

Incidence of Multidimensional Poverty Among Riverine Households in Southwestern Nigeria

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Abstract

What constitutes poverty transcends the lack of income but generally captures such other subjective and supplementary aspects that represent human functioning and capability. This view enables the design and implementation of policies to alleviate poverty among the poor, especially the riverine households with their attendant risks. Data were obtained from 448 riverine households in South-western Nigeria to examine the level of multidimensional deprivation and poverty among them. The mean household size was 5; fifty-six (56%) having less than minimum 9 year compulsory and basic education; only about 16% of them having members gainfully engaged and about 68% of the household heads engaging in Onshore livelihood activities. Majority (60.3%) of the households suffered deprivation in eight indicators (61.54% of the total possible number of deprivation) and above, all (100%) of the riverine households being adjudged poor in about 6%, 12% and 19% respectively of the thirteen dimensions of deprivation. At dual cutoff value ($k = 8$), the adjusted multidimensional poverty rate of the households ($M_0 = 0.3422$); adjusted poverty gap ($M_1 = 0.1608$), and poverty severity ($M_2 = 0.0761$) showed high level of inequality among the deprived households. Conclusively, poverty was manifested in basic standard of living commodities and services among the riverine households as indicated by their low level of education, limited access to hygienic source of drinking water, food, energy, health care, toilet facilities as well as improved means of livelihood.

Keywords: welfare indicators, riverine households, multidimensional poverty, onshore activities

1. Introduction

Poverty is regarded as a complex manifestation of socio-economic deprivation of which income is only one aspect. Therefore, other non-monetary (or supplementary) variables need to be included into the analysis of poverty and social exclusion, determined by appropriately weighed indicators to reflect the degree of deprivation as well as the various sources (dimensions) of poverty as experienced by the households (Maggio, 2004). In contemporary times, multidimensional approaches have been developed with the scope of achieving a more comprehensive analysis and measurement of poverty. The view of poverty as multiple deprivation will better provide the basic information for the design and implementation of policies to reduce the relative proportion of the poor as well as the intensity of poverty in society. Thus, poverty has more recently been addressed (e.g. Okunmadewa, 2002; Oyekale & Okunmadewa, 2011) from a multidimensional viewpoint by stakeholders in the development arena.

Poverty is multifaceted according to the types of deprivation, and it is also gender and age specific. It consists in any form of inequity, which is a source of social exclusion, in the distribution of the living conditions essential to human dignity. These living conditions correspond to the capabilities of individuals, households and communities to meet their basic needs in such areas as income, education, health, food/nutrition, safe water/sanitation, labor/employment, housing (living environment), access to productive assets, access to markets, and community participation/social peace (Asselin, 2009). Poverty has often times been seen as a state of deprivation and is manifested in illiteracy, lack of access to water, poor housing and declining purchasing power (e.g. Adepoju, 2001).

The coastal areas in Nigeria predominantly comprise of fishing communities/settlements of varying sizes mostly located on the edge of freshwater forest and on the top of beach ridges. There are about 20 millions of such people living along the coastline stretching some 800 Km in length (Ibe & Awosika, 2004). Many of these riverine households 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). 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 in affected riverine areas.

Wherever they exist, coastal regions are mostly affected by the scourge of poverty with lives and property at the risk of flooding and erosion and the situation can make even a riverine community within an urban metropolis far worse than rural areas (Sardar et al., 2008). The situation in the Nigeria coastal region is not in any way different as the combined consequences of flooding, erosion and crude-oil exploration often produce a shock in the local economy that results in decreasing economic activities (both onshore and offshore) leading to decreasing crop outputs and fish catch, with an attendant increase in poverty level and welfare loss (Maduagwu, 2000). Oyekale (2010) in a poverty study across rural Nigeria reported that in the coastal south-southern zone of the country, relative poverty was particularly high in Akwa Ibom (5.06%); Bayelsa (1.18%); Cross River (2.57%); Delta (3.32%); and Rivers (2.84%) among other southern States. This variation in the poverty level within a geographic zone underscores the need to pay particular attention to riverine communities when designing national policy intervention programmes to alleviate poverty. This study had examined the incidence of multidimensional poverty among riverine households in southwestern Nigeria and constructed a profile of poverty according to selected households' socio-economic characteristics.

