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Organic Farming Practices among Livestock and Fish Farmers in Southern Nigeria

Charity N. Atoma, Olufemi M. Adesope and Linda C. Familusi

Abstract

To provide solutions to the issues of climate change, food insecurities, environmental degradation, food safety and sustainability in production, organic farming was developed as opposed to the conventional method of farming which involved the use of synthetic fertilizers and other agro-chemicals. The objectives of the study was to determine the level of awareness of organic farming practices and to determine the use and level of use of organic farming practices among livestock and fish farmers in the study area. Multistage sampling techniques were employed. Primary data was collected through structured questionnaire. Sample size comprised of 115 fish farmers and 99 livestock farmers which made a total of 214 rural farmers. Results showed that fish farmers were more aware of organic farming practices relative to livestock farmers. Also, fish farmers used more of organic farming methods for fishing activities than livestock farmers. However, the level of awareness and level of use of organic farming practices was low for both farmers. Therefore, it was recommended that extension campaign on organic farming sensitization should be increased.

Keywords: organic agriculture, awareness, use level

1. Introduction

Agriculture is the mainstay of the Nigerian economy. Agriculture in its nature is multifunctional. This multi-functionality nature relates to food production, security and safety, environment and landscape, water management and social and economic focus [1]. Agriculture has the capability to feed its population, serve as a source of revenue to the nation, provide employment and employment opportunities and serve as source of raw materials to agro-allied industries [2]. In recent times however, these functions could not be met given that food production in the nation could no longer meet up with the rapid population growth and thus reduction in exports [2]. In order to address the issues of insufficient food supply to meet the need of the nation's ever growing population, the use of agro-chemicals was adopted. This led to an increase in crop and animal production through the use of synthetic fertilizers and other agro-chemicals. Nevertheless, a number of side effects from the use of synthetic fertilizers and other agro-chemicals have been recorded and hence has led to the development of organic farming.

Inorganic fertilizers usually cause water pollution due to the leaching and washing away of such agro-chemicals by erosion in rivers [3]. It argued that most inorganic fertilizers and chemicals used in agriculture are manufactured using non-renewable resources such as fossil fuel which usually contributes to pollution and environmental degradation and hence unsustainable agricultural production [4]. Organic farming is a multifunctional system with benefits which cuts across economic, environmental and social functions. The multifunctional benefits of organic farming includes its contributions to the improvement of livelihoods, food security, resilience to climate change, increase in yields in a long run bases, reducing financial risks, creating market opportunities, improving health and the environment, combating desertification among other numerous benefits [5].

Organic farming represents a deliberate attempt to make the best use of local natural resources and is an environmental friendly system of farming. Organic farming is a production system that excludes the use of synthetically manufactured chemicals like fertilizers, pesticides, growth enhancers/regulators, food additives, fungicides and herbicides [6–8]. Organic farming practices include crop rotation, biological pest control, crop residues, cover crop, legumes, organic fertilizers, animal manures and green manures among others [9]. Organic farming technology is frequently regarded as the solution to environmental problems that are related to agriculture as well as food safety [10]. It usually has “zero impact on the environment” [4, 9, 11].

Organic farming practices has been shown to affects soil microbiological and chemical properties by increasing soil nutrient availability, microbial biomass and microbial activity, which represent a set of sensitive indicators of soil quality [12, 13]. In addition to other benefits especially as it relates to health and food safety, organic farming has shown to be safer and healthy [14, 15]. It also results to increased levels of flavonoids¹ when used for the production of fruits and vegetables [14] and protects against cancer and other age related diseases to a lesser extent [16]. Organic farming increases insect pollination and overall specie richness [17]. The major goal of organic farming activities is a sustainable production of food with little or no effect on the environment. This goal and many others have not been achieved by conventional farming hence the need to encourage organic farming which is capable of providing solutions to the current environmental challenges like the climate change and environmental hazards and also help to achieve maximal production of quality food sustainably [18]. Food and Agriculture Organization clearly states that organic agriculture promotes ecological resilience, improves biodiversity, healthy management of farm and surrounding environment and building community knowledge and strength [19].

