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EUROPEAN UNION ASSISTED WATER PROJECTS IN IMO STATE, NIGERIA: COMMUNITY PARTICIPATION AND SOCIO-ECONOMIC EFFECTS

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ABSTRACT

The study determines the level of community involvement in the European-Union Micro-Projects Programme (EU-MPP6) water supply and sanitation projects in rural communities of Imo State, Nigeria. It also ascertains the extent of contribution of the projects to the socio-economic well-being of the rural people. The survey method was employed in the study. Questionnaires and interview schedules were used in collecting primary data. The data were analyzed by the following inferential statistical techniques; Student's t-test, Factor analysis, multiple regression and Chi-square models. From results of the study, there was significant community involvement in the planning and execution of the projects. The projects have a positive impact on the rural people's socio-economic well-being. The study concludes that the provision of improved water supply and sanitation will result in an improved socio-economic well-being of the rural people and ultimate sustainability of projects only when the set rules for project development is community driven.

Keywords: Water projects; community involvement; well-being; Nigeria; sustainability; European Union; socio-economic

INTRODUCTION

Water holds the key to sustainable development. It is an integral part of the ecosystem and also a social and economic good. Water is not only the most basic of human need, but it is also at the centre of sustainable development and essential for poverty eradication. Briscoe and Ferranti (2005) stated that the fundamental conditions for human development cannot be met without investments in safe water supply and sanitation, especially in rural areas. Thus, the international community has continued to make efforts to address water needs and water poverty. Notable efforts at the international level are the Millennium Development Goal Declaration on the Halving of the Number of People who are unable to reach or to Afford Safe Drinking Water by 2015 and the International Adoption of an "Action Plan for Water" which commits all leaders of the world's wealthiest and most powerful nations to give assistance to poor nations that make political commitments to place safe drinking water and sanitation at the top of their poverty eradication and sustainable development programme (United Nations, 2001 & 2003).

At the local level, efforts have been made in the past in the water supply and sanitation sector in Imo state, Nigeria with the assistance of external funds, such as the World Bank-Federal Government Water Rehabilitation Project launched in November 1992 (Okereke, Udeagu & Eze, 2000; Imo State Government, 2006). However, previous studies have shown that after several decades of such efforts in financing, designing and managing water supply and sanitation projects, water projects have remained ineffective and are far from achieving their objectives (Federal Ministry of water resources, 2000; Okereke & Onyenechere, 2009).

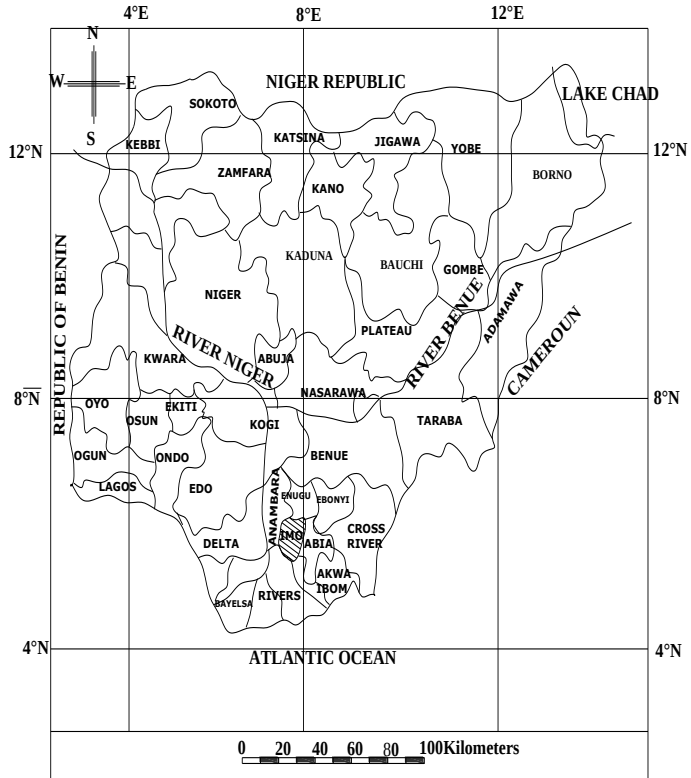
According to Onyenechere (2004) and Okereke (2010), the emphasis by the planning and executing agencies has been on the construction of the facilities rather than on sustainable flow of services which depends on adequate involvement of the benefiting communities. Consequently, in existence in the water supply and sanitation sector are very low input of local resources, a sense of indifference by the communities to the executed projects, a system too sophisticated for them to operate and maintain, problems exacerbated by the inability of the implementing agencies to provide for the maintenance of what is built. Corroborating this fact, Fox (2006) reported that completed water supply and sanitation projects easily become inoperative a few years after they have been commissioned and many communities witness incessant breakdown of pumping machines which are not maintained and latrines which have never been used.

According to World Health Organization (2002), the involvement of beneficiary communities in the planning and execution of water supply and sanitation projects plays important role in sustaining services but the rules set by most responsible agencies are not community-involvement friendly. To change this, between 2003 and 2008 the European Union Micro-Projects Programme (EU-MPP6) on water supply and sanitation was designed and implemented through a participatory approach in rural parts of Imo State, Nigeria. Since the main objective of the project is the development of the social and economic well-being of local communities; this study attempts to determine the level of community involvement in the projects and to ascertain the socio-economic impact of projects to households.

MATERIALS AND METHODS

The study area is Imo State. It lies between latitude 4^0 45'N and $7^0$15' North and longitude 6^0 50'E and 7^0 25' E. It is bordered on the East by Abia State, on the West by Delta State and River Niger, on the North by Anambra State, and on the South by Rivers State (see Figures 1.1 and 1.2). The greater part of the study area is flat and low-lying. The main streams draining the state are Imo, Otamiri, Njaba and Urasi rivers. Otamiri, Njaba and Urasi Rivers rise within the coastal plain sands while Imo River extends far inland from the Bight of Benin to the South and the extensive low-lying area is drained by its tributaries. Toward the East the plain gradually acquires the character of undulating low land consisting of many small hills. Generally, river valleys constitute the major physical features in the state, which are often marshy. Four main geological regions can be distinguished in the study area. These are the Niger River Plain and Delta, the Coastal Plain, the Plateau Escarpment, and the Cross River Basin. The Niger River and Delta comprises a land surface of 3 to 6 metres above the flood level of the braided tributaries of the Niger. Mainly shale with siltstone and limestone horizons underlies the Cross River plain. The sediments of the coastal plain are reticular, unconsolidated and sandy. The Plateau Escarpment is, in essence, sandstone Plateau and Cuesta separating the Cross River plain and the coastal plain. The main soil types in the study area are ferrallitic soil, hydromorphic soil and alluvial soil. The ferralitic soil occupies 7,778 square kilometers (61 per cent) of the total study area. The hydromorphic soil occupies 3,845 square kilometers (31 per cent) of the total land area while the alluvial soil occupies 1,066 square kilometers (8 per cent) of the total land area.

The study area comprises an area of 5289.48 square kilometers. It has a total population of 3,003,653 inhabitants. It contains 27 Local Government Areas and 306 autonomous communities and has a population density of 568 people per square kilometer. The 27 L.G.As are taken as clusters. They form the first sample frame from which 44 percent of the L.G.As, representing 12 L.G.As of Imo State were randomly selected. In each of the randomly selected L.G.As, communities where the EU-MPP6 water supply and sanitation projects were initiated and completed were identified. The list of these communities formed the second sample frame from which 50 percent of the communities, representing 29 communities were randomly selected. The same procedure was employed in selecting the 50 percent of the communities. In terms of the selection of the respondents, the randomly selected 29 communities served as the third sampling frame from which stratified sampling method was employed to draw out 20 households from each of the communities. Stratified sampling method was adopted. The study covered randomly selected 580 households from randomly selected 29 communities which benefited from the intervention. The survey method was employed in the study. Questionnaires and interview schedules were used in collecting primary data from households in the study communities and key staff of the EU-MPP6 programme. Inferential statistics such as Factor analysis and Chi-square, student't' test, multiple regression models were used to analyze the data.



SOURCE: www.googlemaps.com

Figure 1.1: MAP OF NIGERIA SHOWING THE STUDY AREA IN ITS NATIONAL CONTEXT

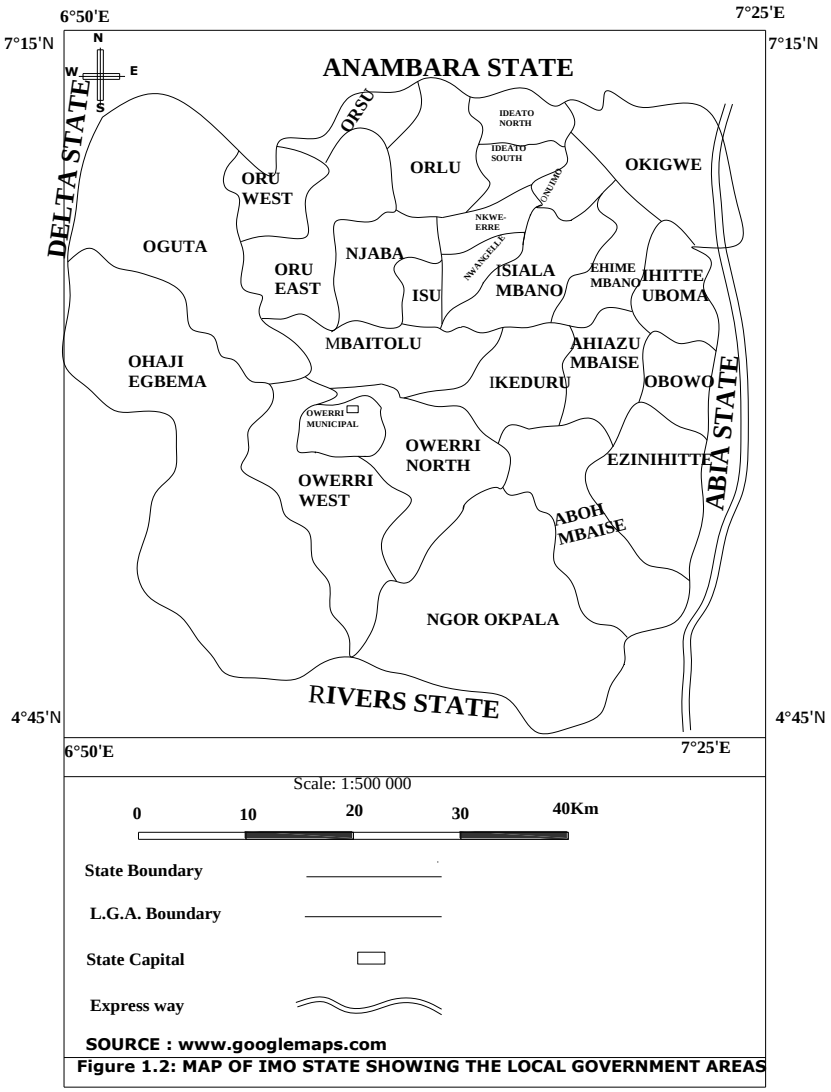


Figure 1.2: MAP OF IMO STATE SHOWING THE LOCAL GOVERNMENT AREAS

RESULTS AND DISCUSSION

THE EXTENT OF COMMUNITY INVOLVEMENT IN THE PLANNING AND EXECUTION OF THE EU-MPP6 WATER SUPPLY AND SANITATION PROJECTS

The stages of community involvement in the planning and execution of the EU-MPP6 water supply and sanitation projects are revealed in Table 1. From Table 1, 30.2 percent of the respondents indicate high involvement of the communities at the stage of identifying the water option, 67.6 percent of the respondents indicates average involvement, while 2.2 percent of the respondents indicate low involvement of the communities at the stage of identifying the water option. At the design stage, 1.4

percent of the respondents indicates high involvement of the communities, 7.2 percent indicates average involvement, while 91.4 percent of the respondents indicates low involvement of the communities at the design stage. Responses on high involvement of the communities at the stage of siting of the water projects account for 87.4 percent while responses on average and low involvement of the communities at that stage account for 12.2 percent and 0.3 percent respectively. 3.4 percent indicates high involvement of the communities at the stage of constructing the water project facility while responses on average and low involvement of the communities account for 23.8 percent and 72.8 percent respectively. Responses on high involvement of the communities at the stage of operating the water projects account for 79.8 percent while responses of respondents on average and low involvement of the communities at that stage account for 19 percent and 1.2 percent respectively. 30.2 percent of the respondents indicate high involvement of the communities at the stage of maintaining the water project facility while responses of respondents on average and low involvement of the communities in that respect are 67.6 percent and 2.2 percent respectively. Responses on high involvement of the communities on the stage of monitoring the water projects account for 1.2 percent while responses of respondents on average and low involvement of the communities at that stage account for 11.0 percent and 87.8 percent respectively. 24.7 percent of the respondents indicate high involvement of the communities at the stage of using the water from the projects while responses of respondents on average and low involvement of the communities in that respect account for 59.5 percent and 15.9 percent respectively. Giving all the stages of involving the communities in the planning and execution of the EU-MPP6 water supply and sanitation projects, 34.4 percent of the respondents indicate high involvement of the communities, 29.8 percent of the respondents indicates average involvement, while 36.8 percent of the respondents indicate low involvement. From the data, the involvement of the communities in all stages is above average as indicated by 64.2 percent of the respondents. Therefore, there is high level involvement of the communities in the planning and execution of the EU-MPP6 water supply and sanitation projects through the stages of identification, design, locating the projects, operation, and maintenance, monitoring and using the project water.

