

NEEDS ASSESSMENT OF YOUTHS INVOLVED IN FISH FARMING IN IBADAN METROPOLIS, OYO STATE, NIGERIA

Adeleke, O. A., Adedokun, O. E. and Adegoke, A. M.

Department of Agricultural Extension and Rural Development, University of Ibadan, Nigeria.

Correspondence contact details: aladeoluwaseun@yahoo.com

ABSTRACT

This study examined the needs assessment of youths involved in fish farming in Ibadan Metropolis, Oyo State, Nigeria. A multi-stage sampling procedure was used to select 100 youths that were involved in fish farming in the study area. Specific objectives like personal characteristics, enterprise characteristics, accessibility to factors of production, level of involvement in fish farming, constraints to involvement in fish farming and needs towards fish farming were assessed. Data were analysed using frequencies, percentages, mean, Chi-square and Pearson Product Moment Correlation. Results of the study showed that the mean age of respondents was 25.8 ± 6 years and 79.0% were male. About sixty percent of respondents raised both catfish and tilapia and the years of experience of respondents was 4.8 ± 5.0 years. The result further showed that 53.0% of respondent had low access to factors of production and the level of involvement in fish farming activities was high (60.0%). Constraints to involvement in fish farming were weather conditions ($\bar{x} = 1.52$), high cost of inputs ($\bar{x} = 1.49$) and high cost of feeds ($\bar{x} = 1.48$). The needs of respondents were technical ($\bar{x} = 29.97$), information ($\bar{x} = 27.10$) and agro-service ($\bar{x} = 30.64$) needs with agro-service being the major need. Chi-square result showed that scale of business ($X^2 = 0.527$, $p = 0.004$) was significantly related to the needs of respondents. Also, respondents' accessibility to factors of production ($r = 0.328$, $p = 0.001$) was significantly related to their needs. The study recommended that government at all levels should provide agro-services to fish farmers and make agriculture a business that is attractive so as to encourage youths to stay in the enterprise and achieve food security in the nation.

Keywords: Agro-service, Constraints, Fish farming, Food security, Involvement, Needs

INTRODUCTION

Aquaculture is one of the fastest growing sub-sector of agriculture with great potentials. It is defined as the artificial rearing of fish in an enclosed and fairly shallow body of water where all its life processes can be controlled (FAO, 2021). It is a means of contributing to the food security of the nation directly by producing fish for food and indirectly by generating employment for the teeming unemployed populace (Ifeonu, Chukwuemeka and Agwu, 2019). Fish is nutritious, a good source of protein, low in cholesterol and calories level and also an important revenue earning enterprise in Nigeria (Balami, Sharma and Karn, 2019) especially at such a time when the nation seeks to diversify its productive base from total dependence on oil sector to other sectors like agriculture (Owan, Ndibe and Anyanwu, 2020).

According to Naylor, Hardy and Buschmann, *et al* (2021), the global aquaculture production has tripled over the past twenty years in live-weight volume from 34Mt in 1997 to 112Mt in 2017. The growth of aquaculture industry is caused by the expansion in global trades, competitive product pricing, rising incomes and urbanisation all of which contribute to rising per capita consumption of seafood worldwide. For instance, the contribution of the fisheries sub-sector to the Gross Domestic Product (GDP) figure in Nigeria which was 1.1% in 1995 increased to 3.2% in 2007 and 5% in 2020 (Oluwatayo and Adedeji, 2019). The need to actively pursue the development of fisheries sub-sector in order to cope with the rising demand for fish and fish products and also to diversify the oil-based economy of Nigeria becomes imperative. This is important so as to achieve self-sufficiency in fish

and food production and ultimately to have fish products available for export (Adeleke, Robertson-Andersson, Moodley and Taylor, 2020).