Keynote address emphasized that in Nigeria and many developing countries, organic agriculture is just developing [15]. As at the ending of 2016, report showed that Africa as a whole contributes to only 3% (i.e., 1.8 million hectares) of the total organic farmlands of the world [20, 21]. This contribution is mostly accounted for from East African countries with little or nothing from Nigeria. These points to the need to fast track organic farming development in Nigeria. Hence, the International Federation of Organic Agriculture Movement (IFOAM) and their members were charged with the responsibilities of developing organic farming in Nigeria during the second national conference on organic agriculture which held in Nigeria [5]. However, literatures argued that the yield from organic agriculture is lower than the yield from the conventional methods [22]. This may be the case

¹ Flavonoids helps to protect against cardiovascular disease

but notwithstanding, the net farm income of organic farmers was reported more profitable than that of conventional farmers [23]. Part of the (better) profits from certified OA resulted from the premium paid by contracting companies. The revenue generated from organic farming is higher than that of conventional methods because of the higher product prices generated from it [9].

Thus, the general objectives of the study are to ascertain the household level of awareness and use of organic farming practices in South-South Nigeria. Specifically, the study determined the level of awareness of organic farming practices among livestock and fish farmers, identified the use of organic farming practices among livestock and fish farmers and determined the level of use of organic farming practices among livestock and fish farmers in the study area.

2. Methodology

The area of study is South-South Nigeria which comprises six (6) states namely: Delta, Bayelsa, Edo, Rivers, Cross River and Akwa Ibom as shown in **Figure 1**.

The study population comprises of rural households engaged in livestock and fish farmers. Multistage random selection technique was employed. The first stage was the random selection of three states—Bayelsa, Delta and Akwa-Ibom. The study population is the livestock and fish farmers in Bayelsa, Delta and Akwa-Ibom. Delta state is divided into three agricultural zones—Delta North, Delta South and Delta Central out of which Delta central was selected. Bayelsa state is also classified into three agricultural zones—Brass, Yenagoa and Sagbama out of which brass zone was sampled. Akwa-Ibom is divided into six agricultural zones—Abak, Eket, Etinan, Ikot Ekpene, Oron and Uyo zones. Two zones Uyo and Ikot Ekpene were samples. A total of 99 livestock farmers and 115 fish farmers were sampled. The lists of farmers were gotten from the zonal managers in charge of each zone. Primary data were collected through the use of a questionnaire and interview schedule. Data obtained were analyzed using descriptive statistics as mean and percentages. Four point Likert scale was used to measure the response of famers in terms of their awareness level of organic agriculture and their use and use level of organic farming practices.

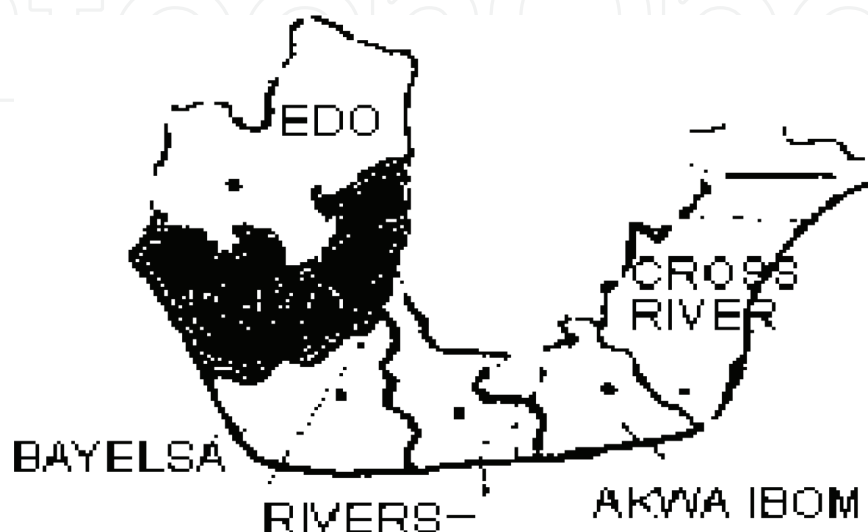


Figure 1.
Map of South-South region of Nigeria. Source: [26].

3. Results and discussions

Table 1 shows the result for the level of awareness of organic farming practices among livestock farmers. The mean and percentages of the response were clearly shown.

