ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PERCEPTION OF ORGANIC MANURE USAGE AMONG CROP FARMERS IN JIGAWA STATE, NIGERIA: A PANACEA TO CLIMATE-SMART PRACTICES

[1]Bello, O. G., [2]Sulaiman-Ilobu, B.B., [3]Garba, I.D., [3]Bankole, A.S., [3]Dada, M and [3]Abdul-Qadir, M.I.

[1]Department of Agricultural Extension and Rural Development, Faculty of Agriculture Federal University Dutse

[2]Department of Agricultural Biotechnology, National Biotechnology Research and Development Agency (NABDA), Abuja, Nigeria

[3]Nigerian Institute for Oil Palm Research (NIFOR), PMB 1030, Benin-City, Edo State, Nigeria

Correspondence E-mail: sulaimanilobubashirat@gmail.com +2349027108002.

ABSTRACT

Climate-smart agricultural practices reduce greenhouse gas emissions with the proclivity to increase income and production. Shifting rainfall patterns and extreme temperature threatens agricultural activities. This now disturbs agriculture with immediate and long-term effects on food security, soil degradation and yield losses. These have multiple effects on local and global food markets in the long run. Understanding Climate change in agriculture is a vital concern for a sustainable global food production system. Small-scale farmers are vulnerable to climate change due to insufficient funds, difficulty in accessing agro-inputs, restricted market access and small farm sizes. The study examined the knowledge, attitude and perception on organic manure usage among crop farmers in Jigawa State, Nigeria. A total of 120 crop farmers were interviewed for the study through a 4-stage sampling procedure. Data were analyzed using descriptive statistical tools. The majority of the respondents were male (96.7%), married (90.8%) with no formal education (72.5%). The mean age of the respondents is 43 years, household size of 7 persons, farming experience of 13 years and monthly income of ₦36, 426.00. The main source of awareness on organic manure usage is family/friends/neighbours (91.7%). The clientele had high knowledge of organic manure usage, a favourable attitude and a perception of organic manure usage. The main constraints to organic fertilizer usage were its availability and transportation (100%), high cost of labour (100%), inadequate extension agents (95.8%) and lack of education /timing of the production of organic manure (91.7%). Infrastructural upscaling in transportation, adequate labour, timing of its preparation and engagement of more extension officers were recommended.

Keywords: Knowledge, Attitude, Perception, Organic Manure. Climate Smart Practices

INTRODUCTION

Among the hitches inherent to tropical soils, soil acidity, characterized by low pH, extreme aluminium, deficient calcium, and low organic matter is the most serious. Tropical earths are often unproductive because some of the soils are prone to strong phosphate fixation that renders phosphorus unavailable to plants. Soils predisposed to strong phosphate fixation (adsorption to oxides and clay minerals) frequently require exceedingly high phosphate fertilizer application to assuage the effect of phosphate fixation (Aderinoye-Abdulwahab, and Salami, 2017; Ukoja and Yusuf, 2013). Soil acidity and mineral deficiencies can be revised by fertilizers and lime. Tactlessly, lime and fertilizers are not constantly easy alternatives open to the small and resource-poor farmers. Agriculture has been practiced for thousands of years without the use of artificial chemicals in the world (Singh, 2016). Hence desirable farm products with high qualities were obtained.

Organic manure is defined as materials with a fixed chemical composition having a high analytical value that supplies plant nutrients in an available form, they are fertilizers derived from animal matter, human execrate or vegetable matter (e.g. compost, manure) they are made with natural raw material. Compost is made by decomposing biodegradable wastes like paper, leaves, fruit peelings, leftover foods and even fruit juices. Organic manure always makes a good addition to the soil, it makes the soil rich and ideal for planting (CTA, 2010; Assefa, 2019).

In the northern region of Nigeria, organic manure was sourced from peat, animal wastes (often from slaughterhouses), and plant wastes from agriculture and sewage sludge. Naturally occurring organic manure includes animal wastes from meat processing, peat, and slurry. Organic fertilizers are carbon-based compounds that increase the productivity and growth quality of plants (Ahmed, et al 2016). Organic manure, though not purified and simplified chemicals, was a complex compound that includes many subordinate and micro-nutrients. Organics such as manures, powdered rocks (such as lime, rock phosphate, and greensand), blood meal, bone meal, wood ash and compost all contain important micronutrients, and their texture would improve soil quality rather than degrading it. Sustainable agriculture emphasises the use of only organic fertilizers for fertility maintenance.