The modes of community involvement in the planning and execution of the EU-MPP6 water supply and sanitation projects are revealed in Table 2. From Table 2, 72.4 percent of the respondents indicate that the mode of information sharing used in involving the communities is high, 12.8 percent of the respondents indicates that the use of the mode is average, while 14.8 percent of the respondents indicates that the use of the mode in involving the communities is low. The use of consultation in involving the communities is indicated high by 73.1 percent of the respondents, while responses of respondents on average and low use of the mode account for 12.3 percent and 14.7 percent respectively. 22.9 percent of the respondents indicate that the use of decision-making in involving the communities is high, 6.7 percent of the respondents indicates that it is on the average, while 70.3 percent of respondents indicates that the use of the mode of decision-making is low. Responses on high use of the initiating action mode in involving the communities in the water supply and sanitation projects account for 17.1 percent while responses on average and low use of the mode account for 66.4 percent and 16.6 percent respectively. Giving the all modes used in involving the communities in the planning and execution of the EU-MPP6 water supply and sanitation projects, high rating is indicated by 46.4 percent of the respondents, average rating is indicated by 24.5 percent of the respondents, while low rating is indicated by 29.1 percent of the respondents. From the data, the influence of the use of all the modes in involving the communities in the planning and execution of the EU-MPP6 projects is above average as indicated by 70.9 percent of the respondents. By implication, the use of the modes of information sharing, consultation, decision-making

and initiating action in involving the communities in the planning and execution of the EU-MPP6 water supply and sanitation projects positively influenced the planning and execution of the projects in Imo State.

The contributions made by the communities to the planning and execution of the EU-MPP6 water supply and sanitation projects are revealed in Table 3. From Table 3, 9.8 percent of the respondents indicate that the contribution made by the communities in the area of giving ideas is high, 66.0 percent indicates that the contribution of ideas is average, while 24.1 percent of the respondents indicates that the contribution of ideas by the communities is low. The contribution of money by the communities to the planning and execution of the project is indicated high by 91.4 percent of the respondents, while responses on average and low contributions of money by the communities account for 7.2 percent and 1.4 percent respectively. 31.9 percent of the respondents indicate that the provision of materials for the projects by the community is high, 65.7 percent of the respondents indicates that it is average, while 2.4 percent of the respondents indicates that the provision of materials for the projects by the communities is low. Responses on high provision of labour by the communities for the projects account for 36 percent while responses of respondents on average and low provision of labour for the projects account for 38.3 percent and 25.7 percent respectively. In the area of safety/security for the projects, 79.8 percent of the respondents indicate that the contribution made by the communities is high, 19 percent of the respondents indicates that the provision is average, while 1.2 percent of the respondents indicates that the provision of safety/security by the communities is low. For the contribution by the communities to maintenance of the projects, responses from respondents on high rating is 3.6 percent while responses from the respondents on average and low ratings account for 11 percent and 85.3 percent respectively. Giving the overall contributions made by the communities to the planning and execution of the EU-MPP6 water supply and sanitation projects, high rating is indicated by 41.1 percent of the respondents, average rating is indicated by 34.5 percent of the respondents, while low rating is indicated by 23.4 percent of the respondents. From the data, 75.6 percent of the respondents indicate above average contributions to the planning and execution of the EU-MPP6 water supply and sanitation projects.

As further observed during the field survey, for the communities to qualify for the water project, a commitment fee representing 25 percent of the total cost of the project was made by the communities. All communities made these commitment fees. In addition to the commitment fees, the members of the community made voluntary contributions during the implementation of the projects. The majority of the support was in the form of monetary contributions which were basically levies imposed on every member of the community to enable the community raise the 25 percent commitment fee for the water project. Others were in the form of labour, especially during the construction phase of the projects and maintenance of the facilities after commissioning. By implication, the level of involvement of the communities in the planning and execution of the EU-MPP6 water supply and sanitation projects through the contributions of ideas, money, materials, skills/labour, safety/security, and maintenance of facility is highly above average.

TABLE 1: **STAGES OF COMMUNITY INVOLVEMENT IN THE PLANNING AND EXECUTION OF THE EU-MPP6 WATER SUPPLY AND SANITATION PROJECTS**

		STAGES OF COMMUNITY INVOLVEMENT																																							
		IDENTIFICATION OF WATER PROJECT OPTIONS					DESIGN OF THE WATER PROJECT					LOCATING THE WATER PROJECT					CONSTRUCTION OF THE WATER PROJECT					OPERATION OF THE WATER PROJECT					MAINTENANCE OF THE WATER PROJECT					MONITORING OF THE WATER PROJECT					USING THE WATER AFTER THE COMMISSIONING				
		VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL
S/N	COMMUNITY																																									
1	EZUHU NGURU	1	5	14	0	0	0	0	2	4	14	3	16	1	0	0	0	0	5	7	8	1	14	5	0	0	3	6	11	0	0	0	0	3	5	12	0	2	13	0	5
2	OBOKWU NGWURU	2	5	13	0	0	0	0	1	3	16	4	15	1	0	0	0	0	4	7	9	2	12	5	1	0	2	5	13	0	0	0	1	2	4	13	0	4	12	0	4
3	NNARAMBIA	1	5	14	0	0	0	0	1	5	14	5	14	1	0	0	0	0	5	8	7	1	14	5	0	0	1	5	14	0	0	0	1	4	4	11	0	3	13	0	4
4	UMULOLO OGBE	2	4	14	0	0	0	0	1	4	15	4	15	1	0	0	0	1	4	7	8	3	12	4	1	0	1	5	14	0	0	0	0	3	5	12	0	5	12	0	3
5	AMAEGBU	2	5	12	1	0	0	0	1	5	14	4	11	5	0	0	0	1	7	5	7	2	14	4	0	0	2	5	13	0	0	0	0	4	3	13	0	7	11	0	2
6	UMUORIE EZIUDO	1	5	14	0	0	0	1	2	4	13	5	12	3	0	0	0	0	2	8	10	1	16	3	0	0	1	5	14	0	0	0	0	5	4	11	0	6	11	0	3
7	EZIALA AMUMARA	2	4	14	0	0	0	0	1	5	14	1	14	5	0	0	0	2	8	4	6	1	14	5	0	0	2	4	14	0	0	0	0	3	5	12	0	6	12	0	2
8	AMAGHOR IHITE	1	5	14	0	0	0	2	1	3	14	2	14	4	0	0	0	1	5	6	8	2	14	4	0	0	2	4	12	2	0	0	0	3	5	12	0	5	14	0	1
9	UMUEZEALA OBBOKO	1	4	13	0	2	0	0	1	5	14	2	12	5	1	0	0	0	4	8	8	16	3	1	0	0	2	3	13	2	0	0	1	2	4	13	0	3	13	0	4
10	AMUWU	1	4	14	1	0	0	1	2	5	12	1	14	5	0	0	0	0	3	9	8	15	4	1	0	0	2	4	14	0	0	0	0	0	1	19	0	5	12	0	3
11	AGWU NA DIM	1	5	14	0	0	0	0	2	3	15	2	14	4	0	0	0	1	5	7	7	1	14	5	0	0	1	3	16	0	0	0	0	2	2	16	0	5	10	0	5
12	NNEATO UMUOKIE	2	5	12	1	0	0	0	3	6	11	1	14	5	0	0	0	1	4	7	8	1	15	4	0	0	1	5	14	0	0	0	0	2	3	15	0	5	11	0	4
13	UMUZOHO EZIHE	1	5	14	0	0	0	0	1	5	14	4	15	1	0	0	0	1	7	5	7	11	4	5	0	0	2	3	15	0	0	0	0	0	2	18	0	6	9	0	5
14	AGADA ATTA	3	4	12	1	0	0	0	1	5	14	6	12	2	0	0	0	0	2	8	10	12	5	3	0	0	1	5	14	0	0	0	0	3	2	15	0	4	13	0	3
15	ABOH EBIKORO	2	4	14	0	0	0	0	1	5	14	5	13	2	0	0	0	2	8	4	6	14	1	5	0	0	2	4	13	1	0	0	0	0	1	19	0	5	11	0	4
16	UMUOZIRI	1	3	16	0	0	0	0	2	5	13	6	12	2	0	0	0	0	2	8	10	1	14	5	0	0	1	5	14	0	0	0	0	1	1	18	0	4	14	0	2
17	OWUBIRIUBI	1	5	14	0	0	0	0	1	5	14	5	13	2	0	0	0	2	8	4	6	2	12	5	1	0	2	5	13	0	0	0	0	2	1	17	0	5	13	0	2
18	NDIUKWU	1	3	15	0	1	0	0	2	4	14	5	12	3	0	0	0	1	5	6	8	2	15	3	0	0	1	5	14	0	0	0	0	0	1	19	0	6	11	0	3
19	UMUCHOKE	1	5	14	0	0	0	1	2	5	12	5	13	2	0	0	0	0	4	8	8	3	11	6	0	0	2	4	14	0	0	0	0	3	5	12	0	4	12	0	4
20	UMUDURUEKWE	2	4	13	1	0	0	0	1	5	14	6	12	2	0	0	0	0	4	7	9	1	14	5	0	0	2	5	12	1	0	0	1	4	4	11	0	7	11	0	2
21	AMAKUTA	1	5	14	0	0	0	0	2	4	14	5	14	1	0	0	0	1	4	8	7	1	14	5	0	0	1	5	14	0	0	0	0	3	5	12	0	8	9	0	3
22	NDIKPA	1	4	13	2	0	0	0	1	5	14	4	13	3	0	0	0	1	4	7	8	3	13	3	1	0	2	4	14	0	0	0	0	4	3	13	0	10	8	0	2
23	UMUNWAFOR	1	5	14	0	0	0	0	1	6	13	5	13	2	0	0	0	0	4	7	9	1	14	5	0	0	3	2	13	2	0	0	0	3	5	12	0	5	11	0	4
24	UMUOCHAM NTU	2	5	12	1	0	0	1	1	4	14	6	12	2	0	0	0	1	4	6	9	2	13	3	2	0	3	4	11	2	0	0	2	2	4	12	0	5	12	0	3
25	AMAOKPARA	2	3	14	0	1	0	0	1	5	14	6	12	2	0	0	0	0	5	8	7	1	14	5	0	0	2	4	14	0	0	0	1	2	4	13	0	2	16	0	2
26	UMUGARA	3	6	11	0	0	0	1	2	5	12	4	15	1	0	0	0	1	4	7	8	15	4	1	0	0	1	5	14	0	0	0	0	0	1	19	0	4	13	0	3
27	UMUASONYE	2	5	13	0	0	0	0	1	5	14	3	15	2	0	0	0	1	7	5	7	15	3	2	0	0	2	4	13	1	0	0	0	2	2	16	0	5	13	0	2
28	EZEAKIRI	1	5	14	0	0	0	1	3	4	12	4	15	1	0	0	0	0	2	8	10	15	4	1	0	0	1	5	14	0	0	0	0	2	3	15	0	3	13	0	4
29	OBUBE	3	3	13	1	0	0	0	1	6	13	2	16	1	1	0	0	2	8	4	6	14	3	2	1	0	1	3	14	2	0	0	0	0	2	18	0	4	12	0	4
	TOTAL	45	130	392	9	4	0	8	42	135	395	115	392	71	2	0	0	20	138	193	229	159	304	110	7	0	49	126	392	13	0	0	7	64	91	418	0	143	345	0	92
	% DISTRIBUTION	7.8%	22.4%	67.6%	1.6%	0.7%	0.0%	1.4%	7.2%	23.3%	68.1%	19.8%	67.6%	12.2%	0.3%	0.0%	0.0%	3.4%	23.8%	33.3%	39.5%	27.4%	52.4%	19.0%	1.2%	0.0%	8.4%	21.7%	67.6%	2.2%	0.0%	0.0%	1.2%	11.0%	15.7%	72.1%	0.0%	24.7%	59.5%	0.0%	15.9%

