Food and Agricultural Organization (FAO) Model Analysis of Training Needs of Artisanal Fishers in Kwara State, Nigeria

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Abstract

The aim of the study is the Food and Agricultural Organisation (FAO) Model Analysis of Training Needs of Artisanal fishers in Kwara State, Nigeria. Data were collected with the use of a questionnaire and analysed using frequency count, percentages, mean score and Binary Logistic Regression. The food and Agriculture Organisation (FAO) Needs Assessment Model was used to determine the areas of training needs. Any task or skill that had a threshold score above 6.13 requires training intervention. The results revealed that all the respondents were male (100 %), 41.7 years was the average age of the fishers. about 89.3 % of the respondents were married, 45.4% had no formal education, the average years of experience was 26.9 years and 59.7 % of the respondents practiced farming as a supportive occupation. 19.2 kg was the mean quantity of fish caught per day and the mean household size was 8 persons. The fisherfolks required capacity building identification and sorting of fish ($\bar{x}$=6.26), handling and transportation of captured fish ($\bar{x}$=7.46), canoe use and maintenance ($\bar{x}$=6.76), use of chorkor smoker ($\bar{x}$=6.7), maintaining personal and environmental health hygiene ($\bar{x}$=7.29) and local weather forecasting ($\bar{x}$= 6.62). The determinants of training needs on Artisanal Fishing practices were years of fishing experience ($p<0.05$), income ($p<0.05$), household size ($p<0.10$), and membership of a fishing association ($p<0.01$). The highest ranked constraint affecting artisanal fishing practices was the of storage facilities ($\bar{x}$=2.62). The recommendations of the study are that there should be provision of training in the identified areas and provision of supports to the artisanal fisherfolks inform of inputs and credit facilities..

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Introduction

Agriculture plays an important role in process of economic development of any country. The Agricultural sector provides food for human consumption and raw materials for the industries and also serves as a source of foreign exchange earnings for Nigeria. The Nigerian Agricultural sector in Nigeria is characterized by the low level of irrigation, low technology and productivity, land tenure problems, high production cost, limited financing, poor distribution of inputs and high labour intensity (FAO, 2022 and International Institute of Tropical Agriculture [IITA], 2017).

Fish is a vital, cheap and readily available source of protein for low income countries like Nigeria and it accounts for about 17 percent of the global animal-sourced protein. (FAO, 2018; Bene, *et al.*, 2015). The fish by-products are primarily used in the formulation of animal feeds and also for pharmaceutical purpose. Nigerians are the largest fish consumers in Africa with about 3.2 million metric tonnes of fish consumed yearly (FAO, 2022; FAO, 2016; Olaoye and Oloruntoba, 2011).

Artisanal fishing involves the use of crude crafts and gears and local knowledge in catching diverse species of fish. Also, artisanal fishing can be defined as the method of catching fish or any aquatic organism with the use of locally fabricated tools and techniques. The main motives of the fisherfolks are personal and family consumption, and income purpose (FAO, 2008). The artisanal fishing practice is an important source of livelihood for the fisherfolks. The demand for fish products are increasing because of their nutritional and health

benefits over meat as it is low in cholesterol. The features of Artisanal fisheries are presented in Table 1 below.

Table 1. Features of Artisanal Fisheries

Variables	Features of Artisanal Fisheries
Gears	Passive and multiple gears (Diverse-nets, lines, hooks, spear, cages etc.)
Craft	Gourds, Diverse canoe, boat, small vessels, very few motorized vessels
Technologies	Crude tools, traditional methods, low level of technology, labour intensive,
Target species	Multi- species fishing activities
Knowledge	Local knowledge of fisheries (indigenous practices), because of little or no contact with fisheries extension agents
Hazards/Risks	Highly risky occupation, Risk includes drowning, attacks from predators, injuries on the body, risks of inhaling smokes, respiratory illnesses, muscular disorders sun bites etc.
Distance covered	Short distances, inshore, fishing activities close to the settlements
Fishing Settlement	Most of the settlement lacks basics infrastructure like electricity, pipe borne water, a good road network, and health care centres. Remote to the neighboring urban centres. (Underdeveloped). Few people live there.
Occupational style	Part-time, seasonal, multi-occupational
Supportive Occupation	Farming, Artisan, Water Transporter, Trading etc.
Goal	Food, income, game and pleasure
Local fisheries regulation and management	Customary rules through the Community heads, fishing edicts, fishing regulations, and government policies through their agencies
Processed fish product	Low quality products and low value addition initiative practices
Market	Local village markets, retail outlets in urban cities, middle men/agents
Post-harvest fish losses	High - due to destructive fishing methods, setting gears for a long period, long distance fishing trip, discarded as by-catch, poor hygienic practices, poor processing methods, marketing and distribution problem
Constraints	Inadequate/lack of access to extension, Poor road networks, lack of modern fish processing equipment, the problem of middle men, no financial support, flooding, drought, health risks etc.