2. Methodology

2.1 Study Area

The empirical setting for this study is the coastal area of southwest geo-political zone of Nigeria characterized by the existence of lagoon, the Atlantic ocean and brackish water. Three states (namely Ogun, Ondo and Lagos) having these characteristic features were selected for this study. The southwestern zone lies within Latitude 5.45°N and 8.15°N and Longitude 3°E and 6°E, with a temperature range of 27 °C and 32 °C. The coastal bed of Southwest geo-political zone of Nigeria has artisanal and commercial capture fishing activities as the predominant occupation among the settlers, as well as homestead culture fishing that is undertaken by some households but to a smaller extent. Land-based farming activities such as crop and livestock rearing are also practiced in some upland communities either as primary occupation by permanent inhabitants of these communities or as secondary activity by displaced riverine settlers who occasionally migrate to the upland areas at the time of floods. Households in the coast of Southwestern Nigeria also engage in natural resource collection such as sharp sand from the lagoon bed and sea shores, as well as games, fuel wood and timber and non-timber products from the brackish water-dominated forest area. The climate in the study area also favours the growing of arable and tree crops such as cassava, yam and grains, as well as tree crops such as cocoa, rubber, kolanut, among others, the production of which is predominantly characterized by small-holder, subsistence practices.

2.2 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. Information were collected mainly on the socio-economic, demographic, and community-specific variables that bothered on the welfare status of the riverine households. Sixteen welfare indicators (categorized under five dimensions) directly linked to Millennium Development Goals (MDGs) were used in examining the multidimensional poverty structure of the households, namely Education (*year of schooling, child enrolment in schools*); Health (*method of malaria treatment, self-reported health*); Food and Nutrition (*food availability, food sufficiency*); Standard of Living (*source of drinking water, cooking fuel, 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, ownership of basic assets*); and Social Affiliation (*political participation, social participation*).

2.3 Sampling Procedure and Sample Size

A five-stage sampling procedure was adopted. 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 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 stud. 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:

2.4 Estimation Procedures

2.4.1 Determination of Welfare Deprivation Among the Riverine Households

The starting point for measuring dimensional poverty following the Alkire-Foster (2007) approach adopted in this study is to determine the level of welfare deprivation among the surveyed households. Achieving this objective involved identifying the number of welfare deprivations suffered by riverine households in Southwestern Nigeria, starting with an identification function $\rho(y; z)$ yielding the set $Z \subseteq \{1, \dots, n\}$ of households who are poor in y given z , where:

y = household deprivation vector, and z = vector of dimensional deprivation cutoff

$\rho(y_i; z) = 1$ if household i is poor, and $\rho(y_i; z) = 0$ if otherwise.

$g^0 = [g_{ij}^0]$ is an $n \times d$ matrix of deprivations associated with y , where $g_{ij}^0 = 1$ ($= w_j$) when $y_{ij} < z_j$, and $g_{ij}^0 = 0$ when $y_{ij} \geq z_j$ (i and j represent individual household and dimension, respectively).

The i^{th} row vector of g^0 , denoted by g_i^0 , is the *deprivation vector* for the i^{th} household. From matrix g^0 a column vector c of *deprivation counts* was constructed whose i^{th} entry $c_i = |g_i^0| = \sum_{j=1}^d g_{ij}^0$ is the *sum of weighted deprivations suffered by household i* . The vector c identifies the number of welfare dimensions in which the poor households are deprived, which is the incidence of deprivation.

