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MULTIDIMENSIONAL ASSESSMENT OF CONSTRAINTS TO ARTISANAL FISHERIES PRODUCTIVITY AMONG FISHER FOLKS IN SOME FISHING CATCHMENTS IN MBO LOCAL GOVERNMENT AREA, AKWA IBOM STATE

Samuel Awolumate

Department of Fisheries and Animal Sciences, Faculty of Agriculture, National Open University of Nigeria, Kaduna Campus, Kaduna State, Nigeria. Email: sawolumate@noun.edu.ng

Abstract
Strategies towards improving the quality of welfare status of the fishing households in the fishing communities have been an on-going process. The fishing communities have been impacted by the unfolding challenges faced especially in changing climate, environmental and socioeconomic uncertainties. This study was undertaken to fill the information gap on the constraint sources as it affects fisheries productivity of fishing households in Mbo Local Government Area, Akwa Ibom State. The specific objectives were to qualitatively map the arrays of constraints in the fishing catchment and ascertain the significant underlying dimensions of fisheries productivity constraints. The study was carried out in fishing catchments in Mbo Local Government Area, Akwa Ibom State. A two-stage sampling technique was used to select 218 fishing households for the study. Data were collected with well-structured and validated questionnaires. Descriptive statistics and factor analysis were employed in the data analysis. The results revealed that the constraints to fisheries productivity were less severe in Mbo LGA. It was shown that the most prevalent problems facing the area are high cost of fishing gear, pollution of the fishing ground and effect of bad weather. Finally, this study identified six significant underlying dimensions of the constraints as; factor 1: inadequate support to fisheries, factor 2: lack of human capacity development in fisheries, factor 3: lack of technical assistance in fisheries, factor 4: inadequate environmental protection education, factor 5: lack of demand creation in fish and fish products, factor 6: vulnerability caused by oil exploration. Based on these, it can be concluded that functionality of the fishing households in Mbo LGA, Akwa Ibom State is seemingly threatened. This is a result of their socioeconomic dynamics and the environmental restrictions they encounter in their profession as fishermen.
Keywords: Challenges, Small-scale fisheries, Performance, Communities, fishermen

Introduction

Household functionality is intimately connected to family functions, which have been understudied since the 1970s (OECD, 2013). Household function measures households' core functions such as supplying food and clothing, developmental responsibilities like adapting and promoting growth, and crisis jobs like handling family emergencies (OECD, 2013). Therefore, the welfare of fishing households reflects fisheries productivity, which affects household function. If a household's fisheries productivity is low or negligible, it leads to dysfunction and predisposes fisher families to additional multidimensional limitations that affect fisheries productivity (Birkmann *et al.,* 2022). Abuse, apathy, neglect, or lack of emotional support is examples of dysfunctional home behaviours. Dysfunctional households share some traits. Lack of empathy, poor communication, emotional or physical abuse, drug or alcohol misuse, perfectionism, fear and unpredictability, denial, boundary disrespect, control, and harsh criticism define a dysfunctional household (LaMar, 1992).

Household patterns and changes play a determining part in the health of the individual members, so contributes significantly to the changes in the family organization, attitudes and responses to changes. The concept of household functions invokes the recognition that the well-being of an individual is profoundly affected by the primary socioeconomic and environmental factors (Abayomi, 2015). Well-being is methodically related to quality of life and generally indicates how an individual behaves in the society (Narayan, *et al*., 2000). Quality of life is defined as the general well-being of an individual (Meule, *et al*., 2013). World Health Organization defines well-being "as the individual's perception of their position in life, in terms of culture and value system in which they live and also in relation to their goals, expectations, standards and concerns" (WHO, 1997). In the definition of Foo (2000), quality of life is explained as individual overall satisfaction with life. It focuses on all facets of life which includes cultural, social, environmental, physical, health and the local value systems among others. Kesebir and Diener (2008) defined well-being as a measure of human lifestyle which makes a positive assessment of their lives, confident, emotions, satisfaction and engagement in day-to-day activities. In measuring quality of life, two approaches are available; these are objective and subjective indicators (Galloway, *et al.,* 2005. Subjective indicators represent the individual's evaluation of objective conditions of life, which are derived from surveys of resident perceptions, satisfaction, or well-being. On the other hand, objective indicators signify the external or tangible conditions of life that are often derived from secondary data such as demographic and socio-economic data, crime, housing, physical health and functioning. Others are independence, social functioning, economic stability, and privacy (Galloway, *et. al.,* 2005). Nonetheless, both approaches can be used in measuring quality of life occasionally.

