MULTIDIMENSIONAL POVERTY CHARACTERISTICS AMONG RIVERINE HOUSEHOLDS IN SOUTHWESTERN NIGERIA

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ABSTRACT

Poverty abatement and eradication efforts are key to sustainable development in any emerging economy, and an empirical knowledge of the poverty characteristics of a population segment is a major prerequisite at achieving these. This study had examined the poverty characteristics of riverine households in southwestern Nigeria using five dimensions consisting of thirteen welfare indicators. This study adopts the household as the unit of poverty measurement. By the descriptive analysis, mean household size was 5 with about 71% of the households falling short of the Federal Government of Nigeria (FGN)'s stipulated 9-year minimum formal education. Majority (about 46%) of the households constructed plank houses on the river, and over 89% of them defecating directly into the water bodies beneath, serving also as source of drinking water to about 63% of them. About 68% of the households dumps refuse directly into the surrounding water bodies. 74.78% of the households lack basic household assets and a means of transport. At an average benchmark of 8 (about 62%) of the weighted indicators, 270 (about 60%) of the households were poor, being deprived in 8 welfare variables, with adjusted multidimensional poverty incidence (M_0), depth (M_1) and severity (M_2) were 0.3422, 0.1608), and 0.0761, respectively. The riverine households are socio-political affiliated, having about 84% and 92% of their members actively involved in politics and community development projects. As a way of exiting the poverty cycle, basic intervention programmes such as access to public educational facilities and formal employment were recommended for the riverine households.

Keywords: poverty characteristics, riverine households, poverty measure, welfare deprivation, southwestern Nigeria

INTRODUCTION

Poverty among the resource-poor has been conceptualized to reflect a state of deprivation which is manifested in illiteracy, lack of access to water, poor housing and declining purchasing power (Adepoju, 2001). The poor in Nigeria, majority of whom are rural-based, are usually confronted with lack of assets, as well as receiving income from the natural (land) endowments (World Bank, 2001). Very many often, fisher households in the coastal areas do not find adequate and appropriate shelters; quality food and drinking water; adequate and hygienic sanitation; privacy for women, particularly for the lactating mothers and adolescent women (Sardar *et al*. 2008).

These coastal areas comprise an appreciable number of these fishing communities that are mostly located on the edge of freshwater forest and on the top of beach ridges, numbering about 20 millions of such people living along the coastline stretching some 800 kilometer in length (Ibe and Awosika, 2004). Most riverine households in Southwest Nigeria are exposed to risky situations occasioned by devastating natural/environmental hazards such as erosions and floods which have perpetually subjected them to a situation of homelessness, hopelessness, reduced welfare status and abject poverty (Siyanbade, 2006). The most alarming case is the high level of impoverishment of women, children and families with children, which was an indication of weak family and occupation structures (Speder, 2005). A study by Sardar *et al*. (2008) revealed that riverine households often do not find adequate and appropriate shelters; quality food and drinking water; adequate and hygienic sanitation; privacy for women, particularly for the lactating mothers and adolescent women. In addition, floods often force students out of academic activities since their learning centers are often used as makeshift flood shelters, thus affecting children enrolment (especially girls) in many coastal communities the world over.

Types of settlements and (or) regional status also exert a significant and growing influence on poverty and deprivation levels (Speder, 2002). Many disadvantaged riverine households usually posses unproductive and largely uncultivated land portions. These situations not only affect the income and nutritional intake of the poor, but also affects their ability to acquire assets, and their quest for better social amenities, such as education, health care services, food, water, among others. A poverty-related study by Alayande and Alayande (2004) associated major environmental problems with low agricultural productivity, high vulnerability to health hazards as well as poor infrastructural developments (such as network of roads, markets, and means of communications, among others).

FAO (2008) reported that about 90 per cent of Nigeria's food is produced by small-scale farmers who cultivate small plots of land and depend on rainfall rather than irrigation systems as a result of their low knowledge base, access to facilities and poor financing. Nwafor *et al*. (2007) note that low flexibility of Nigerian farmers to allow substitution in production practices, especially for export crops and cereals is a major limiting factor, which results from low human capital, technological capacities, credit market access and infrastructure. These limitations have been linked with the high incidence of poverty and low level of socio-economic development in both rural and coastal areas of Nigeria which inadvertently retards sustainable development in such affected areas.

Lack of education, information and training is a key limiting factor to smallholder households' sustainable development. The report of UNICEF (2005) notes that the poor state of Nigerian educational systems had its toll on the poor people, the majority of whom are landless farmers and fishers in rural areas. As reported by Narayan *et al*. (2000), the welfare context of rural households is not entirely dismal; with the appropriate intervention, some households are able to escape

poverty. A key route to this escape is education. The education of a member to a reasonably high level can help enhance the household's welfare significantly. With the aim of assessing the potentials of the deprivation of basic welfare incentives on the sustainability of fishing communities, this study had profiled the poverty characteristics of riverine households in the southwestern coast of Nigeria, many of whom inhabitants are predominantly smallholder fisher folks.