VH=VERY HIGH=5; H=HIGH=4; A=AVERAGE=3; L=LOW=2; VL=VERY LOW=1

NUMBER OF SAMPLED HOUSEHOLDS=580

SOURCE OF DATA: AUTHOR'S FIELD WORK (JULY-SEPTEMBER 2011)

TABLE 2: MODES OF INVOLVING THE COMMUNITY IN THE PLANNING AND EXECUTION OF THE EU-MPP6 WATER AND SANITATION PROJECTS

		MODE OF COMMUNITY INVOLVEMENT																			
		INFORMATION SHARING					CONSULTATION					DECISION MAKING					INITIATING ACTION				
		VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL
S/N	COMMUNITY																				
1	EZUHU NGURU	1	14	2	2	1	3	12	1	3	1	2	3	2	12	1	1	3	13	3	0
2	OBOKWU NGWURU	2	13	3	1	1	2	14	2	1	1	2	4	0	13	1	1	2	14	3	0
3	NNARAMBIA	1	14	1	3	1	0	15	3	1	1	2	3	1	12	2	1	2	13	3	1
4	UMULOLO OGBE	0	13	3	4	0	1	13	3	2	1	2	2	2	13	1	1	2	14	2	1
5	AMAEGBU	2	12	2	3	1	0	15	1	3	1	1	1	3	14	1	0	3	13	3	1
6	UMUORIE EZIUDO	2	14	1	2	1	2	13	3	1	1	2	3	2	13	0	1	4	13	2	0
7	EZIALA AMUMARA	0	14	2	3	1	2	13	2	2	1	2	2	2	14	0	2	3	12	2	1
8	AMAGHOR IHITE	2	14	1	3	0	1	14	2	2	1	2	2	0	15	1	1	2	14	2	1
9	UMUEZEALA OBBOKO	2	15	2	1	0	2	13	3	1	1	2	2	1	14	1	2	3	12	2	1
10	AMUWU	2	12	4	2	0	1	14	1	3	1	1	2	2	14	1	3	1	13	3	0
11	AGWU NA DIM	1	13	3	2	1	1	13	2	4	0	2	2	2	14	0	2	1	14	3	0
12	NNEATO UMUOKIE	1	12	4	2	1	0	14	2	3	1	2	2	2	13	1	2	2	12	3	1
13	UMUZOHO EZIHE	0	13	5	2	0	3	13	1	2	1	1	3	2	14	0	1	1	14	3	1
14	AGADA ATTA	2	12	3	3	0	0	14	2	3	1	1	4	1	13	1	2	2	12	3	1
15	ABOH EBIKORO	0	14	2	4	0	2	12	2	3	1	2	3	1	14	0	1	2	14	3	0
16	UMUOZIRI	2	12	2	3	1	2	14	2	2	0	1	2	1	16	0	1	1	15	2	1
17	OWUBIRIUBI	2	14	1	2	1	2	11	4	3	0	2	3	1	14	0	1	3	14	1	1
18	NDIUKWU	0	14	2	3	1	1	13	3	2	1	2	3	0	14	1	2	1	14	2	1
19	UMUCHOKE	2	14	1	3	0	0	14	3	2	1	1	2	2	14	1	2	1	13	3	1
20	UMUDURUEKWE	3	12	3	1	1	0	13	5	2	0	4	2	1	12	1	1	2	13	3	1
21	AMAKUTA	1	13	3	2	1	0	14	3	3	0	3	2	1	13	1	1	3	14	1	1
22	NDIKPA	2	13	3	1	1	1	13	2	4	0	4	2	1	12	1	1	2	13	3	1
23	UMUNWAFOR	1	14	1	3	1	0	14	2	3	1	3	2	1	13	1	1	2	14	2	1
24	UMUOCHAM NTU	2	12	4	1	1	2	13	2	2	1	4	2	1	12	1	1	3	13	2	1
25	AMAOKPARA	1	14	2	2	1	0	14	2	3	1	2	4	0	13	1	0	2	14	3	1
26	UMUGARA	3	12	2	2	1	2	13	3	1	1	2	3	2	12	1	1	2	11	5	1
27	UMUASONYE	1	13	3	2	1	2	13	4	0	1	2	2	2	13	1	0	3	13	3	1
28	EZEAKIRI	1	12	4	2	1	2	14	3	1	0	2	3	1	12	2	1	3	14	2	0
29	OBUBE	0	13	5	2	0	2	13	3	1	1	3	2	2	13	0	1	3	13	2	1
	TOTAL	39	381	74	66	20	36	388	71	63	22	61	72	39	385	23	35	64	385	74	22
	% DISTRIBUTION	6.7%	65.7%	12.8%	11.4%	3.4%	6.2%	66.9%	12.2%	10.9%	3.8%	10.5%	12.4%	6.7%	66.4%	4.0%	6.0%	11.0%	66.4%	12.8%	3.8%

VH=VERY HIGH=5; H=HIGH=4; A=AVERAGE=3; L=LOW=2; VL=VERY LOW=1

NUMBER OF SAMPLED HOUSEHOLDS=580

SOURCE OF DATA: AUTHOR'S FIELD WORK (JULY-SEPTEMBER 2011)

TABLE 3: CONTRIBUTIONS OF THE COMMUNITY TO THE PLANNING AND EXECUTION OF THE EU-MPP6 WATER AND SANITATION PROJECTS

		CONTRIBUTIONS OF THE COMMUNITY TO THE EU-MPP6 PROJECTS																													
		IDEAS					MONEY					MATERIALS					SKILL/LABOUR					SAFETY/SECURITY					MAINTENANCE OF FACILITY				
		VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL
S/N	COMMUNITY																														
1	EZUHU NGURU	1	0	13	5	1	14	4	2	0	0	1	4	14	1	0	0	7	8	4	1	14	1	5	0	0	0	1	3	11	5
2	OBOKWU NGWURU	2	0	13	5	0	16	3	1	0	0	1	5	14	0	0	0	7	9	4	0	12	2	5	0	1	1	0	2	13	4
3	NNARAMBIA	1	0	14	5	0	14	5	1	0	0	1	6	13	0	0	0	8	7	3	2	14	1	5	0	0	1	1	3	11	4
4	UMULOLO OGBE	2	1	12	4	1	15	4	1	0	0	1	4	14	1	0	1	7	6	4	2	12	3	4	0	1	0	0	3	12	5
5	AMAEGBU	2	1	12	5	0	14	5	1	0	0	5	5	10	0	0	1	5	7	7	0	14	2	4	0	0	0	0	4	13	3
6	UMUORIE EZIUDO	1	0	14	5	0	13	4	2	0	1	3	6	11	0	0	0	8	8	2	2	16	1	3	0	0	0	0	5	11	4
7	EZIALA AMUMARA	2	0	14	4	0	14	5	1	0	0	3	3	14	0	0	2	4	6	8	0	14	1	5	0	0	0	0	3	12	5
8	AMAGHOR IHITE	1	0	14	5	0	14	3	1	0	2	3	3	14	0	0	1	6	8	5	0	14	2	4	0	0	0	0	3	12	5
9	UMUEZEALA OBBOKO	1	0	13	4	2	14	5	1	0	0	5	2	12	0	1	0	7	8	4	1	3	16	1	0	0	1	0	2	13	4
10	AMUWU	1	2	12	4	1	12	5	2	0	1	5	1	14	0	0	0	7	8	3	2	4	15	1	0	0	2	1	0	16	1
11	AGWU NA DIM	1	0	14	5	0	15	3	2	0	0	4	2	14	0	0	1	7	7	5	0	14	1	5	0	0	0	0	2	16	2
12	NNEATO UMUOKIE	2	1	12	5	0	11	6	3	0	0	4	1	14	1	0	1	7	8	4	0	15	1	4	0	0	0	0	2	15	3
13	UMUZOHO EZIHE	1	0	14	5	0	14	5	1	0	0	2	3	14	1	0	1	5	7	7	0	4	11	5	0	0	1	1	1	15	2
14	AGADA ATTA	3	1	12	4	0	14	5	1	0	0	2	6	12	0	0	0	8	9	2	1	5	12	3	0	0	0	0	3	15	2
15	ABOH EBIKORO	2	0	14	4	0	14	5	1	0	0	2	5	13	0	0	2	4	6	8	0	1	14	5	0	0	1	1	0	16	2
16	UMUOZIRI	1	0	16	3	0	13	5	2	0	0	2	6	12	0	0	0	8	9	2	1	14	1	5	0	0	0	0	1	18	1
17	OWUBIRIUBI	1	0	14	5	0	14	5	1	0	0	2	4	13	0	1	2	4	6	8	0	12	2	5	0	1	0	0	2	17	1
18	NDIUKWU	1	1	13	3	2	14	4	2	0	0	3	5	12	0	0	1	6	8	5	0	15	2	3	0	0	0	0	0	19	1
19	UMUCHOKE	1	0	14	5	0	12	5	2	0	1	2	5	13	0	0	0	8	8	4	0	11	3	6	0	0	0	0	3	12	5
20	UMUDURUEKWE	2	1	13	4	0	14	5	1	0	0	2	4	12	0	2	0	6	9	4	1	14	1	5	0	0	1	0	4	11	4
21	AMAKUTA	1	0	14	5	0	14	4	2	0	0	1	5	14	0	0	1	8	7	4	0	14	1	5	0	0	0	0	3	12	5
22	NDIKPA	1	2	13	4	0	14	5	1	0	0	3	4	13	0	0	1	7	8	4	0	13	3	3	0	1	0	0	4	13	3
23	UMUNWAFOR	1	1	12	5	1	13	6	1	0	0	2	4	13	0	1	0	7	9	4	0	14	1	5	0	0	0	0	3	12	5
24	UMUOCHAM NTU	2	1	12	5	0	14	4	1	0	1	2	6	12	0	0	1	6	9	4	0	13	2	3	0	2	2	0	2	12	4
25	AMAOKPARA	2	0	14	3	1	14	5	1	0	0	2	6	12	0	0	0	8	7	5	0	14	1	5	0	0	1	0	2	13	4
26	UMUGARA	3	0	11	6	0	12	5	2	0	1	1	4	13	1	1	1	7	7	4	1	4	15	1	0	0	0	0	0	19	1
27	UMUASONYE	2	0	13	5	0	14	5	1	0	0	2	3	15	0	0	1	5	7	7	0	3	15	2	0	0	1	1	2	14	2
28	EZEAKIRI	1	0	14	5	0	12	4	3	0	1	1	3	14	1	1	0	8	10	2	0	4	15	1	0	0	0	1	2	14	3
29	OBUBE	2	1	13	3	1	13	6	1	0	0	1	2	16	0	1	2	4	6	8	0	3	14	2	0	1	1	1	0	16	2
	TOTAL	44	13	383	130	10	395	135	42	0	8	68	117	381	6	8	20	189	222	135	14	304	159	110	0	7	13	8	64	403	92
	% DISTRIBUTION	7.6%	2.2%	66.0%	22.4%	1.7%	68.1%	23.3%	7.2%	0.0%	1.4%	11.7%	20.2%	65.7%	1.0%	1.4%	3.4%	32.6%	38.3%	23.3%	2.4%	52.4%	27.4%	19.0%	0.0%	1.2%	2.2%	1.4%	11.0%	69.5%	15.9%

VH=VERY HIGH=5; H=HIGH=4; A=AVERAGE=3; L=LOW=2; VL=VERY LOW=1

NUMBER OF SAMPLED HOUSEHOLDS=580

SOURCE OF DATA: AUTHOR'S FIELD WORK (JULY-SEPTEMBER 2011)

CONTRIBUTIONS OF THE EU-MPP6 WATER SUPPLY AND SANITATION PROJECTS TO THE SOCIO-ECONOMIC WELL-BEING OF THE BENEFITTING COMMUNITIES

It is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Inequitable access to safe water can cause poverty and environmental degradation. Sustainable development is the centerpiece and key to water resource quantity and quality, as well as economic health and societal well-being. The word *sustainability* implies ability to support life, to comfort, and to nourish. It also means continuing without lessening. Under the principles of sustainable development is a social equity imperative to create equal access to resources and minimize human suffering.

