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Environmental, Demogrphic and Socioeconomic Factors Influencing Adoption of Fisheries Conservation Measures in Niger Delta, Nigeria

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Abstract: This study was conducted to determine Environmental, Demogrphic and Socioeconomic factors influencing adoption of artisanal fisheries resources conservation measures based on the perspectives of Artisanal fishers in Delta, Rivers and Bayelsa states, Niger Delta, Nigeria. The study was conducted for a period of one year (January 2008 to Decmber 2008). With the aid of well-structured questionnaires the desired information were collected and analyzed. A total sample size of 1,200 respondents within the study area, were selected using random sampling technique. Logistic regression technique was used to determine the impact of the independent variables on willingness to adopt fisheries conservation measures. The regression analysis result show that eleven (11) independent variables (Public Enlightenment, Regulatory pressure, Environmental stewardship, Severity of pollutants, Economic circumstances, Institutional Support, Information access, Highest Education, Fishing Experience, Legal Structure and Age) were factors that influence willingness to adopt conservation measures by the fishers. However, the level of influence was found to vary differently in the three states studied depending on the socioeconomic and educational status and other peculiarities of each of the state. Generally, based on the result of the logit analysis of the perspectives of the artisanal fisher respondents, it is therefore inferred that the willingness to adopt fisheries resources conservation measures in the Niger Delta by the Artisanal Fishers, is significantly a function of the studied demographic, socioeconomic, psychological, institutional and environmental factors as specified by the eleven variables.

Key words: Adoption, conservation measures, demogrphic, environmental, fisheries, influencing, Niger Delta, Nigeria, socioeconomic

INTRODUCTION

Fish resource utilization is first and foremost an economic activity. Its purpose is to provide a sustainable flow of benefits to human society. As indicated by Conrad and Clark (1987), in recent years, the relative economic efficiency of the fishing industry has significantly declined in many countries. This is partly due to overexploitation, and the consequent reduced yield from many fish stocks. The currently widespread low economic performance of fishing in Lake Malombe mainly on *Chambo* Fishery is not only harmful to the fishing communities. It is detrimental to society as a whole since it devalues the social importance of communities around the lake and weakens the willingness of national authorities to maintain strong scientific research in the field of fisheries biology and economics.

In the latter half of the twentieth century, global population increases, technological advances and increased economic output combined to create challenges to continued natural resource development. Advents in technology and scientific knowledge have created new approaches to manage agricultural, fishery and forest resources. In addition, in order to address increasing demand for natural resources in the United States, agricultural, fisheries and forestry producers are required to meet increasingly stringent state and federal environmental standards (Mendoza, 2006).

The relationship between the environment and aquatic life is a phenomenon, which determines the direction and nature of mans reliance on beneficial biotic resources of the aquatic environment. The future well being of the developing worlds burgeoning population, especially in Africa, will depend upon wiser balance between exploitation and conservation of natural resources in order to achieve appropriate sustainable production systems that avoid environmental degradation (Yemi *et al*., 2005).

The major cause of over exploitation and waste in fisheries is the condition of free and open access to the

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resource. With a minimum number of assumptions, it is possible to derive some useful hypotheses regarding to several important aspects of resource over exploitation behaviour. The reason, of course is that no one in open access fishery is able to exercise entrepreneurial control over the application of variable resources to the fixed resource. Entry of efforts will proceed until all potential rents to the fish stock have been exhausted. The fishery and species are then left in a sub-optimal bio-economic equilibrium in which a harvest may be taken, but with fish stock that is too low and amounts of capital and efforts that are too high in terms of efficiency.

Akankali and Abowei (2010a) citing Ama-Abasi and Akpan (2005), reported that in Nigeria studies were conducted to determine the response of some biological species to changes in environmental parameters of the Cross River Estuary. Population of some commercially important fish species along with algal densities were studied. The most critical environmental variable considered was salinity. In the study it was found that plankton abundance decreased from 89,218.5 cells/L of water to 186 cells/L of water between January and June. Similarly Bonga emigrated out of the estuary leading to Zero abundance in June. Bonga emigration and the collapse of plankton density are clear indicators of variability in the environmental parameters in the Estuary. The local fishers stand to benefit from this information in their fishing operation, by using the knowledge of salt content of the water system as an aid to tracking of Bonga population.

