

Analysis of training needs of fish farmers in Ikorodu Local Government Area of Lagos state, Nigeria

Ajala, A. O., Kolawole, E. A., Owolabi, A. O. and Faseyi, S. A.

Department of Agricultural Economics and Extension, Landmark University, Omu-Aran,
Kwara State, Nigeria



Corresponding author: ajala.abiodun@lmu.edu.ng;
abiodunajala66@yahoo.com; 07068617924

Abstract

In this study the level of knowledge, skill and training needs of fish farmers in Ikorodu Local Government Area of Lagos State were investigated. Eighty out of 150 fish farmers currently operating in the Fish Farm Estate, Ikorodu were randomly selected. Data were collected from the farmers with structured interview schedule and were summarised with frequency counts, percentages, mean and correlation coefficient. Result showed that the following practices were carried out by farmers: pond/vats/fibre glass/tank cleaning, water quality maintenance and management, pond fertilisation, brood stock production, spawning, fingerlings sourcing/production, disease prevention, control and management, feed formulation and production/sourcing, record keeping, fish feeding, fish processing, fish storage, fish sorting, pest and predator control, fry care, transfer and feeding, siphoning, and fish transportation. The mean age of the fish farmers were 45 ± 13.0 years with 63.8% being males. Majority (78.8%) were married with mean family size of 4 ± 2 . Majority (82.5%) of the farmers had more than twelve years of formal education. The mean farming experience was 8 ± 3 years with average mean income of 1.4 million naira. 58.8% and 47.5% had high level of knowledge and skill respectively. Training was needed in seven out of the seventeen practices. The major constraints to fish production are high cost of feed and lack of capital. Also, a positive and significant relationship exist between level of knowledge of the farmers and farmers' gender, marital status, membership of cooperative society and fish farming association and primary occupation while age of the farmers had a negative but significant relationship with it. It is recommended that training by extension agents should focus the area of training needs and that credit and cost of fish feeds be subsidized.

Keywords: Training, fish, farmers, training needs, knowledge

Introduction

Fish farming is the industrial (small scale, medium scale or large scale) occupation of raising fish in enclosed facilities such as plastic tanks, fiberglass, ponds, and vats; in order to boost, support, compensate or increase fish food supplies. According to Nwiro (2012), "the fishery sector [which fish farming belongs to] is estimated to contribute 3.5% of the nation's Gross Domestic Product and [it] provides direct and indirect employment to over six million people in the country." Since its emergence and popularity in the

Nigerian society, it has provided alternative sources of animal protein for the populace; thereby impacting on the health and wellbeing of the nation. This has been made possible through fish's nutritional content which are: Omega-3 fatty acids, calcium, iron, and fat soluble vitamins. Its contribution to the nation's economy cannot be understated. "The major sources of fish supplies in the country are as follows: 56% imports, 37.6% coastal, brackish-water and inland fisheries, 2.6% industrial trawl fisheries, and 3.8% aquaculture (Adebesin, 2011). The technologies used in the

Analysis of training needs of fish farmers in Ikorodu Local Government Area of Lagos state, Nigeria

industry vary from vats, ponds and tanks to water recirculation systems and the scale of operation range from house backspaces to integrated aquaculture facilities. These fish farming technologies are necessary for meeting the fish needs of the citizenry of any nation. The technologies includes: cold room, hatcheries, and processing, packaging and transportation infrastructures.

Training is a process of acquisition of new skills, attitude and knowledge in the context of preparing for entry into a vocation or improving one's productivity in an organization or enterprise (Sajeev *et al.*, 2010). Training analysis looks at each aspect of an operational domain so that the initial skills, concepts and attitudes of the human elements of a system can be effectively identified and appropriate training can be specified (as cited in Wikipedia, 2015). Sajeev and Singha (2010) posited that training plays an important role in the advancement of human performance in a given situation.

According to Wikipedia (2015), training needs analysis is the process of identifying the gap in employee training and related training needs. It is the first stage in training process and involves a procedure to determine whether training will indeed address the problem, which has been identified. It is also as the identification of training requirements and the most cost effective means of meeting those requirements. The purpose of training needs analysis is to provide answers to the following questions: what is needed and why, where is it needed, who needs it, how will it be provided, how much will it cost and what will be the business effect (Greenberg, 2015).