CONCEPTUAL FRAMEWORK ON HOUSEHOLD MULTI-DIMENSIONAL POVERTY AND DEPRIVATION

Poverty amid plenty is the world's greatest challenge. Poor people live without fundamental freedoms of actions and choices that the better off take for granted (Sen, 1999). These include the lack of income and assets to attain basic necessities (food, shelter, clothing and acceptable levels of health, education, and other welfare enhancing goods and services). The poor experience a sense of voicelessness, powerlessness, exposure to ill treatment, gross inability to influence key decisions affecting their lives as well as inadequate social networking within the institutions of state and society. They face extreme vulnerability to ill health, economic dislocation, and natural disasters, and adverse shocks linked to inability to cope with such shocks. These deprivations keep them from leading the kind of life that every one values. These are all dimensions of poverty (World Bank, 2001).

Sickness due to malaria infection has profound human and socioeconomic consequences in all societies. The costs of lost productivity and mandays as well as treatment of malaria-stricken individuals constitute a significant economic burden and welfare loss for the family and society. Globally, access to adequate food and proper nutrition is one of humanity's basic needs. Shala and Stacey (2001) reported that many countries, especially the sub-Sahara Africa region, experience food insecurity with food supplies being inadequate to maintain their citizens' per capita consumption. The average amount of food available per person per day in the region was 1,300 calories compared to the world wide average of 2,700 calories.

Nigeria was among the countries in Sub-Sahara Africa experiencing significant food shortages as over 40% of the country's population is estimated to be critically food insecure (Idachaba, 2004). F.A.O (2005)'s report indicted most developing countries (Nigeria inclusive) of food insufficiency and inaccessibility to a very large segment of the population; the types and quality of food consumed being often nutritionally inadequate. Addo (2005) reported that Nigerian children below the age of 18 years (about 47% of the nation's population) are still victims of stunting, wasting and underweight, all of which are evidence of under-nutrition; and according to Aromolaran (2004), this inadequate supply of calorie lowers productivity, hinders learning and increases the risk of diseases.

Following Benach *et al.* (2003); Tello *et al.* (2005); Curtis *et al.* (2006) and Alkire and Santos (2010), the conceptual framework for this study was developed around the resultant effect of negative policy intervention (or policy neglect) on the five basic welfare dimensions used in this study (comprising of sixteen indicators) which increases households' multiple deprivations and eventually worsening the poverty situation of the Riverine households. The expected interventions were conceptualized to either come from public (e.g government and its parastatals) or private (e.g non-governmental organizations, incorporated organizations or self) agencies or both. On the other hand, positive intervention of the agencies on the present state of households' welfare variables has the effect of improving on the household

endowments which will invariably increase income and (or) reduce expenditure and thus manifesting in reduced household multidimensional poverty level (Figure 1). Vision 2020 advocated for an increased recognition of the vital role of promoting and sustaining poverty intervention programmes through accelerated efforts in three fundamental areas: advocacy and public relations; information, education and communication; and community participation.
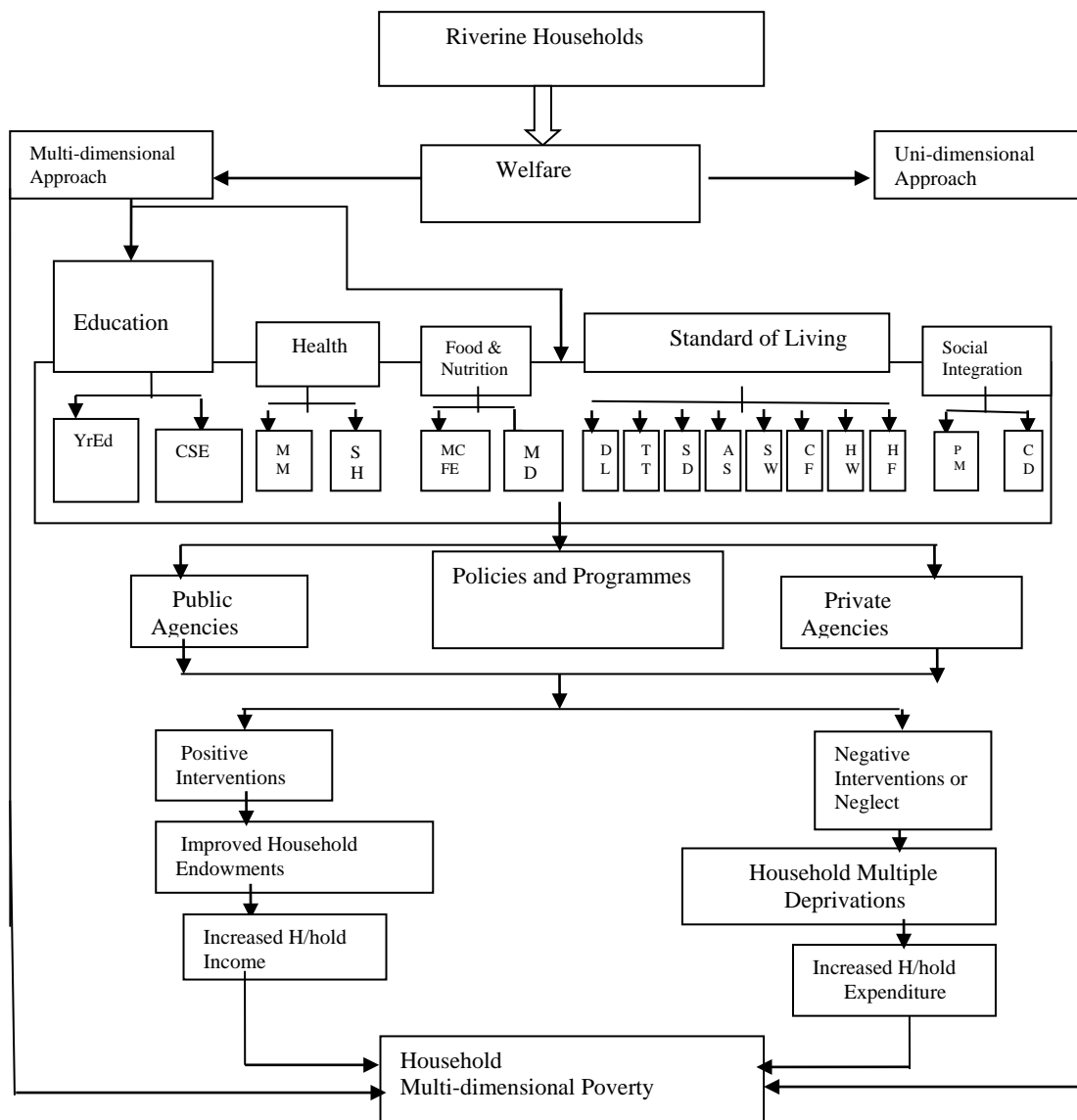
Figure 1: Conceptual framework on manifestation of household multi-dimensional poverty through welfare deprivations and negative policy interventions. (Adapted from Benach, *et al,* 2003; Tello, *et al,* 2005; Curtis, *et al,* 2006 and Alkire and Santos, 2010).