2.4.2 Multidimensional Poverty Measures

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 (2007) and Alkire and Santos (2010). The multidimensional poverty measures are defined as:

$$M_\alpha = \mu(g^\alpha(k)) \quad \text{for } \alpha \geq 0 \quad (1)$$

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,

$$M_\alpha = \frac{|g^\alpha(k)|}{nd} \quad (2)$$

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 j^{th} 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 $\alpha = 0$,

$$M_0 = \mu(g^0(k)) \quad (3)$$

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

$$M_0 = \frac{|g^0(k)|}{nd} \quad (4)$$

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: $A = |c(k)|/(qd)$, and H , incidence of multidimensional poverty, $H = \frac{q}{n}$. Thus,

$$M_0 = HA = \mu(g^0(k)) \quad (5)$$

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:

$$M_1 = HAG = \mu(g^1(k)) \quad (6)$$

G = average poverty gap across all dimensions in which the poor households are deprived, given as

$$G = |g^1(k)|/|g^0(k)| \quad (7)$$

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

$$M_2 = HAS = \mu(g^2(k)) \quad (8)$$

where S = average severity of deprivation across all dimensions in which the poor households are deprived,

$$S = |g^2(k)|/|g^0(k)| \quad (9)$$

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:

$$V = \sum_i \sum_j \left((\mu(g^1) - g_{ij}^1) \right)^2 / nd \quad (10)$$

In terms of the deprivation vector c , $M_2 = (M_1)^2 [1 + C^2]$ where

$$C^2 = V / (\mu(g^1))^2 \quad (11)$$

3. Results and Discussions

3.1 Households' Socio-Economic Characteristics

Table 1 shows the socio-economic characteristics of sampled riverine households. 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. This reflects a gross educational deprivation among the respondent 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.

The multidimensional nature of poverty in the study area, as described above, has well been adjudged as the consequence of lacking various welfare goods/services necessary to maintain a minimum level of living, such as health, income, human capital (literacy), housing condition, access to public services, employment opportunities, to mention but few. For instance, major environmental problems associated with low agricultural productivity, high vulnerability to health hazards and poor infrastructural developments (such as network roads, markets, means of communications, among others) have been linked with the high incidence of poverty in the rural areas of Nigeria (Alayande & Alayande, 2004). In addition to these, Okunmadewa (1999) have also identified low level of education, high fertility rate, lack of access to improved seeds and inputs, social amenities as being grossly responsible for the poverty status of many households in the Nigerian rural economy. Thus, early exit from the poverty circle is more of an illusion among the rural poor if the present socio-economic situation persists (Oyekale & Okunmadewa, 2008).

Table 1. Households' socio-economic characteristics

Characteristic	Frequency	Percentage (%)
<i>Age (Years)</i>		
< 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	
<i>Gender</i>		
Male	323	72.10
Female	125	27.90
Total	448	100.00
<i>Marital Status</i>		
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
<i>Primary Occupation</i>		
Fishing/Natural Resource Collection	306	68.30
Offshore Activities	142	31.70
Total	448	100.00
<i>Household Size</i>		
1- 6	199	44.42
7- 12	202	45.09
> 12	47	10.49
Total	448	100.00

<i>Mean = 5</i>	<i>S.D = 3.0168</i>	
<i>Dependency Ratio</i>		
0	71	15.85
0.1 - 0.50	303	67.63
0.6 - 1.0	74	16.52
<i>Total</i>	<i>448</i>	<i>100.00</i>
<i>Mean = 0.41</i>	<i>S.D = 0.4263</i>	
<i>Formal Education Status</i>		
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
<i>Total</i>	<i>448</i>	<i>100.00</i>
<i>Spouse/Child(ren) Working</i>		
Yes	377	84.15
No	71	15.85
<i>Total</i>	<i>448</i>	<i>100.00</i>
<i>Monthly Household Income (₦)</i>		
< 10,000	37	8.26
10,000 - 50,000	310	69.20
50,001 - 100,000	89	19.87
100,001 - 150,000	12	2.68
<i>Total</i>	<i>448</i>	<i>100.00</i>
<i>Mean = ₦37,115.94.00</i>	<i>S.D = ₦23,298.97</i>	
<i>Monthly External Remittances (₦)</i>		
< 10,000	349	77.90
10,000 - 50,000	74	16.52
> 50,000	25	5.58
<i>Total</i>	<i>448</i>	<i>100.00</i>
<i>Mean = ₦3,909.00</i>	<i>S.D = ₦9475.69</i>	

Source: Field survey data, 2010.