Currently, numerous challenges are confronting fish farming practices; among which are poor management, inadequate

supply of good quality fish seed, lack of capital, high cost of feed, inadequate access to extension services and poor marketing of products. Although, most research and extension efforts have focused on providing information on improved fish production technologies, it appears that these efforts are not enough. Furthermore; access to equipment, tools, information and technologies for improved production of fish are not enough, farmers need to have the knowledge of how to use them on their farms before fish production can increase (Olaoye *et al.*, 2014). Consequently, this study identified the training needs of fish farmers in Ikorodu Local Government Area of Lagos State

Materials and methods

The study took place in Lagos state. Lagos is located in south-western Nigeria and has boundaries with Ogun State both in the north and east. The state is endowed with marine, brackish and fresh water ecological zones with varying species that provide productive fishing opportunity for fishermen (Adesoji and Kerere, 2013). The respondents were 80 out of 150 fish farmers operating currently in the Fish Farm Estate, Odogunyan, Ikorodu chosen through simple random sampling (without replacement). Primary data was employed and collected via questionnaire(s) and or interview schedule(s) as appropriate. Both descriptive and inferential tools were used. The descriptive statistics tools used were: table, mean, frequency and cumulative frequency, mean and standard deviation while the inferential statistics tools used were: correlation, regression, and Chi-Square.

The variables measured were:

Knowledge level was measured using 4 Point Likert-Type Scale comprising of No Knowledge (1 point), Read About (2 point),

Seen and Performed (3 point), Performed Myself (4 point), and Possess Mastery (5 point). The farmers were asked questions about the Level of Their Knowledge on a list of 17 practices. The knowledge level index was the sum of the scores on all 17 questions asked each fish farmer with maximum score being 85 and the minimum score being 17. Skill level was also measured using 5 Point Likert-Type Scale comprising of Very low (1 point), Low (2 points), Moderate (3 points), High (4 points) and Very High (5 points). The skill level index was the sum of the scores on all 17 questions asked each fish farmer with maximum score being 85 and the minimum score being 17. Frequency of Performance of Improved Fish Production Management Practices: This variable was measured with 5 Point LikertType Scale comprising of Never Done (1 point), Done Daily (2 points), Done Weekly (3 points), Done Monthly (4 points) and Once in a Cycle (5 points). The frequency of performance of improved fish production management practices index was the sum of the scores on all 17 questions asked each fish farmer with maximum score being 85 and the minimum score being 17. The Training Needs of the Fish Farmers was measured using the 5 Point LikertType Scale comprising of Not Needed (1 point), Needed (2 points), and Extremely Needed (3 points). The training needs index was the sum of the scores on all 17 practices with maximum score being 85 and the minimum score being 17.

Results and discussion

Socio-economic characteristics of the fish farmers

The mean age of the fish farmers was 45 ± 13 years. This means majority of fish farmers were able-bodied and agile young men and women, who possessed the physical strength to sustain rigorous and

arduous tasks required in fish farming that can enhance the effectiveness of carrying out the improved agricultural technologies. Majority were males (63.8%) which is in conformity to Adebessin (2011) and Ogunremi and Oladele (2012) report of more male fish farmers. This shows that the male gender engages in fish farming than the female gender.

Majority (78.8%) were married. This shows that fish farming is attractive more to married individuals than any other category of fish farmers based on marital status. This could be as a result of the profitability of fish farming which they see as an income channel to meet up with the financial responsibilities arising from their families. 95% (majority) of the fish farmers have a family size of 4 persons which is similar to the findings of Adebessin (2011) that most fish farmers are likely to have a family size of between 3 and 5. This shows the availability of family labour that could assist the fish farmers in their business. The study results also showed that a little above average (55%) of fish farmers had 17 and above years of formal education; a finding similar to that of Ifejika *et al.* (2013) in their study area in which majority (82.8%) of fish farmers were had 16 years of formal education. The implication of this is that majority of fish farmers have access to information from different sources and as a result can convert this information to knowledge due to reading and writing skill which also would impact on their knowledge level and ultimately the efficiency of their fish farming operations.

The results showed that majority (76.2%) had less than 10 years of farming experience. Also, above average (55%) of fish farmers had less than ₦ 500,000 income per annum, The analysis shows that most of the fish farmers were small scale operators with less than ₦ 500,000 annual

Analysis of training needs of fish farmers in Ikorodu Local Government Area of Lagos state, Nigeria

income from fish farming which is a little lesser than the income reported by Adebesein (2011) that fish farmer's income was ₦ 700,000 and ₦ 890,000 in his study area. Furthermore, 81.2% of fish farmers were engaged in fish farming as a primary

occupation which is in agreement with Olaoye and Oloruntoba (2010) and Ogunremi and Oladele (2012) findings that majority of fish farmers engage in fish farming as a primary occupation.