Azionu *et al*. (2005) reported that fisheries development plan in Nigeria have spanned a period of 44 years. However, but the major objective to make Nigeria self sufficient in fish production and supply is still a mirage. With about 14 million litres of inland ware bodies, Nigeria could be self sufficient in fish production and in fact a major exporter of fish. The repeated episodes of declining yields and economic returns, stock collapse and crises of social dislocation and loss of biodiversity could be arrested if the contemporary fisheries management precepts and practice are adopted and vigorously sustained.

In a study carried out to ascertain the literacy level of Artisanal Fishers within the Niger Delta, Akankali *et al*. (2009), reported that the highest qualification for majority of the respondents is primary school education, closely followed by those educated up to secondary school, while those with higher qualifications of OND/NCE and First degree are comparatively fewer in number (36.33, 33.33, 18.67 and 11.67%, respectively). This pattern of relatively high percentage of fishers with lower level of education in the states studied is attributable to the artisanal fisheries industry status generally in Nigeria. Being a rural based largely traditional occupation that involves a lot of drudgery and with relatively low earnings, the Nigerian artisanal fishery sector often attracts the poorly educated manpower of the nation that has less opportunity in other employment. Indeed it will not be an exaggeration to conclude that most of present day artisanal fishers, especially the younger generation engage in fishing as an employment of last resort. The obvious implication of this poor educational status, is that the fishers of the Niger Delta, Nigeria, are not easily amenable to adopt fisheries resource conservation and management measures that would lead to sustainability of their fisheries.

The preceding scenario description of the Niger Delta artisanal fishers attitude towards adoption of the conservation measures necessitate a critical evaluation of the fisheries resources environmental conservation and management issues in Nigeria's Niger Delta, a region that can be described to be the fish basket of the nation (Akankali and Abowei, 2010b). Thus, this study intends to appraise the perspectives of one of the core stake holders- the artisanal fishers, in order to have a structured insight of the factors that influence the adoption of conservation measures as a means of engendering a sustainable artisanal fishery industry within the Niger Delta, Nigeria. The result of this study, it is hoped will provide a policy guide line for developing effective programmes that shall encourage the artisanal fishers to willingly adopt conservation measures.

MATERIALS AND METHODS

The sample consist of fishing individuals, families and registered fishing cooperatives that are involved in artisanal capture fisheries in Rivers, Bayelsa and Delta States, Niger Delta, Nigeria (Fig. 1). The period of the study is from January 2008 to December 2008. The classification of the respondent fishers in terms of their fishing gear type was based on the classification of the Niger Delta artisanal fishery into ten fishery types. Viz;

- Long line and hook fishing
- Cast net fishing
- Drift net fishing
- Set net fishing
- Trap fishing
- Seine net fishing
- Collection of periwinkles, crabs and oyster
- Cray fish fishing
- Hand net fishing
- Fence fishing

The preceeding classification is based on the type of gears used for a particular fishery in the Niger Delta region (Alfred-Ockiya, 2000).

The population of artisanal fishermen are usually large and widely dispersed and are known to share a common characteristics of crafts, gears, catch, methods of capture