3.2 Households' Deprivation Counts

Table 2 presents the number and percentage of deprivations suffered by the riverine households, based on the *indicator-specific cutoff*, (z_j). Only five of the eight 'standard of living' variables were satisfactorily retained in the process of rescaling of the sixteen initial welfare variables, the remaining three indicators (wall material, cooking fuel, and means of solid waste disposal) having been found redundant. Thus, only thirteen of the welfare indicators initially proposed for exploring the multidimensionality of poverty in the study area were subsequently included in the analysis. As evidenced from Table 2, none of the surveyed households suffered deprivation in exactly one or two welfare indicators, depicting the true multidimensional poverty status of the riverine households. Only three (0.7%); seven (1.6%) and twenty-one (4.7%) households suffered deprivation in exactly three, four and five dimensions, respectively. Percentage of the riverine households that experienced deprivation in exactly six (11.6%); seven (21.2%); eight (22.3%); nine (19.0%) and ten (13.6%) indicators was relatively larger than the other groups. Observably from Table 2, the greater percentage (22.3%) of the

households suffered deprivation in eight (61.54% of the total possible number of deprivation) indicators, beyond which value the number of deprivations suffered diminished gradually. Again, intuitively, none of the households suffered multiple deprivation in as many as thirteen indicator variables.

Table 2. Distribution of households' deprivation counts

No. of deprivations suffered	Number of households	% of households deprived
One	0	0
Two	0	0
Three	3	0.7
Four	7	1.6
Five	21	4.7
Six	52	11.6
Seven	95	21.2
Eight	100	22.3
Nine	85	19.0
Ten	61	13.6
Eleven	20	4.5
Twelve	4	0.9
Thirteen	0	0

Source: Field survey data, 2010.

3.3 Welfare Deprivation among Riverine Households

Table 3 presents the extent of households' deprivation in the welfare variables as a follow up on the deprivations counts, based on the within- and across-dimension *dual cutoff value*, (*k*). Summary statistics presented in Table 3 shows that the proportion of riverine households deprived in each dimension ranges from 5.8% for "participation in community development projects", to 97.5% for "source of drinking water". By implication, 94.2% of the riverine households participated in the various community development programmes engaged in by the respondents as their communal contributions to reducing their suffering within the neighbourhood. Prominent among the reported projects were erection of passage planks on the flowing stream (common among core Riverine households), onshore security surveillance against pilferages of fishing gadget and catches, as well as forming community self-help vigilance groups against robbery, attack and violence.

For the education, health and food/nutrition dimensions, households were more endowed in one (i.e, 50%) of the two indicators making up each of those welfare dimensions. In about 71% of the surveyed households, no household had a member with the minimum required universal basic education of nine years (Junior Secondary education) as set under the Nigerian education policy to achieve the second millennium development goal (MDG2). This has implication for the inability of members the coastal households to disengage from artisanal fishing activities to take up formal sector employment thus further worsening their poverty situation. However, only few (about 20%) of the households have school-age children (6-15 years) not presently enrolled in school, giving an indication that deprivation in the education dimension may only be temporary among the riverine households. This finding underscores the Education For All (EFA) policy of the Federal Government of Nigeria (FGN) to have all children, particularly girls, to have access to complete, free and compulsory primary education of good quality by the year 2015 (NEEDS, 2004).

Sixty-six (66%) of the households either visited registered hospitals, patronize drug sellers or used insecticide treated bed nets to treat/prevent malaria outbreak, while over 60% of them had adult members with self-reported health status below average. By implication, coastal households are gradually having better access to modern healthcare delivery services but more awareness may be required to sustain this emerging trend. In terms of food adequacy, less than 15% of the households had children aged 6-15 years feeding on less than 2 major meals per day while food was available to close to 46% of the surveyed households. This observed food sufficiency may have also been closely linked to the improving health condition of members of the coastal households.