However, despite the growth in the fishery sub-sector, there is no sufficient increase in supply to meet up with the demand. According to Oluwatayo and Adedeji (2019), more than 80 percent of Nigeria's total domestic production is generated by small-scale fishers from coastal and inshore of the Niger-delta, lagoons and lakes. Fish demand in Nigeria is presently put at about 2.66 million metric tonnes per annum and the total domestic fish production can only supply 800,000 metric tonnes, leaving a shortfall of 1.2 million metric tonnes of fish annually. Therefore in order to meet the local demand, government imports 1.90 million metric tonnes of fish worth of N125 billion annually (Olaoye and Ojebiyi, 2018), which is a mere waste of resources. Nigeria has large natural resources to support aquaculture development: inland freshwater of 14 million hectares and available land area of 1.7 million hectares for the aquaculture development. Although production in the country is largely based on small-scale operations and the use of traditional fishing methods in most parts, there is a wide consensus that fish farming has the potentials to meet the growing demand for nutrition as it contributes to growth of the economy and supports the sustainable livelihoods of many communities especially in the rural parts of the country (Olaoye and Ojebiyi, 2018).

The contribution of aquaculture as part of agricultural sector to economic growth and poverty reduction cannot be overemphasized as it is also a viable solution in tackling the rising youth



unemployment in Nigeria. However, the state of the sector is worrisome as it is being left in the hands of ageing and subsistent farmers with several challenges to be solved, this is resulting into low production. Maximum production that will meet the demands of ever-increasing population can be achieved when agile youths are integrated into the system. Nigerian youths have desirable qualities such as curiosity and activeness that can promote aquaculture sector. Despite this, it is widely known that young people are increasingly moving away from agriculture as a source of livelihood to white collar jobs and other means of economic survival (Arulingam, Nigussie, Senaratna and Debevec, 2019).

In order to cultivate interest of youth in fish farming, promotion of aquaculture products will provide opportunities for young entrepreneurs to get ideas, create new products and influence the interest of youths to ensure sustained involvement in fish farming and other agricultural related ventures. There is no doubt that youths involved in fish farming are few even as the rate of unemployment keeps increasing which could be as a result of some challenges and needs hindering their full participation in the sector. This study therefore assessed the needs of youths involved in fish farming so as to overcome challenges faced in the industry which when solved will motivate other youths to be part of the industry.

The general objective of this study was to assess the needs of youths involved in fish farming in Ibadan metropolis of Oyo State, Nigeria. The specific objectives are to:

1. describe the personal characteristics of respondents;
2. describe the enterprise characteristics of respondents;
3. determine respondents' accessibility to factors of production;
4. evaluate the level of involvement of respondents in fish farming activities;
5. identify constraints to involvement in fish farming and
6. assess respondents' needs towards fish farming.

The hypotheses of the study were stated as follows:

H₀₁: There is no significant relationship between the respondents' enterprise characteristics and their needs.

H₀₂: There is no significant relationship between the respondents' accessibility to factors of production and their needs.

METHODOLOGY

The study area is Ibadan. Ibadan is the capital and most populous city in Oyo State with a population of over 3 million. It is the country's largest city in terms of geographical area co-

ordinates of 7°23'47"N 3°55'0E/7.39639°N 3.91667°E. The city and its environs is home to several industries such as agro-allied, textile, food processing, health care and fish production etc. The city of Ibadan is naturally surrounded by four rivers with many tributaries: Ona, Ogbere, Ogunpa and Kudeti River in the central part of the metropolis.

The population of the study consisted of youths between the ages of 18 and 35 years involved in fish farming in Ibadan metropolis.

This study employed multi-stage sampling procedure for the selection of respondents for this study. At the first stage, two Local Government Areas (LGAs) were purposively selected from the eleven LGAs in Ibadan metropolis i.e. Oluyole and Ibadan south west LGAs because of the prevalence of fish farmers in the areas.

At the second stage, 20% of the wards in each LGA were purposively selected due to the level of fish farming activities making 2 wards from both Oluyole and Ibadan Southwest which are Ikereku and Odo ona from Oluyole and ward 2 and ward 6 from Ibadan south west.

