting cultivation	15	12.50	12.50	
Fallow/ crop rotation	20	16.67	29.17	
Continuous cultivation	45	37.50	66.67	
Alley farming	15	12.50	79.17	
Agro- forestry	25	20.83	100.00	
Frequency of Extension contacts				
None	20	16.67	16,67	
Once every 2 years	20	16.67	33.34	
Once every year	15	12.50	45.84	
Once every 6 months	25	20.83	66.67	
Once every 3 months	20	16.67	83.34	
Once every month	20	16.67	100.0	

Source Field Survey 2019

Determination of Knowledge Level of the Respondents in BAPs in Crop Production

The Knowledge Level in BAPs in Crop Production is as presented in Table 2. Table 2 shows that the respondents had high ($\bar{X} \geq 50\%$) knowledge level on 12 item statements of BAPs in crop production out of 16 item statements. The ones they indicated low ($\bar{X}$ = 0 - 49 %) knowledge level included knowledge on correct plant geometry ($\bar{X}$=41.66 %), recommended tillage operations for each crop ($\bar{X}$= 45.83 %), mulching technique against water loss (($\bar{X}$ = 45.83%) and optimum cropping patterns ($\bar{X}$ = 45. 83 %) respectively. It implied that these were highly technical innovations that normally come from the scientists' research stations and transmitted to the farmers by the Extension Agents. Therefore, in conclusion, the respondents in the study area had a high (($\bar{X} \geq 50\%$) knowledge level in BAPs on crop production since the grand mean ($\bar{X}$ = 55.63 %).

Table 2: Distribution of the Respondents According to Knowledge level in BAPs Crop Production (n= 120)

S/No	Best- Agronomic Practices	Frequency	Percentage scores	Knowledge Level
01	Do you know about improved cultivar	80	66.67	High
02	Do you know about recommended planting dates for each crop	70	58.33	High
03	Do you know about the correct planting population for each crop	70	58.33	High
04	Do you know about correct plant geometry as recommended	50	41.66	Low
05	Do you know about the recommended tillage operations for each crop	55	45.83	Low
06	Do you know that you should incorporate plant residues in your farm	60	50.00	High
07	Do you know about mulching of your crops against the loss of water	55	45.83	Low
08	Do you know about optimum water and fertilizer management	60	50.00	High
09	Do you know about optimum cropping pattern for each crop	55	45.83	Low
10	Do you know about farm yard, cow dung, poultry droppings and compost manure	75	62.50	High
11	Do you know about integrated pest management system (IPM)	60	50.00	High
12	Do you know about cover cropping system of farming	70	58.33	High
13	Do you know about alley- farming	70	58.33	High
14	Do you know about agro – forestry system of farming	80	66.67	High
15	Do you know about liming to improve the texture and structure of the soil	70	58.33	High
16	Do you know about irrigation	90	75.00	High

Source: Field Survey 2019

Determination of the Attitude Level of the Respondents in BAPs in Crop Production in the Study Area.

The Attitude Level in BAPs in Crop Production is as presented in Table 3 below. Table 3 shows that the respondents had low ($\overline{\bar{X}}$= 1.00 - 1.99) attitude level in 6 item statements in BAPs in crop production. They include: following the correct planting dates increases

yield ($\bar{X}$ = 1.83), following the correct planting density (population) increase yield ($\overline{\bar{X}}$=1.75), following the recommended tillage operations increase yield $\bar{X}$= 1.63), following the optimum cropping pattern increases yield ($\bar{X}$= 1.79), use of organic manure improves soil structure and increases yield.

$\bar{X}$= 1.83), and integrated pest management (IPM) is the best way to sustain the environment (X=1.96). The respondents equally, indicated moderate ($\bar{X}$= 2.00 - 2.99) attitude level in 8 items statements out of 16 item statements. They include: planting improved cultivar is the best way to increase yield ($\bar{X}$=2.66), following the correct plant geometry increases yield ($\bar{X}$= 2.00), incorporating plant residues increases soil fertility $\bar{X}$= 2.50), mulching your crops protect your crop against water loss $\bar{X}$= 2.67), optimum fertilizer and water management is the best in farming $\bar{X}$=2.92), cover- cropping system improves soil fertility $\bar{X}$= 2.29), alley- farming protects and enriches the soil ($\bar{X}$=2.71), and agro- forestry system is the most sustainable way of farming in fragile soil ($\bar{X}$=2.63) . Table 3 equally shows that Farm yard residue, cow dung & poultry droppings improve the soil texture and structure and irrigation allows you to farm during the dry season respectively recorded high ($\bar{X}$= 3.O8) attitude level in BAPs in crop production. Table 3 finally shows that the grand mean ($\bar{X}$= 2.3) attitude level which implies that holistically the respondents in the study area had a moderate ($\bar{X}$= 2.00 – 2.99) attitude level in BAPs in crop production in the study area.