Fishing households' functionality entails information concerning the ability of fishing households to realize the basic need of food security among other things. Thus, it explains a condition where all people always physical and economic access to sufficient, safe and nutritious food have to meet their dietary needs and food preferences or an active and healthy life (World Food Summit, 2003). Furthermore, the committee on the world food security posited that food security connotes physical and economics access to adequate food for all household members, without undue risk of losing the access (FAO, 2015). A household is food secured when it has access to the food needed for a healthy life and for its members in terms of adequate quality, quantity, supply and cultural acceptable and when it is not at undue risks of losing such access (Cafiero *et al*., 2018). Therefore, food must be available, accessible, affordable, adaptable and acceptable to households in order for an adequate food security status to be attained (Mugalavai, 2008). Food security guarantees social harmony since a hungry man is known to be an angry man (Ndaeyo, 2007). Deprivations of this basic need presented by food insecurity are undesirable and are possible precursors to nutritional, health and developmental problems (Bickel, *et al.,* 2000).

According to studies, household production affects food security (Liverpool-Tasie *et al.,* 2011; Shuaibu *et al*., 2015) and coastal problems hinder fishermen's output. These obstacles include flood, marine piracy, oil platforms, costal storms, and seacoast erosion, which affect fish sales, marketing, and distribution. Their low income affects their fisheries productivity (FAO, 2015). Open access to the resource and low labour opportunity costs causes low fishing incomes. Open access to fisheries leads to economic (and probably biological) overexploitation of the resource, reducing profitability and impoverishing the fishing community (Awolumate *et. al.,* 2018). Béné (2003) called this "endogenous poverty in fisheries." Multidimensional and complicated issues impact fisheries productivity in developing countries. Some studies like (Kareem *et al.,* 2013; Gbigbi *et al.,* 2013) found high efficiency given technology and input quality. Educational level and marital status positively influenced the likelihood of a household being food secure, but household size and dependency ratio negatively influenced the likelihood (Okon *et al.,* 2017).

Several other factors influence fisheries productivity, first of all, family structure influences fishing productivity; some families are single parent, others are complete family, labour division and complementing tasks build riches and assets (McFarlane *et al.,* 1995). Second factor is the social and economic status of the family, which creates differences among families and its functionality. For instance, monthly income, father's work, father's educational level, and housing conditions affect a family's ability to function, as do familial relationships. Another factor is the stage of family. According to time periods, a family can belong to different stages, such as young married with no child, phase with pre-school children, phase with elementary school children, phase with teenagers, the midstream of life, empty nest stage and the retirement years. The last but not the least, Life events can also influence the family function (Andrew, 1976). There are many events that can influence our lives. For example, getting married, being fired, starting the employment, getting first child and so on.

