ASSESSMENT OF AQUACULTURE EXTENSION INNOVATION DISSEMINATION AMONG FISH FARMERS IN IBI LOCAL GOVERNMENT AREA, TARABA STATE NIGERIA

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ABSTRACT

This study assessed aquaculture extension innovation dissemination among fish farmers in Ibi Local Government Area, Taraba State Nigeria. A multi-stage sampling procedure was used to select respondents using a structured questionnaire and scheduled interview. Data collected was analyzed using descriptive and inferential statistics. The findings from the study revealed that most fish farmers were males (58.2%), married (60%), 25.5% were less than 25 years, and 36.4% earned ₦201,000 - ₦300,000 annually. Only 50% of the fish farmers knew the extension agents in their area. Extension agents visit the fish farmers monthly (30.0%), the frequency of innovation dissemination showed that 37.3% fish farmers do not receive innovation at all. Group demonstration ($\bar{x}$ =3.10) and mass media ($\bar{x}$ =2.87) were mostly used by extension agents, while political affiliation ($\bar{x}$ =3.36) and Government policy ($\bar{x}$ =3.34), were major constraints to effective extension service delivery. Mass media was commonly used by the extension agents; field trip was effective and preferred by the fish farmers for dissemination of innovation. Significant relationship existed between the socio-economic characteristics and extension service dissemination methods among the fish farmers (p<0.05). The frequency of innovation dissemination was low among the fish farmers and they preferred group demonstration. The study therefore recommended that government should employ more aquaculture extension Officers to intensify adequate programmes that will improve fish farming methods to be adopted in order to increase productivity in the study area

Key word: Assessment, Aquaculture, Extension, Fish farmer, Innovation

INTRODUCTION

The aquaculture sub-sector in Nigeria is widely accepted to have large potentials and several prospects for large-scale production thus considered as a very viable alternative to attaining satisfaction in national need of fish production (Kaleem and Sabi, 2021). Studies proved that aquaculture has brought immense positive impact on the global food production industry through micronutrients and animal protein, (Obiero *et al.,* 2019). Aquaculture is currently one of the fastest-growing food-producing sectors in the world. Its global importance is related to its contribution to the supply-demand gap of fish products. With the attendant decline in wild fish catches due to overexploitation of our fisheries resources, which leaves a yawning gap between demand and supply, aquaculture will be the only alternative to fill the gap (Ayoola and Ishola, 2020). Aquaculture is a major source of n-3 long-chain polyunsaturated fatty acids, which are proved to provide several health benefits for humans, namely protection against cardiovascular diseases, brain development, and some cancers (Oliva-Teles, 2021). Aquaculture also provides high-quality and highly digestible protein and is a good source of minerals, including Zn, Fe, and vitamins A and D. Contrary to other animal production sectors in which production is based on a few species,

aquaculture is highly diversified with more than 420 organisms being exploited (FAO 2020). Extension describes all organized communication efforts by which an agency or individual tries to bring about changes in the knowledge, attitudes, skills and behaviour of a client population, in order to reach one or more objectives that have been established within the framework of an overall development policy (Zagonel *et al.,* 2019) . In precise terms, extension is an organized, collective effort; it works with, and for, a client population; and it serves a development policy. The success of a new technology relies strongly on its dissemination from the source of the invention to a wide range of potential end users (Kumar *et al.*, 2018; Obiero *et al.*, 2019). Agricultural extension workers have a greater role to play in bridging the information gap between the information source (research institutions) and farmers (Umar *et al.,* 2021). Skilled extension personnel are involved in developing effective extension programs that identify critical problems and then design appropriate combinations of solutions. These provide the necessary information, including results of on-farm trials that demonstrate feasibility, and are essential for the timely transfer of technologies to farmers (Awuor *et al.,* 2021). Management of agricultural extension in Nigeria over

time laid less emphasis on aquaculture and fisheries extension which was apparently deemphasized in favour of crop and livestock agriculture. The study therefore assessed aquaculture extension innovation dissemination among fish farmers in Ibi Local Government Area, Taraba State Nigeria**.** The objectives of the study are to:

i. determine the socio-economic characteristics of the fish farmers
ii. examine extension services and frequency to fish farmers.
iii. identify the extension service dissemination methods among the respondents
iv. assess fish farmers' assessment of Extension service dissemination methods
v. Identify the constraints to effective extension services among the respondents

METHODOLOGY

Ibi Local Government Area is one of the sixteen Local Government Areas in Taraba State. It covers the total area of 2,672 Km^2 and extends between latitude 8^0, 19' north of the equator and 9^0, 51 east of the Greenwich meridian (Taraba, State Government, 2015). The town is located at the south bank of the Benue River, opposite the influence of much smaller Shemankar River. Both the Taraba River and the Donga River flow into the Benue within the local government area. Ibi local government has two seasons, the rainy season which extends from April to October and the dry season which last for five months extending November and March, the annual rainfall ranges between 1,058 mm and 1,300 mm with the temperature range of 28^0C and 39^0C. The major occupation of the community in the studied area is fishing which is characterized by annual Nwonyo festival.