Table 3: Distribution of the Respondents According to their Attitude Level on Best – Agronomic Practices in Crop Production (n= 120)

S/No	Best- Agronomic Practices	Strongly agree	Agree	Disagree	Strongly Disagree	Mean	Attitudinal Level
01	Planting improved cultivar is the best way to increase yield	30	40	30	20	2.66	Moderate
02	Following the recommended planting dates increases yield	-	20	60	40	1.83	Low
03	Following the correct plant population increases yield	-	30	30	60	1.75	Low
04	Correct plant geometry increases yield	-	40	40	40	2.00	Moderate
05	Following recommended tillage operations increases yield	-	35	35	50	1.63	Low
06	Incorporating plant residues increases soil fertility	30	30	30	30	2.50	Moderate
07	Mulching of your crops help against water loss	30	40	30	20	2.67	Moderate
08	Optimum water and fertilizer management is the best in farming	40	40	30	10	2.92	Moderate
09	Optimum cropping pattern increases yield	-	25	45	50	1.79	Low
10	The use of organic manure and compost improves the soil & increases yield	10	20	30	60	1.83	Low
11	Integrated pest management system(IPM) is the best way to sustain the environment	10	20	45	45	1.96	Low
12	Cover cropping system improves the soil fertility	20	30	35	35	2.29	Moderate
13	Alley- farming protects and enriches the soil	30	35	35	30	2.71	Moderate
14	Agro – forestry system is the most sustainable way of farming on fragile soil	35	35	20	30	2.63	Moderate
15	Farm yard residue, cow dung & poultry droppings improve the soil texture and structure	50	40	20	10	3.08	High
16	Irrigation allows you to farm during the dry season	55	35	15	15	3.08	High

Source: Field Survey 2019

Determination of the Practice Level of the Respondents in BAPs in Crop Production
The Practice Level in BAPs in Crop Production is as presented in Table 4 below. Table 4 shows that the respondents had low (1.00 - 1.99) practice level in 9 item statements in BAPs out of 16 item statements in BAPs in crop production. Table 4 further shows that the respondents had moderate ($\bar{X}$= 2.00 - 2.99) practice level in in 7 item statements out of 16 item statements in BAPs in crop production. Table 4 equally shows the grand mean ($\bar{X}$= 1.92) which implies that the respondents generally had a low ($\bar{X}$= 1.00 – 1.99) practice level in BAPs in crop production in the study area. This might be linked to the low extension contacts among the respondents in the study area.

Table 4: Distribution of the Respondents According to their Practice Level in BAPs in Crop Production in the Study Area (n = 120)

S/No	Best- Agronomic Practices in Crop Production	Always	Often	Sometimes	Never	Mean	Practice Levels
01	How often do you plant improved cultivar?	5	15	35	65	1.66	Low
02	How often do you plant according to the recommended planting dates?	-	20	40	60	1.66	Low
03	How often do you plant according to the correct plant population (plant density) ?	-	25	35	60	1.71	Low
04	How often do you plant according to the correct plant geometry?	5	20	30	65	1.71	Low
05	Do you always follow the correct tillage operations for your crops?	10	20	30	60	1.66	Low
06	Do you always incorporating plant residues into the soil?	15	20	35	50	2.00	Moderate
07	Do you always carry out mulching of your crops against water loss?	20	30	40	30	2.33	Moderate
08	Do you always practice optimum water and fertilizer management in your farming?	20	25	35	40	2.21	Moderate
09	How often do you practice optimum cropping pattern?	10	20	30	60	1.83	Low
10	Do you always use organic manure and compost in your farm?	20	30	30	40	2.25	Moderate
11	Do you always practice integrated pest management system (IPM) in your farming operations?	-	15	20	85	1.58	Low
12	How often do you carry out cover cropping in your farming system?	5	10	25	80	1.54	Low
13	How often do you practice alley-farming?	10	20	30	60	1.83	Low
	How often do you practice agro – forestry?	20	30	40	30	2.33	Moderate
15	How often do you use farm yard residue, cow dung & poultry droppings improve the soil texture and structure?	25	30	35	30	2.42	Moderate
16	Do you always practice irrigation for dry season farming?	15	25	35	45	2.08	Moderate

Source: Field Survey 2019

Hypothesis Testing

There was no significant relationship between the knowledge level of the respondents and their practice level in BAPs in crop production in the study area since $\Gamma_s = 0.955$. Therefore, Ho_1 is accepted.

CONCLUSION

The results showed that the respondents had a high ($\bar{X}$= = 55.6%) knowledge level in BAPs and a moderate ($\bar{X}$= 2.3) attitude level and a low ($\bar{X}$= 1.92) practice level in BAPs in crop production. The results equally showed that there was no significant relationship between the knowledge level in BAPs and practice level of the respondents in crop production in the study area. The study therefore concluded that the respondents had a low (X= 1.92) practice level in BAPs in crop production in the study area due to poor extension contacts to them. The study therefore recommended that Government and other stakeholders in extension delivery services should improve upon funding and management of extension delivery services in the study area in order for extension to effectively raise the practice level of the respondents in BAPs on crop production as to ensure sustainability of the environment.

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