Adapted from: Ifabiyi, Adisa and Opeyemi (2021), Ifabiyi (2019); Ifabiyi, Banjoko and Komolafe, (2017), Sumaila, (2017); Gibson and Sumaila (2017), Onuoha, (2009) and FAO, (2008).

Training is the process of adjusting a person's skills, knowledge, attitude, and behaviour through a learning experience in order to achieve a particular outcome (Wilson, 1999). Training is the ability of an individual, group or organization to learn and adapt. Training is the process of acquiring additional skills and knowledge needed to effectively perform a particular task or duty (Lynton and Pareek, 1990). Training is the process of improving an individual's knowledge, skills and attitude to do a particular task or job better (O'Herron and Simonsen, 1995). Needs is a gap or discrepancy between the actual or present condition and the desired or projected condition. Needs exist anytime the current output or performance

differs from the desirable out or performance (McCawley, 1999; Farinde and Ajayi, 2005). The term training needs are defined as the attitude, abilities and knowledge that are required to achieve the projected goals and overcome the problems (O'Donnell, 2022; Owona, *et al*, 2010). Training needs refer to detailed items of information, skills and knowledge required to effectively perform certain tasks.

The provision of training through agricultural extension service to the fisherfolks could increase their productivity, income and increase their food and nutrition security as the demands for fish products are increasing at a rate of 3% annually (Alagoa, Elo, Andew and Ojukuli, 2011). However, the artisanal fishery had been reported to be fast diminishing (Kapadia, 2002). This might be attributed to inadequate access to agricultural extension services and training deliveries, use of crude and unhygienic practices, high post-harvest fish losses and inadequate government supports to the fisherfolks.

According to Samson (2006) fisheries extension services in Nigeria had been reported to be ineffective and not properly organized. Okwu, Yahaya and Obinne (2011) also reported that there is inadequate information on the extension needs of the fisherfolks. The poor quality of fish products and high post-harvest fish losses is attributed to the procedures used by the artisanal fishers (Kyangwa and Odongkara, 2005). Hence, there is a need to determine the Training needs of the fisherfolks to provide the right intervention. The identification of fisherfolks' areas of training needs would assist agricultural extension service providers to match their training programmes to their needs. Therefore, there is a need to assess the training needs of artisanal fishers in Kwara State, Nigeria. The specific objectives were to:

1. Identify the socio-economic characteristics of respondents.

2. Identify areas of training needs of artisanal fishers in the study area.

3. Examine the determinants of training needs of artisanal fishers in the study area.

4. Identify the constraints affecting artisanal fishers in the study area.

Materials and Methods

Methodology

The study was conducted in Kwara State, Nigeria. The population for the study consists of all the artisanal fishers in Kwara state, Nigeria. A 3-stage sampling technique was used for the study. The 1st stage involved a purposive selection of two Local Government Areas (LGA) located along the River Niger Banks in Kwara State, Nigeria where there were fisherfolks. Selected LGAs in Kwara State were Patigi and Edu LGAs. The 2nd stage was a random selection of 5 fishing communities from the selected local government areas in Kwara State, Nigeria. The selected fishing communities in Kwara State were (Patigi LGA): Kpata-gbaradogi, Ellah, Sunkoso, Egwa-mama and Patigi. (Edu LGA): Gondongi, Tswako, Chewuru, Likpata and Eko'o. The 3rd stage involved a proportionate random sampling of 10 % of the population of the fisherfolks from the selected communities. The total number of respondents for the study was 196 fishers. The FAO Model could be used to do needs assessment through job analysis (Wentling 1992). This was done by ascertaining the frequency of performance, the importance and difficulties faced when performing the fishing tasks. (a) To determine the Frequency of performance, a 5-point likert type scale was used where seldom=1, occasionally=2, weekly to monthly=3, daily to weekly=4 and daily=5 (b) To determine the Importance of fishing practices, a 3-point likert type scale was used where slightly important=1, moderately important=2 and extremely important=3. (c) To determine the Difficulty in performing the fishing tasks, a 4-point likert type scale was used where easy=1, moderately difficult=2, very difficult=3 and extremely difficult=4. The various scores were pooled and the means standardized. Thereafter, all practices with means score above the aggregate mean score of

6.13 was a practice or task where training is required. In order to determinants of the training needs, the Binary Logistic Regression analysis was used where Y= Training Needs [High Training Needs = 1, Low Training Needs = 0] and X = (age; gender; educational status; marital status; years of experience; income; household size; quantity of catch; contact with extension agents; fishing craft and number of fishing trips). Constraints limiting the fisherfolks were measured on a 3-point likert type scale. Respondents were provided with the list of 16 possible constraints, where Not a constraint =1, Severe =2 and Very Severe = 3. The statistical tools used to analysed the data were frequency count, mean, percentages and Binary Logistic Regression.

Results and Discussion

The result in table 2 showed that all (100 %) of the fishers were male. All the respondents being male could be attributed to the fact that artisanal fishing is a strenuous job that female might not want to participate. 41.7 years was the average age of the fishers in the study area. The implication of this result is that the fisherfolks were within the economically active age bracket. The result suggested that artisanal fishery tasks require much energy to fully execute. About 89.3% of the fishers were married. The implication of marriage to artisanal fishing is that family members could be used to do certain tasks. The result presented in Table 2 revealed that about 45.4 % of the fishers had no formal education. The result showed that a higher percentage of fisherfolks were illiterates. The result presented in Table 2 further revealed that about 54.1% of the fishers were members of fishing associations. The membership of the fishing association is important as the fishers can exchange useful information and skills which can enhance their productivity. Furthermore, the implication of being a member of the fishing association is that it could be a useful platform for the provision of extension services to the fisherfolks. The result showed that about 57.1% of the respondents had no contact with extension services in the study area. This implies that most of the fishers have no or limited access to extension service deliveries on artisanal fishing practices. The result showed that about 78.1% of the fishers practiced fishing as a primary occupation. About 59.7 % of the fishers practice farming as a supportive occupation. The result presented in table 2 showed that the mean household size of the fishers was 8 persons. This implies that the artisanal fishers have family responsibilities that might require more financial commitments which could propel them to obtain training on the needed fishing skills. This result concurred with the result of Ifabiyi, Banjoko and Komolafe (2017) who stated that the mean household size of fisherfolks was 8 persons. The result indicated that 26.9 years was the fishers' mean years of experience. This infers that the fishers had some years of experience in the supportive fishery. The result presented in Table 2 showed that 59,816 Naira was the mean monthly income of the fisherfolks. This is equivalent to 146 United States Dollars. The mean monthly income of the respondents is higher than the present nationwide minimum wage of 30,000 Naira in Nigeria. This showed that fishing business is a profitable venture. The result as shown in Table 2 revealed that 19.2 Kg was the mean daily quantity of catch. The result in table 2 indicated that 2 trips were the mean number of fishing trips per day. This might be adduced to the fact that fishing activities are strenuous in nature. The result further showed that 56.1% of the fishers uses dugout/plank canoe for fishing. This indicates that dugout/plank canoes are the most common type of craft in the study area. This could be due to the fact that artisanal fishery uses crude tools and techniques. The result in table 2 showed that about 58.7% had not participated in any training on fishing practices before. This indicates that higher percentage of the fisherfolks had not been trained as fishery extension service had been reported to be ineffective (Samson, 2006)