Another factor is household asset structure, this represents the physical, natural, financial, social and human category of assets accessible to the households with respect to their allocation of resources, (Moser and Felton, 2007; Adato *et al.,* 2006). Asset accumulation affects socioeconomic well-being (Knowler and Bradshaw, 2007; Traynor and Raykov, 2013; Parizeau *et al.,* 2015). The studies affirmed how assets affect agricultural households' well-being and influence their poverty status. The studies further revealed that household's asset-based index is higher for the physical asset than for the other categories, in order of relative importance: natural, financial, and human assets, as well as the social asset (Moser and Felton, 2007). Physical assets have the greatest asset capacity, followed by natural assets, social assets, financial assets, and human assets. The infrastructural gap resulting from prolonged years of mitigating neglect has made intervention a major priority for national, state, and municipal governments and donor organizations. Some scholars have found that infrastructure and the environment have a negative impact on the residents' social and economic well-being and their fish business (Ekanem and Inyang, 2016; Inyang and Solomon, 2007). Despite some sequence of intermittent programmes that has been done to address dwindling fisheries productivity in the fishing settlements with concerted efforts aimed at solving the problem of low fisheries productivity in the fishing communities. The relatively slow impact on the welfare of the fisher folk households appears more complex to understand, as years go by and thus, throw up worrying concerns. This study becomes expedient to seek understanding of the peculiarity of constraints that affects artisanal fisheries productivity amidst the challenging environmental and climatic changes in the fishing catchments in the study area. Thus, this study sought to analyse the pattern and incidences of component of constraints to fisheries productivity, assessed the level of severity of the constraints and ascertained the significant underlying constraints to fisheries productivity in the study area.

Methodology

The study was carried out in Mbo Local Government Area, Akwa Ibom State. Mbo Local Government is located between longitude 8.3^0E and latitude 4.6^0N. It is in the south eastern part of Nigeria and bounded in the south axis by Atlantic Ocean and Cameron. It occupies a land mass of 365km and has a population of 121,110 (NPC, 2006). The primary occupation of Mbo people is fishing and maritime trade, which over the five decades has extended to such foreign countries as the Republic of Cameroon, Equatorial Guinea and Gabon. The study population consisted of all the fishing households in Mbo Local Government Area, Akwa Ibom State, Nigeria. A two-stage sampling procedure was used to select the sample for this study. In the first stage, a purposive sampling was used to select three fishing villages out of seven mangrove islands based on their proximity to the fishing ground. The three proximal villages were Ebughu, Ibaka and Efiat. Then, systematic sampling technique was used to sample 73 households each from the villages. Useable data from a total of 218 fishing households who participated in the survey across the selected catchments were used for data analysis.

Primary data were generated from fishermen using structured questionnaires designed to collect information on constraints faced by fishing households that militate against their productivity. To ascertain the reliability of the survey instrument, the instrument was subjected to face and content validity and later subjected to Cronbach alpha analysis using SPSS version 22. The measure of the constraints to fisher folks was determined using 3 points scale. The constraints to fisheries productivity were analysed using descriptive statistics, composite index analysis, incidence index and relative rank order position. The major significant underlying dimensions of the constraints were analysed using factor analysis. The construct of constraints to fisheries productivity measurement items, were subjected to factor analysis using principal component approach (Parasuraman *et al.,* 1988; Kinnear and Gay, 1997). To reduce the number of items to major and sizeable significant number of factors or dimensions, Eigen value criterion of ≥ 1 was adopted to select the underlying dimensions of the original 16 items. Factor analytic procedure primarily analysed the inter relationship among variables (scale items) in terms of their underlying dimensions (factors). Communalities Extraction Index value expresses the amount of variance accounted for by the number of factors or items in the variable matrix, taken together i.e. how much variance in a variable is accounted for by others in the factor solution. The index of communality extraction tells the degree to which a variable or item has in common with other variables included in the analysis and vice-versa (Hair *et al.,* 1998).