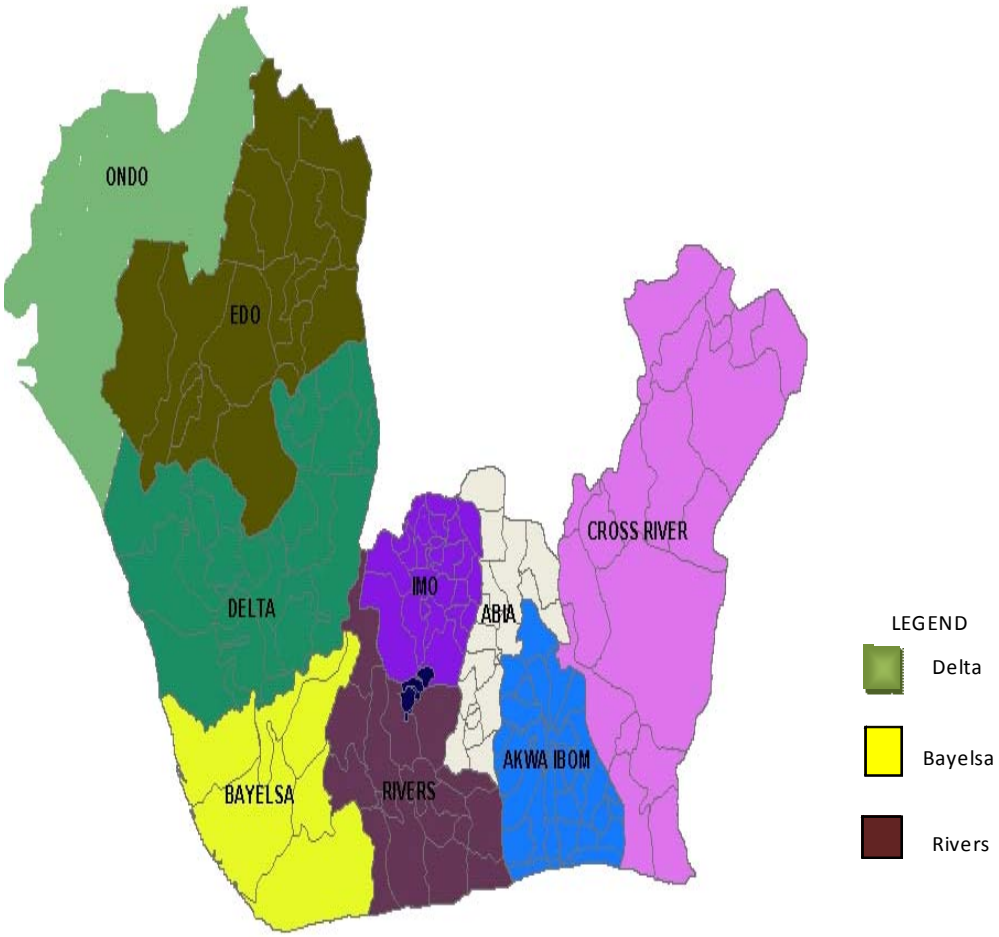

Fig. 1: Study area

etc., within a given fishery and locality. To ensure that the study sample is representative and robust, the study employed the cluster random sampling technique. A cluster comprises a fishing community in a local government area of each state. Communities were selected from the LGA's based on the researcher's experience. In each community, focus group discussions were held with contact fisher men of the State Agricultural Development Programmes upon which a sample frame was drawn. Thereafter, simple random sampling was engaged to determine the study respondents.

Instrument validity: The instrument is a modified version of an instrument used to examine Environmental factors that influence the adoption of conservation measures by Farmers and Loggers in Louisiana USA (Mendoza, 2006). Using factor analysis, Mendoza certified that the convergent and discriminant validity of the instrument was acceptable. In addition the reliability coefficients for the constructs were obtained for the three states and found to be within acceptable limits.

Mendoza (2006) reported that by reducing a data set from a group of interrelated variables into a smaller set of uncorrelated factors, factor analysis achieves parsimony by explaining the maximum amount of common variance in a correlation matrix using the smallest number of exploratory concepts." For this study, the principal component factor analysis identified strong correlations among the attitudinal variables and resulted in two unique dimensions (Demographic and Conceptual variables) that could be used to describe respondent's perspectives on factors that influence the adoption of conservation measures of fisheries resources.