Obviously, level of material deprivation was more prominent within the living condition dimension as only in two (basic assets and domestic lighting) of the five indicators were households not deprived, representing 40% of the indicators within this dimension. Only 2.5% of the households had access to drinking water from protected wells, boreholes or pipe-borne water. Majority (97.5%) of the households obtained water from unprotected wells, springs, rivers, lagoons, rains, stagnant water and forest creeks that were common within their neighbourhood. All the households were however relatively endowed in the two indicators that make up the social integration dimension which is a reflection of high level of social capital among the riverine households in political and community development activities.

Table 3. Incidence of deprivation among riverine households ($k = 8$)

Welfare Dimension	Welfare Indicator	Number of deprived households	Percentage of deprived households	% of dimension in which H/holds are non-deprived
Education	Year of schooling	317	70.8 (0.0215)	50%
	Children school enrolment	89	*19.9 (0.0189)	
Health	Self-reported health	273	60.9 (0.0230)	50%
	Method of malaria treatment/control	153	*34.1 (0.0224)	
Food/Nutrition	No. of meals per day	65	*14.5 (0.0167)	50%
	Monthly food Expenditure	241	53.8 (0.0236)	
Household living condition	Material of the floor	443	94.4 (0.0000)	40%
	Domestic light	53	*11.8 (0.0153)	
	Toilet type	400	89.3 (0.0146)	
	Source of drinking water	437	97.5 (0.0073)	
Social Integration	Household assets	113	*25.2 (0.0205)	100%
	Political affiliation	69	*15.4 (0.0171)	
	Participation in community development projects	26	*5.8 (0.0111)	

Source: Field survey data, 2010.

Figures in parentheses are the standard errors.

* Welfare indicators in which households were relatively more endowed compared to the 50 percentile.

3.4 Household Multidimensional Poverty Measures

3.4.1 Identification of Multidimensionally Poor Households

Table 4 shows the number and percentage of riverine households identified as being 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 riverine 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 riverine households. At the other extreme when deprivation in 13 indicators is required as a condition for being poor, none of the riverine 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 indicators. The number of households identified as poor declines at an increasing rate as the number of deprivation increases up till the ninth indicator. At welfare level up to ten, eleven and 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 cutoff value)

Value of cutoff (k)	Number of MPI poor households	Percentage of the households that is MPI poor (%)	Marginal increase in number of poor households
1*, 2, 3	448	100	-
4	445	99.3	3
5	438	97.8	7
6	417	93.1	21
7	365	81.5	52
8	270	60.3	95
9	170	38.0	100
10	85	19.0	85
11	24	5.4	61
12	4	0.89	20
13**	None	None	-

Source: Field survey data, 2010.

(* and ** value of cutoff (k) = 1 and 13 is the union and intersection approach, respectively).

3.4.2 Multidimensional Poverty Headcount Ratio (H)

The percentage of households that are MPI poor and experiencing deprivation in certain number of weighted indicators according to the cutoff value is depicted on Table 5. 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 multidimensionally poor with deprivation in 8 (about 62%) of the weighted indicators. This censored headcount value is different from the traditional headcount in three ways: firstly, it is the proportion of households that are deprived in some combination of one to three indicators (i.e, 50% of the weighted indicators within a dimension) *and* deprived in each dimension. Secondly, the headcount refers to the percentage of households with individual members deprived that are affected by some levels of deprivation, bearing in mind the concept of poverty by inclusion. Therefore, households that were deprived in a particular indicator *but* still not considered as being multidimensionally poor were not included in this headcount. For instance, if a household has a child of school age not registered in school, such a household is considered deprived in education but may not necessarily be poor within the multidimensional context of poverty analysis. This makes the headcount in the multidimensional sense to be different from the traditional definition of literacy headcount – the percentage of people who are themselves educationally deprived. Thirdly, contrary to the usual

trend in unidimensional poverty identification, the number of households adjudged to be multidimensionally poor decreased as the dual cutoff value increased. Therefore, moving the cutoff value from 6 to 10 showed a remarkable decline in the proportion (and percentage) of the riverine households that were identified as being multidimensionally poor, from 417 (93.1%) to 85 (19%), respectively.