Key:	YrEd:	Year of education	CSE:	Child school enrolment
	MM:	Malaria treatment method	SH:	Self-reported health
	MCFE:	Mean per capita food expenditure	MD:	No. of meal per day
	DL:	Source of Domestic Light	TT:	Toilet type
	SD:	Means of solid waste disposal	AS:	Ownership of H/hold assets
	SW:	Source of drinking water	CF:	Type of cooking fuel
	HW:	Material of the house wall	HF:	Material of the house floor
,,,	PM:	Political membership	CD:	Participation in comm. dev. projects

METHODOLOGY

Study area

The study covered the coastal area of Southwest geo-political zone of Nigeria, characterized by the existence of lagoon, the Atlantic ocean and brackish water. The Southwestern zone lies within Latitude 5.45^0N and 8.15^0N and Longitude 3^0E and 6^0E, with a temperature range of 27^0C and 32^0C. Households at the coastal bed primarily engage in artisanal and commercial capture fishing activities, small-scale land-based farming (crop and livestock rearing) natural resource collection (including sharp sand, games, fuel wood and timber and non-timber products from the forest brackish).
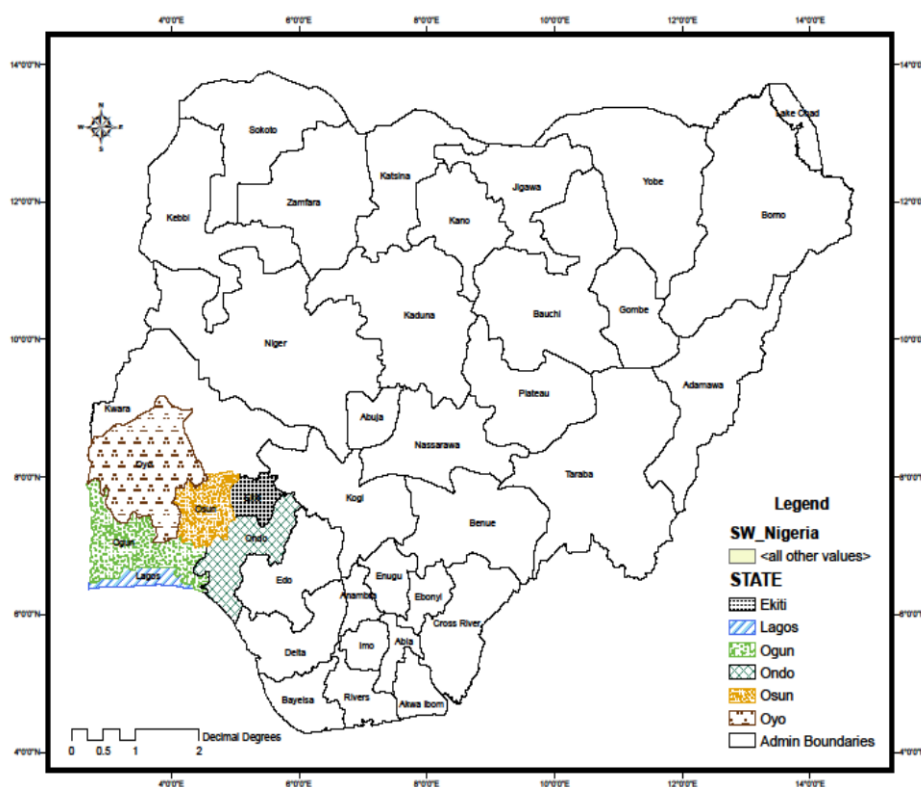
Fig 2: Map of Nigeria showing the Southwestern (SW) Zone

Source of data and methods of data collection

Primary data were used for this study. Primary data were obtained with the aid of structured questionnaires that were administered on the household head. Where the household head was not available the spouse provided the required information. Information were collected on the socio-economic, demographic, and community-specific variables that bothered on the welfare status of the riverine households.