A total of four hundred (400) fishers were served with the study questionnaire per state, giving an aggregate of 1,200 respondents. Based on the questionnaires that where properly completed three hundred per state were eventually selected and used for the analysis. The basis for using a sample size of three hundred respondents per state is derived from the rule-of-thumb for a minimum sample size selection given by Tabachnick *et al.* (2003) who recommended that for testing beta coefficients, the applicable formula is:

$N \geq IO4 + m$ (1)

where m = number of independent variables. In this study eleven (11) independent variables were included in the final model. An application of the formula of this rule in other to obtain the minimum sample size for both the individual states and aggregate sample size = $N \geq 104+11 = 115$. Another popular rule of the thumb commonly used as recommended by Tabachnick *et al.* (2003), requires that there must be at least twenty times as many cases as the independent variables (m). Thus for this study based on this further rule the minimum sample size was determined thus: Sample size = (11x20) = 220. However, a sample size of 300 for each of the three states was adopted in order to make the research regression significance tests results highly reliable.

Research variables: The dependent variable in this research is willingness to adopt fisheries conservation measures ("CONMEAS"). The independent variables are:

Regpres: Regulatory Pressure
Envstew: Environmental stewardship
Severenv: Severity of damage to the environment
Econcir: Economic circumstances
Instsup: Institutional Support
Infoacc: Information access
Pubenli: Public Enlightenment
HEQ; Highest Education Qualification
Age: Age
Fishexp: Fishing Experience
Legstru: Legal Structure

Regression model: Binary Logistics regression technique was used to determine the impact of the independent variables on willingness to adopt fisheries conservation measures. Consistent with Mendoza (2006) and Whitehead (1998). Stepwise logistic regression was adopted as a means of testing variance factors for willingness to either participate in adopting conservation measures.

Model specification and estimation: A simple econometric model on the likelihood that fisher folks will adopt conservation measures was constructed based on demographic variables and the conceptual constructs. Evaluation of the model was done using logistic regression defined as:

$$\text{Ln}\,[p/(1-p)] = a + BX + e \quad \text{or} \quad [p/(1-p)] = \exp a \exp B\,X \exp e \qquad (2)$$

where;
Ln is the natural logarithm, log exp, where exp = 2.7182
p is the probability that the event Y occurs, p(Y = 1)
p/(1-p) is the "odds ratio"
Ln[p/(1-p)] is the log odds ratio, or "logit"
All other components of the model are the same.
The general model specified for the study is given as:

$$\text{CONMEAS} = \beta o + \beta\, D + \beta\, C + \mu \qquad (3)$$

where; β is the beta coefficient and D is the vector of demographic variables and independent variables and C is the vector of conceptual variables.

Logit interpretation: The logit analysis applied in this research is interpreted with respect to the reference category of the independent variables. The independent variables are categorized into two distinct groups based on the discretion of the researcher. These two categories were coded into 1 and 0. The category coded 1 therefore becomes the reference category upon which the logit inference is drawn. If the sign of the logit is negative (-ve), this implies less likelihood of the event defined by the reference category occurring. Thus, in the logit analysis for age involving different age groupings of five (5) years intervals up to seventy (70) years as applied for this research, the "reference category" for the respondents are the ones who are less than thirty five years (<35 years). This category becomes coded as one (1) (1 = <35years) and the non reference category will be for respondents whose age are greater than thirty five years old (>35 years). This second category becomes coded as zero (0) (0=>35 years). In interpreting the result of the logit analysis therefore, if the logit for the reference category for age is negative (-) for instance, it means that respondents who are less than thirty five years old (<35 years) are less likely to engage in the specified activity such as the adoption of conservation fisheries resources conservation measures or a new technology. The reverse becomes the case when the logit analysis result is positive (+) for the reference category of the affected independent variables. This concept constituted the basis of interpretations applied for the eleven (11) independent variables analyzed in this research.