At the third stage, one community each notable for fish farming was purposively selected from each ward making 4 communities: Gege, Isale-osi, Ayegun and Latunde. Snowball technique was used to compile a list of fish farmers from the 4 communities. 50% of the list of fish farmers in each community were randomly selected: Gege (21), Isale-osi (24), Ayegun (26) and Latunde (29) giving a total of 100 fish farmers that formed the sample size for this study.

The dependent variable for this study is needs assessment. Respondents' needs were assessed on Agro-service needs, information needs and technical needs with respect to the different activities that are peculiar to each needs like input purchases, specie selection, fish stocking, feed production, water treatment, harvesting, among others. This was measured on a three point Likert-type scale of not in need (0), slightly in need (1) and seriously in need (2). Mean score was generated for each need and used to identify the most severe of all the three needs.

Data were collected through a well-structured questionnaire on the objectives of the study and analysed using descriptive (frequencies, percentages and mean) and inferential statistics (Pearson product moment correlation (PPMC) and Chi-square) were used in testing the hypotheses with the aid of Statistical Package of Social Sciences (SPSS).

RESULTS AND DISCUSSION

Personal characteristics

The age distribution presented in Table 1 reveals that the mean age of respondents was 25.8±6 years indicating that the respondents are still in their active and productive age. This suggests that there is

better future for fish farming enterprise as it can be sustainably practiced by the youths. This is corroborated by Adelodun, Bankole, Rafiu, Morawo and Ajao (2016) that sustainability of fish venture which is highly profitable is dependent on the effective participation of the younger generations. Results in Table 1 also showed that 79.0% of the respondents were male, this implies that fish farming is dominated by male. This is in tandem with the findings of Olaoye and Ojebiyi (2018) that

fisheries activities are mostly dominated by the male folks. Table 1 further reveals that 98.0% of respondents had formal education ranging from primary to tertiary education. This finding agrees with the results of Ifeonu, Chukwuemeka and Agwu, (2019) that most youths who are engage in fish farming are educated. The result in Table 1 shows that the mean household size of the respondents was 2 ± 2.4 persons which implies less dependants on the respondents.

Table 1: Distribution of respondents by personal characteristics

Variables	Percentage	Mean	SD
Age			
17-22	31.0	25.8	6
23-28	41.0		
29-34	17.0		
35-40	11.0		
Sex			
Male	79.0		
Female	21.0		
Level of education			
No formal education	2.0		
Primary education	1.0		
Secondary education	7.0		
Tertiary education	90.0		
Household size			
1-2	62.0	2.4	2
3-4	17.0		

Enterprise characteristics

The result in Table 2 show that the mean annual income of respondents was ₦458,424±380,424. This suggests that fish farming could sustain livelihood of farmers when provided with adequate resources and inputs. Results from Table 2 revealed the mean for years of experience as 5.0 ± 4.8 years. This shows that majority of the respondents were new in fish farming. Experience of youths in fish farming have positive influence on fish production (Adelodun, Bankole, Rafiu, Morawo, and Ajao, 2016). As revealed in Table 2, more than half (59.0%) of the respondents raised catfish and tilapia. This result disagrees with the findings of Ifeonu, Chukwuemeka and Agwu, (2019) that monoculture was the major type of fish practice among youths. Results from Table 2 also shows that 51.0%, 45.0% and 14.0% of the respondents were operating fish farming on a medium, large and small scale production, respectively. The scale of production could be attributed to availability of resources and the ease at which the respondents can access them. Majority

(94.0%) of respondents used between 1-10 ponds for production with an average of 5 ± 10 ponds. The number of ponds used determines the volume and scale of production as corroborated by Ifeonu, Chukwuemeka and Agwu, (2019).