The respondents were asked to indicate the effects that manifested in the socio-economic well-being of households as a result of the planning and execution of the EU-MPP6 water supply and sanitation projects in the benefitting communities. The distribution of the responses as shown in Table 4 are: reduced infection from water related diseases, improved personal hygiene, reduced time spent in fetching water, improved attendance to school by children, improved employment, improved income, more time allocated to leisure activity, and reduced burden of fetching water on women and children. From the Table, 86.4 percent of the respondents indicates that the EU-MPP6 projects is related to high reduction of infection from water-related diseases in the communities, 12.1 percent of the respondents indicates that the projects are causal to the average reduction of infection from water-related diseases, while 1.6 percent of the respondents indicates that the reduction in infection from water-related diseases as a result of the new projects is low. On improved personal hygiene, 79.5 percent of the respondents indicates high effect as a result of the EU-MPP6 projects, 16.7 percent indicates average effect for improved personal hygiene, while 3.8 percent of the respondents indicates low effect of improved personal hygiene as a result of the new projects. Responses of respondents on high effect of reduced time spent in fetching water as a result of the EU-MPP6 projects account for 76 percent, responses on average effect account for 19.1 percent, while 4.8 percent of the respondents indicates low rate effect of reduced time spent in fetching water. On shorter distance covered to fetch water, 76 percent of the respondents indicate that the new projects relate to its high effect, 17.1 percent indicates average effect for shorter distance covered to fetch water, while 6.9 percent of the respondents indicate low effect of shorter distance covered to fetch water as a result of the EU-MPP6 projects. Responses of respondents on high effect of the new projects on improved attendance to school by children account for 79.5 percent, responses of respondents on average effects account for 16 percent, while 4.5 percent of the respondents relate low effect of improved attendance to school by children to the new projects. On improved employment, 77.4 percent of the respondents indicates high effect, 11.9 percent indicates manifestation of average effect as a result of the projects, while 10.7 percent of the respondents indicates low effect for improved employment. Responses of respondents on high effect with respect to increased income from livelihood activities account for 29.1 percent, responses on average effect account for 55.3 percent, while 15.5 percent of the respondent indicates low effect for increased income. On the issue of more time allocated to leisure activity, 81 percent of the respondents indicates high effect, 8.8 percent indicates manifestation of average effect, while 10.2 percent of the respondents indicates low effect for more time allocated to leisure activity as a result of the EU-MPP6 projects. Responses on high effect with respect to reduced burden of fetching water on women and children account for 78.7 percent, responses of respondents on average effect account for 18.3 percent, while 3.1 percent of the respondent indicates low rate effect for reduced burden of fetching on women and children. Generally, with the exception of income of households which is not very highly improved as indicated by 29.1 percent of the respondents, the rest of the eight variables relating to the socio-economic well-being of the households are very highly improved as indicated by the responses ranging from 76percent to 86.6 percent.

Managing water is an important way of achieving efficient and equitable use, and of encouraging conservation of water resources. Thus, priority in water resources development and management as demonstrated by the water and sanitation projects on ground leads to accelerated provision of food, water and sanitation to people previously not served.

TABLE 4: EFFECTS OF THE EU-MPP6 WATER SUPPLY AND SANITATION PROJECT ON THE SOCIO-ECONOMIC WELL-BEING OF HOUSEHOLDS

		LEVEL OF EFFECTS																																												
		REDUCED INFECTION FROM WATER-RELATED					IMPROVED PERSONAL HYGIENE					REDUCED TIME SPENT IN FETCHING WATER					SHORTER DISTANCE COVERED IN FETCHING					IMPROVED ATTENDANCE TO SCHOOL					IMPROVED EMPLOYMENT					IMPROVED INCOME					MORE TIME ALLOCATED TO ENGAGE					REDUCED BURDEN OF FETCHING WATER ON				
S/N	COMMUNITY	DISEASES															WATER					BY CHILDREN													ACTIVITY					WOMEN AND CHILDREN				
		VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL	VH	H	A	L	VL
1	EDUNU NGURU	3	14	3	0	0	1	14	4	0	1	3	12	3	2	0	4	11	3	2	0	14	1	4	0	1	3	11	3	3	0	5	4	7	2	2	14	3	2	0	1	3	11	6	0	0
2	OKOKWU NGWURU	3	12	4	1	0	11	4	3	1	1	3	13	4	0	0	3	13	2	1	1	4	11	3	1	1	2	12	3	2	1	5	5	6	2	2	14	4	0	1	1	10	4	5	1	0
3	NNARAMBA	2	13	3	1	1	12	5	3	0	0	2	13	3	1	1	3	12	3	1	1	5	12	3	0	0	3	11	3	2	1	4	4	10	1	1	13	4	1	1	1	5	14	1	0	0
4	UMULOLO OGBE	3	13	4	0	0	14	1	5	0	0	2	14	4	0	0	3	13	2	1	1	1	14	4	1	0	3	12	3	2	0	3	4	11	0	2	14	3	0	1	2	3	13	3	1	0
5	AMABOU	2	13	4	1	0	5	14	1	0	0	2	13	3	0	2	3	12	3	0	2	14	5	1	0	0	4	13	2	1	0	3	12	2	2	1	14	3	1	2	0	3	11	6	0	0
6	UMUCHE EZUDO	5	13	1	0	1	2	12	5	1	0	3	11	4	2	0	4	10	4	2	0	12	2	5	1	0	4	11	2	3	0	4	1	10	3	2	14	3	2	0	1	2	14	4	0	0
7	EZIALA AMUMARA	6	11	2	0	1	10	6	3	0	1	4	12	3	1	0	5	11	3	1	0	6	10	3	0	1	2	12	2	4	0	3	2	13	1	1	14	4	1	1	0	1	13	3	2	1
8	AMAHOR INYE	6	12	2	0	0	3	11	6	0	0	1	14	5	0	0	2	13	3	1	1	11	3	4	2	0	2	12	3	3	0	2	2	12	2	2	11	5	1	1	2	3	12	5	0	0
9	UMUEBALA OBOKO	7	11	2	0	0	10	4	5	1	0	2	14	4	0	0	3	13	4	0	0	4	10	5	1	0	1	12	3	3	1	1	4	13	0	2	12	3	3	1	1	11	4	3	1	1
10	AMUNU	6	12	2	0	0	5	14	1	0	0	3	13	2	2	0	4	12	2	2	0	14	5	1	0	0	0	16	3	1	0	2	3	13	0	2	13	3	2	1	1	12	5	3	0	0
11	AGWU NA DIM	6	11	3	0	0	3	13	3	1	0	3	12	4	1	0	4	11	4	1	0	13	3	3	1	0	2	15	2	1	0	3	3	11	1	2	11	5	2	1	1	14	1	5	0	0
12	NWATO UMUOKE	6	12	2	0	0	1	12	5	1	1	2	14	4	0	0	3	13	4	0	0	12	1	5	1	1	2	14	3	1	0	4	4	10	1	1	13	4	1	1	1	5	14	1	0	0
13	UMUDIKO EZIHE	7	11	2	0	0	15	4	1	0	0	2	14	3	0	1	3	13	3	0	1	4	15	1	0	0	0	17	2	1	0	3	3	10	2	2	14	2	1	1	2	2	12	5	1	0
14	AGADA ATTA	6	13	1	0	0	15	3	2	0	0	2	13	4	1	0	3	12	4	1	0	3	15	2	0	0	3	14	2	1	0	2	3	13	1	1	14	3	1	1	1	10	6	3	0	1
15	ADOH EMKORO	4	13	3	0	0	15	4	1	0	0	1	14	3	1	1	2	13	3	1	1	4	15	1	0	0	0	17	2	1	0	4	3	12	0	1	13	4	2	1	0	3	11	6	0	0
16	UMUCHI	5	13	2	0	0	5	9	4	1	1	1	14	3	2	0	2	13	3	2	0	9	5	4	1	1	1	16	2	1	0	2	3	11	2	2	13	4	2	0	1	10	4	5	1	0
17	OWUBIMURI	4	13	1	1	1	2	12	5	1	0	1	14	5	0	0	2	13	3	1	1	12	2	5	1	0	2	15	2	1	0	3	3	12	1	1	14	3	1	1	1	5	14	1	0	0
18	NDIUKWU	5	14	1	0	0	1	14	5	0	0	2	14	3	0	1	3	13	3	0	1	14	1	5	0	0	1	16	2	1	0	3	2	12	1	2	14	2	2	1	1	3	13	3	1	0
19	UMUCHOKE	6	13	1	0	0	3	12	4	1	0	3	11	4	2	0	4	10	4	2	0	12	3	4	1	0	2	12	2	4	0	3	2	12	2	1	12	3	2	2	1	3	11	6	0	0
20	UMUDURUBOKE	5	14	1	0	0	2	14	4	0	0	2	12	5	1	0	3	11	5	1	0	14	2	4	0	0	3	11	3	2	1	3	2	12	2	1	12	4	4	0	0	10	4	5	1	0
21	AMAKUTA	5	11	4	0	0	1	13	3	2	1	3	13	2	2	0	4	12	2	2	0	13	1	3	2	1	2	12	2	4	0	2	4	12	1	1	12	4	2	0	2	5	14	1	0	0
22	NKWPA	5	12	3	0	0	3	12	5	0	0	3	11	4	1	1	4	10	4	1	1	12	3	4	1	0	3	13	2	2	0	3	1	12	2	2	13	2	3	1	1	3	13	3	1	0
23	UMUNNAPOR	5	12	3	0	0	2	14	4	0	0	2	13	5	0	0	3	12	3	1	1	14	2	4	0	0	2	12	3	3	0	3	2	12	2	1	12	3	2	3	0	1	12	5	1	1
24	UMUCHIAM NTU	6	12	2	0	0	11	4	2	2	1	1	14	5	0	0	2	13	5	0	0	4	11	2	2	1	2	12	2	2	2	2	2	12	2	2	10	4	2	2	2	15	4	1	0	0
25	AMACHPARA	5	13	2	0	0	14	5	1	0	0	1	14	5	0	0	2	13	5	0	0	5	14	1	0	0	2	12	3	2	1	2	2	12	3	1	11	5	2	1	1	15	3	2	0	0
26	UMUDARA	6	12	2	0	0	14	4	2	0	0	2	13	5	0	0	3	12	5	0	0	4	14	2	0	0	0	17	2	1	0	1	2	12	3	2	13	3	1	1	2	15	4	1	0	0
27	UMUAGWTE	5	13	2	0	0	14	5	1	0	0	2	13	3	1	1	3	12	3	1	1	5	14	1	0	0	2	15	2	1	0	2	2	13	1	2	13	3	2	2	0	5	9	4	1	1
28	EZIAKORI	3	13	4	0	0	5	9	5	0	1	1	14	5	0	0	2	13	3	1	1	9	5	5	0	1	2	15	2	1	0	2	3	12	3	0	12	3	2	2	1	2	12	5	1	0
29	ONUBI	3	12	4	1	0	4	10	4	1	1	2	14	4	0	0	3	13	4	0	0	10	4	4	1	1	0	17	2	1	0	0	3	12	4	1	11	4	4	0	1	1	14	5	0	0
	TOTAL	140	361	70	5	4	203	258	97	13	9	61	380	111	20	8	89	352	99	28	14	258	203	93	17	9	55	394	69	55	7	79	90	321	47	43	370	100	51	30	29	180	276	106	13	5
	% DISTRIBUTION	24%	62.2%	12.1%	0.9%	0.7%	35.0%	44.5%	16.7%	2.2%	1.6%	10.5%	65.5%	19.1%	3.4%	1.4%	15.3%	60.7%	17.1%	4.5%	2.4%	44.5%	35.0%	16.0%	2.9%	1.6%	9.5%	67.9%	11.9%	9.5%	1.2%	13.6%	15.5%	55.3%	8.1%	7.4%	63.8%	17.2%	8.8%	5.2%	5.0%	31.0%	47.6%	18.3%	2.2%	0.9%