Table 1: Distribution of fish farmers by their socio-economic characteristics

Variable	Frequency	Percentage	Mean±std. Dev
Age (years)			
< 30.00	8	10.0	
30.00 - 39.00	17	21.2	
40.00 - 49.00	27	33.8	45±13
50.00 - 59.00	14	17.5	
60.00+	14	17.5	
Gender			
Male	51	63.8	
Female	29	36.2	
Marital status			
Single	10	12.5	
Engaged	3	3.8	
Married	63	78.8	
Divorced	4	4.9	
Family size (Number of person/house)			
< 4.00	24	30.0	
4.00 - 7.00	52	65.0	4±2
8.00+	4	5.0	
Years spent in formal education			
< 7.00	9	11.2	
7.00 - 11.00	5	6.2	
12.00 - 16.00	22	27.5	16±6
17.00+	44	55.0	
Farming experience (Years)			
< 10.00	61	76.2	
10.00 - 19.99	13	16.2	8±3
20.00+	6	7.5	
Income (in naira)			
< 500000	44	55.0	
500000 – 999999	13	16.2	1.4million
1000000+	23	28.8	

Source: Field Survey, 2016

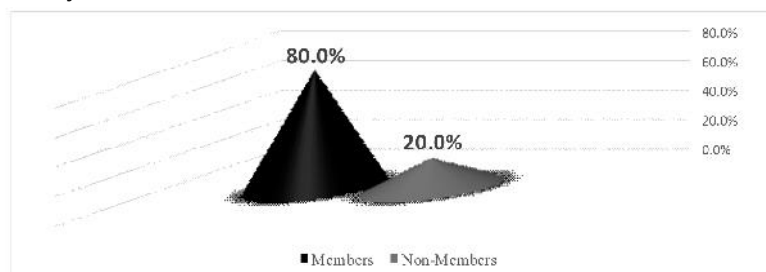


Figure 1: Membership of Fish Farming Association

Source: Field Survey, 2016

In addition, the study result showed that 50% of the fish farmers are members of cooperative society while the remaining 50% are not members of the same as shown in Figure 2. This may be as a result of their membership of fish farming association indicated in Figure 1 which equally serve the purpose of savings and loan

procurement that cooperative society does. This result is in agreement with Salau *et al.* (2014) findings that majority of fish farmers in Southern Agricultural Zone of Nassarawa State do not belong to a cooperative society whereas they belong to fish farming associations.

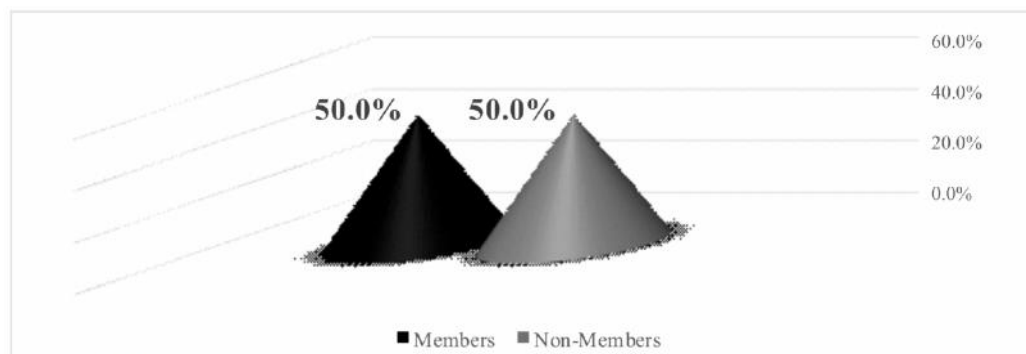


Figure 2: Membership of Cooperative Society

Source: Field Survey, 2016

Improved fish production management practices practised by fish farmers

The study result showed that 98.8% of fish farmers engage in pond/vats/fibre glass/tank cleaning; 81.2% perform water quality maintenance and management; 62.5% engage in pond fertilisation; 61.2% engage in brood stock production; 71.2% engage in spawning; 80% engage in fingerlings sourcing/production; 73.8% engage in disease prevention, control and management; and 68.8% engage in feed formulation and production/sourcing as shown in Table 2. Also, 92.5% engage in record keeping; 90% engage in fish feeding; 57.5% engage in fish processing; 48.8% engage in fish storage; 93.8% engage in fish sorting; 76.2% engage in pest and predator control (physical/structural, chemical, mechanical, sound and light methods); 77.5% engage in fry care, transfer and

feeding; 72.5% engage in siphoning; and 61.2% engage in fish transportation.