A sampling frame was drawn from the list of fish farmers registered with the Department of Fisheries at Ibi Local Government Area, Taraba State, Nigeria. A multi-stage design was used for the selected respondents in the study area. The first stage involved stratification of the Local Government Area into four districts (Sarkin Kudu, Dampar, Ibi and Rimi Uku) based on the prevalence of fish farmers in the districts. The second stage involved random selection of fifty five (55) fish farmers from each of the four Districts to obtain a total sample size of two hundred and twenty (220) respondents. Questionnaire was used as instrument for data collection among the literate respondents while scheduled interview was used to obtain information from the illiterate respondents. Data were analyzed using descriptive and inferential statistics, such as frequency and percentage. Inferential statistics involved the use of weighted mean score and Chi square to test the hypothesis at $p<0.05$ significant level.

RESULTS AND DISCUSSION

Table 4 showed that majority of the fish farmers were male (58.2%) and married (60%), this implied that male is dominant in aquaculture in the study area. In a similar study, Omeje *et al*, (2021) opined more male and married fish farmers in Niger State in a study. Most of the respondents less than 25 – 45 years were 79.1%. The fish farmers could be referred to as being in their economically active age in which all things being equal are expected to be strong enough to cope with strenuous cultural activities. Omeje *et al*, (2020) reported that fish farmers within the economically active age possess the potentials to expand for higher income. Respondents with secondary school certificate were 61.8% which implied that the respondents have more than the basic educational requirement. Odinwa *et al*, (2022) reported similar result meaning having formal education is an added advantage to the prospects of fish farming in the area, since the farmers were literate; it becomes easier for them to receive, digest and adopt innovations to boost their production. Better information processing, usage of innovations and relevant farm practices are easier among the educated fish farmers (Awour *et al.,* 2021), similarly, Githukia *et al.,* (2020) opined that education is conceived as a means of creating conducive mental attitude towards embracing fish farming innovations and understanding of fundamental extension service information on fish production and marketing. Apart from formal education, Koge et al., (2018) asserted that fish farmers also need exposure to entrepreneurial skills to make well informed choices on how to increase their production and profit margin.
Only 28.2% of the respondents had fish farming as their primary occupation others combined it with other profession or integrate with crops. About 47% fish farmers had between 6-10 years experience in fish farming, family size of 11-15 was 45.9% which could imply that the family size are source of farm labour and about 55% of the respondents were members of farming association. This implied that they would have access to agricultural information, better access to knowledge, inputs and credits from members. However, (William *et al.,* 2019) reported some of the households that have large numbers of members do not necessarily rely on family labour. This is because the involvement of any family member in the labour at the fishpond depends on the availability of that member since there are seasonal variations in the fishpond activities

Table 1: Socio-economic characteristics of the fish farmers

Socio-economic characteristics	Labels	Frequency	Percentage
Gender	Female	92	41.8
	Male	128	58.2
Marital status	Single	66	30.0
	Married	132	60.0
	Widow/widower	14	6.4
	Divorce	8	3.6
Age	Less than 25 years	56	25.5
	26-30 years	28	12.7
	31-35 years	26	11.8
	36-40 years	24	10.9
	41-45 years	40	18.2
	46 years and above	46	20.9
Educational level	Primary school cert.	40	18.2
	Secondary school cert.	136	61.8
	Tertiary institution	36	16.4
	Non formal education	8	3.6
Primary occupation	Fish farming	62	28.2
	Civil servant	64	29.1
	Business	60	27.3
	Arable cropping	34	15.5
Fish farming experience	1-5 years	24	10.9
	6-10 years	103	46.8
	11-15 years	63	28.6
	16 and above years	30	13.6
Family size	1-5	28	12.7
	6-10	49	22.3
	11-15	101	45.9
	16 and above	42	19.1
Membership of association	No	100	45.5
	Yes	120	54.5

Source: Field Survey, 2022

Frequency of extension innovation dissemination to fish farmers

Table 2 presented the frequency of extension innovation dissemination to fish farmers. Half of the total respondents (50%) had contact with the extension agents. In Delta State, Oyibo *et al,* (2020) observed that 66% of the fish farmers had no contact with extension agents, it has implication for sources of fish farming knowledge in a situation where the fish farmer was not a professional, and it means that such knowledge may probably have been acquired through friends or seminars. Extension agent mostly visits fish farmers on a monthly basis (30.0%) while majority (33.6%) had no contact with the extension agents. Aquaculture extension innovation dissemination was frequent among 20.9% fish farmers while 37.3% had no contact with the extension agents.