Table 2. The Result of Socioeconomic Characteristics of the Artisanal Fishers

Variables	Frequency	Percentage	Mean Score	S . D
Gender				
Male	196	100		
Female	0	0		
Age (Year)			**41.7 Years**	±16.6
20 -30	35	17.9		
31- 40	55	28.1		
41– 50	54	27.6		
51– 60	33	16.8		
61-70	15	7.6		
Above 70	4	2.0		
Marital Status				
Single	11	5.6		
Married	175	89.3		
Widowed	6	3.1		
Divorced	4	2.0		
Educational Status				
No formal	89	45.4		
Primary	68	34.7		
Secondary	26	13.3		
Tertiary	13	6.6		
Membership of Association				
Yes	106	54.1		
No	90	45.9		
Contact with Extension-Service				
Yes	84	42.9		
No	112	57.1		
Is Fishing your Primary Occupation				
Yes	153	78.1		
No	43	21.9		
Other Supportive Occupation				
Farming	117	59.7		
Trading	36	18.4		
Artisans	7	3.6		
Others	36	18.3		
Household size			**8 Persons**	**±4**.6
Below 5	68	34.7		
5– 10	87	44.4		
Above 10	41	20.9		
Years of Fishing Experience			**26.9 Years**	±12.7
Below 10	20	10.2		
11 – 20	57	29.1		
21 – 30	51	26.0		
Above 30	68	34.7		
Monthly Income			**59,816 Naira (146 US Dollars)**	±37,816

Below 20,000 Naira	36	18.4		
20,000-40,000 Naira	34	17.4		
41,000- 60,000 Naira	44	22.5		
61,000- 80,000 Naira	37	18.8		
Above 80,000 Naira	45	22.9		
Daily Quantity of Catch (KG)			**19.2 Kg**	±16.1
Below 5 KG	36	18.4		
5- 10 KG	27	13.8		
11- 20 KG	75	38.3		
21 – 30 KG	23	11.7		
31 – 40 KG	27	13.8		
Above 40 KG	8	4.0		
Number of fishing Trips per Day			**2-Trips**	±0.5
One trip	46	23.5		
Two trips	126	64.3		
Three trips	24	12.2		
Four trips	-	-		
Craft Type				
Use of Boats with Engine	5	2.6		
Use of Boats without Engine	64	32.7		
Use of Dugout/Plank Canoe	110	56.1		
Use of Gourds	27	8.6		
Participation in Training on Fishing Practices				
Yes	81	41.3		
No	115	58.7		

Source: Author's Field Survey 2018, S.D – Standard Deviation.

The result in Table 3 reveals that the fisherfolks in Kwara State required capacity building in the following tasks: identification and sorting of fish ($\bar{x}$=6.26), handling and transportation of captured fish ($\bar{x}$=7.46), use and maintenance of multiple hooks on a line, ($\bar{x}$=7.17), canoe use and maintenance ($\bar{x}$=6.76), use of chorkor smoker ($\bar{x}$=6.7), maintaining personal and environmental health hygiene ($\bar{x}$=7.29) and local weather forecasting ($\bar{x}$= 6.62). This implies that there is need for the provision of training to fisherfolks in the study area. The provision of training on fishing practices will enhance the capacity of the fisherfolks as Adisa *et al.*, (2018) reported that farmers must acquire new ideas and techniques in order to be more productive and to make more profits. This is in agreement with the findings of Adisa, Ifabiyi, and Gbenga (2021) which stated that fisherfolks had low knowledge level and high capacity building needs.

Table 3. The Training Needs of the Respondents (N=196)