The result on pond cleaning (98.8%) showed that majority of fish farmers engage in -pond/vats/fibre glass/tank cleaning which is in agreement with the findings of Olaoye, *et al.* (2014) as well as that of Adefalu *et al.* (2013) that 100% of fish farmers engage in pond/vats/fibre glass/tank cleaning. It also shows that majority (81.2%) of the fish farmers engage in water quality maintenance and management. This is in agreement with Ashley-Dejo *et al.* (2013) and Adefalu *et al.* (2013) that majority (95.5% and 91.7% respectively) of fish farmers engage in water quality maintenance and management. The result on pond fertilisation (62.5%) is the same as 62.5 per cent reported by Adefalu *et al.* (2013) in their study in Ilorin Metropolis, Kwara. Furthermore, they also reported that

Analysis of training needs of fish farmers in Ikorodu Local Government Area of Lagos state, Nigeria

majority (73.8%) of fish farmers practise disease prevention, control and management.

The result on feed formulation and production/sourcing gives credence to Ashley-Dejo *et al.* (2013) findings that majority (81.5%) of fish farmers engage in it. The result on record keeping (92.5%) is in agreement with Hundeyin-Agoro (2011) findings that majority (95%) of fish farmers in this study area keeps record, a factor contributing to high productivity, income and fish farm efficiency.

Also, the result showed that majority

(57.5%) of fish farmers engage in fish processing which is in agreement with Hundeyin-Agoro (2011) findings that majority (91.7%) of fish farmers engage in fish farming in the same study area. Furthermore, the result on fish sorting (93.8%) agrees with Ashley-Dejo *et al.* (2013) findings that majority (81.1%) of fish farmers engage in it. On pest and predator control (physical/structural, chemical, mechanical, sound and light methods), the result also conforms to Ashley-Dejo *et al.* (2013) findings that majority (80.6%) of fish farmers engage in it.

Table 2: Distribution of fish farmers by the improved fish production management practices engaged

Improved Fish Production Management Practices	Frequency	Percentage
1. Pond/vats/fibre glass/tank cleaning	79	98.8
2. Water quality maintenance and management	65	81.2
3. Pond fertilization	50	62.5
4. Brood stock production	49	61.2
5. Spawning	57	71.2
6. Fingerlings sourcing/production	64	80.0
7. Disease prevention, control and management	59	73.8
8. Feed formulation and production/sourcing	55	68.8
9. Record keeping	74	92.5
10. Fish feeding	72	90.0
11. Fish processing	46	57.5
12. Fish storage	39	48.8
13. Fish sorting	75	93.8
14. Pest and predator control (physical/structural, chemical, mechanical, sound and light methods)	61	76.2
15. Fry care, transfer and feeding	62	77.5
16. Siphoning	58	72.5
17. Fish transportation	49	61.2

Source: Field Survey, 2016

Level of knowledge of improved fish production management practices

Results in Figure 3 showed that 58.8% of the fish farmers had high level of knowledge of the identified fish production management practices. In addition; according to the results, 41.2% of the fish

farmers had low knowledge level. This is in agreement with the findings of Rajan *et al.* (2013) that 67.78% of fish farmers in their study area had low level of knowledge of the identified fish production management practices.