VH=VERY HIGH=5; H=HIGH=4; A=AVERAGE=3; L=LOW=2; VL=VERY LOW=1

NUMBER OF SAMPLED HOUSEHOLDS=580

SOURCE OF DATA: AUTHOR'S FIELD WORK (JULY-SEPTEMBER 2011)

From this study therefore, it's been found that the presence of the EU-MPP6 water supply and sanitation projects greatly contributed to the socio-economic well-being of the households in the benefitting communities.

Land is an important environmental resource, but it is fixed. Land like other basis of human existence is central to the social and physical reproduction of human beings. It therefore touches on sustainable development. About 81.2 million hectares of arable land exist in Nigeria. A large portion of the land is under cultivation, others are built-up, wooded grasslands and forests. Land in Nigeria as in other parts of the world is considered an asset. Generally assets are economic resources that may be tangible or intangible. They are capable of being owned or controlled to produce value. They are held to have positive economic value; they can be used to produce other goods and services. Simply stated, assets represent value of ownership that can be converted into cash, though cash itself is also considered an asset. Fixed assets include buildings and equipment. Non-fixed assets include animals and vehicles.

The respondents were asked to state the effect the presence of the EU-MPP6 water supply and sanitation projects has on their assets. For the EU-MPP6 project water user-households, the distribution of responses of respondents is shown in Table 5. From the Table, 19.9 percent of the respondents indicate that the value of their fallow land increased, 9.6 percent of the respondents indicate that their fallow land decreased, while 70.6 percent of the respondents indicated that their fallow land neither increased nor decreased. On the issue of farm land, 19 percent of the respondents indicate that the value increased, 4.3 percent indicates a decreased in the value, while 76.6 percent of the respondents indicate that the value of their farm land neither increased nor decreased. For the dwelling units, 100 percent of the respondents indicate that the value neither increased nor decreased and another 100 percent of the respondents indicate that the value of their vehicle neither increased nor decreased. On the issue of economic generating activity, 29.5 percent of the respondents indicate that the value increased while 70.5 percent indicates that the value neither increased nor decreased. 38.2 percent of the respondents indicate that the value of their domestic animal increased in value while 61.8 percent of the respondents indicate that their domestic animal neither increased nor decreased. On the issue of cash (money), about 95.7 percent of the respondents indicate that the value increased while 4.3 percent indicates that the value neither increased nor decreased. On the whole, there are increases in the values of all the assets of the user-households (84.1percent) as a result of the presence of the EU-MPP6 projects in the communities.

Similarly, the non-users households of the EU-MPP6 project water were asked to state the effect of the projects on the assets of households. The distribution of responses is shown in Table 6. From the Table, the data show that the value of all the assets of the non-users households (15.9 percent) neither increase nor decreased as a result of the EU-MPP6 water supply and sanitation project. Overall, the presence of the EU-MPP6 water supply and sanitation projects added value to the assets of majority of the of households (84.1percent) in the benefitting communities.

The asset index in development research has been introduced by researchers since 1998 (Sahn & Stifel, 2001). It's a method that actually employs data of household's assets to describe household well-being and influences on household well-being instead of using household's expenditure data. Considering the fact that money metric measure is too narrow for defining household well-being, the concept of asset is employed. Again, the asset index needs less data intensive which may give rise to measurement error. Using the asset index, the data needed is easy, quick to collect and

reliable for the basic reason that in this regard; few questions are only necessary. These questions basically require yes-no answer when posed.

Generally, the measuring of socio-economic well-being has been fraught with difficulty for the fact that defining an aggregate measure that captures this notion is difficult. Money-metric measures and alternative measures are two ways of household socio-economic assessment. The money-metric approach is easier to measure than the latter. It is also widely well comprehended by the public and used by the economists. However, it assumes that a household's material /asset determine its well-being. The money-metric measures have been disputed on some grounds. It has been criticized because of its use to assess household socio-economic well-being in developing countries. Using a monetary indicator which does not take into account how money is earned and how much time is spent working, is not very acceptable. In low-income countries the quality of data on income and expenditure is not likely to be reliable. It's against this back drop that other non-monetary indicators of household well-being such as the asset-based index have been developed for classifying household socio-economic status and determining improvement on household socio-economic well-being.

Household assets reflect a household's well-being or quality of life. The proportion of households having improved socio-economic well-being increases with increasing household wealth. It must be mentioned that this relationship is not always linear. This is because some goods or services may have an intermediate relationship, at first increasing and sometimes decreasing as wealth increases. But access to potable water reduces the time women and children spend in water collection, enhance household income and encourage asset acquisition in households. Increase in household assets demonstrates that the household is succeeding financially. Assets cost money, so their acquisition and increase is determined primarily by household income boosted by the presence of water infrastructure. Many surveys on non-economic issues actually rely on household assets as their primary economic indicator. Thus, a household's assets and its increase are determined by its economic context and the development of local infrastructure, such as water. Since possessions are a sign of the family's economic success, owning land, dwelling units, vehicles, and domestic animals becomes important. It highlights the challenge of providing high quality services by documenting the provision and reliability of water supply. It implies that communities with poorly developed water infrastructure may experience low investment, productivity growth and decreased household asset.

Potable water like electricity provokes extensive debates about their role in sustainable development in rural communities. They are part of a household's standard of living/well-being, much like household assets. As access to potable water increases, income rises and households are more likely to acquire assets. In this study information on effects of EU-MPP6 water supply and sanitation projects on assets were collected for purposes of determining whether the water and sanitation projects greatly contributed to the socio-economic well-being of the households in the benefitting communities or not.

TABLE 5: EFFECTS OF THE EU-MPP6 WATER SUPPLY AND SANITATION PROJECTS ON THE ASSETS OF USER-HOUSEHOLDS

		STATE OF ASSET																				
		FALLOW LAND			FARMLAND			DWELLING UNIT			VEHICLE			ECONOMIC GENERATING EQUIPMENT			DOMESTIC ANIMAL			CASH		
		I	NE	D	I	NE	D	I	NE	D	I	NE	D	I	NE	D	I	NE	D	I	NE	D
S/N	COMMUNITY																					
1	EZUHU NGURU	1	8	1	2	6	1	0	11	0	0	5	0	1	4	0	1	2	0	13	2	0
2	OBOKWU NGWURU	2	6	2	1	8	1	0	9	0	0	4	0	1	4	0	1	0	0	15	1	0
3	NNARAMBIA	2	7	2	2	10	0	0	10	0	0	3	0	0	4	0	1	1	0	15	1	0
4	UMULOLO OGBE	1	9	1	3	7	0	0	8	0	0	3	0	1	3	0	1	3	0	15	2	0
5	AMAEGBU	3	6	0	3	6	1	0	7	0	0	3	0	1	3	0	1	2	0	17	1	0
6	UMUORIE EZIUDO	2	6	2	2	7	0	0	9	0	0	4	0	2	2	0	1	2	0	16	1	0
7	EZIALA AMUMARA	1	6	1	2	7	1	0	11	0	0	5	0	1	2	0	1	3	0	17	1	0
8	AMAGHOR IHITE	1	6	2	1	7	0	0	9	0	0	4	0	2	3	0	1	2	0	18	1	0
9	UMUEZEALA OBBOKO	1	7	1	1	5	1	0	8	0	0	4	0	1	2	0	2	4	0	16	0	0
10	AMUWU	1	7	0	1	8	0	0	6	0	0	3	0	1	2	0	4	5	0	17	0	0
11	AGWU NA DIM	3	6	1	2	8	0	0	9	0	0	2	0	1	3	0	1	3	0	15	0	0
12	NNEATO UMUOKIE	1	8	0	1	7	1	0	10	0	0	5	0	1	1	0	1	3	0	16	0	0
13	UMUZOHO EZIHE	3	5	1	1	9	0	0	12	0	0	4	0	1	2	0	1	3	0	14	1	0
14	AGADA ATTA	3	7	0	2	6	1	0	11	0	0	4	0	1	3	0	2	3	0	16	1	0
15	ABOH EBIKORO	2	7	1	2	9	0	0	7	0	0	6	0	1	4	0	1	3	0	16	0	0
16	UMUOZIRI	1	7	1	2	7	0	0	8	0	0	3	0	1	3	0	2	4	0	17	1	0
17	OWUBIRIUBI	3	6	1	2	6	0	0	7	0	0	3	0	1	3	0	1	2	0	18	0	0
18	NDIUKWU	2	5	1	3	2	1	0	7	0	0	4	0	1	2	0	1	1	0	17	0	0
19	UMUCHOKE	1	7	1	2	6	1	0	8	0	0	4	0	1	1	0	1	2	0	15	1	0
20	UMUDURUEKWE	2	6	1	2	8	0	0	9	0	0	4	0	2	3	0	1	2	0	17	1	0
21	AMAKUTA	3	6	1	2	9	1	0	9	0	0	3	0	1	3	0	1	1	0	17	0	0
22	NDIKPA	2	5	1	3	7	1	0	8	0	0	4	0	1	2	0	1	2	0	17	1	0
23	UMUNWAFOR	2	6	1	2	7	0	0	10	0	0	3	0	1	3	0	1	1	0	15	1	0
24	UMUOCHAM NTU	1	7	0	2	8	0	0	9	0	0	5	0	2	3	0	1	2	0	17	0	0
25	AMAOKPARA	2	7	0	1	9	0	0	9	0	0	3	0	1	1	0	1	1	0	17	1	0
26	UMUGARA	3	7	0	3	7	1	0	10	0	0	3	0	1	3	0	2	1	0	16	1	0
27	UMUASONYE	0	8	1	3	8	0	0	10	0	0	4	0	1	2	0	2	1	0	18	0	0
28	EZEAKIRI	4	6	1	0	8	0	0	7	0	0	2	0	1	3	0	2	2	0	15	1	0
29	OBUBE	1	8	1	0	12	0	0	8	0	0	3	0	2	5	0	2	2	0	15	1	0
	TOTAL	54	192	26	53	214	12	0	256	0	0	107	0	33	79	0	39	63	0	467	21	0
	%DISTRIBUTION	19.9%	70.6%	9.6%	19.0%	76.7%	4.3%	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%	29.5%	70.5%	0.0%	38.2%	61.8%	0.0%	95.7%	4.3%	0.0%

NOTE: I=INCREASE; NE=NO EFFECT; D=DECREASE

NUMBER OF SAMPLED HOUSEHOLDS=488

SOURCE OF DATA: AUTHOR'S FIELD WORK (JULY-SEPTEMBER 2011)