Sampling procedure and sample size

Primary were collected from selected households in the study area using multi-stage sampling procedure. In the first stage, Ogun, Ondo and Lagos States were purposively selected as they contain the coastal areas of the Southwest geo-political zone of Nigeria. Three (3) Local Government Areas (LGAs) belonging in the core coastal area of the three

States were purposively selected at the second stage. They were Ogun waterside, Ipokia and Ijebu-East LGAs in Ogun State; Ilaje, Ese-Odo and Irele LGAs in Ondo State and Epe, Badagry and Ibeju/Lekki LGAs in Lagos State. Subsequent stages involved a proportional (shown below) selection of 20 political wards at the third stage and 100 riverine communities at the fourth stage. In the final stage, 5 households (HH) were proportionally selected per community, targeting a maximum of 500 households for the study. However, responses from only 448 questionnaires were used while others were discarded for incomplete information. The proportionality factor used in the third stage to select wards is given below:

$$P_i = \frac{n_i}{N_i} \times 20$$

where P_i = number of sampled wards

n_i = number of wards in the particular LGA of interest

N_i = total number of wards in all the 9 LGAs (i.e, 114)

i represents the referenced State (Ogun, Ondo, Lagos).

This led to 20 wards been selected from the 9 LGAs.

Another proportionality factor was used in the fourth stage to select riverine communities as given below:

$$X_j = \frac{q_i}{Q_i} \times 100$$

(1)

where Xi = number of sampled riverine communities

q_i = number of major communities in the particular ward of interest

Q_i = total sum of major communities in the 20 wards selected

i represents the referenced ward.

This led to 100 major riverine communities covered in the course of data collection.

A final proportionality factor was introduced in the final stage to select households as given below:

$$H_i = \frac{s_i}{S_i} \times 500$$

(2)

where H_i = number of sampled households

s_i = number of households in the particular riverine community

S_i = total sum of households in the 100 riverine communities selected

i represents the referenced community.

This led to 500 households interviewed in this study.

Estimation procedures

Methodological steps to computing the multi-dimensional deprivation

Step 1: Unit of analysis

The unit of analysis was chosen as the household. As such, the definition given to the indicator variables used in this study follows the concept of effective poverty inclusion, endogenous poverty and external capabilities as developed in literature (e.g, Basu and Foster, 1998).

Step 2: Choice of dimensions, indicators and weights

The dimensions and indicators used for the construction of multi-dimensional poverty index (MPI) were chosen on the basis of documented public consensus and their conformity to the framework of the Millennium Development Goals (MDGs) framework (United Nations, 2003; BDCLG, 2007) and on empirical evidence regarding people's values as well as the psychological theory of basic needs (Alkire, 2007; Alkire and Eli, 2010; and Alkire and Santos, 2010). The constructed MPI is based on five dimensions: education, health, food and nutrition, standard of living and social affiliation, from within which sixteen initial welfare indicators were carefully selected as guided by literatures (following Townsend; 1979; Pampalon and Raymond; 2000; Oyekale and Okunmadewa, 2008 and Alkire and Foster, 2010).

The five chosen dimensions comprising of sixteen [1]indicators are Education ([2]*year of schooling, child enrolment in schools); Standard of Living (source of drinking water, cooking fuel, ownership of basic assets, toilet type, means of solid waste disposal, material of the wall of the house, material of the floor of the house, source of domestic lighting)*; Health *(method of malaria treatment, self-reported health)*; Food and Nutrition *(food availability, food sufficiency)* and Social Affiliation *(political participation, social participation)*. Equal weights were assigned to each of the five dimensions and sixteen welfare indicators (following Atkinson, 2003; Decancq and Lugo, 2008 and Pampalon *et al.* 2009).

Step 3: Setting the indicator-specific deprivation cut-off value/achievement (k)

The cut-off values or achievements used for each of the sixteen welfare variables were based on MDG international standard and relevant studies. Households with no school-year children (6-15 years) under the 'child enrolment' and 'food adequacy' indicator variables were considered in each case as non-deprived. The 9-year cut-off achievement for the *year of schooling* variable was based on the Education For All (EFA) policy of the Federal Government of Nigeria (FGN), whose aim is to make all children, particularly girls, have access to complete, free and compulsory universal basic education (up to Junior Secondary School) of good quality by the year 2015 (NEEDS, 2004). Households with missing data or incorrect information on any of the indicator variables were excluded from the sample.

Step 4: Applying the indicator-specific deprivation cutoff and counting the number of deprivation for each household

Following the deprivation counting approach of Alkire and Foster (2010), achievements of the riverine households in each dimensional indicator was measured against the cutoff value set for each of the thirteen (13) resultant indicators on the basis of which households whose achievement levels were lower than the set cutoff values were counted as being deprived in the specific indicator. Those with achievements above the cutoff values were categorized as being non-deprived.