At the one extreme, all (i.e., 100%) the surveyed households were identified as being multidimensionally poor in the case of union criterion ($k=1$) where deprivation in any one dimension/indicator were enough to identify a household as been poor. This satisfies the axiomatic condition that the union identification approach often predicts high numbers, identifying a large percentage of the population as being poor in the multidimensional sense (in consonance with the findings of Chakravarty et al., 1998; Bourguignon and Charavarty, 2003; and Alkire & Eli, 2010;). In the case of intersection criterion ($k=13$) where deprivation in all 13 indicators (or all 5 dimensions) is required as poverty identification criterion, no household was particularly poor (similar to the findings of Alkire & Seth, 2008). There is a clear indication that the households were mostly deprived in 7 to 10 weighted indicators as already indicated on Table 2.

Table 5. Incidence of multidimensional poverty (at $k=8 \equiv 62\%$ 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: Field survey data, 2010.

3.4.3 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 riverine 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 ($M_1 = 0.1608$) showed a deepening of the deprivation of households in the identified dimensions. Poverty severity $M_2 (= 0.0761)$ showed a further decrease in value reflecting a 21.90% level of inequality among deprived states of the poor households.

Table 6. Poverty incidence, depth and severity (at $k=8$)

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

Source: Field survey data, 2010.

3.4.4 Multidimensional Poverty Profile by Household Socio-Economic Characteristics

The size of riverine households strongly affects the pattern of multidimensional poverty indices as depicted on 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).

Table 7. Multidimensional poverty profile by households' socio-economic characteristics

Household Characteristics	Multidimensional Poverty Incidence (M_0)	Multidimensional Poverty Depth (M_1)	Multidimensional Poverty Severity (M_2)
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)
<i>F</i> 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)
<i>F</i> 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)
<i>F</i> value	0.655 ^{NS}	2.543 ^{**}	3.844 ^{***}

Household Income			
< 1000	0.1971 (0.0295)	0.0510 (0.0251)	0.3137 (0.0851)
10,000 – 50,000	0.1568 (0.0184)	0.0709 (0.0098)	0.3328 (0.0326)
50,001 – 100,000	0.1516 (0.0156)	0.0707 (0.0084)	0.3341 (0.0203)
100,001 – 150,000	0.1330 (0.0526)	0.1030 (0.0166)	0.3590 (0.0237)
Total	0.1607 (0.0109)	0.0758 (0.0059)	0.3414 (0.0137)
External Remittances			
< 10,000	0.3385 (0.1375)	0.0621 (0.0133)	0.3390 (0.0145)
10,000 – 50,000	0.1628 (0.0116)	0.0777 (0.0063)	0.3447 (0.0351)
> 50,000	0.1414 (0.0254)	0.1721 (0.0849)	0.4531 (0.1539)
Total	0.1621 (0.0106)	0.0763 (0.0058)	0.3408 (0.0133)

Source: Field survey data, 2010.

Figures in parenthesis are the sub-groups contribution to the whole weighted multidimensional poverty measures.

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 (composition of the non-working members of the household as children or aged-adults may likely make no difference going by the low level of external remittances the households receive, as reflected on Table 1). This report agrees with the finding of Riber and Hamrick (2003) and London and Scott (2005) on household poverty level and dependency ratio. 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.

4. Conclusion and Recommendations

The poor households in the riverine communities experience deprivation in a number of welfare commodities, services and activities that requires a mix of poverty reduction interventions to abate. As there exists some level of inequality among the deprived households, poverty reduction intervention programmes should be targeted at different socio-economic groups among the poor. As low human capital development was very prominent among the riverine households, policies that will increase access of households to improved basic educational services should be a priority, such as building of more schools, distribution of educational materials as well as deployment and sustenance of trained teachers in the coastal areas.

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