Significance of variables: In sampling a logistic model, variables or factors that will significantly predict the specified outcome are sought for. In this study therefore, in the consideration of variables that influence adoption of conservation measures for logit analysis, all conceived possible variables are first of all subjected to a significance test. The variables or factors that are not significant were subsequently dropped from the logit analysis model. Hence, it is only the eleven (11) independent variables statistically proven to contribute significantly to the logit analysis as shown in the significance column- (Sig = nificance level of the independent variables included in the logit) of Table 1, 2 and 3, were eventually analyzed as recommended by Whitehead (1998).

Table1: Delta State Logistic regression results

Variable/Construct	*B	**Wald	***Sig.	***Exp.(B)
Public Enlightenment	3.614	8.432	0.0091	14.82
Regulatory Pressure	- 2.093	9.651	0.031	3.854
Environmental Stewardship	3.613	4.952	0.050	0.388
Severity of damage to the environment	3.785	6.834	0.035	16.94
Economic circumstances	- 2.340	3.289	0.001	11.23
Institutional Support	3.012	4.312	0.201	5.978
Information access	2.109	3.216	0.04	
Highest Education	- 1.431	5.142	0.043	0.441
Fishing Experience	1.26	3.422	0.013	0.351
Legal Structure	- 2.54	4.316	0.031	0.254
Age	- 3.70	3.892	0.023	0.340
Model Chi Square	3.876			
	[13]			
	[0.001]			
Goodness of fit	0.524			
Cox and Snell R Square	0.742			
Nagelkerke R Square	0.576			
% Correct Prediction	79			
Dependent Variable	Willingness to adopt fish Conservation Measure			

Table 2: Rivers state Logistic regression results

Variable/Construct	*B	**Wald	***Sig.	****Exp. (B)
Public enlightenment	0.026	7.528	0.006	1.026
Regulatory pressure	- 0.101	8.952	0.000	0.903
Environmental stewardship	0.038	11.798	0.000	1.039
Severity of damage to the environment	0.039	3.794	0.050	1.040
Economic circumstances	- 1.959	6.933	0.008	0.141
Institutional support	1.985	18.473	0.500	7.276
Information access	0.431	3.584	0.031	4.311
Highest education	- 7.652	13.160	0.000	2.105
Fishing experience	2.873	7.502	0.006	0.057
Legal structure	- 2.937	6.405	0.000	0.000
Age	- 6.531	4.610	0.032	0.001
Model chi-square	2.129			
Goodness of fit	[14]			
	[0.001]			
Cox and snell R^2	510			
Nagelkerke R^2	0.727			
Correct prediction (%)	82.6			
Dependent variable	Willingness to adopt fish conservation measure			

*: Standardized coefficient of Beta; **: Wald statistics (t-value); ***: Significance level of the independent variables included in the logit; ****: Exponentiations of Beta which indicates that a unit change in one variable category will lead to the equivalent change in exponential value of the rate of adoption of conservation measures by the respondents. Exponentiation value is therefore a predicted probability occurrence which has a standard formula: (P=1/exponential value)

Table 3: Logistic regression results (Rivers State)

Variable/Construct	*B	**Wald	***Sig	****Exp (B)
Public enlightenment	0.030	10.934	0.001	10.033
Regulatory pressure	- 0.111	22.696	0.000	4.895
Environmental stewardship	0.038	12.455	0.000	1.039
Severity of damage to the environment	0.040	4.704	0.030	1.041
Economic circumstances	0.343	3.507	0.000	1.014
Institutional support	1.985	20.208	0.500	1.410
Information access	1.041	11.651	0.011	2.005
Highest education	- 8.185	14.882	0.003	0.541
Fishing experience	3.293	9.068	0.003	1.086
Legal structure	- 3.288	8.608	0.003	1.423
Age	- 0.475	0.978	0.041	0.021
Model chi-square	5.140			
Goodness of fit	[13]			
	[0.000]			
Cox and snell R^2	0.599			
Nagelkerke R^2	0.711			
Correct prediction (%)	89.4			
Dependent variable	Willingness to adopt fish Conservation Measure			

*: Standardized coefficient of Beta; **: Wald statistics (t-value); ***: Significance level of the independent variables included in the logit; ****: Exponentiations of Beta which indicates that a unit change in one variable category will lead to the equivalent change in exponential value of the rate of adoption of conservation measures by the respondents. Exponentiation value is therefore a predicted probability occurrence which has a standard formula: (P=1/exponential value)

RESULTS AND DISCUSSION

The results of the study based on the logistic regression of considered factors that influence the willingness to adopt conservation measures by the respondents for Delta, Rivers and Bayelsa states of Niger Delta region of Nigeria which constituted the areas coverd by this study as shown in Fig. 1 are provided in Table 1, 2 and 3.