Measuring households' multidimensional poverty level

In order to profile poverty of the riverine households, multidimensional poverty measures were computed, following Bourguignon and Chakravarty (2003), as used by Alkire and Foster (2010) and Alkire and Santos (2010). The multidimensional poverty measures are defined as:

$$M_\alpha = \mu\big(g^\alpha(k)\big) \text{ for } \alpha \geq 0 \qquad\qquad (3)$$

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[1] *Indicators chosen under each dimension are italicized and put in parentheses.*

[2] The Federal Government of Nigeria (FGN) has declared a minimum basic and compulsory 9 years of formal education for all children in Nigeria (especially female children) (NEEDS 2004, 2009).

where α is a poverty aversion parameter which takes on values 0, 1, or 2. The general form of the dimension-adjusted poverty index (MPI) is denoted by $M_\alpha(y;z)$ where y represents the household's level of achievement in any given indicator, and z represents the dimension-specific cut-off for the indicator.

In another expression,
$$M_\alpha = \frac{\left|g^\alpha(k)\right|}{nd} \tag{4}$$

where d represents the number of dimensions and n is the total number of sampled households. The variable g^α is an $n \times d$ matrix whose ij^{th} entry is 1 when household i is deprived in the jth dimension, and 0 otherwise, with i^{th} row vector g_i^α being the household i's *deprivation vector*. In this case, M_α is defined as the quotient of the sum of the α powers of the normalized gaps of the poor and the highest possible value for this sum.

When $\alpha = 0$,
$$M_0 = \mu\left(g^0(k)\right) \tag{5}$$

The notation μ portrays M_0 as the mean of the matrix $g^0(k)$,

that is,
$$M_0 = \frac{\left|g^0(k)\right|}{nd} \tag{6}$$

where n and d are number of sampled observation and dimensions, respectively.

M_0 is a product of two quantities, the deprivation share A given as: $A = \left|c(k)\right|/(qd)$, and H, incidence of multidimensional poverty, $H = \frac{q}{n}$ Thus,
$$M_o = HA = \mu(g^0(k)) \tag{7}$$

where $q = q(y;z)$ is the number of poor households in the set Z_k, and hence the number of households identified to be multidimensionally deprived based on the dual cutoff criterion, ρ_k. The notation $c_i(k)/d$ represents the fraction of weighted indicators in which the poor household i is deprived given the cut-off k. M_0 is thus the dimension-*adjusted* Headcount Ratio.

When $\alpha = 1$, the dimension-adjusted poverty gap, $M_1(y;z)$ results, defined as:
$$M_1 = HAG = \mu(g^1(k)) \tag{8}$$

G = *average poverty gap* across all dimensions in which the poor households are deprived, given as
$$G = \left|g^1(k)\right|/\left|g^0(k)\right| \tag{9}$$

where $g^1(k)$ is a censored matrix defined by $g_{ij}^1(k) = 0$ if $c_i < k$ and $g_{ij}^1(k) = g_{ij}^1$ if $c_i \geq k$, so that $g^1(k)$ only includes the deprivations of the poor.

When $\alpha = 2$, the dimension-adjusted poverty severity $M_2(y;z)$ results, expressed as
$$M_2 = HAS = \mu(g^2(k)) \tag{10}$$

where S = average severity of deprivation across all dimensions in which the poor households are deprived,
$$S = \left|g^2(k)\right|/\left|g^0(k)\right| \tag{11}$$

For any defined increase in deprivation, the M_2 measure registers a greater impact the larger the initial level of deprivation. Indeed, $M_2 = (M_1)^2 + V$, where V is the variance among all normalized gaps given as:

$$V = \sum_i \sum_j \left(\left(\mu(g^{'}) - g^{'}_{ij} \right)^2 / nd \right) \qquad (12)$$

In terms of the deprivation vector c, $M_2 = (M_1)^2 \left[1 + C^2 \right]$ where $C^2 = V / (\mu(g^{'}))^2$ (13)

RESULTS AND DISCUSSIONS

Households' socio-economic characteristics

Tables 1 and 2 display the socio-economic characteristics of sampled riverine households and the household heads, respectively. The mean household size was 5 with medium-sized households having between 7 and 12 members making the largest percentage (about 45%). About 84% of the households had members that were non-working as a result of under-age, over-age or other factors; while 77.46% and 94.42% have a maximum of ₦50,000 either as monthly income or external remittance. The larger proportion (about 71%) of the households did not meet the Federal Government of Nigeria (FGN) policy of minimum educational attainment of Junior Secondary School (i.e, 9 years of formal education), with only about 9% of them having members with tertiary education, a reflection of gross educational deprivation among the households.

Majority (72.10%) were male, mostly (38.84%) polygamous with mean age of 46 ± 10.94 years. About 68% of the household heads engaged in fishing and on-shore natural resource collection activities, in which sector about 70% of this number had acquired not less than 10 years of experience. Only 142 (about 32%) of the household heads engaged in off-shore occupational activities which included peasant farming, 81.92% of them cultivating less than 2 hectares of farm land.