Table 2: Frequency of extension innovation dissemination to fish farmers

Variables		Percentage
Do you have contact with Extension Agent in your area?	Yes	50
	No	50
How often does She/he visit you?	Weekly	16.4
	Forth nightly	20.0
	Monthly	30.0
	Not at all	33.6
How often is Aquaculture innovation disseminated to you?	Very frequent	20.9
	Frequently	16.4
	Rarely	25.5
	Not at all	37.3

Source: Field Survey, 2022

Extension Agents methods of aquaculture innovations dissemination among fish farmers

Table 3 showed Extension Agents methods of innovation dissemination to the fish farmers. Group demonstration ($\bar{x}$ =3.10) was rated highest by weighted mean score rating as the most used method for aquaculture innovation dissemination by the extension agents, and was followed by Mass media ($\bar{x}$ =2.87). Nwaogu and Akinbile (2018) reported in a similar study that the mostly used method of innovation dissemination by the extension agents is group demonstration in Oyo and Ogun States. Phone call ($\bar{x}$ =2.60) was the least method used in disseminating innovation information in the study area. This implied that the extension agenst rarely used phone call as a method of disseminating innovation since it require money for the purchase of phone and recharge cards or probably the challenge of network as majority of the respondents are scattered in the rural areas.

Table 3: Extension Agents methods of aquaculture innovations dissemination among fish farmers

Methods	Not at all	Rarely	Frequent	Very Frequent	$\bar{x}$	SD	Decision
Group demonstration	15.5%	-	43.6%	40.9%	3.10	1.01	Accept
Field trip	25.5%	-	63.6%	10.9%	2.60	0.99	Reject
Mass media	24.5%	1.8%	35.5%	38.2%	2.87	1.17	Accept
Visit	24.5%	0.9%	51.8%	22.7%	2.73	1.07	Reject
Phone call	30.0%	-	50.0%	20.0%	2.60	1.12	Reject

Weighted Mean = 2.78

Fish farmers' assessment of Extension service dissemination methods

Table 4 showed fish farmers' assessment of extension service dissemination methods on aquaculture innovation. Mass media (58.6%) was the method commonly used, field trip (39.5%) was the most effective method, Phone call (48.6%) was the less effective method and field trip (40.0%) was the most preferred method by the fish farmers in the study area. The use of mass media is common because it is the quickest means of reaching large audience of fish farmers within short period of time on aquaculture information. Mass media is broad with different units ranging from print and electronic. Davis *et al.* (2019) reported mass media to be an influential tool most especially in diffusion of information to masses. Field trip as preferred by the fish farmers afford them the opportunity of extension agents' direct impact of guidance, demonstration and support for better farm productivity.

Table 4 Extension service dissemination methods

Methods	Group demonstration	Field trip	Mass media	Visit	Phone call
Which of these dissemination methods is commonly used to disseminate innovation about aquaculture?	9.1%	16.8%	58.6%	82%	7.3%
Which of these methods is the most effective in disseminating aquaculture innovation?	9.1%	39.5%	30.0%	11.8%	9.5%
Which of these methods is less effective method of disseminating aquaculture innovation?	3.6%	15.9%	16.4%	15.5%	48.6%
Which of the methods do you prefer?	6.4%	40.0%	34.5%	10.9%	8.2%

Source: field survey, 2022

Constraints to effective innovations dissemination among fish farmers

Table 5 showed the constraints to effective extension service delivery. Political affiliation ($\bar{x}$ =3.36) was ranked highest by the weighted mean score rating as the major constraints to effective extension service delivery, followed by Government policy ($\bar{x}$ =3.34), Inadequate extension Staff ($\bar{x}$ =3.31), Attitude of extension agents to farmers ($\bar{x}$ =3.27), Corruption ($\bar{x}$ =3.21), and Lack of good road network ($\bar{x}$ =3.15) respectively. This implied that most fish farmers in the area what they benefit from the Government is determined by the political party they belong to which is not healthy in boosting aquaculture production. Most of the times, government policy is difficult to be separated from the political party which could be regarded as political party agenda. Inadequacy of personnel was also agreed by most respondents to be a serious threat to the effectiveness of the extension service delivery this implied that the available information cannot be disseminated due to insufficient aquaculture extension

Staff as reported by Githukia *et al.* (2020) on increasing farmer's access to aquaculture extension services lesson from central Uganda.