Organic Farming Practices for livestock	Not at all	Low	Moderate	High	Mean	Decision
Adequate land holding	33 (33.3)	40 (40.4)	14 (14.1)	12 (12.1)	2.05	Not aware
Farm diversification	44 (44.4)	29 (29.3)	25 (25.5)	1 (1.0)	1.82	Not aware
Free movement of animals/ Provision of fresh air and natural day light	61 (61.6)	6 (6.1)	25 (25.3)	7 (7.1)	1.77	Not aware
Protection against adverse weather condition	57 (57.6)	2 (2.0)	30 (30.3)	10 (10.1)	1.92	Not aware
Resting areas	57 (57.6)	16 (16.2)	13 (13.1)	13 (13.1)	1.81	Not aware
Clean and dry beddings	55 (55.6)	3 (3.0)	29 (29.3)	15 (15.2)	2.09	Not aware
Enough space for exercise	52 (52.5)	3 (3.0)	29 (29.3)	15 (15.2)	2.07	Not aware
Access to fresh drinking water by livestock	12 (12.1)	1 (1.0)	59 (59.6)	27 (27.3)	3.02	Aware
Allowing livestock to express natural behaviour	29 (29.3)	11 (11.1)	40 (40.1)	19 (19.2)	2.50	Aware
Use of local breed	59 (59.6)	2 (2.0)	26 (26.3)	12 (12.1)	1.90	Not aware
Natural reproduction technique	53 (53.6)	11 (11.1)	20 (20.2)	15 (15.2)	1.96	Not aware
Produce without genetic engineering , ionising radiation or sewage sludge	51 (51.5)	25 (25.3)	15 (15.2)	8 (8.1)	1.79	Not aware
Adequate feeding	16 (16.2)	64 (64.6)	0 (0.0)	19 (19.2)	2.86	Aware
Animal feeding is 100% organic	32 (32.3)	3 (3.0)	24 (24.2)	40 (40.4)	2.72	Aware
Prompt treatment of sick animals	27 (27.3)	10 (10.1)	51 (51.5)	11 (11.1)	1.74	Not aware
Manage animals without antibiotics	74 (74.7)	10 (10.1)	7 (7.1)	8 (8.1)	1.48	Not aware
Traditional/natural treatment of sick animals	62 (62.6)	11 (11.1)	15 (15.2)	11 (11.1)	1.74	Not aware
Vaccinate only during disease outbreak	69 (69.7)	16 (16.2)	8 (8.1)	6 (6.1)	1.50	Not aware
Manage without added growth hormones	45 (45.5)	29 (29.3)	15 (15.2)	10 (10.1)	1.89	Not aware
Accurate record keeping	33 (33.3)	1 (1.0)	40 (40.4)	25 (25.3)	2.57	Aware

Table 1.
Distribution of livestock farmers by level of awareness of organic farming practice.

Table 1 showed that farmers were adequately aware of allowing livestock access to fresh drinking water ($\bar{x} = 3.02$), adequate feeding ($\bar{x} = 2.86$), animal feeding of 100% organic ($\bar{x} = 2.72$) and accurate record keeping ($\bar{x} = 2.57$). The four practices above had mean scores above the discriminating index. The other practices were below the discriminating index of 2.50. The grand mean on the level of adoption for livestock farmers was 2.06. This shows that farmer's level of awareness of organic farming practices for livestock production is low. This is in-line with [24]. They implied that low awareness of organic agriculture was as a result of low coverage. Therefore, this study suggested that the low farmer's awareness could be as a result of poor extension campaign in organic livestock practices.

Table 2 shows the level of awareness of organic farming practices among fish farmers in the study area. The mean and percentages of the response were clearly shown.

Table 2 revealed that farmers were aware of such organic farming practices as eco-friendly design ($\bar{x} = 2.91$), high quality water source ($\bar{x} = 2.90$), pond