Table 1. Socio-economic characteristics of surveyed households

Characteristic	Frequency	Percentage (%)
Household Size		
1- 6	199	44.42
7- 12	202	45.09
> 12	47	10.49
Total	*448*	*100.00*
Mean = 5	*S.D = 3.0168*	
Dependency Ratio		
0	71	15.85
0.1 - 0.50	303	67.63
0.6 - 1.0	74	16.52
Total	*448*	*100.00*
Mean = 0.41	*S.D = 0.4263*	
Highest Formal Education		
No Formal Education	80	17.86
Primary Education	169	37.72
Junior Secondary Education	68	15.18
Senior Secondary/Vocational Education	94	20.98
Tertiary Education	37	8.6
Total	*448*	*100.00*
Spouse/Child(ren) working		
Yes	377	84.15
No	71	15.85
Total	*448*	*100.00*
Monthly Household Income (N)		
< 10,000	37	8.26
10,000 - 50,000	310	69.20
50,001 - 100,000	89	19.87
> 100,00	12	2.68
Total	*448*	*100.00*
Mean = ₦37,115.94.00	*S.D = ₦23,298.97*	
Monthly External Remittances (N)		
< 10,000	349	77.90
10,000 - 50,000	74	16.52
> 50,000	25	5.58
Total	*448*	*100.00*
Mean = ₦3,909.00	*S.D = ₦9475.69*	

Source: Author's computations from surveyed data, 2010

Table 2. Socio-economic characteristics of household heads

Characteristic	Frequency	Percentage (%)
Age (Years)		
< 31	63	14.06
31 – 40	63	14.06
41 – 50	175	39.06
51 – 60	108	24.11
> 60	39	8.71
Total	*448*	*100.00*
Mean = 46	*S.D = 10.94*	
Gender		
Male	323	72.10
Female	125	27.90
Total	*448*	*100.00*
Marital Status		
Single	65	14.51
Married (monogamous)	125	27.90
Married (polygamous)	174	38.84
Separated/Divorced	41	9.15
Widowed	43	9.60
Total	448	100.00
Primary Occupation		
Fishing/Natural Resource Collection	306	68.30
Offshore Activities	142	31.70
Total	448	100.00

Source: Author's computations from surveyed data, 2010

Households' poverty profile

Multiple correspondence analyses (MCA) was carried out to reduce the sixteen initial poverty indicators to [3]thirteen that were subsequently used to compute multidimensional poverty measures from which household poverty profile was constructed for the fisher folks. Descriptive statistics were presented for poverty counts. The dimension-adjusted Foster-Greer-Thorbecke (FGT) poverty measure was adopted in computing incidence of multidimensional poverty following the Alkire and Foster (2010) methodology.

Components of multidimensional poverty

According to the total inertia decomposition, the inertia relative to the ten (10) consistent indicators on factorial axis 1 is 0.2931, which is 11.17% of the total inertia. For factorial axis 2, the inertia relative to the three (3) consistent indicators is 0.088 which is only 3.38% of the total inertia. The inertia explained by the first two axes therefore, is (4.69 + 1.42)/16 = 0.3819, that is, 14.55% which is 30.26% more than with only the first axis. The two retained poverty components are as shown on Table 3.

The loading on the first and second retained components took preeminence in understanding the poverty structure of the surveyed households. On Table 3, the two food and nutrition indicator variables loaded highly on the first axis while the

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[3] Three of the household living conditions variables (wall material, cooking fuel and solid waste disposable method) were not consistent with any of the two poverty components and as such were eventually eliminated

two health indicator variables aligned with the second axis. The two education variables belonged to different components: years of formal schooling on axis 1 and child enrolment on axis 2. Only five of the eight variables in the standard of living dimension loaded satisfactorily on axis 1, the remaining three indicators (material of the wall, cooking fuel, and means of solid waste disposal) showing poor loading on both axes. The two social integration variables also loaded on the first factorial axis bringing the total number of welfare variables on the first component to ten (10). Only three (3) indicators were consistent on axis 2 thereby forming a complimentary poverty component. Thus, these first two axes were retained to explain the poverty structure of the fishing households, being consistent with the welfare status of the fishing households, but with decreasing values of their explained inertia. This implies that from left to right, the welfare condition expressed by these thirteen (13) indicators was deteriorating.

Table 3: Retained poverty components

Welfare Indicator	Discrimination measures of the factorial axes	
	Axis 1	*Axis 2*
Wall material	***0.07***	***0.01***
Floor material	0.40	0.02
Toilet type	0.51	0.01
Domestic light	0.29	0.02
Cooking fuel	***0.07***	***0.01***
Solid waste disposal method	***0.06***	***0.03***
Water source	0.53	0.05
Self-reported health condition	0.01	0.54
Malaria treatment & control method	0.00	0.65
Monthly food Expenditure	0.60	0.00
No. of meals per day	0.44	0.02
Year of education	0.42	0.01
H/H with children not enrolled in school	0.23	0.00
H/H Has basic assets & a means of transport	0.59	0.01
H/H member(s) involved in politics	0.41	0.01
H/H member(s) involved in comm. development projects	0.50	0.00
Total discrimination measure	*4.90*	*1.62*
Eigen value (λ_i)	0.30625	0.10125
*Total inertia explained (50% of K * λ_i)*	2.45	0.81
Poverty relevant inertia	4.69	1.42

Source: Author's computations from surveyed data, 2010

Household multidimensional poverty measures

On Table 4, the censored headcount is presented for the union (k =1), intersection (k =13) and intermediate (k =8) cutoff values. Values for k = 6 and k = 10 were presented merely for the purpose of comparison. For the intermediate *(k = 8)* position, 270 (i.e, 60.3%) of the households were multidmensionally poor with deprivation in 8 (about 62%) of the weighted indicators.