Results and Discussion

Table 1 shows the distribution of fisher folks according to pattern of response, incidence index and relative rank order positioning of constraints to fisheries productivity constraints. It revealed that the item that ranked 1st; high price of fishing gear, had an index value of 0.707 which shows 70.7% rate of prevalence in the study area. This was followed by item 10; Pollution of fishing ground and item 16; we are affected by bad weather, that ranked 3rd and 2nd with index values of 0.648 and 0.652, respectively which shows 64.8% and 65.2% rate of prevalence in the study area. Though, the relative positioning of constraints by incidence index in this study was similar to mean ranking by George, in similar constraints identification study in some local government in Rivers State of Nigeria, the outcomes depict that severity of the constraints are spatially different in spite of this study share similar ecological characteristics and close proximity. Even though, the robustness of mixed-method evaluation approach adopted in this study is slightly more explicit the outcomes of George *et al*. (2021) ought to have similar reflection of the relative rank order positioning of constraints. The outcome mapping of other studies reveals similar constraints to fisher folks' productivity as mapped in this study, their identified constraints predominantly composed of social and economic issues (George *et al.,* 2021; Mascia *et al.,* 2017, Okeowo *et al.,* 2015). This result reflects part of the findings of Kareem *et al.* (2013) that mode of technology adopted, affected the technical efficiency of fisher folks. Also, Inyang and Solomon (2007) affirmed that gear type and number of gears were the significant variables influencing the level of technical efficiency of the fisher folks. Consequently, when the fishing technology is costly, people adhere to crude implements, which do not contribute much to the output and any effort to increase welfare through increased number of gears, may affect the output.

Table 1: Distribution of Fisher folks according to Pattern of Response, Incidence Index and Relative Rank Order Positioning of Constraints to Fisheries Productivity

Item	Constraints That Work Against Maximum Productivity	Percentage				Incidence index/RR OP
		Not at all	Less serious	Serious	Most serious	
1	Fishing gear price is relatively high	11.5	17.9	41.3	29.4	0.707 1st
2	There is lack of money to increase my output	16.1	34.4	23.9	25.7	0.486 5th
3	There is inadequate labour hands in the key area	20.2	36.7	22.9	20.2	0.431 10th
4	Our fishing area is covered by vegetation	37.2	19.3	28.0	15.6	0.436 9th
5	Cases of low water fluxes/irregular flood pulses	35.3	28.0	16.5	20.2	0.367 13th
6	Government/community restrictions	25.7	33.5	25.7	15.1	0.408 11th
7	Use of dangerous chemicals to kill fish	56.0	16.5	13.8	13.8	0.276 16th
8	There is lack of storage facilities (poor electricity supply)	56.0	16.5	13.8	13.8	0.276 16th
9	There is hardly good market price for produce	12.4	27.5	40.4	19.7	0.601 4th
10	Pollution of fishing ground	18.8	16.1	33.5	31.3	0.648 3rd
11	There is high level of harvest losses	26.1	34.9	22.5	16.5	0.390 12th
12	Loss of fishing area	27.1	37.2	22.0	13.8	0.358 14th
13	There is high level of theft in the area	20.2	31.7	24.8	23.4	0.482 6th
14	Inadequate knowledge on the use of fishing technology	18.3	35.8	21.6	24.3	0.459 7th
15	Access to credit facilities	23.4	32.1	24.3	20.2	0.445 8th
16	We are affected by bad weather	15.6	19.3	35.8	29.4	0.652 2nd

Table 2 shows the distribution of the respondents based on the level of severity of constraints to fisheries productivity. Following the measurement of response pattern, as shown in table 1, the scaling pattern followed the increasing order of 0 to 3 with respect to the extent of seriousness of incidences pattern of constraints to fisheries productivity in the study area. Following through composite index analysis to derive the order of severity, a four-category of index of severity and its implication were established as shown on table 2, the first and second columns, respectively. Consequently, the constraint is most severe if the index estimation moves towards 1.00. Relatively from the results on the table 2, it was revealed that majority (62.8%) of the respondents were severely affected by the constraints, which was explained by index range of (0.26-0.5099). A proportion (29.4%) of the respondents fell under more severe category which was explained by index range of (0.51-0.7599). Less number (6.4%) of the respondents fell under the most severe category which was explained by index range of (0.76-1.00), while only 1.4% of the respondents fell under category less severe that was explained by index range of (0.00-0.2599). This implies that fishers in Mbo LGA are severely affected by the identified constraints. Therefore, majority (62.8%) of the respondents can improve their productivity if adequate attention is given to those areas of constraints. The percentage distribution pattern of severity of the constraints to fisheries productivity implies a massive impact on the socioeconomic well-being of these fishing communities. It corroborates the findings of earlier authors (Béné, 2003; Moser and Felton, 2007; FAO, 2015; Abayomi, 2015, and George *et al.,* 2021). However, some developmental scientists have advocated for massive intervention efforts, to improve the level of productivity and social welfare status (Narayan *et al* 2000; LaMar, 1992, Meule *et al.,* 2015 and Birkmann *et al.,* 2022).