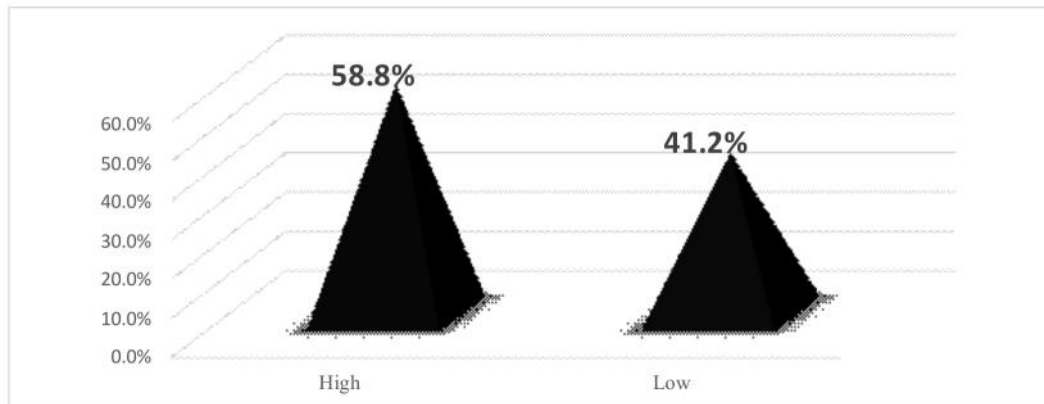


Figure 3: Fish Farmers Level of Knowledge

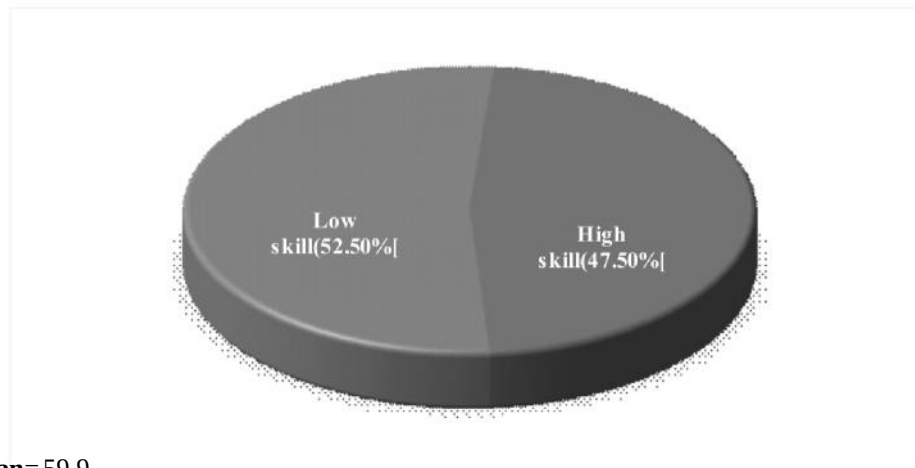
Mean = 60.2

Source: Field Survey, 2016

Level of skill

As shown in Figure 4, 52.5% of the fish farmers had low level of skill on the improved fish production management practices while only 47.5% had high level

of skill in the improved fish production management practices. This means that there are more of less skilled fish farmers in the study area than skilled ones.



Mean= 59.9

Figure 4: Level of Skill Possessed by the Fish Farmers on Improved Fish Management Practices

Source: Field Survey, 2016

Frequency of performance of improved fish production management practices

The results in Table 5 shows that fingerlings sourcing/production (mean=3.24), pond/vats/fiber glass/tank cleaning (mean=3.19), and fish sorting (mean= 3.15)

were the frequently performed improved fish production management practices as they were ranked 1st, 2nd and 3rd using their mean, respectively among others. The result could be due to the difference in time that each management practices are to be carried out.

Analysis of training needs of fish farmers in Ikorodu Local Government Area of Lagos state, Nigeria

Table 5: Ranking of fish farmers based on the ten frequency performed improved fish production management practices

Improved Fish Production Management Practices	Mean	Mean Rank
1. Fingerlings sourcing/production	3.24	1 st
2. Pond/vats/fibre glass/tank cleaning	3.19	2 nd
3. Fish sorting	3.15	3 rd
4. Pond fertilization	3.08	4 th
5. Spawning	2.81	5 th
6. Brood stock production	2.81	5 th
7. Feed formulation and production/sourcing	2.76	6 th
8. Fish processing	2.75	7 th
9. Fish storage	2.65	8 th
10. Fry care, transfer and feeding	2.63	9 th

Source: Field Survey, 2016

Training needs of fish farmers

The results in Table 6 shows the training need distribution of fish farmers on improved fish production management practices using the mean score for each of the improved fish production management practices identified. Specifically, improved fish production management practices

training were needed by fish farmers in the following areas: pond/vats/fiber glass/tank cleaning (mean=1.54), pond fertilization (mean= 1.54), record keeping (mean= 1.60), fish feeding (mean=1.51), fish sorting (mean=1.46), fry care, transfer and feeding (mean=1.73) and siphoning (mean=1.61).

Table 6: Distribution of fish farmers by their training needs

Improved Fish Production Management Practices	Mean	Training need
1. Pond/vats/fibre glass/tank cleaning	1.54**	Needed
2. Pond fertilization	1.54**	Needed
3. Record keeping	1.60**	Needed
4. Fish feeding	1.51**	Needed
5. Fish sorting	1.46**	Needed
6. Fry care, transfer and feeding	1.73**	Needed
7. Siphoning	1.61**	Needed
Grand Mean	1.78	

** Training needed

Source: Field Survey, 2016

Constraints to fish production

The results in Table 7 showed the three major fish production constraints faced by fish farmers in the study area. The result shows that the major constraints to fish

production are high cost of fish feed and lack of capital followed by inefficient extension services. This is in agreement with Olaoye *et al.* (2014) findings.