Fishing Tasks	Frequency of Performance	Level of Importance	Level of Difficulty	Aggregate Score	Remark If Training Is Needed
1. Identification and sorting of fish	2.32	2.19	1.75	6.26	**Needed**
2. Handling and transportation of captured fish from the landing site	3.18	2.78	1.50	7.46	**Needed**
3. Use and Repair of nets, cage and traps	2.25	2.06	1.79	6.1	Not Needed
4. Use and Maintenance of multiple hooks on a line	3.04	2.61	1.52	7.17	**Neede**d
5. Canoe use and maintenance	2.76	2.46	1.54	6.76	**Needed**
6. Icing of fish	2.02	1.55	1.70	5.27	Not Needed
7. Outboard engine use and repairs	1.71	1.87	1.75	5.33	Not Needed
8. Rescue, resuscitation and safety skill	1.59	2.17	1.93	5.69	Not Needed
9. Use of Chorkor smoker	2.78	2.35	1.57	6.7	**Needed**
10. Drying of fish	2.20	2.25	1.53	5.98	Not Needed
11. Salting of fish	2.47	2.17	1.28	5.92	Not Needed
12. Branding/packaging of processed fish	1.99	2.09	1.43	5.51	Not Needed
13. Management of storage pest	1.80	2.10	1.44	5.34	Not Needed
14. Fish marketing and distribution	2.39	2.23	1.39	6.01	Not Needed
15. Record keeping	1.83	2.02	1.56	5.41	Not Needed
16. Credit Acquisition	1.75	1.97	1.78	5.5	Not Needed
17.Maintaining personal and Environmental Health Hygiene	3.18	2.66	1.45	7.29	**Needed**
18. Local weather forecasting	2.59	2.39	1.64	6.62	**Needed**
Threshold score				**6.13**	

Decision Rule: Aggregate score ≥ (6.13) Threshold score requires Capacity Building, Aggregate score ≤ (6.12) Threshold score does not require Capacity building.

Years of Experience: Table 4 revealed that the years of experience in artisanal fishing has a negative coefficient (-0.0569) and also a determining factor of training needs ($p<0.05$). This indicates that the years of experience in fishing activities is a determining factor of participation in training on fishing practices.

Income: the income of the respondents has a negative coefficient (-0.0018) and also a determining factor of the fishers' training need ($p<0.10$). The implication of this is that the more the income of the fisherfolks, the lesser their training need on fishing practices

Table 4. The Result of Binary Logistic Regression Analysis to Identify the Determinant of Artisanal Fishers' Training Needs

Variables	Coefficient	Standard Error	z-value	p-value
Constant	-5.8903	1.7379	-3.39	0.001
Age of the Fisherfolks	-0.0067	0.0263	-0.26	0.798
Marital status	-0.1469	0.5242	-0.28	0.779
Educational status	-0.2356	0.1973	-1.19	0.232
Years of Experience	**-0.0569****	0.0285	-2.00	**0.046**
Income of the Fisherfolks	**-0.0018***	0.0010	-1.79	**0.074**
Household size	**0.1632***	0.0956	1.71	**0.088**
Labour Type	0.5277	0.4411	1.20	0.232
Membership of Fishing Association	**2.2464*****	0.8182	2.75	**0.006**
Quantity of Catch	**0.0857****	0.0368	2.33	**0.020**
Contact with Extension Services	0.2018	0.1478	1.37	0.172
Other Supportive Occupation	**-1.0089***	0.5203	-1.94	**0.053**
Craft Type	0.4202	0.5329	0.79	0.430
Fishing Trips	**2.764*****	0.7254	3.81	**0.000**
Prob > Chi^2= 0.000 **Pseudo R^2 = 0.5684** **Log Likelihood = -50.554**				

Source: Author's Field Survey 2018, Note: *, **, *, Significant at 1%, 5% and 10% levels respectively**

The result of the Binary logistic regression model with the seven predictors produced Pseudo R^2 =0.5684, P <0.001.

Household Size: the household size of the respondents has a positive coefficient (0.1632) and also a determining factor of training needs ($p<0.10$). This infers that an increase in the household size of the fisherfolks, would lead increase the fishers' likelihood of participation in training on fishing practices.

Membership of Fishing Association: the membership of fishing association has a positive coefficient (2.2464) and a determining factor of training needs ($p<0.01$). This implies that the more the fishers are actively involved in fishing associations, the more their likelihood of participation in training on fishing practices.

Quantity of catch: the quantity of catch has a positive coefficient (0.0857) and also a determining factor of training needs ($p<0.05$). The result infers that the more the quantity of catch, the more the fishers' likelihood of participation in training on fishing practices.