Logistic regression variables: The analysis of results of the logistic regression were carried out with a view to determine statistically grouped variables influence on the willingness of the fishers to adopt conservation measures. The discussions were based on the regression results of two sets of grouped variables (Background and conceptual) as shown in Table 1, 2 and 3.

Explanation of the logistic regression results for background variables:

Age: The Negative value of logit coefficient for Delta, Rivers and Bayelsa states B = (-3.70, -6.531and -0.475 respectively), show the variable of age has the highest probability of Fishers less than 35 years being less likely to adopt conservation measures, while Fishers older than 35 are more likely to adopt conservation measures in Rivers state, followed by Delta state and Bayelsa state. This result may be due to young Fishers ignorance of the implications of not adopting conservations and perhaps their desire to increase fish catch as a step to increasing their income. Apparently, individuals who were less than 35 years old and much younger in the business would have experienced less about the dangers of poor conservation management. Therefore they would be less enthusiastic about adopting conservation measures, since their attitude would mostly tilt towards increasing their catch and hence revenue.

It is therefore imperative that younger fishers in all the states become prime targets of conservation adoption enlightenment and implementation programmes.

Highest education: The Negative values of logit coefficient for highest education qualification showed higher level of probability of Fishers with primary school education or lesser educational qualifications as less willing to adopt fisheries resources conservation measures in Delta, Rivers and Bayelsa states B = (-1.431, -7.652 and -8.185, respectively), when compared with those with post primary level qualifications. Bayelsa state is therefore the state having the highest proportion of Fishers that are less likely to adopt conservation measures as a result of their low educational qualification, followed by Rivers and Delta states. The negative sign for logit of highest education being most significant in Bayelsa state (B = -8.185) is obviously due to the fact that the general educational level of people of Bayelsa State is among the lowest in the country and this has expectedly rubbed off on the perceptions opined in the study. This result makes Bayelsa state the most critical out of the three states in terms of promoting literacy programmes, especially among the Fishing population.

Fishing experience: The positive values of the logits for fishing experience- Delta (B = 1.26), Rivers, (B = 2.873) and Bayelsa (B = 3.293) indicate that Delta state has more of fishers with longer years of fishing experience (Sign. = 0.013). The uniform positive sign of the logits for fishing experience indicates that respondents from the three states with long years of fishing experience (> Between 15 and 20 years) are more likely to adopt conservation measures, while those whose fishing experience is <15 years are less likely to adopt conservation measures. It is presumed that having more years of fishing experience enables fisher folks have more information and understanding about the industry. It can also imply that the many years of fishing experience might have enhanced their ability to analyze and determine the needs to conserve noticeable depleting fish stocks.

Legal structure: This defines the ownership structure of the business as to whether it is a formally registered enterprise on one hand (Incorporation) or a non formally registered business (Individuals, Family, Partnerships, Communal, Cooperatives and other forms of enterprise structures of ownership that are not legally binding). The negative logits of legal structure for all the states- Delta (B = -2.54), Rivers (B = -2.937) and Bayelsa (B = -3.288), which indicates the state where legal structure most influence conservation adoption to be Bayelsa. However, the logit values for the three states show that Fisher folks whose legal structure is defined as incorporated are more likely to adopt conservation measures than those who ran their business as individuals or family enterprise and other forms of non registered entities. This trend could be explained by the reasoning that there is a direct relationship between international best practices and legal structure of a business. An incorporated organization is most likely to operate in a sustainable manner knowing that it could be held accountable for it's actions. Also managers of such an incorporated fishing outfit has a very high likelihood of being educated and therefore they may be much more familiar with implications of what the changing times portends for fish stock as well as the consequences of ignoring conservation measures.