Accessibility to factors of production

The result from Table 3 revealed that most accessible factors of production are good quality water ($\bar{x} = 1.55$), fish feeds ($\bar{x} = 1.46$), fish seeds and land space ($\bar{x} = 1.43$), among others. However, skilled manpower and start-up capital were among the factors that were not accessible by respondents. Table 4 further shows low (53.0%) level of accessibility to factors of production. This implies that respondents will not be able to produce optimally as access to factors of production determines the level of production and profit that will be generated. This is in line with the findings of Gumel (2017) that access to factors of production is key to maximum production.

**Table 2. Distribution of respondents by enterprise characteristics**

Variables	Percentage	Mean	SD
Annual income (₦)		458,424	380,424
30,000-410,424	48.0		
410,425-790,849	33.0		
790,850-1,171,274	16.0		
1,171,275-1,551,689	2.0		
2,312,547-2,500,000	1.0		
Years of fish farming experience		5.0	4.8
1-5	74.0		
6-10	19.0		
11-15	5.0		
Above 15	2.0		
Type of fish reared			
Catfish only	35.0		
Tilapia only	6.0		
Catfish and tilapia	59.0		
Type of pond used			
Earthen pond	75.0		
Flow through	11.0		
Tank	14.0		
Scale of business			
Small scale	14.0		
Medium scale	51.0		
Large scale	35.0		
Number of pond		4.5	10
1-10	94.0		
11-20	3.0		
21-30	2.0		
31-40	0.0		
41-50	1.0		

Source: Field survey, 2020

Table 3: Distribution of respondents based on accessibility to factors of production

Factors	Accessible (%)	Fairly accessible (%)	Inaccessible (%)	Mean	Rank
Good quality water	60.0	35.0	5.0	1.55	1st
Fish feeds	57.0	32.0	11.0	1.46	2nd
Fish seeds	53.0	37.0	10.0	1.43	3rd
Land space	58.0	27.0	15.0	1.43	3rd
Favourable location for ponds	52.0	27.0	21.0	1.31	5th
Start-up capital	49.0	21.0	30.0	1.19	6th
Credit facilities	45.0	20.0	35.0	1.10	7th
Skilled manpower	30.0	23.0	47.0	0.83	8th

Source: Field survey, 2020

Table 4: Level of accessibility to factors of production

Level of accessibility	Frequency	Percentage	Minimum	Maximum	Mean	SD
Low (0-18.1)	53	53.0	0	24.0	18.2	4.7
High (18.2-24.0)	47	47.0				
Total	100	100.0				

Source: Field survey, 2020

Constraints to involvement in fish farming

The result in Table 5 shows that the major constraints to involvement in fish farming were

weather conditions ($\bar{x} = 1.52$), high cost of inputs ($\bar{x} = 1.49$) and high cost of feeds ($\bar{x} = 1.48$), poor source of fingerlings ($\bar{x} = 1.30$), among others. This

implies that provision and availability of inputs from good and viable source will ensure involvement of youths in fish farming. Most of these constraints were also highlighted in the result of Arulingam,

Nigussie, Senaratna and Debevec (2019) that they influence fish farming operations and serve as hindrance to effective production and profit maximization.

Table 5: Distribution of respondents on constraints to involvement in fish farming

Constraints	Severe constraint	Mild constraint	Not a constraint	Mean	Rank
Weather conditions	60.0	32.0	8.0	1.52	1st
High cost of inputs	55.0	39.0	6.0	1.49	2nd
High cost of feeds	51.0	46.0	3.0	1.48	3 rd
Poor extension services	50.0	45.0	5.0	1.45	4th
Poor source of fingerlings	47.0	36.0	17.0	1.30	5th
Unavailability of land	42.0	45.0	13.0	1.29	6th
Insufficient information	36.0	52.0	12.0	1.24	7th
Water quality maintenance	40.0	41.0	19.0	1.21	8th
Poor processing facilities	36.0	46.0	18.0	1.18	9 th
Inadequate breed of fish	34.0	41.0	25.0	1.09	10th
Waste treatment and disposal	34.0	37.0	29.0	1.05	11th