Organic farming as a component of sustainable agriculture was the way of life as it is a method of farming. Soil nutrient depletion and likely degradation have been considered serious threats to agricultural productivity and it was identified as major causes of decreased crop yields and per capita food production. Among the positive effects, organic farming has on the environment and quality of food is that it greatly helps a farmer to become self-sufficient in his requirements for agro-inputs and reduce his costs. Organic farming aspires to a combined mixture of organic, environmental, social and ethic objectives (Aderinoye-Abdulwahab, and Salami, 2017; CTA, 2010).

Synthetic fertilizers usually contain chemicals which were not easily biodegradable. These chemicals leach into the soil and eventually find their way into the water system where they were consumed by birds and other wildlife, destroying the eco-diversity. In contrast, organic fertilizer had no such harmful compounds and therefore didn't pose this danger, even with increased use.

Access to climate-smart ideas, innovation and cognizance of climate-smart agricultural (CSA) practices are major elements in the decisive utilization of land and farm practices that could concomitantly upturn the adaptive capacity of farmers, reduce greenhouse gas emissions, and increase food security (Autio *et al,* 2021). According to Ogunyiola, *et al* (2022), Climate-smart agriculture (CSA) is an integrated approach to managing landscapes which handle the interwoven problems of food security and accelerating climate change to enhance resilience, increase productivity and decrease emissions. The unpredictability of climatic conditions caused by fluctuating weather is posing a significant threat to smallholder agrarians all over the world (World Bank, 2021). Agriculture is a livelihood source for a projected two-thirds of adults living in insufficiency, mainly lacking the means to maximize outputs and or respond effectively to production-related issues, such as extreme weather situations, pests and disease of crops (FAO *et al,* 2020). Inorganic fertilizer as agro-input has been a mirage to small-scale farmers in Nigeria especially those at the northwest agrarian region. Mostly used coping strategies among farming folks are the utilization of green manure, farmyard manure, compost making of all kinds and organic manure simply because they are eco-friendly and can stay in the soil for longer periods than their inorganic counterparts. In addition to its residual effects, danger to human health and the unfriendly nature in the long run. It has been predicted that growth in global yields by 2050 could decline up to 30%, leading more people to become undernourished, and food insecure inevitably increased\ food prices. Climate resilience refers to the ability of farmers to adapt to long-term shifts in climatic conditions, to antedate and take steps to mitigate the effects of extreme weather events exacerbated by climate change (GSMA AgricTech, 2021).

The general objective of the study is to assess the knowledge, attitude and perception (KAP) of crop farmers on organic manure usage in Jigawa state, Nigeria. The specific objectives are to:

1. describe the socioeconomic characteristics of the crop farmers;
2. determine the respondents' knowledge of constituents and usage of organic manure;
3. examine the attitude and perception of the respondents on the usage of organic manure;
4. identify the constraints of the respondents to the utilization of organic matter.

METHODOLOGY

The study was conducted in Jigawa State Nigeria. The state was carved from Kano State on August 27, 1991. Jigawa State is one of thirty-six states that constitute the Federal Republic of Nigeria. It is situated in the north-western part of the country between latitudes 11.00°N to 13.00°N and longitudes 8.00°E to 10.15°E. The state has a total land area of approximately 22,410 square kilometres with twenty-seven (27) local governments (Jigawa Wikipedia, 2014 & National Population Commission [NPC], 2006). It is bordered on the West by Kano State, on the east by Bauchi State and Yobe State and on the North by Katsina State and the Republic of Niger (NIG, 2004) The state has a population of 4,348,649 people (National Population Commission NPC, 2006) while the estimated population in 2014 was 5,372,754 at 2.9% rate of population growth. Farming is among the major occupation of the people who are predominantly Hausa/Fulani and are majorly engaged in rural and subsistence farming. The topography is characterized by high land areas which are almost 750 meters. Soil tends to be fertile ranging from sandy-loamy with many pockets of Fadama and alluvial plains suitable for the cultivation of rice, sugar cane, millet, maize, vegetables, and sorghum etc. There are usually two seasons in the state viz the rainy season lasting from June through October and dry season spanning from November to May. The mean temperature ranges from 35◦c in October to about 50◦c in May, while mean annual rainfall varies from 700mm to over 1000mm and can last up to 200 days in some lowland parts of the state. The major rain-fed crops grown in the state include millet, sorghum, maize, cowpea, groundnut, cocoyam, and soya beans. (IFAD Community Based Agricultural and Rural Development Programme: IFAD-CBARDP, 2004). Jigawa state is divided into four ADP Zones 1, 2, 3 and 4

- Zone 1. With headquarters in Brinin kudu comprises of Dutse, Kiyawa, Jahun, Buji, Brinikudu, Gwaram, and Miga.
- Zone 2. With headquarters in Gumel comprises Gumel, Maigatari, Ringim, Taura, Gagarawa.
- Zone 3. with headquarters in Hadejia comprises of Briniuwa, Kirikasamma, Kafin-Hause, Auyo, Guri, Malamadori, Kaugama, Hadejia.
- Zone 4. With headquarter in Kazaure comprises of Kazaure, Yankwashi, Gwiwa, Roni, Suletankarkar, Babura, Garki.

