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DETERMINANTS OF FISH FARMERS' WILLINGNESS TO PAY FOR PRIVATE EXTENSION SERVICES IN UYO AGRICULTURAL ZONE, AKS

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ABSTRACT

The study examined the determinants of fish farmers' willingness to pay for privately provided extension services in Akwa Ibom State. Their socioeconomics and fish farming characteristics, the type of extension services needed, constraints to the willingness to pay, and the factors that affect their willingness to pay for privately provided extension services were also identified. A structured questionnaire was used to elicit data from 120 fish farmers, randomly selected across the study area. Descriptive statistics and a logistic regression model were used to analyse the data. The results showed that a sizeable number (55.8%) of fish farmers in the study area were willing to pay for privately provided extension services, while 44.2% of the respondents were not. Extension services in high demand by the fish farmers were information and technical knowhow on record keeping ($\bar{x}$ =3.50) breeding and method of improving fingerling breeds ($\bar{x}$ =3.45), construction of the modern ponds ($\bar{x}$ =3.44), selection of fish species ($\bar{x}$ =3.42) and water quality management ($\bar{x}$ =3.42). Fish farmers were constrained by inadequate capital or financial incapability. The fish farmers' willingness to pay for privately provided services was driven by age (0.860), stock size (1.206), their knowledge level towards private extension service (0.795), and the type of extension services needed (1.131). There is a need for private extension service providers to render professional services to fish farmers in the State. Therefore, the fishery extension delivery system in Akwa Ibom State should be restructured through an agricultural extension transformation agenda to encourage this.

Keywords: *Determinants, Fish Farmers, Willingness to Pay, Privately Provided, Extension Services*

INTRODUCTION

The contribution of fish farming sub-sector to the global economy and food security cannot be underestimated. Fish farming is strategically positioned as an alternative to the continuous decline in fish supplies experienced by capture fisheries and has livelihood opportunities potentials. Fish farming helps empower the poor and directly promotes their standard of living (Apata et al. 2018). It has been reported that the fisheries sector contributed 1.09% of the country's total GDP in 2020 and 0.9% in Q3 of 2021 having grown by 2.27% in Q2 2021 from 3.24% in Q1 2020 and 5.68% in Q2 2020 (NBS 2021). Oluwasola and Ajayi (2013), stated that fish farming has the potential to help expand the resource base for food production and reduce the pressure on conventional sources of fish which are harvested faster than they can be regenerated. Fish farming contributes significantly to the socio-economic well-being of fish farmers.

Apata et al. (2018) however, gave the actual total domestic fish production in 2015 as 579,500 tonnes, while production from aquaculture was 56,300 tonnes in the same year, Ifie and Erhieguren, (2024) put the demand-supply gap of fish in Nigeria as 1.0 million metric tonnes while fingerlings demand-supply gap is over 500 million. According to Satia in Apata et al. (2018), Artisanal fisheries contribute about 491 million tonnes, Aquaculture, about 57 million tonnes, Industrial (Trawler), about 33 million tonnes and Distance fishing (Imports) about 612 million tonnes. Nigeria is the world's fourth-largest importer of fish products in terms of quantity as it imports about $876 million and exported about $106 thousand worth of frozen fish (excluding fish fillets and other fish meat) in 2020 (TrendEconomy, 2021). From the above analysis, less than 50% of the total yearly fish consumed by Nigerians is produced locally. It becomes necessary not only to maximize the exploitation of our fishery resources but also to concentrate more on the development of aquaculture which has the greatest potential to increase fish production for local consumption and export, (Ifie and Erhieguren, 2024).

A report on the reason behind the inability of the fish farmers in Nigeria, to produce at a rate that can meet the local consumption need has been traced to a lack of access to crucial information on improved fish farming and other agricultural practices, among other factors (ICS-Nigeria, 2005). This is escalated by the dearth of agricultural extension workers through whom farmers can be reached, (Ifie and Erhieguren, 2024).

Agricultural extension services were designed to drive Nigerian agricultural development through awareness creation to benefit farmers to identify, analyze, and link research innovations with the production challenges they face. Extension agents were engaged by the government to encourage and aid farmers to utilize opportunities for production and yield improvements leading to an improvement in their income and their living standard. However, the government-driven agricultural extension services publicly offered to promote and expand agricultural productivity and eliminate poverty have not made the desired progress in recent times. As a result, the public extension system is now seen as outdated top-down, paternalistic, inflexible, subject to bureaucratic inefficiencies, and therefore unable to cope with the dynamic demands of modern agriculture (Rivera et al., 2000). The most significant shortcomings of public agricultural extension, in general, have been unresponsiveness to the variation in farmers' needs, lack of ownership by intended beneficiaries, limitation in the quality of the field, and technical staff's unstable policy and political support (Hussaini, Dennis, and Ogezi, 2013). This results from the limited resources available to the public extension agencies with which farmers are reached free of charge in the country (Budak, Budak, and Kaçira, 2010).