Organic Farming Practices	Not at all	Low	Moderate	High	Mean	Decision
Eco-friendly design	22 (19.1)	4 (3.5)	51 (44.3)	38 (33.0)	2.91	Aware
Manage without growth Hormone	31 (27.0)	3 (2.6)	61 (53.0)	20 (17.4)	2.60	Aware
Antibiotics is only used in clinical cases where no other treatment would work	65 (56.5)	2 (1.7)	19 (16.5)	29 (25.2)	2.10	Not Aware
Cultivate without genetic engineering.	44 (38.3)	5 (4.3)	21 (18.3)	45 (39.1)	2.58	Aware
Site is far from polluting substances	63 (54.8)	4 (3.5)	20 (17.4)	28 (24.3)	2.11	Not Aware
High quality water source (stream, river)	31 (27.0)	1 (0.9)	31 (27.0)	52 (45.2)	2.90	Aware
Organic fertilizer	54 (47.0)	4 (3.5)	20 (17.4)	31 (27.0)	2.24	Not Aware
Low stock density 10kg/m	39 (39.9)	6 (5.2)	47 (40.9)	23 (20.0)	2.46	Not Aware
Manage without synthetic appetizer and colouring	40 (34.8)	15 (13.0)	44 (38.3)	16 (13.9)	2.31	Not Aware
Polyculture	70 (60.9)	13 (11.3)	18 (15.7)	14 (12.2)	1.79	Not Aware
Proper record keeping	65 (56.5)	3 (2.6)	18 (15.7)	29 (25.2)	2.09	Not Aware
Pond protection from predators	13 (11.3)	2 (1.7)	36 (31.3)	64 (55.7)	3.31	Aware
Use of resistant species	29 (25.2)	1 (0.9)	34 (29.6)	51 (44.3)	2.95	Aware
Natural treatment (homeopathy)	43 (37.4)	8 (7.0)	11 (9.6)	53 (46.1)	2.64	Aware

Source: Field survey, 2015

Table 2.
 Distribution of fish farmers by level of awareness of organic farming practices.

Organic farming practices	Use	%	Non use	%
Organic Farming Practices for livestock				
Adequate land holding	44	44.5	55	55.5
Farm diversification	39	39.4	60	60.5
Free movement of animals Provision of fresh air and natural day light	50	50.5	49	49.5
Protection against adverse weather condition	29	29.9	70	70.1
Resting areas	25	25.3	74	74.7
Clean and dry beddings	41	41.4	58	58.6
Enough space for exercise	46	46.6	53	53.4
Access to Fresh drinking water	75	75.8	24	24.2
Allowing livestock to Express natural behaviour	63	63.6	36	36.4
Use of local breed	49	49.5	50	50.5
Natural reproduction technique	57	57.6	42	42.4
Produce without genetic engineering , ionizing radiation or sewage sludge	40	40.4	59	59.6
Adequate feeding	73	73.3	26	26.3
Animal feeding is 100% organic	52	52.5	47	47.5
Prompt treatment of sick animals	60	60.6	39	39.4
Manage animals without antibiotics	21	21.2	78	78.8
Traditional/natural treatment of sick animals	36	36.4	63	63.6
Vaccinate only during disease outbreak	23	23.2	76	76.8
Manage without added growth hormones	31	31.3	68	68.7
Accurate record keeping.	54	54.5	45	45.5

Table 3.
Distribution of livestock farmers by use of organic farming practices.

protection from predators ($\bar{x} = 3.36$), use of resistant species ($\bar{x} = 2.95$, natural treatment ($\bar{x} = 2.64$), cultivation without genetic engineering ($\bar{x} = 2.58$) and management without growth hormones ($\bar{x} = 2.60$). Other practices were below mean score of ($\bar{x} = 2.50$). The grand mean was 2.49. This implies a moderate awareness level which could be as a result of organic fish farming practices being in line with the traditional method of fish farming.

Table 3 shows the use of organic farming practices by livestock farmers in the study area.

According to **Table 3**, organic farming practices commonly used by livestock farmers includes fresh drinking water (76%), adequate feeding (73%), allowing livestock to express natural behavior (64%), prompt treatment of sick animals (61%), natural reproduction technique (58%), accurate record keeping (55%), animal feed is 100% organic (53%), free movement of animals/provision of fresh air and natural day light (51%) and use of local breed (50%). Out of 20 organic livestock practices, only 9 were above average and this is not up to 50% rating. This is not surprising since most livestock farmers are yet to be abreast with what organic livestock entails hence the low awareness level.

Table 4 shows the result for the use of organic farming practices by fish farmers in the study area.

Organic Farming Practices	Use	%	Non use	%
Eco-friendly design	91	79.1	24	20.9
Manage without growth Hormone	84	73.0	31	27.0
Antibiotics is only used in clinical cases where no other treatment would work	70	60.9	45	39.1
Cultivate without genetic engineering.	64	55.7	51	44.3
Site is far from polluting substances	87	75.7	28	24.3
High quality water source (stream, river)	63	54.8	52	45.2
Organic fertilizer	56	48.7	59	51.3
Low stock density 10k/m	35	30.4	80	69.6
Manage without synthetic appetizer and colouring	46	40.0	69	60.0
Poly-culture	59	51.3	56	48.7
Proper record keeping	53	46.1	62	53.9
Pond protection from predators	93	80.9	22	19.1
Use of resistant species	80	69.6	35	30.4
Natural treatment (homeopathy)	65	66.5	50	43.5

Table 4.
Distribution of fish farmers by use of organic farming practices.