The population for the study comprises all the crop farmers in Jigawa State. A multistage sample technique was employed in the study. The first stage was a purposive selection of Jigawa State among the seven states in the northwest, Nigeria and also being a predominantly an agrarian state. The second stage was a random selection of two (2) local governments each from the four Agricultural Development Programme Zones (ADP) in Jigawa State to give 8 LGAs. The third stage was a random selection of one community each from the selected local governments.

The fourth stage was the random selection of 15 crop farmers from each of the selected communities from the list of crop farmers obtained from the Jigawa Agricultural and Rural Development Authority (JARDA) to make a sample size of 120 respondents for the study. A structured questionnaire was used to elicit information from the respondents who were analyzed using descriptive statistics (percentages, mean, frequency counts, standard deviation) and mean scores from the Likert type scale.

RESULTS AND DISCUSSION:

Socio-economic Characteristics of the Crop Farmers

Table 1 shows the socioeconomic characteristics of the respondents. It shows that the majority of the crop farmers were with a mean age of $\bar{x}$= 42.6 years (90.7%). This implies that the respondents were still in their active productive age range. This corroborated the findings of Bello *et al*. (2016) who observed the average age of farmers involved in groundnut production in Jigawa State was 43.5 years. The majority were males (96.7%), married (90.8%) with a mean household size of 7 persons (81.7%). Marriage confers responsibility according to Vogelstein (2013). A significant proportion had no formal education (72.5%) while the remaining 27.5% were with either primary, secondary or tertiary education respectively. This implies that the clientele was not educated. Margret and Samuel (2015) asserted, that an increase in the education of farmers positively influences adoption and utilization of improved agricultural practices. They were very experienced farmers judging from their average farming experience (85.0%, $\bar{x}$=12.6). The average monthly income from farm production activities is N36,426.00 (67.5%). It shows that they have favourable proceeds from crop farming activities.

Sources of Awareness of Organic Manure

As shown in Table 2, on the major source(s) of information about organic manure utilization on the farm, family/friend/neighbours (91.7%) was the main source of information and this was followed by Radio agricultural programs in the state (4.2%). Radio is the cheapest and the easiest medium of accessing information on agricultural production activities by the clientele. Television and extension agents (1.7%) were next and it implies that extension services which are saddled with the responsibility of disseminating improved practices and innovations to the clientele is not effective in the study area. similarly, television may not serve as a good medium for information dissemination because it is not affordable to most of the farmers and also there is infrastructural failure in most cases like inadequate power supplies. This agrees with the submission of Aderinoye-Abdulwahab, and Salami (2017) who agreed that the main source of awareness of organic fertilizer among farmers in Kwara state were family and friends.

Table 1: Distribution of the Respondents based on Some Selected Socio-economic Characteristics.

Variables	Frequency	Percentage	$\bar{x}$± S.D
Age (Years)			
≤ 30	2	1.6	42.6± 8.9
31- 40	62	51.7	
41- 50	47	39.2	
51- 60	7	5.8	
≥ 61	2	1.6	
Sex			
Male	116	96.7	
Female	4	3.3	
Marital Status			
Singled	7	5.8	
Married	109	90.8	
Divorced	2	1.6	
Separated	1	0.9	
Widow	1	0.9	
Household Size			
0-5	13	10.8	7.3 ± 2.1
6-10	98	81.7	
11-15	8	6.7	
≥ 16	1	0.8	
Educational Qualification			
No Formal Education	87	72.5	
Primary Education	23	19.2	
Secondary Education	8	6.7	
Tertiary Education	2	1.6	
Farming Experience			
1-5	15	12.5	12.6 ± 4.7
6- 10	44	36.7	
11-15	58	48.3	
≥16	2	1.6	
Average Monthly Income (N)			
1-10,000	2	1.6	36,426.00±7,005.62k
11,000-20,000	2	1.6	
21,000-30,000	10	8.3	
31,000-40,000	81	67.5	
41,000-50,000	24	20.0	
≥ 51,000	1	0.8	

Source: Field Survey, 2021.

Table 2: Main Source of Awareness on Organic Manure.