Generally, following Aryal et al. (2009), farmers' willingness to pay for a given agricultural service is a function of knowledge, attitude, and intention. Available information influences both knowledge and attitude toward the proposed service (Hussaini, Dennis, and Ogezi, 2013). Socioeconomic characteristics such as age, gender, and income also shape a consumer's willingness to pay, because those characteristics affect attitudes toward agricultural service. In

addition, market characteristics such as accessibility and prices affect purchase behaviour and ultimately farmers' willingness to pay (Hussaini, et al, 2013).

This study examined the determinants of the willingness of fish farmers in Akwa Ibom State to pay for privately provided extension services. In addition, their socioeconomics and fish farming characteristics, the types of extension services needed, constraints to fish farmers' willingness to pay, and the factors that affect their willingness to pay for privately provided extension services were also identified.
The hypothesis developed to guide the study was that willingness to pay for private extension services would not be correctly predicted from the socioeconomic characteristics of the respondents.

METHODOLOGY

The study was carried out in the Uyo Agricultural Zone of Akwa Ibom State, Nigeria. Uyo Agricultural Zone is made up of Ibesikpo, Uyo, Uruan, Itu and Ibiono Local Government Areas. The area falls under the rainforest zone with a mean annual rainfall of about 2484mm, annual temperature is about 27^{o}C and relative humidity ranges from 70 – 80 %. Two distinct seasons are discernible; the dry season (November – March) and the rainy season (April – October). The study area is centrally located in Akwa Ibom state, and the commercial nerve centre assumes extra importance in the state. The economic activities of the inhabitants are farming, trading, crafts, transportation, civil service, artisans, etc. The area has a large concentration of fish farms especially in the urban and the peri-urban areas.
The selection of respondents was based on the Akwa Ibom State Agricultural Development Programme (AKADEP) framework. A two-stage random sampling procedure was used for the study. The first stage involved the random selection of five out of eight blocks from the zone. The second stage involved the random selection of 24 registered fish farmers in each of the selected blocks, giving a total of 120 fish farmers. Primary data were gathered through the use of a well-designed and validated questionnaire administered to the selected respondents. Descriptive statistical tools such as percentages and mean rankings were used while a logistic regression model was used to examine the determinants of fish farmers' willingness to pay for privately provided extension services.

RESULTS AND DISCUSSION

Analysis of Socio-Economic Characteristics of Respondents

The result from Table 1 revealed that 51.7% of the respondents were males while 48.3% were females. This can be attributed to the tedious nature of fish farming particularly in the aspect of culture, as noted by Okonji and Bekerederemo (2011). The majority (93.3%) of the respondents were between 20 to 60 years of age with a mean age of 45 years. The majority (77.5%) of the respondents were married. This implied that fish farming is practiced mostly by married people to make ends meet and cater to their families as noted by Edeoghon, Oria-Arebun (2011), and Hussaini, et al, (2013). The majority (71.7%) of the respondents had a household size of 1-5 persons with an average household size of 4 persons. The average years of fish farming experience of the respondents was 10 years. This indicated that the respondents had reasonable years of farming experience that should facilitate their understanding and willingness to pay for private extension services. From the results, 60.0% of the farmers had access to extension agents.

Table 1: Socio-Economic characteristics of Respondents

S/n	Variables	Frequencies	Percentages (%)
1	**Gender**		
	Male	62	51.7
	Female	58	48.3
	Total	**120**	**100.0**
2	**Age**		
	20 to 40 years of age	39	32.5
	41 to 60 years of age	73	60.8
	61 years and above	8	6.7
	Total	**120**	**100.0**
3	**Marital status**		
	Single	21	17.5
	Married	93	77.5
	Divorced	4	3.3
	Widow/widowed	2	1.7
	Total	**120**	**100.0**
4	**Household size**		
	1 to 5-person household	86	71.7
	6 to 10-person household	34	28.3
	Total	**120**	**100.0**
5	**Years of Farming Experience**		
	1 to 10 years	73	60.8
	11 to 20 years	35	29.2
	21 to 30 years	12	10.0
	Total	**120**	**100.0**
6	**Highest Level of Education**		
	Primary school	10	8.3
	Secondary school	53	44.2
	Tertiary education	57	47.5
	Total	**120**	**100.0**
7	**Access to extension services**		
	No	48	40.0
	Yes	72	60.0
	Total	**120**	**100.0**
8	**Membership of Cooperative**		
	Yes	16	13.3
	No	104	86.7
	Total	**120**	**100.0**