Involvement in fish farming activities

Table 6 revealed that input purchases ($\bar{x} = 1.75$) and specie selection ($\bar{x} = 1.74$) were the major activities that respondents were involved in under pre-production activities. Also, for production activities, respondents were always involved in fish stocking ($\bar{x} = 1.87$), feeding ($\bar{x} = 1.49$) and general management ($\bar{x} = 1.49$). In post-production activities, respondents were always involved in packaging ($\bar{x} = 1.96$) and selling/marketing ($\bar{x} = 1.93$). This suggests that most of the respondents did not engage the use of hired

labourers on their farm probably due to extra cost that will be accrued to their production cost or their desire to learn more about various activities in fish farming.

The level of involvement of youths in fish farming was high (60.0%) as shown in Table 7 which implies that youths are now embracing fish farming probably due to unemployment and need to make ends meet. This negates the findings of Tsojon, Gidado and Asogwa (2017) that very few young people are involved in fish farming with negative attitude towards the occupation.

Table 6: Involvement in fish farming activities

Operations	Always involved	Sometimes involved	Never involved	Mean	Rank
Pre-production					
Input purchases	75.0	25.0	0	1.75	1 st
Specie selection	74.0	26.0	0	1.74	2 nd
Liming of pond	72.0	28.0	0	1.72	3 rd
Production					
Fish stocking	89.0	11.0	0	1.89	1 st
General management	90.0	7.0	3.0	1.87	2 nd
Feed production	72.0	24.0	4.0	1.68	5 th
Feed purchasing	81.0	18.0	1.0	1.80	4 th
Feeding	87.0	12.0	1.0	1.86	3 rd
Medication	58.0	40.0	2.0	1.56	9 th
Spawning	60.0	37.0	3.0	1.57	8 th
Water management	70.0	28.0	2.0	1.68	5 th
Fish sampling	58.0	40.0	2.0	1.56	9 th
Harvesting	66.0	30.0	4.0	1.62	7 th
Post production					
Packaging	96.0	4.0	0	1.96	1st
Marketing	93.0	7.0	0	1.93	2nd
Selling	93.0	7.0	0	1.93	2nd
Grading	92.0	8.0	0	1.92	4th
Weighing	78.0	18.0	4.0	1.74	5 th

Source: Field survey, 2020

**Table 7: Level of involvement in fish farming activities**

Level of involvement	Frequency	Percentage	Minimum	Maximum	Mean	SD
Low (10.0-32.1)	40	40.0	10.0	38.0	32.2	5.1
High (32.2-38.0)	60	60.0				
Total	100	100.0				

Source: Field survey, 2020

Needs assessment in fish farming

From Table 8, the mean value for technical needs is $\bar{x} = 29.97$. Some of the technical needs were identifying right inputs like fingerlings ($\bar{x} = 1.79$), liming of pond ($\bar{x} = 1.70$) and feed production ($\bar{x} = 1.69$). This implies that most youths in fish farming are still learning some of the technical-know-how involved in the enterprise which may affect their level of production. This corroborates the findings of Adelodun (2015) that technicalities, skills and expertise are needed for successful culture of the organism.

Information needs has the mean value of $\bar{x} = 27.10$. Most of the respondents need information on input purchases ($\bar{x} = 1.84$), fish stocking ($\bar{x} = 1.77$) and feed production ($\bar{x} = 1.74$). This implies that most of the respondents need more information on fish farming and its production despite their level of education. This negates the findings of Ifeonu, Chukwuemeka and Agwu, 2019 that youths involved in fish farming with high level of formal education could access information through the internet and books which may reduce the level of information that may be needed.