Table 5: Constraints to effective innovations dissemination among fish farmers

Constraints	UD	NC	NS	S	VS	$\bar{x}$	SD	Decision
Lack of good road network	20.9%	20.9%	11.8%	14.5%	31.8%	3.15	1.57	Accept
Poor communication	19.1%	26.4%	17.3%	26.4%	10.9%	2.84	1.31	Reject
Problem of social network	21.8%	16.4%	36.4%	10.0%	15.5%	2.81	1.31	Reject
Location of the farm	29.1%	19.1%	17.3%	15.5%	19.1%	2.76	1.49	Reject
Inadequate extension staff	16.4%	12.7%	21.8%	21.8%	27.3%	3.31	1.42	Accept
Extension agents' attitude	16.4%	15.5%	15.5%	30.0%	22.7%	3.27	1.40	Accept
Religion	16.4%	28.2%	11.8%	25.5%	18.2%	3.01	1.39	Reject
Political affiliation	13.6%	14.5%	22.7%	20.0%	29.1%	3.36	1.39	Accept
Corruption	19.1%	18.2%	16.4%	15.5%	30.9%	3.21	1.52	Accept
Government policy	18.2%	14.5%	17.3%	15.5%	34.5%	3.34	1.52	Accept

Undecided (UD), Not a Constraints (NC), Not Severed (NS), Severed (S), Very Severed (VS)
Source: field survey, 2022

Association between the socio-economic characteristics of fish farmers and dissemination methods commonly used by extension agents on innovations

From Table 5 showed an association between the socio-economic characteristics of fish farmers and dissemination methods commonly used by extension agents on innovations. There is a significant association between socio-economic characteristics (gender, marital status, age, educational level, primary occupation, method of land acquisition, fish farming experience, family size, source of capital, annual income from farm, and membership of association p<0.05) and dissemination methods commonly used to determine innovation on aquaculture in the study.

Educational level of the fish farmers influenced/dictated the understanding of communication methods commonly used to disseminate innovation on aquaculture this is because fish farming requires technical know-how and scientific knowledge if fish farmers are not literate enough, innovation would not be comprehended. Information on innovation is somehow complex and this require some high level of education to practice and the more educated an individual is the easier it will be for him/her to synthesize, process and utilize innovative information as required. Annual incomes' influence on communication methods commonly used to disseminate innovation on aquaculture, this implied that farmers with low income level cannot access information that are disseminated through mass media due to inability to connect and access social networks and group demonstration usually involve travelling to designated farm where extension agents would practically show the usage or adoption of an innovation. A fish farmer whose income is not commensurate with input is likely to miss such opportunity. The implication is that the more the annual income of fish farmers the greater the tendency of participating in innovation dissemination methods of the extension agent.

Hypothesis one: There is no significant association between the socio-economic characteristics and dissemination methods.

Table 4: Association between the socio-economic characteristics and innovation dissemination methods used to among the fish farmers

Socio-economic characteristics	Chi-square value	Contingency co-efficient	Correlation	P-value	Remarks
Gender	10.971	.218	-.120	.027*	Sig.
Marital status	25.289	.321	.039	.014*	Sig.
Age	73.464	.500	.069	<.001*	Sig.
Educational level	51.398	.435	.065	<.001*	Sig.
Primary occupation	42.804	.404	.102	<.001*	Sig.
Fish farming experience	30.967	.351	-.027	.002*	Sig.
Family size	38.448	.386	-.035	<.001*	Sig.
Annual income from farm	42.539	.403	.039	<.001*	Sig.
Membership of association	14.763	.251	.123	.005*	Sig.

* Sig. at 0.05 level
Source: field survey, 2022

CONCLUSION AND RECOMMENDATIONS
The findings from the study area revealed that most fish farmers were males and their age was within the economic active range which favored the adoption of aquaculture innovation. Gender, marital status, educational level fish farming experience and annual income determined the methods of innovation dissemination methods used among fish farmers. The frequency of innovation dissemination was low among the fish farmers and they preferred group demonstration. Government should employ more fisheries based extension Officers and finance to intensify adequate programme that will encourage improved fish farming methods. Extension agents should implore other methods of innovation dissemination to fish farmers.

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