Table 7: Distribution of fish farmers by the constraints to fish production

Improved Fish Production Management Practices	Mean	MeanRank
1. High cost of fish feed	2.51	1 st
2. Inadequacy of capital	2.44	2 nd
3. Inefficient extension services	2.4	3 rd

Source: Field Survey, 2016

Test of hypotheses

The findings in Table 8 revealed that only age ($r = -0.216$; $p \leq 0.05$) has a significant and negative relationship with the level of knowledge possessed by fish farmers in the study area. The coefficient of determination (r^2) of age ($r^2 = 0.04665$) derived from the coefficient of correlation (r) means that

4.665% of the variance in the level of knowledge is explained by age at a level of significance of 0.05. This result implies that the higher the age, the less the level of knowledge possessed by the fish farmers and the lesser they engage in improved fish production management practices.

Table 8: Correlation analysis showing the relationship between fish farmers socio-economic characteristics and level of knowledge on improved fish production management practices

Variables	Correlation Coefficient (r)	Coefficient of Determination (r^2)	Decision
1. Age	-0.216*	0.04665	S
2. Family size	-0.015	0.00002	NS
3. Years of formal education	0.048	0.00230	NS
4. Farming experience	0.19	0.03610	NS
5. Income (annual)	-0.13	0.01690	NS

Keys: * Significant at 0.05 level of significance

Source: Field Survey, 2016

As shown in Table 9, the results of Chi-Square analysis showed that the following categorical variables have significant relationships with the level of knowledge possessed by fish farmers on improved fish production management practices: sex ($\chi^2 = 6.05$; $p \leq 0.014$); marital status ($\chi^2 = 175.5$; $p \leq 0.01$); Primary occupation ($\chi^2 = 31.25$; $p \leq 0.01$); membership of fish farming association ($\chi^2 = 28.8$; $p \leq 0.01$); membership of cooperative society ($\chi^2 = 5.00$; $p \leq 0.025$). These results implies that: This results conforms to the findings of Adesoji *et al.* (2013) that sex had a positive and significant relationship with

knowledge level of improved fish farming technologies. Also, Rajan *et al.* (2013) reported a positive and significant association between primary occupation and knowledge level among fish farmers. The result of positive association with marital status could be as a result of a higher percentage of married fish farmers (78.8%) in the study area while that of membership of fish farming association may be true because it affords fish farmers the opportunities of awareness and exposure to innovation which could lead to a change in their knowledge, skill and attitude, which thus leads to a higher level of knowledge.

Table 9: Chi square analysis showing significant association between the socioeconomic characteristics of fish farmers and the level of knowledge possessed on improved fish production management practices

Characteristics	χ^2 value	Df	P-value	Decision
1. Sex	6.05**	1	0.014	S
2. Marital status	175.5**	4	0.01	S
3. Primary occupation	31.25**	1	0.01	S
4. Membership of fish farming association	28.8**	1	0.01	S
5. Membership of cooperative society	5.00*	1	0.025	S

Keys: * Significant at 0.05; **Significant at 0.01

Source: Field Survey, 2016.

Analysis of training needs of fish farmers in Ikorodu Local Government Area of Lagos state, Nigeria

Hypothesis two

The results of linear regression analysis in Table 10 shows that the frequency of performance of improved fish production management practices ($t= 7.021$; $p \leq 0.00$) is significantly influenced by the knowledge possessed by fish farmers on improved fish management practices. The implications of these statistical results is that the more the knowledge of fish farmers

on improved fish production management practices, the more the frequency of performance of the practices by fish farmers. The result of this study supports the findings of Adesoji *et. al.* (2013) that fish farmers perform low and operate dismally because of the level of their knowledge of fish farming and the attendant production management practices.

Table 10: Linear regression analysis showing the influence of knowledge on frequency of performance of improved fish management practices among fish farmers

Coefficients ^a						
Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	Constant	15.532	6.492		2.392	0.02
	Frequency of performance	0.967	0.138	0.622	7.021	0

Source: Field Survey, 2016

a = Dependent Variable: Knowledge Level

Hypothesis three

There is no significant relationship between the training needs and the level of knowledge of fish farmers.

Results in Table 11 showed that there is a significant and negative relationship between the training needs and the knowledge level of fish farmers in the study area ($r = -0.761$; $p \leq 0.01$).