Table 8: Distribution of needs assessment in fish farming

Categories	Grand mean	Mean
a. Technical Needs	$\bar{x} = 29.97$	
Identifying right inputs		1.79
Liming of pond		1.70
Fish stocking		1.64
Feed production		1.69
Feeding		1.79
Right medication		1.62
Spawning		1.48
Water and ponds treatment		1.56
Harvesting		1.61
Grading		1.60
Packaging		1.61
b. Information needs	$\bar{x} = 27.10$	
Input purchases		1.84
How to lime ponds		1.65
Fish stocking		1.77
Feed production		1.74
Right medication		1.68
Spawning		1.59
Water treatment		1.69
Marketing		1.34
Harvesting		1.29
Weighing		1.43
c. Agro-service needs	$\bar{x} = 30.64$	
Input purchases		1.79
Specie selection		1.73
Fish stocking		1.66
Feed production		1.80
Feeding		1.77
Right medications		1.61
Spawning		1.61
Water treatment		1.75
Harvesting		1.61
Packaging		1.43

Source: Field survey, 2020

Agro-service needs has the highest mean (\bar{x} =30.64). Respondents were in need of agro services like input purchases like fingerlings, fertilizers or lime (\bar{x} = 1.79), feeding (\bar{x} = 1.77), water treatment (\bar{x} = 1.75) among others. This implies that respondents are in need of inputs which is germane to achieving maximum production. Comparing the mean of technical (\bar{x} =29.97), information (\bar{x} =27.10) and agro-service needs (\bar{x} =30.64), it is evident that agro-service needs has the highest mean which implies that youths involved in fish farming were in need of agro-services and

inputs. This is in tandem with the findings of Ifeonu, Chukwuemeka and Agwu, 2019 that high cost of feeds, poor source of fingerlings and lack of credit facilities were some of the challenges faced by youths involved in fish farming.

Table 9 also reveals that needs of youths involved in fish farming was high (63.0%) as corroborated by Adedolun (2015) that youths faced several challenges in fish farming. This calls for prompt attention from all stakeholders so as to encourage youths in this sector and help the nation to be more food secured.

Table 9: Level of respondents' needs in fish farming

Level of needs	Frequency	Percentage	Minimum	Maximum	Mean	SD
Low (33.0-87.6)	37	37.0	33.0	104.0	87.7	16.2
High (87.7-104.0)	63	63.0				
Total	100	100.0				

Source: Field survey, 2020

Chi-square result on enterprise characteristics and needs in fish farming

Table 10 indicates that there was a significant relationship between the scale of business and needs of respondents. ($X^2=0.527$) This finding suggests that the scale of business involve in, will determine the needs of respondents as

respondents involved in high scale of business may probably have more needs than someone in small scale of business. This supports the report of Gumel (2017) that scale of business determines how entrepreneurs will overcome challenges and needs faced in their enterprise.

Table 10: Respondents' enterprise characteristics and needs in fish farming

Variables	X^2	df	P-value
Secondary occupation	0.527	3	0.486
Scale of business	6.385	2	0.004
Type of pond used	10.430	2	0.435
Type of fish reared	0.245	2	0.885

$P \leq 0.005$

PPMC result on accessibility to factors of production and their needs in fish farming

Result in Table 9 reveals that there was a significant relationship between respondent's accessibility to factors of production and their needs ($r=0.328$) in fish farming. This implies that the more

accessible respondents are to factors of production, the lower their needs. This is in tandem with the report of Kreneva, Halturina, Larionova, Shvetsov and Tereshina (2015) that access to factors of production limits challenges that could occur in the production system.

Table 10: PPMC result on accessibility to factors of production and needs in fish farming

Variable	r-value	p-value
Accessibility	0.328	0.001

$P \leq 0.005$

CONCLUSION AND RECOMMENDATIONS

The study concluded that respondents were formally educated which helped their involvement in the enterprise. There was low accessibility to factors of production which affected their maximum production and profit. Youths were highly involved in fish farming which reflects high rate of unemployment and the need to shift to other sector of the economy. Major constraints to fish farming were high cost of inputs, cost of feeds and poor extension services. The major need encountered by

youths involved in fish farming was agro-service. The study concluded that youths are venturing into fish farming because it is profitable but not without needs to be tackled. It is recommended that government at all levels should provide agro-services and make agriculture a business that is attractive so as to encourage youths to stay in the enterprise and achieve food security in the nation.