Table 2: Distribution of Fisher Folks According to Level of Severity of Constraints to Fisheries Productivity (LSCFP)

LSCFP range	LSCFP Index Interpretation	frequency	Percentage
0.00-0.2599	Less severe	3	1.4
0.26-0.5099	Severe	137	62.8
0.51-0.7599	More Severe	64	29.4
0.76-1.00	Most severe	14	6.4
Total		**218**	**100.0**

In developing nations, fishing activities are conducted despite social, political, economic, and environmental obstacles (Onemolease and Oriakhi 2011, Okeowo *et al.,* 2015; George *et al.,* 2021). These variables have been reported to affect the productivity of fishermen, which in turn leads to the food insecurity and socioeconomic wellbeing of households. In order to better comprehend the particular difficulties to fisheries productivity in the study area, earlier research on the analysis of constraints and fisheries productivity identified the operational investment cost burdensome scenarios. Credit availability was highlighted as one of the elements that may guarantee a certain level of profitability. The study of Okeowo *et al.* (2015) had a similar research objective, but analysed the situation in the lagoon waters of Epe and Badagry in Lagos State, revealing that access to credit was identified as the most significant constraint. Okeowo *et al.* (2015) also noted a loss in fishing productivity, inadequate technology, and environmental disturbances, as well as other widespread restrictions. The limitations mapping outcomes (Okeowo *et al*., 2015) in southwest Nigeria were comparable to the findings of Onemolease and Oriakhi (2011) in Delta State, south-south Nigeria. The Onemolease and Oriakhi (2011) list of restrictions on fisheries productivity is similar to that of this study in the coastal fishing catchment in the southern Niger Delta region, although additional constraints were mapped during the deployment of qualitative assessment tools, as indicated in table 1. These limits appeared to be rather generic, necessitating comprehensive, systematized analyses that would produce substantial underlying exit indications, for the creation of strategic intervention plans by employing the Kaiser-Meyer-Olkin and Bartlett's test (KMO) and the principal component analysis of the limits to fisheries productivity, the significant underlying aspects of the constraints to fisheries productivity were determined (Inyang *et al*., 2022).

Table 3 shows the Kaiser-Meyer-Olkin (KMO) and Bartlett's test results. Kaiser-Meyer-Olkin (KMO) primarily ascertains how suitable and adequate a measurement determines the essence of the construct variables. The sixteen (16) items instrument was subjected to KMO and Bartlett's Test to check for the tenability of the instrument and to confirm the appropriateness of the data for exploratory factor analysis. Kaiser-Meyer-Olkin value of 0.653, implied that the scale was great and adequate and Bartlett's of sphericity was significant at (65.3%), revealing that the correlation was not an identify matrix thus, the correlating underlying structures are tenable and suitable for the factor analysis.

Table 3: Showing the Tenability of the Instrument

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.653
Bartlett's Test of Sphericity	Approx. Chi-Square	499.545
	Df	120
	Sig.	.000

Table 4 shows the Communalities Extraction Index (CEI), which portrayed the extent of interrelationship between each of the 16 identified constraints. Communality extraction index of the 16 items were sufficiently good and explained substantial variation among each other. Despite the high relationship among the constraint's items, item 11 (0.396) accounted for the lowest variation in the factor matrix. The sixteen constraints earlier identified significantly realign themselves into six mutually exclusive and independent salient underlying dimensions of productivity. The resultant outcomes thus suggested the following major underlying dimensions: factor 1: inadequate support to fisheries factor 2: lack of human capacity development in fisheries, factor 3: lack of technical assistance in fisheries, factor 4: inadequate environmental protection education, factor 5: lack of demand creation in fish and fish products, factor 6: vulnerability caused by oil exploration.