The use of organic farming practices among fish farmers varied slightly in percentages as shown in **Table 4**. However, the commonly used organic farming practices includes pond protection from predators (81%), eco-friendly design (79%), site protection far from polluting substances (76%), manage without growth hormones (73%), use of resistant varieties had (70%), natural treatment (67%), antibiotics is used in clinical cases where no other treatment would work (61%), cultivated without genetic engineering (56%), high quality water source (55%) and poly-culture (51%). The use of organic farming practices by fish farmers was relatively high compared to organic farming practices by livestock farmers. This could be attributed to the fact that most of the organic practices are in line with the traditional practices of the people.

Table 5 shows the result for the level of use of organic farming practices among livestock farmers.

From **Table 5**, organic livestock production practices' in South-South Nigeria is low (grand mean = 1.93) as only 2 (10%) out of 20 outlined practices had mean score of 2.50 (discriminating index) and above. That is access to fresh drinking water (mean score = 2.77) and adequate feeding (mean score = 2.65). This result implied that the level of use is rare.

Table 6 shows the level of use of organic farming practices among fish farmers in the study area.

The results from **Table 6** revealed that out of the fourteen (14) practices outlined, fish farmers regularly engaged in the use of three of such practices which are the use of eco-friendly design ($\bar{x} = 2.56$), site being far from polluting substances ($\bar{x} = 2.57$) and pond protection from predators ($\bar{x} = 2.70$). From the result, the others were considered not being used. The grand mean of 1.99 indicates that the level of use of organic farming practices by fish farmers in the study area is low.

This could be associated with some challenges or difficulties in carrying out such practices and lack of awareness of the dangers associated with the conventional

Organic Farming Practices for livestock	Never	Rarely	Regularly	Very regularly	Mean	Decision
Adequate land holding	55 (55.5)	9 (9.1)	25 (25.3)	10 (10.1)	1.89	NU
Farm diversification	60 (60.5)	9 (9.1)	20 (20.2)	10 (10.1)	1.79	NU
Free movement of animals/Provision of fresh air and natural day light	49 (49.5)	16 (16.2)	34 (34.3)	0 (0.00)	1.84	NU
Protection against adverse weather condition	70 (70.1)	1 (1.0)	28 (28.3)	0 (0.00)	1.57	NU
Resting areas	74 (74.7)	5 (5.1)	20 (20.2)	0 (0.00)	1.45	NU
Clean and dry beddings	58 (58.6)	1 (1.0)	39 (39.4)	1 (1.0)	1.83	NU
Enough space for exercise	53 (53.4)	15 (15.2)	20 (20.2)	11 (11.1)	1.89	NU
Access to fresh drinking water	24 (24.2)	1 (1.0)	48 (48.5)	26 (26.3)	2.77	U
Allowing livestock to Express natural behaviour	36 (36.4)	3 (3.0)	57 (57.6)	3 (3.0)	2.27	NU
Use of local breed	50 (50.5)	1 (1.0)	37 (37.4)	11 (11.1)	2.09	NU
Natural reproduction technique	42 (42.4)	1 (1.0)	46 (46.5)	10 (10.1)	2.24	NU
Produce without genetic engineering , ionizing radiation or sewage sludge	59 (59.6)	4 (4.0)	32 (32.3)	4 (4.0)	1.81	NU
Adequate feeding	26 (26.3)	1 (1.0)	54 (54.5)	18 (18.2)	2.65	U
Animal feeding is 100% organic	47 (47.5)	3 (3.0)	34 (34.3)	15 (15.2)	2.17	NU
Prompt treatment of sick animals	39 (39.4)	1 (1.0)	57 (57.6)	2 (2.0)	2.22	NU
Manage animals without antibiotics	78 (78.8)	3 (3.0)	17 (17.2)	1 (1.0)	1.40	NU
Traditional/natural treatment of sick animals	63 (63.6)	8 (8.1)	27 (27.3)	1 (1.0)	1.65	NU
Vaccinate only during disease outbreak	76 (76.8)	11 (11.1)	11 (11.1)	1 (1.0)	1.36	NU
Manage without added growth hormones	68 (68.7)	2 (2.0)	29 (29.3)	0 (0.00)	1.60	NU
Accurate record keeping	45 (45.5)	3 (3.0)	50 (50.5)	1 (1.0)	2.07	NU

Source: Field survey, 2015

Table 5.
Distribution of livestock farmers by level of use of organic practices.