REFERENCES

- Adeleke, B., Andersson, D., Moodley, G., and Taylor, S. (2020). Aquaculture in Africa: A comparative Review of Egypt, Nigeria, Uganda vis-à-vis South Africa, *Reviews in fisheries Science and Aquaculture*, Vol. 29, issue 2, pp. 167-197, <https://doi.org/10.1080/23308249.2020.1795615> on 20th July, 2021.
- Adelodun, O. B., Bankole, A. F., Rafiu, R. A., Morawo, B.O., and Ajao F.S. (2016). Assessment of youths perception towards fish farming in Ibadan Metropolis, *Research Journal of Agriculture and Environmental Management*, Vol. 5, No. 3, pp. 081-085, <http://www.apexjournal.org>.
- Adelodun, O. B. (2015). Participation of Youth in aquaculture, *Journal of Aquaculture, Research and Development*, Vol. 6, No 12, pg. 1-3, doi: 10.4172/2155-9546.1000386 on 5th August, 2021.
- Arulingam, I., Nigussie, L., Senaratna, S. S and Debevec, I. (2019). Youth participation in small scale fisheries, aquaculture and value chains in Africa and the Asia-Pacific. Penang. Malaysia: CGIAR Research Program on Fish Agri- Food Systems. Program Report: FISH-2019-14.
- Balami, S., Sharma, A. and Karn, R. (2019). Significance of Nutritional value of fish for Human Health, *Malaysian Journal of Halal Research*, 2 (2): 32-34, doi: 10.2478/mjhr-2019-0012 on 20th July, 2021.
- Food and Agriculture Organization (FAO), (2021). Country Profile Fact Sheets. In: FAO Fisheries and Aquaculture Department [online]. Rome. Retrieved from <http://www.fao.org/fishery/http://www.fao.org/fishery/facp/NGA/en> on 20th July 2021.
- Gumel, B. I. (2017). Critical challenges facing small business enterprises in Nigeria: A Literature Review, *International Journal of Scientific and Engineering Research*, Vol. 8, No. 8: pp. 796-808.
- Ifeonu, C. F., Chukwuemeka, V., and Agwu, E. A. (2019). Challenges of Youths involved in Fish Farming in the Federal Capital Territory, Abuja, Nigeria, *Journal of Agricultural Extension*, Vol. 23 (3), pp.156-171, <https://dx.doi.org/10.4314/jae.v23i3.14>.
- Naylor, R. L., Hardy, R. W., Buschmann, A., H., Bush, S., R., Dave, H, Kingler, Ling., C, Little, D.C., Lubchenco, J., Shumway, S.E and Troell, M. (2021). A 20- year retrospective review of global aquaculture, *Nature*, 591, 551-563, <https://https://doi.org/10.1038/s41586-021-03308-6> on 20th July, 2021.
- Olaoye, O. J. and Ojebiyi, W. G. (2018). Marine fisheries in Nigeria, A review, doi.10.5772/interchopen.75032.
- Oluwatayo, I. B., Adedeji, T. A. (2019). Comparative analysis of technical efficiency of catfish farms using different technologies in Lagos State, Nigeria: a Data Envelopment Analysis (DEA) approach. *Agric & Food Security*, 8, 8, <https://doi.org/10.1186/s40066-019-0252-2> on 20th July, 2021.
- Owan, V. J., Ndibe, V. C. and Anyanwu, C. C. (2020). Diversification and Economic Growth in Nigeria (1981-2016): An Econometric approach based on Ordinary Least Square (OLS), *European Journal of Sustainable Development Research*, 4 (4), em013, <https://doi.org/10.29333/ejosdr/8285> on 20th July, 2021