Variables	Frequency	Percentage	Ranking
Radio	5	4.2	2nd
Television	2	1.7	3rd
Family/Friends/Neighbors	110	91.7	1st
Extension Agent	2	1.7	3rd
Others	1	0.7	5th

Source: Field Survey, 2021.

Knowledge of the Respondents on Organic Manure Constituents and Usage

The respondents' knowledge of organic manure constituents and usage in the study area was analyzed using the mean score from a 3-point Likert type scale of Agreed=3, Undecided =2 and Disagreed against some cognitive statements as shown in Table 3. The mean value was generated and used to make remarks on the knowledge statements (2.00). It shows that the respondents agreed with most of the knowledge statement on the usage of organic manure ($\bar{x}$=2.45-3.00) but were indifferent in the areas of ammonium sulphate being part of organic fertilizer ($\bar{x}$=2.00) and inorganic Fertilizer being natural and made in exact dose ($\bar{x}$=2.04). They disagreed with the statement that some inorganic fertilizer can be added to organic manure ($\bar{x}$=1.22) and Organic Manure can be produced by bush burning for ash ($\bar{x}$=1.00). This implies that the crop farmers are fully aware of the usage and ingredients of organic manure and as such implementing them on their farms may not be an issue. This is in line with the work of Babalola, et al., (2017) who agreed that vegetable farmers in Kwara state showed positive knowledge of usage of organic manure.

Attitude and Perception of the Respondents on Usage of Organic Manure

The respondents' attitude and perceptions on the usage of organic manure is indicated in Table 4. The attitude was measured using a mean score on a 3-point Likert type scale of Favorable=3, Undecided =2 and Not favorable=1 respectively against some attitudinal constructs on usage of organic manure. A mean value ($\bar{x}$) of 2.00 was obtained. Scores of 2 and above imply a favourable attitude while scores less than 2 imply an unfavourable attitude. From the table, it can be deduced that respondents have favourable attitudes to the usage of organic matter ($\bar{x}$ ranging from 2.00-3.00.) This is in line with the submission of Ukoja and Yusuf (2013), who agreed that farmers have favourable responses to the use of organic manure in most of Nigeria.

Looking at the perception from the table measured on a 3-point scale of Agreed=3, Undecided=2 and Disagreed=1 against some perception statement on organic manure usage, a mean value ($\bar{x}$) of 2.00 was obtained at an interval of 0.5 which implies that values of ≥2 are agreed while values below indicated disagreed. Hence, it shows that the respondents have a positive perception of the usage of organic matter except for the fact that organic manure leads to under-utilization of agrochemicals and inorganic manure ($\bar{x}$=1.67). this is probably because the respondents might have been used to applications of other agro-inputs and inorganic fertilizers. This agreed with the assertion of Ahmad, et al., (2016) that farmers have a positive predisposition to the use of organic fertilizer.

Table 3: Knowledge of Organic Manure Constituents and Usage

Variable	A (3)	U (2)	D (1)	Sum of Square	Mean $\bar{x}$	Decision
Use as it provides all nutrient of plants in limited quantities	116	0	4	352	2.93*	Agree
Use as it helps to maintain C & N ratio in the soil	90	10	20	310	2.58	Agree
Use because it increases soil fertility & productivity naturally	120	0	0	360	3.00	Agree
Use because it improves the physical, chemical & biological properties of the soil	83	9	28	295	2.45*	Agree
Use because it increases the water holding capacity of the soil	119	1	0	359	2.99*	Agree
It minimizes the evaporative losses of moisture	90	14	16	314	2.61*	Agree
Ammonium Sulphate is part of Organic manure	10	100	10	240	2.00	Undecided
It contains animal wastes, crop residues and green manure	120	0	0	360	3.00*	Agree
It contains urban organic waste and microbial mixtures	115	2	3	352	2.93*	Agree
Bio-gas spent slurry and biodynamic mixtures are contained	120	0	0	360	3.00*	Agree
inorganic Fertilizer are natural & made in exact dose	8	109	3	245	2.04	Undecided
Sewage sludge, industrial wastes, domestic sewages are in	120	0	0	360	3.00*	Agree
Composted agricultural wastes and vermicomposting are contained	116	2	2	354	2.95*	Agree
Accumulated burnt disposed domestic sewage are involved	100	12	8	332	2.77*	Agree
Some inorganic fertilizer can be added to organic manure	13	0	107	146	1.22	Disagree
Organic Manure can be produced by bush burning for ash	0	1	119	121	1.00	Disagree