TABLE 6: EFFECTS OF THE EU-MPP6 WATER SUPPLY AND SANITATION PROJECTS ON THE ASSETS OF NON-USER HOUSEHOLDS

		STATE OF ASSET																				
		FALLOW LAND			FARMLAND			DWELLING UNIT			VEHICLE			ECONOMIC GENERATING EQUIPMENT			DOMESTIC ANIMAL			CASH		
		I	NE	D	I	NE	D	I	NE	D	I	NE	D	I	NE	D	I	NE	D	I	NE	D
S/N	COMMUNITY																					
1	EZUHU NGURU	0	2	0	0	3	0	0	5	0	0	3	0	0	2	0	0	2	0	0	5	0
2	OBOKWU NGWURU	0	2	0	0	3	0	0	4	0	0	2	0	0	2	0	0	2	0	0	4	0
3	NNARAMBIA	0	3	0	0	3	0	0	4	0	0	4	0	0	2	0	0	1	0	0	4	0
4	UMULOLO OGBE	0	2	0	0	3	0	0	3	0	0	3	0	0	1	0	0	1	0	0	3	0
5	AMAEGBU	0	1	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0
6	UMUORIE EZIUDO	0	2	0	0	2	0	0	3	0	0	2	0	0	2	0	0	2	0	0	3	0
7	EZIALA AMUMARA	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0
8	AMAGHOR IHITE	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
9	UMUEZEALA OBBOI	0	2	0	0	3	0	0	4	0	0	3	0	0	2	0	0	2	0	0	4	0
10	AMUWU	0	2	0	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0
11	AGWU NA DIM	0	3	0	0	4	0	0	5	0	0	4	0	0	2	0	0	2	0	0	5	0
12	NNEATO UMUOKIE	0	2	0	0	3	0	0	4	0	0	4	0	0	3	0	0	2	0	0	4	0
13	UMUZOHO EZIHE	0	2	0	0	3	0	0	5	0	0	3	0	0	2	0	0	2	0	0	5	0
14	AGADA ATTA	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0
15	ABOH EBIKORO	0	3	0	0	2	0	0	4	0	0	3	0	0	2	0	0	2	0	0	4	0
16	UMUOZIRI	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0
17	OWUBIRIUBI	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0
18	NDIUKWU	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0
19	UMUCHOKE	0	3	0	0	3	0	0	4	0	0	3	0	0	2	0	0	2	0	0	4	0
20	UMUDURUEKWE	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0
21	AMAKUTA	0	2	0	0	2	0	0	3	0	0	3	0	0	3	0	0	2	0	0	3	0
22	NDIKPA	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0
23	UMUNWAFOR	0	3	0	0	3	0	0	4	0	0	2	0	0	2	0	0	2	0	0	4	0
24	UMUOCHAM NTU	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0	0	1	0	0	3	0
25	AMAOKPARA	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0
26	UMUGARA	0	3	0	0	2	0	0	3	0	0	2	0	0	3	0	0	3	0	0	3	0
27	UMUASONYE	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0
28	EZEAKIRI	0	3	0	0	3	0	0	4	0	0	2	0	0	3	0	0	3	0	0	4	0
29	OBUBE	0	3	0	0	3	0	0	4	0	0	2	0	0	3	0	0	2	0	0	4	0
	TOTAL	0	67	0	0	74	0	0	92	0	0	74	0	0	65	0	0	59	0	0	92	0
	%DISTRIBUTION	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%

NOTE: I=INCREASE; NE=NO EFFECT; D=DECREASE

NUMBER OF SAMPLED HOUSEHOLDS=92

SOURCE OF DATA: AUTHOR'S FIELD WORK (JULY-SEPTEMBER 2011)

LABORATORY ANALYSIS OF PHYSICAL AND CHEMICAL VALUES OF WATER SAMPLES FROM THE EU-MPP6 WATER PROJECTS

Composite water samples from boreholes sunk by the EU-MPP6 organisers across the 29 sampled communities were taken and analyzed in the laboratory. The analysis covered the following areas: temperature, pH, colour, odour, taste, conductivity, turbidity, total dissolved solids, total suspended solids, chlorine, sulphate, nitrate, phosphate, hardness, zinc, iron, copper, total bacteria count, and total coliform count. The result of the analysis is shown in Table 7 and Table 8. The data clearly shows that the water product of the projects is within the safety standard of the World Health Organisation (WHO). The implication is that benefitting communities are assured of clean/potable water.

TABLE 7: VALUES OF PHYSICAL AND CHEMICAL PARAMETERS OF WATER SAMPLES FROM THE EU-MPP6 PROJECTS

S/N	PARAMETERS	VALUES OF PHYSICAL AND CHEMICAL PARAMETERS OF WATER FROM EU-MPP6 WATER PROJECT PER COMMUNITY																												WHO/FMENV
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	23	S24	S25	S26	S27	S28	S29	STANDARDS
1	TEMPERATURE ^{0}C	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	24.0	23.0	22.0	23.0	23.0	24.0	25.0	23.0	23.0	20-30
2	P^{H}	6.6	6.5	8.0	7.3	6.6	7.3	6.6	8.0	6.6	8.3	8.0	6.5	6.6	6.7	6.6	8.0	8.2	6.5	6.6	8.0	6.6	6.7	6.5	6.6	6.7	6.6	6.5	7.7	8.0	6.5-8.5
3	CONDUCTIVITY (µ/cm)	3.2	3.3	3.2	3.2	3.3	3.2	3.2	3.3	3.2	3.2	3.4	3.2	3.0	3.2	3.2	3.3	3.4	3.2	3.2	3.3	3.4	3.2	3.1	3.1	3.4	3.3	3.2	3.3	3.2	100.0
4	TURBIDITY (NTU)	1.0	0.9	1.0	1.2	1.0	1.0	0.9	1.0	2.0	1.0	0.9	9.0	0.8	1.0	1.0	1.1	0.8	1.0	0.8	0.9	0.8	0.9	0.9	0.8	0.7	0.9	0.9	0.8	0.8	50.0
5	TOTAL DISSOLVED SOLIDS (mg/l)	3.4	4.5	3.4	4.6	3.4	4.4	3.4	4.5	3.4	3.3	3.4	4.4	3.4	3.2	3.4	3.4	4.4	3.4	5.3	3.4	3.4	3.4	3.3	3.4	3.5	3.4	3.4	4.4	3.4	50.0
6	TOTAL SUSPENDED SOLIDS (mg/l)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.3	1.3	1.2	1.1	50.0
7	CHLORINE (mg/l)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.3
8	SULPHATE (mg/l)	4.8	5.8	4.7	4.8	4.9	4.8	4.6	4.8	5.8	4.8	6.8	4.8	4.8	7.5	4.8	4.8	6.6	4.8	4.7	4.8	4.8	4.8	4.7	4.9	4.7	4.8	4.9	5.2	4.8	250.0
9	NITRATE (mg/l)	2.0	1.2	2.2	2.3	1.2	2.3	1.2	2.2	2.2	2.3	1.2	3.3	3.4	1.1	1.2	1.3	1.2	1.2	2.2	1.2	2.1	2.2	1.2	2.1	1.3	1.2	1.3	1.3	1.2	40.0
10	PHOSPHATE (mg/l)	0.4	0.5	0.4	0.5	0.4	0.6	0.4	0.3	0.4	0.5	0.4	0.5	0.4	0.4	0.5	0.4	0.6	0.4	0.4	0.5	0.4	0.5	0.3	0.4	0.5	0.4	0.5	0.6	0.4	5.0
11	HARDNESS (mg/l)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.1	6.1	5.1	6.0	5.0	100.0
12	ZINC (mg/l)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	1.0	0.0	5.0
13	IRON (mg/l)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.3
14	COPPER (mg/l)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.3
15	TOTAL BACTERIA COUNT (cfu/ml)	23.0	24.0	23.0	24.0	23.0	24.0	23.0	24.0	23.0	25.0	23.0	25.0	23.0	23.0	24.0	23.0	23.0	25.0	23.0	23.0	25.0	23.0	24.0	22.0	24.0	25.0	23.0	24.0	23.0	1-30
16	TOTAL COLIFORM COUNT (cfu/ml)	8.0	7.0	8.0	7.0	9.0	7.0	8.0	7.0	9.0	8.0	7.0	8.0	7.0	9.0	7.0	8.0	7.0	8.0	7.0	9.0	9.0	7.0	9.0	7.0	7.0	8.0	7.0	8.0	7.0	1-10
NOTE: S1-S29=SAMPLED COMMUNITIES																															
SOURCES OF DATA: (a) World Health Organisation (2012); (b) Federal Ministry of Environment (2001); (c) Author's Fieldwork (July-September 2011)																															

TABLE 8: COMMUNITY CATEGORY ACCORDING TO OBSERVED MEAN VALUE OF PHYSICAL AND CHEMICAL PARAMETERS OF WATER SAMPLES FROM THE EU-MPP6 PROJECTS

S/N	PARAMETERS	WORLD HEALTH ORGANISATION/ FEDERAL MINISTRY OF ENVIRONMENT STANDARDS	OBSERVED MEAN VALUE FOR EU-MPP6 WATER	NUMBER OF COMMUNITIES	
				BELOW OBSERVED MEAN VALUE	ABOVE OBSERVED MEAN VALUE
1	TEMPERATURE ^{0}C	30.0	23.1	27	2
2	pH	8.5	7.08	21	8
3	CONDUCTIVITY (µ/cm)	100.0	3.24	18	11
4	TURBIDITY (NTU)	1.0	1.19	29	0
5	TOTAL DISSOLVED SOLIDS (mg/l)	500.0	3.71	22	7
6	TOTAL SUSPENDED SOLIDS (mg/l)	500.0	1.12	25	4
7	CHLORINE (mg/l)	0.3	0.01	26	3
8	SULPHATE (mg/l)	250.0	5.1	26	3
9	NITRATE (mg/l)	45.0	1.73	16	13
10	PHOSPHATE (mg/)l	5.0	0.44	17	12
11	HARDNESS (mg/l)	100.0	5.04	25	4
12	ZINC (mg/l)	5.0	0.04	26	3
13	IRON (mg/l)	0.3	0.01	27	2
14	COPPER (mg/l)	1.3	0.01	26	3
15	TOTAL BACTERIA COUNT (cfu/ml)	30.0	23.59	16	13
16	TOTAL COLIFORM COUNT (cfu/ml)	10.0	7.72	14	15

SOURCES OF DATA: (a) World Health Organisation (2012); (b) Federal Ministry of Environment (2001); (c) Author's Fieldwork (July-September 2011)

The respondents were asked to rate the quality of water from the EU-MPP6 projects with respect to colour, taste and odour. The distribution of the responses of respondents is shown in Table 9. From the Table, 8 percent of the respondents rate the water to be without colour while 66.8 percent of the respondents rate the water to be less intense in colour. In addition, 11.1 percent of the respondents rate the colour of the water to be intense while 8.6 percent of them rate the colour of the water highly intense. Furthermore, 5.5 percent of the respondents rate the colour of the water to be very highly intense. On the issue of taste, 9.2 percent of the respondents rate the water to be without taste while 69.5 percent of the respondents rate the taste of the water less intense. None the less, 8.8 percent of the respondents rate the taste of the water to be intense while 7.2 percent of them rate the taste of the water highly intense. Furthermore, 5.5 percent of the respondents rate the taste of the water to be very highly intense. In terms of odour, 10.7 percent of the respondents rate the water to be without odour while 70.3 percent

of the respondents rate the odour from the water less intense. In addition, 8 percent of the respondents rate the odour from the water to be intense while 6.8 percent of them rate the odour from the water highly intense. Yet, 4.3 percent of the respondents rate the odour from the water to be very highly intense. This clearly shows that the majority proportion (78.2 percent) of the respondents rates the quality of the water from the EU-MPP6 projects to be of a high standard. This confirms the result of the laboratory analysis of physical and chemical values of water samples from the EU-MPP6 projects that the benefitting communities have access to safe water.