Organic Farming Practices	Never	Rarely	Regularly	Very. regularly	Mean	Decision
Eco-friendly design	24 (20.9)	6 (5.2)	81 (70.4)	4 (3.5)	2.56	U
Manage without growth hormone	31 (27.0)	5 (4.3)	79 (68.7)	0 (0.0)	2.41	NU
Antibiotics is only used in clinical cases where no other treatment would work	45 (39.1)	29 (25.2)	40 (34.8)	1 (0.9)	1.97	NU
Cultivate without genetic engineering.	51 (44.3)	7 (6.1)	38 (33.0)	19 (16.5)	2.21	NU
Site is far from polluting substances	28 (24.3)	9 (7.8)	62 (53.9)	16 (13.9)	2.57	U
High quality water source (stream, river,	52 (45.2)	2 (1.7)	53 (46.1)	8 (7.0)	2.14	NU
Organic fertilizer	59 (51.3)	11 (9.6)	43 (37.4)	2 (1.7)	1.89	NU
Low stock density 10k/m	80 (69.6)	2 (1.7)	29 (25.2)	4 (3.5)	1.62	NU
Manage without synthetic appetizer and colouring	69 (60.0)	1 (0.9)	30 (26.1)	15 (13.0)	1.92	NU
Polyculture	56 (48.7)	7 (6.1)	50 (43.5)	2 (1.7)	1.98	NU
Proper record keeping	62 (53.9)	1 (0.9)	44 (38.3)	8 (7.0)	1.98	NU
Pond protection from predators	22 (19.1)	1 (0.9)	81 (70.4)	11 (9.6)	2.70	U
Use of resistant species	35 (30.4)	3 (2.6)	69 (60.0)	8 (7.0)	2.43	NU
Natural treatment (homeopathy)	50 (43.5)	35 (30.4)	26 (22.6)	4 (3.5)	1.86	NU

Table 6.
Distribution of fish farmers by level of use of organic farming practices.

practices. This does not augur well for the quest for healthy living. There was a positive relationship between knowledge of agricultural practice and innovativeness of farmers [25]. Thus the need to improved awareness of such practices to farmers.

4. Conclusion

The study concludes that the level of awareness of farmers to organic farming practices is low. However, fish farmers are better aware of such practices than livestock farmers. The justification between these major differences in the level of awareness of organic practices in farming activities could reflect on the livelihood of the southern communities in Nigeria. It is known that the major occupation is fishing. Therefore, it is only normal to be better aware of existing and improved techniques to improve fish farming other than the livestock counterpart. The study recommends that in the campaign for increased awareness of organic agriculture, special attention should be taken to create awareness to farmers on how organic

farming practices can be applied for livestock production as well since this sector had shown a lower level of awareness.

Conclusion is also drawn on the use of organic farming practices among farmers. The use of organic farming practices is higher for fish farmers relative to livestock farmers. The rationale to this difference is drawn from the observation that some of the indigenous knowledge and traditional practices of fish farmers were similar to identified organic practices. However for livestock farmers, the opposite was observed and thus the low use of organic practices for production. It is recommended that extension personnel should educate farmers on the adoption of organic farming methods in production with special interest on livestock farmers. This is believed to contribute to the improvement in the use of organic farming methods for fish and livestock production. Particularly, livestock farmers should be educated on the use of such practices as: no antibiotics used, vaccination only during disease outbreak, protection of animals from adverse weather conditions and farm diversification. Likewise, fish farmers should be educated on such practices as: low stock density, no synthetic appetizer and coloring, proper record keeping and use of organic fertilizers.

In spite of the observation that fish farmers used more of organic farming methods relative to livestock farmers, the level of use of organic farming practices among both groups of farmers is low, despite the importance drawn from using organic methods for agricultural production. This draws to the need for increased extension campaign to sensitize farmers and sustain the interest in organic agriculture. It is also recommended that policymakers should create more windows of opportunities and incentives as well as the enabling environment to encourage more farmers to participate in organic farm production. This is believed to contribute to the increase in the level of awareness, use and practices of organic agriculture in South-South Nigeria.

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