Other Supportive Occupation: the other supportive occupation of the respondents has a negative coefficient (-1.0089) and has an inverse relationship with training needs ($p<0.01$). The higher the fisherfolks' involvement in other supportive occupation, the lower their likelihood of participating in training. Those with other supportive occupations may not participate in any capacity building on fishing practices as some of them might be too busy to attend the capacity building programme. This implies that

involvement of fisherfolks in other supportive occupation will limit their participation in training on fishing practices. According to Martey *et al.* (2012), the negative effect of other supportive occupation on the likelihood of participating in training indicates that there is a strong competing effect of diverting the fisherfolks' capabilities, strength and time on other employment opportunities.

Numbers of fishing trips: the number of fishing trips of the respondents has a positive coefficient (2.764) and has a significant relationship with training needs ($p<0.01$). The result infers that increase in number of fishing trips will increase the fisherfolks' participation in trainings.

The result in table 5 revealed that the most severe constraint was lack of storage facilities ($\bar{x}$=2.62). The other major constraints are inadequate access to extension services ($\bar{x}$=2.42) and health risks ($\bar{x}$=2.37), inadequate credit facilities ($\bar{x}$=2.32), High rate of illiteracy ($\bar{x}$=2.15) and poor road access ($\bar{x}$=2.08). This result implies that lack of storage facilities, lack of access to extension services, high cost of fishing inputs and inadequate access to credit were the major factors limiting fishing activities in the study area

Table 5. Mean Distribution of Constructs used to determine Constraints Faced by Fisherfolks

Constraints	**Mean**			
		Std. dev	**Rank**	**Remark**
1.Lack of readily available market	1.41	±0.69	16	Minor
2. Inadequate technical skills	1.66	±0.82	12	Minor
3. Poor access roads	2.08	±0.62	6	Major
4. Health risks/hazards	2.37	±0.73	3	Major
5. Tear and wear of Fishing gears.	2.03	±0.72	7	Major
6. High tax charges	1.81	±0.63	10	Minor
7. High rate of illiteracy	2.15	±0.83	5	Major
8. High cost of fishing inputs	1.94	±0.60	9	Minor
9. Lack of storage facilities	2.62	±0.62	1	Major
10. Inadequate access to credit facilities	2.35	±0.52	4	Major
11.Inadequate access to extension services	2.42	±0.82	2	Major
12. Flooding/Tide and harsh water current	1.97	±0.92	8	Minor
13. Drought / Drying up of river during dry season	1.66	±0.87	12	Minor
14. Problem of middle men	1.59	±0.69	15	Minor
15. Risk of Theft	1.68	±0.62	11	Minor
16. Seasonality of fish harvest	1.74	±0.51	14	Minor

Source: Author's Field Survey 2018. Note: Likert scale: Very severe = 3, Severe= 2, Not a Constraint = 1, Bench mark for Constraint is mean score = 2.00. Decision rule: Mean score ≥ 2.0 (Major Constraint), Mean score ≤ 1.99 (Minor Constraint).

Conclusion

According to the findings of the study, its concluded that the artisanal fishers requires agricultural extension training on identification and sorting of fish, handling and transportation of captured fish, use and maintenance of multiple hook on a line, canoe use and maintenance, use of chorkor smoker, maintaining personal and environmental health hygiene and local weather forecasting. The determining factors of training needs were years of experiences, income, household size, membership of fishing association, quantity of catch per day and numbers of fishing trips. The major constraints affecting fisherfolks are lack of storage facilities, lack of access to extension services, high cost of fishing inputs and

inadequate access to credit. The author recommends:

1. Extension organizations should provide training in the identified areas of training needs.

2. The determinants of training needs such as years of experiences, income, household size, membership of fishing association, quantity of catch per day and numbers of fishing trips should be noted and incorporated during the planning and implementation of any training programme for the artisanal fishers.

3. Government and Non-governmental agencies concerned with artisanal fisheries should work hard to minimise the constraints affecting artisanal fishing practices, fisherfolks should be assisted to enhance their capacity through the provisions of storage facilities, credit facilities, extension services and fishing inputs.

Conflict of Interest

The authors declare that they have no conflict of interest.

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