Source: Field Survey, 2023

Analysis of Fish Farming Characteristics of the Respondents

Results from Table 2 revealed that the majority of the respondents (59.2%) were into full-time fish farming. Item 2 of Table 2 revealed that 55.8% of the respondents stocked Clarias spp, 27.5% stocked Heterobranchus, and 10.8% stocked tilapia, while 5.8% combined Clarias and Tilapia. This might be due to its hardy nature and high consumers' preferences for Clarias and Heterobranchus species as reported by the farmers as well as Okonji and Afegbua (2004) and Omitiyin (2007). As revealed in item 3 of the table, 49.2% of the respondents had a stock size of less than 100 fish while 43.3% stocked within 100 to 1000 fish. This indicated that most of the fish farmers were small-scale producers which agrees with the findings of Abraham, et al, (2012). The majority (83.3%) of the respondents were self-sponsored fish farmers (76.7%) rearing their fish in concrete ponds. However, the majority (93.3%) were making less than N100,000 as monthly income from fish farming. This could propel their desire for technical know-how on more efficient fish management practices as observed by Okonji and Bekerederemo (2011).

Table 2: Fish Farming Characteristics of the Respondents

S/n	Variables	Frequencies	Percentages (%)
1	**Nature of Production**		
	Full-time	71	59.2
	Part-time	49	40.8
	Total	**120**	**100.0**
2	**Species Stocked**		
	Clarias	67	55.8
	Heterobranchus	33	27.5
	Tilapia	13	10.8
	Clarias/Tilapia	7	5.8
	Total	**120**	**100.0**
3	**Stock size**		
	Less than 100	59	49.2
	100 to 1000	52	43.3
	1001 to 2000	5	4.2
	Above 2000	4	3.3
	Total	**120**	**100.0**
4	**Facilities for rearing**		
	Concrete	92	76.7
	Plastic	27	22.5
	Earthen	1	.8
	Total	**120**	**100.0**
5	**The main source of funding**		
	Self-sponsored	100	83.3
	Formal	15	12.5
	Informal	5	4.2
	Total	**120**	**100.0**
6	**Monthly Income**		
	Less than 100,000	112	93.3
	100,000 to 500,000	8	6.7
	Total	**120**	**100.0**

Source: Field Survey, 2023

Analysis of Willingness to Pay for Privately Provided Extension Services

The study revealed a sizeable willingness to pay for privately provided extension services among the fish farmers in the study area. From Figure 1, the majority (55.8%) of the respondents were willing to pay for private extension services. This finding agrees with Hussaini, et al, (2013) who observed a high willingness among local poultry farmers in the area to pay for private extension services but disagrees with the findings of Oladele (2008) for Oyo state South West Nigeria and Ulimwengu and Sanyal (2011), for Uganda, who observed a low trend of willingness among local farmers in the areas to pay for specific extension services.