The relative decreasing magnitude of the discovered major underlying causes is depicted by the percentage of variation in table 4. Each magnitude indicates the amount of change that the underlying dimensions can induce if a systematic approach is implemented. If a comprehensive intervention program is implemented to address factor 1, the percentage variance indicates a likely 18,675% increase in financial limitations to productivity. Factor 2 would likely result in 9.788% labour availability. Factor 3 would statistically guarantee 9.158%better knowledge of skills in fish farming. Factor 4 would statistically guarantee 8.189% knowledge on general environmental issues. Factor 5 would statistically guarantee 6.723% increased interest in fish consumption. Factor 6 would statistically guarantee a decrease in anthropogenic actions on aquatic bodies. In general, programmed solutions can be addressed by loading each aspect individually or in conjunction. Collectively, the factor loadings found major exit strategic precursors that can statistically increase production by 58.834%, indicating that 41.166% of the unwanted condition remain undetected. Consequently, this study regarded the discovered dimensions as observable characteristics and the undetermined component as inactive characteristics of the recipients (Inyang *et al.,* 2022).

Table 4: Major Significant Dimensions of Outcomes of the Constraints Working Against Fisheries Productivity

	CEI	Rotated Component Matrix[a]					
		1	2	3	4	5	6
There is lack of money to increase my output	0.658	0.707					
Government/community restrictions	0.722	0.779					
There is high level of harvest losses	0.396	0.539					
There is inadequate labour hands in the key area	0.470		0.474				
Our fishing area is covered by vegetation	0.518		0.636				
There is high level of theft in the farm	0.542		0.723				
Loss of fishing area	0.450			0.573			
Inadequate knowledge on the use of fishing technology	0.680			0.774			
Access to credit facilities	0.624			0.538			
We are affected by bad weather	0.568			0.650			
Fishing gear price is relatively high	0.667				0.566		
Cases of low water fluxes/irregular flood pulses	0.738				0.744		
Use of dangerous chemicals to kill fish	0.586				0.628		
There is lack of storage facilities (poor electricity supply)	0.536					0.688	
There is hardly good market price for produce	0.602					0.761	
Pollution of fishing ground	0.656						0.770
Diagnostic Statistics							
Initial Eigen values		2.988	1.566	1.465	1.310	1.076	1.008
% of Variance		18.68	9.788	9.158	8.189	6.723	6.300
Cumulative %		18.68	28.46	37.62	45.81	52.53	58.83

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Conclusion

The findings indicated sixteen multidimensional limitations with varying degrees of confirmation in the studied area. More than sixty percent of the fisher folks were impacted by the most significant constraint. The three most incident factors were the price of fishing gears were rather high; we are impacted by bad weather and as well as the pollution of fishing grounds in their respective decreasing index order. Over eighty percent of the fishermen acknowledged that the severity of the limitations on fishing activities in the area. Six key constraints underlying the sixteen mapped constraints were discovered 1: inadequate support for fisheries; 2: lack of human capacity development in fisheries; 3: lack of technical help in fisheries; 4: inadequate environmental protection education; 5: lack of demand creation for fish and fish products; 6: vulnerability created by oil exploration. These important underlying dimensions may serve as strategic exit indicators for a systematized action programming of the sustainable development of the fishing catchments. On the basis of these findings, the functionality of fishing households in Mbo LGA, Akwa Ibom State appeared to be jeopardized. This is probably due to the socioeconomic dynamics and the environmental limits, being experienced by the fishermen.

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