Table 4 shows the number and percentage of fishing households identified as been poor with deprivation in varying number of poverty indicators. With deprivation benchmark (cutoff *k*) set at 1, 2 and 3 indicating deprivation in at least one, two or three welfare dimensions respectively, all (i.e, 100%) the sampled households were identified as being poor. This presents a situation where all the fishing households were adjudged poor in about 6%, 12% and 19% respectively' of the thirteen dimensions of deprivation considered. Increasing the cutoff to six (*k* = 6) shows a slight change in the poverty condition of the households as over 93% of the households are still adjudged poor. Generally, for any seven of the thirteen indicators considered, over 81% of the total households were identified poor reflecting a high level of multidimensional poverty among the fishing households. At the other extreme when deprivation in 13 dimensions is required as a condition for being poor, none of the fishing households was adjudged to be poor. Intervening values of cutoff (*k* between 4 and 12) reveal households who are poor in a specified number but not in all thirteen dimensions. The number of households identified as poor declines at an increasing rate as the number of deprivation increases up till the ninth dimension. At welfare dimension ten through twelve, the number of poor households declines at a decreasing rate until it fades out to zero.

Table 4. Descriptive statistics of multidimensionally poor households (varying values of cutoff *k*)

Value of cutoff (*k*)	Number of MPI poor households	Percentage of MPI poor households
1[*], 2, 3	448	100
4	445	99.3
5	438	97.8
6	417	93.1
7	365	81.5
8	270	60.3
9	170	38.0
10	85	19.0
11	24	5.4
12	4	0.89
13[**]	None	None

Source: Author's computations from surveyed data, 2010
([*] and [**] value of cutoff (*k*) = 1 and 13 is the union and intersection approach, respectively)

Multidimensional poverty headcount ratio (H)

On Table 5, the censored headcount is presented for the union (k =1), intersection (k =13) and intermediate (k =8) cutoff values. Two adjoining cases to the intermediate cutoff position (k = 6 and k = 10) were also presented for comparison. For the intermediate *(k = 8)* position, 270 (i.e, 60.3%) of the households were multidmensionally poor with deprivation in 8 (about 62%) of the weighted indicators. Moving the cutoff value from 6 to10 showed a remarkable decline in the proportion (and percentage) of the fishing households that were identified as being multidmensionally poor, from 417 (93.1%) to 85 (19%), respectively.

Table 5: Incidence of multidimensional poverty *(at k = 8 ≡ 62% of 13 indicators).*

Cutoff value	Deprived households (MPI poor)		Non-deprived households (MPI non-poor)	
	Frequency	Percentage (%)	Frequency	Percentage (%)
k = 1	448	100	0	0
k = 6	417	93.1	31	6.9
k = 8	*270*	*60.3*	*178*	*39.7*
k = 10	85	19	363	81
k = 13	0	0	448	100

Source: Author's computations from surveyed data, 2010

Adjusted multidimensional poverty measures

From Table 6, the value of the headcount ratio is 0.603 when k = 8 (representing about 62% of the 13 final poverty indicators considered). The implication of this is that 60.3% or 270 of the fishing households are poor when deprivation in exactly eight indicators is required to consider a household multidimensionally poor. The adjusted multidimensional poverty rate of the households (M_0) at k = 8 is 0.3422. The value of the adjusted poverty gap (*M1* = 0.1608) showed a deepening of the deprivation of households in the identified dimensions. Poverty severity *M2* (= 0.0761) showed a further decrease in value reflecting a 21.90% level of inequality among deprived states of the poor households.

Table 6: Poverty incidence, poverty depth and poverty severity (*at k = 8*).

Poverty Measures	k = 8
H	0.6030
M_0	0.3422
M_1	0.1608
M_2	0.0761

Source: Author's computations from surveyed data, 2010

Household multidimensional poverty profile by selected socio-economic characteristics

The size of riverine households strongly affects the pattern of multidimensional poverty indices as depicted in Table 7. The result shows an increase in multidimensional poverty incidence, intensity and severity as household size increases. There was a slight increase in the proportion of poor households from 33.26% to 35.69% for small-sized and medium-sized households, respectively. Similar trend was noticed for poverty depth as 15.55%, 17.18% and 43.75% of small-sized, medium-sized and large-sized households were trapped below the multidimensional poverty cutoff. In like pattern, 7.22%, 8.48% and 20.78% of small-sized, medium-sized and large-sized households were severely poor in the five welfare dimensions considered. In all cases, the percentage increase in poverty index was more prominent as household size increased beyond 12 members. This trend is in consonance with the findings of Agboola *et al.* (2004).