Access to safe water is vital to human existence. Doubtful water quality results in poor health and low productivity as well as limits poverty reduction. High incidence of water borne diseases occurs in areas with low access to safe drinking water. Socio-economic well-being is undermined in many rural areas where poor water quality abounds. Unlike surface water, ground water which is relied upon in the EU-MPP6 programme is seen by many as a realistic water supply source. But in some circumstances groundwater may possess some geochemical conditions which make it unfit or safe for human consumption due to presence of high concentrations of toxic elements. Then, drinking water becomes poisonous for normal metabolism because it has mineral elements in excessive quantities. In such cases the quality of water from constructed boreholes indicates pollution as a result of the presence of colour, taste, odour etc.

Where there is heavy reliance on borehole schemes for water supply, there may be contamination from bacteria in the soil called "coliform bacteria". Wastes, human and animal excreta dumped on soil surfaces often get mixed with rainwater and enter the ground through infiltration and seepage. Pit-latrines and soak-away are sources of introduction of feacal coliform in groundwater. There is always the possibility of water-borne diseases arising from microbial, chemical and physical contamination in rural communities in Nigeria. Contaminated water harbours many potentially fatal diseases like typhoid, cholera, diarrhoea, filiariasis and schistosomiasis caused by different diseases organisms such as bacteria, viruses, and other pathogens. This explains why globally, at certain periods half of the hospital beds are filled by patients diagnosed with water-borne or water related diseases. Many children under the age of five die from water related diseases manifest as acute gastroenteriatis, filariasis, and other skin problems. Deaths recorded yearly from childhood ailments that are water related number about 1.8 million. A trend if allowed to continue will aid in strengthening rural poverty and under-development which is as a result of the yearly epidemics witnessed in some places from this water and sanitation problem. This study has demonstrated that carefully planned and implemented water and sanitation intervention or programmes such as those by the EU are likely to be sustainable and indeed beneficial to communities with them because they yield safe water.

TABLE 9: QUALITY RATING OF WATER FROM THE EU-MPP6 WATER SUPPLY AND SANITATION PROJECTS BY HOUSEHOLDS

		RATING BY HOUSEHOLDS														
		COLOUR					TASTE					ODOUR				
		NONE	LESS INTENSE	INTENSE	HIGHLY INTENSE	VERY HIGHLY INTENSE	NONE	LESS INTENSE	INTENSE	HIGHLY INTENSE	VERY HIGHLY INTENSE	NONE	LESS INTENSE	INTENSE	HIGHLY INTENSE	VERY HIGHLY INTENSE
S/N	COMMUNITY															
1	EZUHU NGURU	0	12	1	1	1	1	11	1	1	1	2	10	2	1	0
2	OBOKWU NGWURU	1	13	1	1	0	1	12	1	1	1	1	12	1	1	1
3	NNARAMBIA	2	13	1	0	0	1	12	2	1	0	2	11	1	1	1
4	UMULOLO OGBE	1	12	3	1	0	1	13	1	1	1	1	12	2	1	1
5	AMAEGBU	1	13	2	1	1	3	11	2	1	1	3	11	2	2	0
6	UMUORIE EZIUDO	1	10	4	2	0	2	13	1	1	0	2	12	1	1	1
7	EZIALA AMUMARA	1	13	1	2	1	2	11	2	2	1	2	13	1	1	1
8	AMAGHOR IHITE	1	12	4	1	1	5	10	2	1	1	1	14	1	2	1
9	UMUEZEALA OBBOKO	1	10	2	2	1	2	11	1	1	1	1	12	1	1	1
10	AMUWU	2	11	1	1	2	1	12	1	2	1	3	11	1	1	1
11	AGWU NA DIM	0	12	1	1	1	2	10	1	1	1	1	10	2	1	1
12	NNEATO UMUOKIE	3	9	2	1	1	1	12	1	2	0	1	12	1	1	1
13	UMUZOHO EZIHE	2	10	1	1	1	1	12	1	1	0	2	11	1	1	0
14	AGADA ATTA	1	11	2	2	1	2	11	3	1	0	1	13	1	1	1
15	ABOH EBIKORO	2	10	2	1	1	2	10	2	1	1	1	12	1	1	1
16	UMUOZIRI	1	11	2	2	2	1	11	4	2	0	1	14	1	1	1
17	OWUBIRIUBI	3	11	1	2	1	1	14	1	1	1	2	13	2	1	0
18	NDIUKWU	1	13	1	1	1	2	12	1	1	1	2	13	2	0	0
19	UMUCHOKE	2	10	1	2	1	1	12	1	1	1	3	8	2	2	1
20	UMUDURUEKWE	2	12	2	1	1	1	13	1	1	2	4	10	1	2	1
21	AMAKUTA	1	13	1	1	1	2	11	2	1	1	3	11	1	1	1
22	NDIKPA	1	12	1	2	2	0	12	2	2	2	2	14	1	1	0
23	UMUNWAFOR	3	11	1	1	0	2	11	1	1	1	3	10	1	1	1
24	UMUOCHAM NTU	1	11	1	2	2	2	12	1	1	1	1	12	2	1	1
25	AMAOKPARA	0	8	5	4	1	2	11	2	2	1	2	12	2	1	1
26	UMUGARA	0	8	4	3	2	1	12	1	1	2	1	13	1	1	1
27	UMUASONYE	2	13	2	1	0	1	14	1	1	1	2	13	1	2	0
28	EZEAKIRI	1	11	3	1	0	2	10	2	1	1	1	12	1	1	1
29	OBUBE	2	11	1	1	1	0	13	1	1	1	1	12	2	1	0
	TOTAL	39	326	54	42	27	45	339	43	35	26	52	343	39	33	21
	% DISTRIBUTION	8.0%	66.8%	11.1%	8.6%	5.5%	9.2%	69.5%	8.8%	7.2%	5.3%	10.7%	70.3%	8.0%	6.8%	4.3%
NUMBER OF SAMPLED HOUSEHOLDS=488																
SOURCE OF DATA: AUTHOR'S FIELD WORK (JULY-SEPTEMBER 2011)																

TESTING OF THE RESEARCH HYPOTHESES

This sub-section deals with the analysis of data through the test of the hypotheses posited in this study.

Hypothesis 1

$H_{0:}$ The involvement of the communities is not a significant factor in the planning and execution of the EU-MPP6 water supply and sanitation projects in the communities of Imo State.

$H_{A:}$ The involvement of the communities is a significant factor in the planning and execution of the EU-MPP6 water supply and sanitation projects in the communities of Imo State.

To analyze the extent of the involvement of the communities in the planning and execution of the EU-MPP6 water supply and sanitation projects in Imo State and determine whether it is a significant factor in the effectiveness of the project in the communities, the statistical technique that readily calls to mind is the factor analysis model. The rationale for the choice of factor analysis in testing the hypotheses that states that the involvement of the communities in the planning and execution of the EU-MPP6 water supply and sanitation projects in Imo State is not a significant factor in the effectiveness of the project in the communities is that it is essentially a summarizing or synthesizing technique which is capable of identifying groups of variables with similar patterns of variation. Using this technique and plugging in the data on Stages of Community involvement in the Planning and Execution of the EU-MPP6 Water Supply and Sanitation Project, the resultant correlation matrix produced the explanatory power of each factor as shown in Table 10.

TABLE 10: TOTAL VARIANCE IN STAGES OF COMMUNITY INVOLVEMENT EXPLAINED

COMPONENT		INITIAL EIGENVALUES		
		TOTAL	**% OF VARIANCE**	**CUMULATIVE %**
1	Identification of the water project option	6.536	81.697	81.697
2	Design of the water project	.806	10.073	91.770
3	Locating the water project	.254	3.064	94.834
4	Construction of the water project facility	.164	2.048	96.881
5	Operation of the water project	.104	1.300	98.182
6	Maintenance of the water project	.087	1.082	99.264
7	Monitoring of the water project	.048	.594	99.858
8	Using the water project	.011	.142	100.000

From the Table, it is seen that the strongest factor is the identification of water project options in some communities. The overwhelming strength of the variable necessitated the search for the factor loading. The Varimax Rotation is invoked. The technique collapsed the 8 variables into 5 by eliminating those whose mean score is less than 2.5. The sorted rotated factor loadings are shown in Table 11.

TABLE 11: SORTED ROTATED FACTOR LOADINGS ON STAGES OF COMMUNITY INVOLVEMENT VARIABLES

VARIABLE	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	COMMUNALITY
Maintenance of the water project	0.913	-0.306	-0.244	0.021	-0.112	1.000
Identification of the water project option	0.890	-0.345	-0.265	0.019	0.134	1.000
Operation of the water project	0.369	-0.888	-0.239	-0.136	0.006	1.000
Using the water project	0.318	0.831	-0.389	0.246	0.002	1.000
Locating the water project	0.440	0.524	-0.729	0.013	0.004	1.000
VARIANCE	2.0573	1.9662	0.8659	0.0801	0.0305	5.0000
% VAR	0.411	0.393	0.173	0.016	0.006	1.000

This technique places maintenance as the major variable with identification as the next major one, with operation, using the water, and locating the project following in that order. The negative loadings for factor 2 and factor 3 are indicative that these two variables do not relate very well with other variables. However, the overall implication is that the variables contribute to the effectiveness of the whole system. For the projects to be successfully sustained, the communities and the organisers should monitor the performance of the factors with negative relationships with other variables. It is interesting to observe that the variables with positive factor loading are those where involvement and participation among the indigenes of the benefitting communities are high. Therefore, the involvement of the communities in the planning and execution of the EU-MPP6 water supply and sanitation projects through the stages of identification, design, locating the projects, operation, and maintenance, monitoring and using the project water is indicative of enhanced people's socio-economic well-being and projects' effectiveness It is therefore safe to uphold the alternative hypothesis that states that the involvement of communities is a significant factor in the planning and execution of the EU-MPP6 water supply and sanitation projects in Imo State.

Similarly**,** using the technique and plugging in the data on Modes of Involving the Community in the Planning and Executing the EU-MPP6 Water and Sanitation Project, the resultant correlation matrix produced the explanatory power of each factor as shown in Table 12.

TABLE 12: TOTAL VARIANCE IN MODES OF COMMUNITY INVOLVEMENT EXPLAINED

COMPONENT		INITIAL EIGENVALUES		
		TOTAL	**% OF VARIANCE**	**CUMULATIVE %**
1	Information sharing	3.288	82.198	82.198
2	Consultation	.594	14.874	97.045
3	Decision-making	.101	2.518	99.563
4	Initiating action	.017	.437	100.000

From the Table, it is seen that the strongest factor is the information sharing in some communities. The strength of the variable led to the search for the factor loading. The Varimax Rotation is invoked. The technique retained the 4 variables as their mean score is greater than 2.5. The sorted rotated factor loadings are shown in Table 35.

TABLE 13: SORTED ROTATED FACTOR LOADINGS ON MODES OF COMMUNITY INVOLVEMENT VARIABLES

VARIABLE	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	COMMUNALITY
Consultation	0.936	0.276	0.206	0.072	1.000
Information sharing	0.934	0.292	0.192	-0.073	1.000
Initiating action	0.604	0.573	0.554	-0.000	1.000
Decision-making	0.266	0.951	0.157	-.000	1.000
VARIANCE	2.1841	1.3942	0.4112	0.0105	4.0000
% VAR	0.546	0.349	0.103	0.003	1.000

This technique places consultation as the major variable with information sharing, initiating action, and decision-making coming in that order. The positive loadings for factor 2 and factor 3 are indicative that these variables do relate very well with other variables. The overall implication therefore, is that all the variables contribute to the effectiveness of the whole system. For the projects to be successfully sustained, the communities and the organisers should stretch the performance potentials of the factors with positive relationships with other variables. It is interesting to observe that none of the variables has any negative factor loading. It needs to be added that the consultation, information sharing, initiating action, and decision-making factors which enhance people's socio-economic well-being are vigorously pursued to guarantee effectiveness. By implication, the use of the modes of information sharing, consultation, decision-making and initiating action in involving the communities in the planning and execution of the EU-MPP6 water supply and sanitation projects positively influenced the effectiveness of the projects in Imo State. Based on mode of community involvement, it is also safe to uphold the alternative

hypothesis that states that the involvement of communities is a significant factor in the planning and execution of the EU-MPP6 water supply and sanitation projects in Imo State.