The coefficient of determination (r^2) of age ($r^2 = 0.579121$) derived from the coefficient of correlation (r) means that 5.791% of the

variance in the level of knowledge is explained by the training needs at a significance level of 0.01. This result implies that the higher the knowledge level, the less the training needs of the fish farmers; the more accurately they perform the improved fish production management practices. This result is conforms to Baruah *et al.* (2013) findings that the knowledge level has a negative relationship with the training needs of fish farmers ($r = -0.0325$) in their study area.

Table 11: Spearman Rho's correlation analysis showing relationship between the training needs and the level of knowledge of fish farmers

Variable	Correlation Coefficient(r)	Coefficient of Determination (r^2)	Decision
Training Needs	-0.761**	0.579121	S

Keys: ** Significant at 0.01 level of significance (2 –tailed)

Source: Field Survey, 2016

The results in Table 12 of linear regression analysis shows that the training needs ($t= -4.910$; $p \leq 0.00$) is significantly influenced by the knowledge level of fish farmers on improved fish management practices. The

implications of these statistical results is also that the more the knowledge level of fish farmers on improved fish production management practices, the less the training needs of fish farmers.

Table 12: Results of Linear Regression Analysis Showing the Influence of Knowledge Level on Training Needs of Fish Farmers

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.215	0.294		10.930	0.000
	Knowledge Level	-0.405	0.083	-0.785	-4.910	0.000

a = Dependent Variable: Training Needs

Source: Field Survey, 2016

Conclusion

The study showed that majority of fish farmers engaged in all the improved fish production management practices. The 3 most frequently performed improved fish production management practices were: fingerlings sourcing/production; pond/vats/fiber glass/tank cleaning; and fish sorting. The level of knowledge, skill were Fish farmers needed training on: pond/vats/fiberglass/tank cleaning; pond fertilization; record keeping; fish feeding; fish sorting; fry care, transfer and feeding; and siphoning; while the top 3 constraints to fish production in were: high cost of fish feed and lack of capital; and inefficient extension services. It is recommended that training should be conducted for fish farmers in the area of their training needs. Also, tailor-made credit, loan and insurance facilities should be created for fish farmers so as to support their production efforts with the cost of fish feed subsidized.

References

- Adebesin, A. A. 2011.** Fish production, poverty alleviation and cooperative success of Erie Cooperative Fish Farm at Ijebu-Ode, Ogun State, Nigeria.
- Adefalu, L. L., Aderinoye-Abdulwahab, S. A., Bello, O. G., Olorunfemi, O. D. and Oba, S. A. 2013.** Information needs of fish farmers in Ilorin Metropolis, Kwara State, Nigeria. *Nigerian Journal of Agriculture, Food and Environment*.9(2):15
- Adesoji, S. A. and Kerere, F. O. 2013.** Assessment of the knowledge level of fishers and fish farmers in Lagos State, Nigeria. *International Journal of Knowledge, Innovation and Entrepreneurship*. Volume 1 Nos. 1– 2, 2013, pp. 41–56. Retrieved from http://www.kiecon.org/IJKIE_Vol_1_2013_SA_Adesoji.pdf.
- Greenberg, C. I. 2015.** *How to conduct a training needs analysis*. Retrieved from <http://www.xperthr.com/pages/carl-i-greenberg>
- HR-Survey. 2015.** *Training needs assessment survey*. Retrieved from <http://www.TrainingNeeds.htm>
- Hundeyin-Agoro, O. C. 2011.** The Socio-Economic Analysis of Small Scale Fish Farming Enterprise in Lagos State Fish Farm Estate, Ikorodu, Nigeria.
- Adebesin, A. A. 2011** Fish production, poverty alleviation and cooperative success of Erie Cooperative Fish Farm at Ijebu-Ode, Ogun State, Nigeria.
- Adedoyin, I. A. 2015.** *Lecture note on fish farming techniques and hatchery management*. Retrieved 11th May,