Contrary to expectation, Table 7 also showed that multidimensional poverty incidence, intensity and severity decreased slightly by 4.42%, 1.33% and 0.29% as dependency ratio increased from zero to 0.5, but later increased to 41.96%, 23.81% and 11.23%, respectively with an increase in the number of non-working household members, confirming the findings of Riber and Hamrick (2003) and London and Scott (2005). Households' educational status significantly influenced the level of multidimensional poverty depth and severity at the 5% and 1% confidence level, respectively. As expected, poverty indices were highest among households with no formal education (incidence, 37.81%; intensity, 20.65%; and severity, 11.00%). There is no particularly clear trend for the poverty indices with increase in the educational attainment of the riverine households. However, the proportion of Riverine households that experienced multidimensional poverty decreased with increase in household income and remittances, while intensity and severity of multidimensional poverty increased gradually as household income and remittances increased.

The reduction in poverty depth (from18.68% to 13.04%) and severity (from 9.58% to 5.49%) as age of household head increased from 31 to 60 years followed *a priori* expectations as this is the age bracket when household heads are more occupationally active and productive. However, the lack of clear relational trend between multidimensional poverty incidence and age of household head may be the effect of unobservable factors as captured in the life cycle hypothesis. Generally, poverty indices increased with age of household head beyond 60 years, validating the findings of Agboola (2004) and London and Scott (2005).

Education dimension contributes 14.60% to overall multidimensional poverty of the riverine households, inability to enroll school-age child 6-15 years in school having a slightly weightier effect (8.11%) than having no member of the household that has completed 9 years of schooling (6.49%).

Table 7: Multidimensional poverty profile by socio-economic characteristics

Household Characteristics	Multidimensional Poverty Incidence (M_0)	Multidimensional Poverty Intensity (M_1)	Multidimensional Poverty Severity (M_2)
Age of Household Head			
< 31	0.3254 (0.0339)	0.1558 (0.0311)	0.0844 (0.0174)
31-40	0.3542 (0.0342)	0.1868 (0.0312)	0.0958 (0.0175)
41-50	0.3601 (0.0209)	0.1677 (0.0167)	0.0774 (0.0090)
51-60	0.3160 (0.0283)	0.1304 (0.0188)	0.0549 (0.0096)
> 60	0.3173 (0.0483)	0.1800 (0.0367)	0.0838 (0.0201)
Total	*0.3401 (0.0133)*	*0.1608 (0.0106)*	*0.0761 (0.0057)*
F_{value}	0.564^{NS}	0.833^{NS}	1.351^{NS}
Gender of H/hold Head			
Male	0.3362 (0.0156)	0.1619 (0.0125)	0.0773 (0.0068)
Female	0.3500 (0.0253)	0.1580 (0.0197)	0.0731 (0.0106)
Total	*0.3401 (0.0133)*	*0.1608 (0.0106)*	*0.0761 (0.0057)*
λ^2_{value}	1.431^{NS}	1.279^{NS}	1.279^{NS}
Household Size			
1- 6 (small-sized households)	0.3326 (0.0203)	0.1555 (0.0155)	0.0722 (0.0084)
7-12(medium-sized households)	0.3569 (0.0405)	0.1718 (0.0354)	0.0848 (0.0194)
> 12 (large-sized households)	0.5938 (0.0313)	0.4375 (0.1250)	0.2078 (0.1101)
Total	*0.3393 (0.0133)*	*0.1607 (0.0106)*	*0.0762 (0.0058)*
F_{value}	0.640^{NS}	1.092^{NS}	0.927^{NS}
Dependency Ratio			
0	0.3768 (0.0328)	0.1725 (0.0264)	0.0788 (0.0142)
0.1 – 0.5	0.3326 (0.0170)	0.1592 (0.0135)	0.0759 (0.0074)
0.6 – 1.0	0.4196 (0.0751)	0.2381 (0.0651)	0.1123 (0.0372)
Total	*0.3396 (0.0134)*	*0.1610 (0.0106)*	*0.0761 (0.0058)*
F_{value}	0.850^{NS}	0.622^{NS}	0.551^{NS}
Year of Formal Education			
No Formal Education	0.3781 (0.0291)	0.2065 (0.0291)	0.1100 (0.0164)
Primary Education	0.3173 (0.0217)	0.1298 (0.0160)	0.0599 (0.0085)
Junior Secondary Education	0.3472 (0.0338)	0.1945 (0.0294)	0.0961 (0.0162)
Senior Secondary/Vocational Education	0.3414 (0.0306)	0.1386 (0.0193)	0.0545 (0.0096)
Tertiary Education	0.3351 (0.0485)	0.1979 (0.0404)	0.0967 (0.0224)
Total	*0.3393 (0.0133)*	*0.1607 (0.0106)*	*0.0762 (0.0058)*
F_{value}	0.655^{NS}	2.543^{**}	3.844^{***}

Source: Author's computations from surveyed data, 2010

CONCLUSION

Poverty as a manifestation of deprivation in basic standard of living commodities is very predominant among fishing households, as indicated mainly by their low level of human capital development (low education and child school enrolment rate); high dependency ratio; low monthly household income; and engagement in informal occupational activities exerts lots of pressure on household sustainability and by extension, on the overall sustainable development of the surveyed coastal communities. With high poverty rate, mean deprivation share, and inequality level of 0.603, 0.5652, and 21.90% , respectively, the coastal communities suffer notable level of poverty which requires a mix of poverty reduction interventions to abate, targeted at different socio-economic groups among the poor.

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