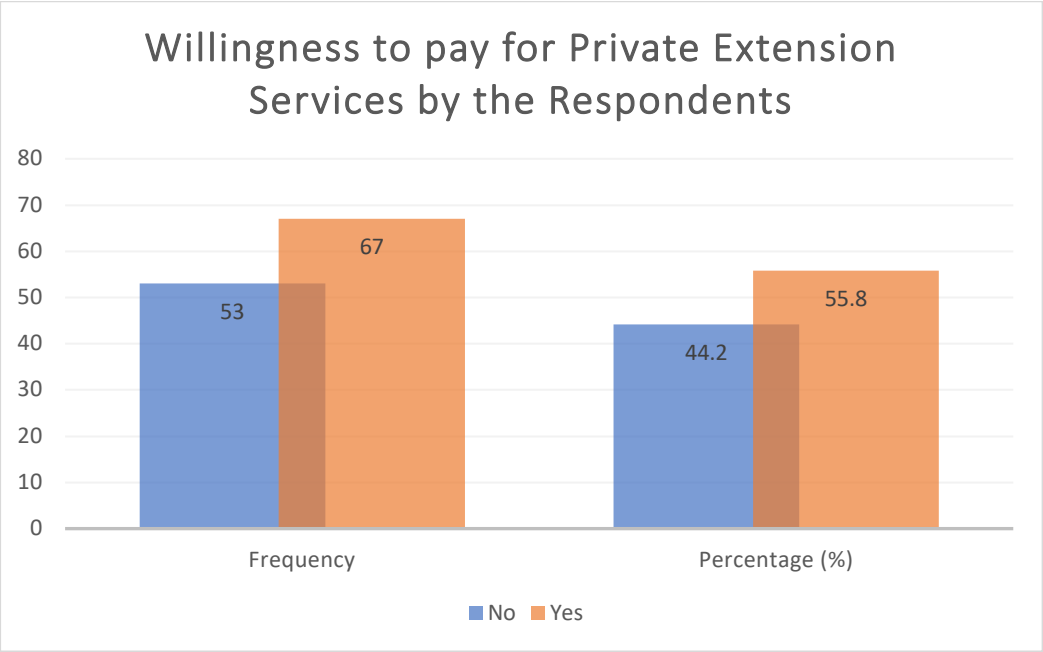


Fig 1: Willingness to pay for Private Extension Services by the Respondents

Analysis of Extension Services Needed by the Respondents

Results in Table 3 show that, all the extension services provided on the list were highly needed by the respondents. The first five include; Record keeping with a mean response of 3.50, breeding, and method of improving fingerling breeds ($\bar{x}$ =3.45), construction of modern ponds ($\bar{x}$ =3.44), selection of fish species ($\bar{x}$ =3.42) and water quality management ($\bar{x}$ =3.42). These were skill areas of fish farming that needed proper guidance by experts which the fish farmers may not get from the public sector agricultural extension services. These were serious issues of concern to the farmers and a good number of them were willing to pay for them. This finding corroborates the findings of Akpabio et al., (2007), Akpabio et al., (2008), Abraham, et al, (2012), Atukunda et al, (2021), and Ifie and Erhieguren, (2024).

Table 3: Extension Services Needed by the Respondents

s/n	Extension Services	SA	A	D	SD	Mean	MR
1	Construction of the modern ponds	71(59.2)	40(33.3)	0	9(7.5)	3.44	4th
2	Feed formulation techniques	58(48.3)	55(45.8)	6(5.0)	1(0.8)	3.41	7th
3	Feeding operation	48(40.0)	43(35.8)	12(10.0)	17(14.2)	3.01	13th
4	Method of improving fingerling breeds	62(51.7)	52(43.3)	5(4.2)	1(0.8)	3.45	2nd
5	Stocking operation	62(51.7)	40(33.3)	15(12.5)	3(2.5)	3.34	9th
6	Water quality management	58(48.3)	57(47.5)	3(2.5)	2(1.7)	3.42	5th
7	Spawning	52(43.3)	61(50.8)	2(1.7)	5(4.2)	3.33	10th
8	Control and management	49(40.8)	63(52.5)	7(5.8)	1(0.8)	3.33	10th
9	Disease symptoms	53(44.2)	65(54.2)	1(0.8)	1(0.8)	3.41	7th
10	Breeding	64(53.3)	49(40.8)	5(4.2)	2(1.7)	3.45	2nd
11	Record keeping	72(60.0)	41(34.2)	2(1.7)	5(4.2)	3.50	1st
12	Selection of fish species	59(49.2)	54(45.0)	6(5.0)	1(0.8)	3.42	5th
13	Access to formal credit	36(30.0)	42(35.0)	10(8.3)	32(26.7)	2.68	14th
14	Marketing/ marketing outlet	44(36.7)	58(43.3)	4(3.3)	14(11.7)	3.10	12th

Source: Field Survey, 2023. Note: Values in parentheses represent percentages while values outside parentheses are frequencies. **MR** = Mean Ranking

Analysis of Constraints to Fish Farmers' willingness to pay for Extension Service

Several factors were found to be potent constraints to the respondents' willingness to pay for private extension services. Results as presented in Table 4 revealed that farmers were constrained by inadequate capital or financial incapability. This constraint had a high mean response of 3.38 and ranked 1st. This was followed by free extension services ($\bar{x}$ =2.91), poor attention given to fish farmers by the Government ($\bar{x}$ =2.84), unprofitability of their fish farming businesses ($\bar{x}$ =2.78), illiteracy among the farmers ($\bar{x}$ =2.69) and then a lack of awareness of extension service providers ($\bar{x}$ =2.51). This corroborates Ifie and Erhieguren, (2024) who indicated that inadequate extension workers, poor funding, and inadequate training materials were the major constraints to extension services delivery to fish farmers in Delta state.