Explanation of the logistic regression results for conceptual variables:

Public enlightenment: The logits for public enlightenment as a strategy for enhancing willful compliance to conservation measures by the Fishers

within the three states studied were found to have a high probability in determining adoption of conservation measures - Delta (B = 3.614), Rivers (B = 0.026) and Bayelsa (B = 0.030). The uniform positive result implies that Fisher folks becomes highly aware about the need for conservation, by emphasizing more on creating that consciousness amongst them through public enlightenment. Public Enlightenment allowed Fisher folks to be empowered with knowledge about activities relating to conservation around the globe. Efforts towards constantly creating awareness on the need and benefits of adopting conservation measures by the artisanal fishers are hereby recommended to be stepped up via enlightenment campaigns.

Regulatory pressure: Regulatory pressure within this context sought to establish the extent the Fishers were willing to adopt conservation measures where by regulations are adequately enforced. The logits for Regulatory pressure for the three states- Delta (B = -2.093), Rivers (B = -0.101) and Bayelsa (B = -0.111) were found to favourably influence willingness to adopt conservation measure. This result is also expected in the states covered by the study given the increased concerns and global call for action to moderate the negative impact of man's activities on the environment, especially within the Nigerian Niger Delta region which has been seriously devastated by crude oil exploration and exploitation activities (Abowei *et al*., 2008). The implication of this is that a robust regulatory frame work and an enhanced mechanism for implementation and enforcement have to be accorded priority as means of enhancing fisheries resources conservation measures adoption in the region amongst the Artisanal Fishers. This is imperative as the persuasive approach alone may never bring willingness for self compliance to adoption measures to the desired significant threshold in the region.

Environmental stewardship: Environmental stewardship has to do with whether the fishers have developed a positive attitude and culture towards environmental parameters that enhance willingness to adopt Fisheries resources conservation measures in the Niger Delta. The logits for environmental stewardship as a conceptual variable was found to have a high probability of influencing Fishers to adopt conservation measures. Delta (B = 3.613), Rivers (B = 0.038) and Bayelsa (B = 0.038). This result is an indication that environmental stewardship is a significant variable in explaining willingness to adopt conservation measures. Consequently environmental programmes that will encourage positive attitudes towards conservation of fisheries resources should be stepped up in the Niger Delta fishing communities.

Severity of damage to the environment: It is a concept that evaluates the extent of influence real and perceived devastation of the environment by mainly socio-econmic activities other than Fishing can exact on the Fishers in adopting conservation measures. In the three States studied, the logits for Severity of damage to the environment were Delta (B = 0.040), Rivers (B = 0.039) and Bayelsa (B = 0.040). Severity of damage to the environment is therefore observed to be a significant predictor of willingness to adopt conservation measures. This outcome is expected given the heightened awareness created in the area on the adverse consequences of environmental degradation to sustainability of the Fishing Industry. This awareness is done via campaigns by environmental groups, NGO's and other interest groups. These groups have in recent times intensified efforts that expose the adverse effects of damage to the environment on fisheries resources of the region. Since the fishers are linked to these groups, they tend to become more aware of the externalities of the severity of environmental damage on their fisheries as an enterprise. While every adverse environmental effects within the region is to be brought to the for as a means of enhancing adoption of conservation measures by the Fishers, efforts should therefore be geared towards the amelioration of the damage done to the aquatic environment by identified pollutants in the region.