Source: Field Survey, 2021 *Implies agreement with the statement

Table 4: Distribution of the Respondents based on Attitude and Perception of the Usage of Organic Manure

Attitude	**F**	**U**	**NF**	$\bar{x}$
Very good because it provides all nutrient of plants in limited quantities	107	1	12	1.88
It will reduce the money to buy fertilizer if adopted	95	10	15	1.71
It increases soil fertility & productivity naturally	106	0	14	1.88
It improves the physical, chemical & biological properties of the soil	91	10	19	1.68
It increases the water holding capacity of the soil	88	20	12	1.57
It minimizes the evaporative losses of moisture	85	0	35	1.71
It last longer than the inorganic manure in the soil	110	0	10	1.92
It does not have any residue in crops compared with inorganic manure	65	20	35	1.38
Continued usage gives optimum output and save cost of buy inorganic manure	120	0	0	2.00
Perception	**A**	**U**	**D**	$\bar{x}$
Organic manure will not give crop good yield	10	21	89	0.91
Crop grown with organic manure is dangerous for human intake	25	0	95	1.21
Organic manure is only good for commercial farmers alone	0	10	110	0.92
It bring diseases to crops easily because it contains dangerous pathogens	0	0	120	1.00
Organic manure is tedious and labor demanding to prepare	29	0	91	1.24
It involves special technicalities/special device to establish on farm	36	2	82	1.28
The understanding of its preparation is very difficult	0	0	120	1.00
It involves some special techniques to applying on farm	10	15	95	0.96
It is not compatible with most sociocultural background in African society	0	0	120	1.00
It is capital intensive to prepare	30	19	71	1.09
Not good for sustainable agriculture because can affect natural ecosystem	2	4	114	0.98
It leads to under-utilization of agro-chemicals and inorganic manure	80	0	40	1.67

Source: Field Survey, 2021

Constraints of the Crop Farmers on Organic Manure Usage

Table 5 shows the constraints of the respondents on organic matter usage in the study area. the most severe constraints of the crop farmers on organic manure usage for agricultural production purposes are the high cost of labour used in the process and transportation and availability of the organic manure (100.0%); this was followed by insufficient extension agents to farmers' ratio (95.8%). This is because the extension agents to farmers' ratio is very high, and this has not allowed for proper coverage of the entire crop farmers in the state. There is also a low level of literacy among the clientele and inadequate timing of the preparation of the manure to coincide with the use (91.7%). Poor infrastructure and financial limitations are another major problem with the crop organic manure users (83.3%). This is so because most of these farmers are operating at subsistence level and as such production is mostly for domestic consumption. Infrastructural problems are another is because things like Information and communication facilities, and internet networks among others are inadequate in the study area. today there are rampant insecurity issues in the study area which prompt respondents to be unable to implement organic manure preparation as well as theft from some undesirable elements in the society (75.0%) and finally, availability of some synthetic organic fertilizers (46.7%). However, this is not seen as a constraint because these fertilizers are not readily available, and they are very costly. This agrees with the submission of Babasola, et al., (2017) that the main factors affecting organic fertilizer usage among vegetable farmers are transportation infrastructure and labour charges.

Table 5: Distribution of the Respondents based on Constraints to Organic Manure Usage

Variables	Frequency	Percentage	Ranking
Lack of Education	110	91.7	3rd
Transportation & Availability	120	100.0	1st
Financial Limitations	100	83.3	4th
Insufficient Extension Agent to Farmers No	115	95.8	2nd
Availability of some synthetic organic manure	56	46.7	6th
Poor infrastructures	100	83.3	4th
High cost of labor used in the process	120	100.0	1st
Adequate timing of the preparation	110	91.7	3rd
Insecurity and Theft Issues	90	75.0	5th

Source: Field Survey, 2021

CONCLUSION AND RECOMMENDATIONS:

Based on the findings of the research it can be concluded that the main sources of awareness of organic manure by the clientele are family/friends/neighbours (91.7%). The clientele has high knowledge, favourable attitude and perception of organic fertilizers. The main constraints to the use of organic manure are high cost, transportation and availability (100.0%). Organic manuring is the only climate-smart adaptive option used by the clientele in the study area to cope with the scarcity of inorganic fertilizer, the high cost of purchase and other dangers inherent in the usage of inorganic fertilizer.

It was recommended that; infrastructural upscaling in transportation facilities should be enhanced to assist the clientele in accessing the organic manure on time; labour should be subsidized by the clientele probably through the use of family household size, timing of its preparation should be made to coincide with the onset of usage for proper utilization and engagement of more extension officers. Organic manure capacity-building training should be done to update the knowledge of farmers on its preparation.

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