Table 4: Constraints to Fish Farmers' willingness to pay for Extension Service

S/n	Constraints	SA	A	D	SD	Mean	MR
1	Inadequate capital or financial incapability of farmers	82(68.3)	19(15.8)	2(1.7)	17(14.2)	3.38	1st
2	Lack of awareness of extension service providers	31(25.8)	33(27.5)	23(19.2)	33(27.5)	2.51	7th
3	Timeliness of availability	16(13.3)	45(37.5)	33(27.5)	26(21.7)	2.42	10th
4	Illiteracy among the farmers	34(28.3)	41(34.2)	19(15.8)	26(21.7)	2.69	5th
5	Distance of agricultural extension providers to farm	28(23.3)	32(26.7)	28(23.3)	32(26.7)	2.46	8th
6	Poor satisfaction with their services	20(16.7)	28(23.3)	30(25.0)	42(35.0)	2.21	11th
7	Inadequate information from agricultural extension services	17(14.2)	30(25.0)	22(18.3)	51(42.5)	2.10	13th
8	Free extension services	51(42.5)	31(25.8)	15(12.5)	23(19.2)	2.91	2nd
9	Scarcity of fish farming inputs	36(30.0)	37(30.8)	14(11.7)	33(27.5)	2.63	6th
10	Lack of Knowledgeable Extension Agents	20(16.7)	15(12.5)	21(17.5)	64(53.3)	1.92	14th
11	Unprofitability of fish farming business	50(41.7)	26(21.7)	12(10.0)	32(26.7)	2.78	4th
12	Poor attention given to fish farmers by the Government	54(45.0)	24(20.0)	11(9.2)	31(25.8)	2.84	3rd
13	Unavailability of Extension Agents	19(15.8)	31(25.8)	18(15.0)	52(43.3)	2.14	12th
14	Extension packages not meeting farmers' needs	33(27.5)	33(27.5)	10(8.3)	44(36.7)	2.45	9th

Source: Field Survey, 2023. Note: Values in parentheses represent percentages while values outside parentheses are frequencies. **MR =** Mean Ranking

Testing of Hypotheses. The age of the respondents was 0.860 times more likely to promote willingness to pay for private extension services (Exp B= 0.860). Increasing age is associated with an increased likelihood of willingness to pay for private extension services. This implied that young and smart farmers with abilities to accumulate higher capital would be more willing and able to pay for privately provided extension services. The table revealed that stock size was associated with an increase in the likelihood of willingness to pay for private

extension services by 1.206. This finding is also congruent with the findings of Oladele (2008) and Hussaini, et al, (2013). Similarly, results showed that the knowledge level of respondents towards private extension services and extension services needed by the respondents were more likely to promote willingness to pay for private extension services by 0.795 and 1.131 respectively. Therefore, sex, household size, farming experience, nature of fish production as well as monthly income did not influence the prediction of willingness to pay for private extension services in the study area.

Table 5: Estimated Coefficients of the Variables Predicting Willingness to Pay for Private Extension Services

Variables	B	SE(B)	Exp(B)	p-value	Remark
Sex	0.362	0.465	0.697	0.437	Not Sig.
Age	0.150	0.041	0.860	0.000	Significant
Household size	0.015	0.152	1.015	0.999	Not Sig.
Farming experience	-0.001	0.038	0.999	0.920	Not Sig.
Nature of fish production	0.404	0.483	1.498	0.403	Not Sig.
Stock size	0.187	0.060	1.206	0.002	Significant
Monthly income	0.025	0.039	0.975	0.513	Not Sig.
Knowledge level	0.229	0.119	0.795	0.050	Significant
Extension services needed	0.123	0.042	1.131	0.003	Significant

Source: Computed from field survey 2023. -2 Log likelihood = 127.581, Nagelkerke R^2=.357. Significant at a .05 level of probability

CONCLUSION AND RECOMMENDATION

The study has shown that a sizeable number of fish farmers in the study area were willing to pay for privately provided extension services. Extension services in high demand by the fish farmers were information and technical know-how on record keeping, breeding and methods of improving fingerling breeds, construction of modern ponds, selection of fish species, and water quality management, to mention but a few. The fish farmers' willingness to pay for privately provided services was driven by age, stock size, their knowledge level towards private extension services, and the type of extension services needed. There is a need for private extension service providers to provide skilled services to fish farmers in the State therefore fishery extension delivery system in Akwa Ibom State should be restructured through an agricultural extension transformation agenda.

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