- 2015 from http://unaab.edu.ng/attachments/463_fis313%20by%20aai.pdf
- Adefalu, L. L., Aderinoye-Abdulwahab, S. A., Bello, O. G., Olorunfemi, O. D. and Oba, S. A. 2013.** Information needs of fish farmers in Ilorin Metropolis, Kwara State, Nigeria. *Nigerian Journal of Agriculture, Food and Environment*. 9(2):15.
- Adesoji, S. A. and Kerere, F. O. 2013.** Assessment of the knowledge level of fishers and fish farmers in Lagos State, Nigeria. *International Journal of Knowledge, Innovation and Entrepreneurship*. Volume 1 Nos. 1– 2, 2013, pp. 41–56. Retrieved from http://www.kiecon.org/IJKIE_Vol_1_2013_SA_Adesoji.pdf.
- Ashley-Dejo S. S., Olaoye, O. J., Fakoye, E. O., Ikeweinwe, N. B., Idowu, A. I., Bolarinwa, K. K. and Adelaja, O. A. 2013.** Limitations to the adoption of recommended aquaculture production technologies by small scale fish farmers in Oyo State Nigeria. *Global Journal of Science Frontier Research Agriculture and Veterinary*. Volume 13 Issue 9 Version 1.0 Year 2013. Pp. 29-37. Online ISSN: 2249-4626 and Print ISSN: 0975-5896.
- Greenberg, C. I. 2015.** *How to conduct a training needs analysis*. Retrieved from <http://www.xperthr.com/pages/carl-i-greenberg>
- Hundeyin-Agoro, O. C. 2011.** *The Socio-Economic Analysis of Small Scale Fish Farming Enterprise in Lagos State Fish Farm Estate, Ikorodu, Nigeria*.
- Illinois Department of Natural Resources. 2004.** *Management of small lakes and ponds in Illinois*. Illinois Department of Natural Resources. Retrieved 13th May 2015 from http://www.rockislandswcd.org/wpcontent/uploads/envirothon/Aquatics/Management_of_Small_Lakes_and_Ponds_in_Illinois.pdf
- Olaoye, O. J. and Oloruntoba, A. 2010.** Determinant of aquaculture technologies adoption among fish-farmers in Obafemi – Owoode Local Government Area of Ogun State, Nigeria.
- Olaoye, O. J., Ashley-Dejo, S. S. and Adekoya, E. O. 2014.** Small holder fish farmers Information and training needs in Ogun State of Nigeria. *Global Journal of Science Frontier Research: Agriculture and Veterinary*. Volume 14 Issue 3 Version 1.0 Year 2014. ISSN: 22494626 and Print ISSN: 09755896. Retrieved from https://globaljournals.org/GJSFR_Volume14/1SmallHolderFishFarmersInformation.pdf
- Ifejika, P. I., Uzokwe, U. N., and Oladosu, O. I. 2013.** Training needs of table size fish farmers operating in Niger State, Nigeria
- National Population Commission (NPC). 2014.** *Nigeria over 167 million population implications and challenges*. Retrieved from <http://www.population.gov.ng/index.php/84news/latest/106-nigeria-over-167-million-population-implications-and-challenges#>
- Nwiro, E. 2012.** *Fish farming a lucrative business*. Retrieved from <http://www.thisdaylive.com/articles/fish-farming-a->

- lucrative-business/119253/
- Ogunremi, J. B. and Oladele, O. I. 2012.** Adoption of aquaculture technology by fish farmers in Lagos State, Nigeria.
- Olaoye, O. J., Ashley-Dejo, S. S. and Adekoya, E. O. 2014.** *Global Journal of Science Frontier Research: D. Agriculture and Veterinary*. Volume 14, Issue 3, Version 1.0.
- Rajan, P., Dubey, M. K., Singh, S. R. K. and Khan, M. A. 2013.** Factors affecting knowledge of fish farmers regarding fish production technology. *Indian Res. J. Ext. Edu.* 13 (2), May, 2013. Pp. 126-129.
- Salau, E. S., Lawee, A. Y., Luka, G. E., and Bello, D. 2014.** Adoption of improved fisheries technologies by fish farmers in Southern Agricultural Zone of Nassarawa State, Nigeria. *J o u r n a l o f Agricultural Extension and Rural Development*. Vol. 6(11), pp.339-346, November 2014. DOI: 10.5897/JAERD13.0565
- Singha, A. K. and Sajeev, M. V. 2010.** Capacity Building through KVKs: Training needs analysis of farmers of Arunachal Pradesh. *Indian Res. J. Ext. Edu.* 10 (1), January, 2010. Pp.83.
- Sajeev, M. V., Singha, A.K., and Venkatasubramanian, V. 2012.** Training needs of farmers and rural youth: An Analysis of Manipur State, *India. J Agri Sci*, 3(2): 103-112(2012)
- United Nations Population Fund. 2014.** *Nigeria*. Retrieved from <http://profiles.unfpa.org/Nigeria>
- Wikipedia, 2014.** *Fish*. Retrieved from <http://en.wikipedia.org/wiki/Fish>

Received: 5th August, 2017

Accepted: 30th November, 2017