Economic circumstances: Economic circumstance is defined within this context to mean an evaluation of the general economic well being of the Fishers, especially in terms of their guaranteed income level within a specified time interval that would always afford them the opportunity of meeting their basic needs. The logits for Economic circumstances in the states covered by the study are Delta (B = -2.34) Rivers (B = -0.001) and Bayelsa (B = -0.343). The negative sign of the logits coefficient suggests that currently the economic circumstance disposes them to be less likely to adopt conservation measures. Therefore it is only Fishers who are able to maintain a certain level of financial security that may be willing to adopt conservation measures. In more precise terms, a certain level of guaranteed minimum income is required by the fishers for them to be able to willingly adopt practices that may reduce their catch, but that will definitely enhance the sustainable exploitation of the fishes from the stock of specified fisheries.

It is therefore recommended that relevant government agencies evolve and implement "conservation subsidy programmes" and "conservation cost sharing funds." Whereas the conservation subsidy programme would entail subsidizing fishing cost, the conservation cost sharing is intended for an outright purchase from the

Fishers some of the cost they will incur due to their inability to fish while adopting conservation measures. These approaches will aid the Niger Delta Fishers to recoup opportunities for lost means of income/lively hood that must occur as a result of adoption of defined conservation measures.

Institutional support: The Institutional supports are routine packages such as fishing inputs, micro credits and technical advisory services that some government agencies currently provides organized groups and legal entities that cooperate with conservation adoption measures within the Niger Delta region. In Bayelsa state Institutional support though found to be a predicator of willingness to adopt conservation measures with a logit of B = 1.985, it represent the least rating among the three states studied. Since majority of the respondents in Bayelsa state are Fisher folks without a formal business organization (refer to "legal structure"), it is not surprising that this variable did explain willingness to adopt conservation measures with the least probability of occurrence among the three states.

Unlike Bayelsa States, Institutional support in Delta and Rivers states with logits of (B = 3.01 and 2.056) respectively, were observed to be highly related to conservation measures. This result suggest that Delta and Rivers States might have characteristic features that attracts more support from government and other aid agencies who normally assist organized groups that are favourably disposed to adopting conservation measures. It is therefore recommended that artisanal fishers in the Niger Delta generally are sensitized on the need for them to formalize their fishing ventures and also join properly registered cooperatives. Above all, they should have a positive environmental stewardship attitudes that will enable them cooperate with Institutional agencies on conservation matters.

Information access: Information access was used to evaluate the extent and influence of access to conservation information with a view to establishing it's level of predictability for conservation adoption by the Fishers. The logit coefficient for Information access in the three states are Delta (B = 2.109), Rivers (B = 0.431) and Bayelsa (B = 1.041). This finding show that the respondents are more likely to adopt conservation measures with adequate access to relevant information and otherwise without adequate access. This finding supports our understanding of the role that critical information can play on conservation when it is made available. It implies that exposing Fisher folks of Niger Delta to information through effective information medium such as extension agencies assisted them in making informed decisions regarding the procedures and requirements pertaining to conservation.

There is an urgent need to ensure that timely delivery of appropriate conservation measures information must be encouraged amongst relevant Institutional agencies. The information must at all times contain the obvious benefits of conservation both on the short and long term basis. The most effective media such as extension agents, communal owners of fishing sites as already identified in this study should be accorded priority as the channels of choice for making conservation measures adoption information available to the artisanal fishers of Niger Delta.

CONCLUSION

Based on the perspectives of the artisanal fisher respondents, it is therefore inferred that the willingness to adopt fisheries resources conservation measures in the Niger Delta, to a large extent is significantly a function of the studied environmental, demogrphic and socioeconomic factors. Thus, the environmental, socio-economic and psychological conflicts over resource utilization, which have marred the Niger Delta and has continued to escalate can be reasonably abated by developing policies that will adress factors that inluence resource conservation as highlighted by this reasearch. This can be achieved by tackling one of it's root causes - that is the depletion of bio-resources; (fisheries prominently implicated; Abowei *et al*., 2008). The application of an appropriate diagnosis of the fishers opinion as highlighted by this research to enhance the regions fisheries resources conservation is a further means of it's actualization. These measures will no doubt help to some extent in engendering within the Niger Delta a path of socio-economic stability, development and ecological balance.

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