Furthermore, using the technique and plugging in the data on Contributions of the Community to the Planning and Execution of the EU-MPP6 Water and Sanitation Project, the resultant correlation matrix produced the explanatory power of each factor as shown in Table 14.

TABLE 14: TOTAL VARIANCE IN CONTRIBUTIONS OF THE COMMUNITIES EXPLAINED

COMPONENT		INITIAL EIGENVALUES		
		TOTAL	**% OF VARIANCE**	**CUMULATIVE %**
1	Ideas	4.561	76.022	76.022
2	Money	.655	10.910	86.931
3	Materials	.306	5.097	92.028
4	Skill/labour	.239	3.977	96.005
5	Safety/security	.146	2.439	98.444
6	Maintenance of project facility	.093	1.556	100.000

From the Table, it is seen that the strongest factor is the ideas generated by some communities. The strength of the variable provoked the search for the factor loading. The Varimax Rotation is used. The technique retained the 6 variables as their mean score is greater than 2.5. The sorted rotated factor loadings are shown in Table 15.

TABLE 15: SORTED ROTATED FACTOR LOADINGS ON CONTRIBUTIONS OF THE COMMUNITIES VARIABLES

VARIABLE	**FACTOR 1**	**FACTOR 2**	**FACTOR 3**	**FACTOR 4**	**FACTOR 5**	**FACTOR 6**	**COMMUNALITY**
Money	0.930	-0.210	-0.195	0.185	0.132	-0.029	1.000
Safety/security	0.724	-0.234	-0.269	0.193	0.242	-0.502	1.000
Maintenance of project facility	0.245	-0.857	-0.333	0.244	0.160	-0.097	1.000
Materials	0.248	-0.339	-0.857	0.220	0.172	-0.104	1.000
Ideas	0.351	-0.490	-0.366	0.677	0.178	-0.114	1.000
Skill/labour	0.500	-0.351	-0.447	0.245	0.178	-0.175	1.000
VARIANCE	1.8842	1.3120	1.2894	0.6980	0.4993	0.3171	6.0000
% VAR	0.314	0.219	0.215	0.116	0.083	0.053	1.000

This technique places money as the major variable with safety/security as the next major one, while maintenance of project facility, materials, ideas and skill/labour follow in that order. The negative loadings for factor 2, factor 3 and factor 6 are indicative that these three variables do not relate very well with other variables. However, the overall implication is that the

variables contribute to the effectiveness of the whole system. For the projects to be successfully sustained, the communities and the organisers should monitor the performance of the factors with negative relationships with other variables. It is interesting to observe that the variables with positive factor loading are those given considerable attention to make the new project development involvement- and participation-friendly among the indigenes of the benefitting communities. It needs to be added that money, safety/security, maintenance of project facility, materials, ideas and skill/labour which enhance people's socio-economic well-being are vigorously pursued to guarantee sustainability. It is therefore safe to uphold the alternative hypothesis that states that the involvement of communities is a significant factor in the planning and execution of the EU-MPP6 water supply and sanitation projects in Imo State.

Having used the factor analysis model to detect the contributory role of each variable in the effectiveness of the EU-MPP6 water supply and sanitation projects, with respect to the involvement of the benefitting communities the same data extracted from Tables are respectively subjected to Chi-square model. By subjecting the previous data extracted to Chi-square analysis, it is found in Table 16 that the Chi-square statistic is 12018. Since the Chi-square statistic of 12018 is greater than the critical value (χ_{α}^{2}) of 41.337 at 28 degrees of freedom for 95 percent confidence limit, the null hypothesis is rejected. It is therefore, concluded that the involvement of the communities is a significant factor in the planning and execution of the EU-MPP6 water supply and sanitation projects in Imo State.

TABLE 16: CHI-SQUARE STATISTIC BASED ON STAGES OF COMMUNITY INVOLVEMENT IN THE PLANNING AND EXECUTION OF THE EU-MPP6 WATER SUPPLY AND SANITATIO PROJECTS

o_{ij}	e_{ij}	$o_{ij} - e_{ij}$	$\frac{(o_{ij} - e_{ij})^2}{e_{ij}}$
13060	13060		12018

In the same vein, by subjecting another previous data extracted to Chi-square analysis, it is found in Table 17 that the Chi-square statistic is 4695.4. Since the Chi-square statistic of 4695.4 is greater than the critical value (χ_{α}^{2}) of 41.337 at 28 degrees of freedom for 95 percent confidence limit, the null hypothesis is rejected. It is therefore, concluded that the involvement of the communities is a significant factor in the planning and execution of the EU-MPP6 water supply and sanitation projects in Imo State.

TABLE 17: CHI-SQUARE STATISTIC BASED ON MODES OF INVOLVING THE COMMUNITY IN THE PLANNING AND EXECUTION OF THE EU-MPP6 WATER AND SANITATION PROJECTS

o_{ij}	e_{ij}	$o_{ij} - e_{ij}$	$\frac{(o_{ij} - e_{ij})^2}{e_{ij}}$
7445	7445		4695.4

Furthermore, by subjecting yet another previous data extracted to Chi-square analysis, it is found that in Table 18 the Chi-square statistic of 10876.77165 is greater than the critical value (χ^2_α) of 41.337 at 28 degrees of freedom for 95 percent confidence limit, the null hypothesis is rejected. It is therefore, concluded that the involvement of the communities is a significant factor in the planning and execution of the EU-MPP6 water supply and sanitation projects in Imo State.

TABLE 18: CHI-SQUARE STATISTIC BASED ON CONTRIBUTIONS MADE BY THE COMMUNITY TO THE PLANNING AND EXECUTION OF THE EU-MPP6 WATER AND SANITATION PROJECTS

o_{ij}	e_{ij}	$o_{ij} - e_{ij}$	$\frac{(o_{ij} - e_{ij})^2}{e_{ij}}$
12240	12240		10876.77165

Generally, given the result of the respective analysis, it is safe to conclude that the involvement of the communities is a significant factor in the planning and execution of the EU-MPP6 water supply and sanitation projects in Imo State.

Hypothesis 2

$H_{0:}$ The EU-MPP6 water supply and sanitation projects in Imo State have not contributed to the socio-economic well-being of the rural people and improvement of their livelihood strategies.

$H_{A:}$ The EU-MPP6 water supply and sanitation projects in Imo State have contributed to the socio-economic well-being of the rural people and improvement of their livelihood strategies.

To test the hypothesis, the statistical technique that is used is the multiple regression model. As shown in Table 19, the two-tailed t-test model is applied to the extractions made respectively from Tables on sources of water supply of households before and after the EU-MPP6 water supply and sanitation project intervention in order to test the hypothesis that the EU-MPP6 water supply and sanitation projects in Imo State have not contributed to the socio-economic well-being of the benefitting indigenes. From the Table 19, it is found that the two-tailed t-test-statistic is 2.280. Testing at 95 percent significance level at 6 degrees of freedom, the critical value is 1.943. Since the two-tailed t-test-statistic is greater than the

critical value, the null hypothesis is rejected. This indicates that the EU-MPP6 water projects as the preferred source of water in the communities after the intervention**.** It is therefore affirmed that the EU-MPP6 water supply and sanitation projects in Imo State have contributed to the socio-economic well-being of the benefitting rural people.

TABLE 19: TWO-TAILED T-TEST-STATISTIC BASED ON SOURCES OF WATER SUPPLY OF USER-HOUSEHOLDS BEFORE AND AFTER THE EU-MPP6 WATER SUPPLY AND SANITATION PROJECT INTERVENTION

		TWO-TAILED T-TEST				
SN	YB	YA	Di =abs(YB-YA)	Di^2	$(\Sigma\ Di)^2$ =	1394761
C1	36	0	36	1296	$\Sigma\ Di^2$ =	429187
C2	488	132	356	126736	$N.\ \Sigma\ Di^2$ =	3004309
C3	293	44	249	62001	$N.\ \sum Di2 - (\sum Di)^2$ =	1609548
C4	117	94	23	529	N . (N - 1) =	42
C5	45	36	9	81	S^2 =[N. ∑ Di2 - (∑ Di)2]/ [N.(N-1)] =	38322.57
C6	59	39	20	400	$S = \sqrt{(S^2)}$ =	195.7615
C7	0	488	488	238144	t = DA * √(N)/S =	2.280
		SUM	1181	429187	DEGREE OF CONFIDENCE, θ =	90%
		AVERAGE	168.7142857		α = 100 -θ =	10
		Σ Di =	1181		For two tailed, α/2 =	5
		DA = Σ Di / N =	168.7142857		(100 - α/2)=	95
					$t_{6,\ 95}$ =	1.943

NOTE: C1-C7=NUMBER OF CASES; YB=RESPONSES BEFORE; YA=RESPONSES AFTER

Also, in testing the hypothesis that the EU-MPP6 water supply and sanitation projects in Imo State have not contributed to the socio-economic well-being of the benefitting indigenes, the data in Table 20 shows the result of the two-tailed t-test model application to the extractions from Tables on amount paid for water by households before and after the EU-MPP6 water supply and sanitation project intervention. From the Table, it is found that the two-tailed t-test-statistic is 3.089. Testing at 95 percent significance level at 5 degrees of freedom, the critical value is 2.015. Since the two-tailed t-test-statistic is greater than the critical value, the null hypothesis is rejected. This indicates that the presence of the EU-MPP6 water projects is causal to the considerable reduction in the amount paid for water by households in the benefitting communities after the intervention**.** It is therefore affirmed that the EU-MPP6 water supply and sanitation projects in Imo State have contributed to the socio-economic well-being of the benefitting rural people.

TABLE 20: TWO-TAILED T-TEST-STATISTIC BASED ON AMOUNT PAID FOR WATER BY HOUSEHOLDS BEFORE AND AFTER THE EU-MPP6 WATER SUPPLY AND SANITATION PROJECT INTERVENTION

		TWO-TAILED T-TEST				
SN	YB	YA	Di =abs(YB-YA)	Di^2	$(\Sigma\ Di)^2$ =	211600
C1	138	322	184	33856	$\Sigma\ Di^2$ =	53746
C2	46	43	3	9	$N.\ \Sigma\ Di^2$ =	322476
C3	83	35	48	2304	$N.\ \sum Di2 - (\sum Di)^2$ =	110876
C4	123	33	90	8100	N . (N - 1) =	30
C5	110	29	81	6561	S^2 =[$N.\ \sum Di2 - (\sum Di)2$]/ [N.(N-1)] =	3695.8667
C6	80	26	54	2916	$S = \sqrt{(S^2)}$ =	60.79364
		SUM	460	53746	t = DA * √(N)/S =	3.089
		AVERAGE	76.66666667		DEGREE OF CONFIDENCE, θ =	90%
		Σ Di =	460		α = 100 -θ =	10
		DA = Σ Di / N =	76.66666667		For two tailed, α/2 =	5
					(100 - α/2)=	95
					$t_{5,\ 95}$ =	2.015

NOTE: C1-C7=NUMBER OF CASES; YB=RESPONSES BEFORE; YA=RESPONSES AFTER

Furthermore, in order to test the hypothesis that the EU-MPP6 water supply and sanitation projects in Imo State have not contributed to the socio-economic well-being of the benefitting indigenes. Using the data in Table 21 derived from the application of the two-tailed t-test model to the extractions from Tables on the purposes for which water fetched by households before and after the EU-MPP6 water supply and sanitation project intervention is used, it is found that the two-tailed t-test-statistic is 2.532. Testing at 95 percent significance level at 6 degrees of freedom, the critical value is 1.943. Since the two-tailed t-test-statistic is greater than the critical value, the null hypothesis is rejected. This again indicates that there has been favourable disposition by the benefitting communities towards the use of the EU-MPP6 project water for most of their domestic purposes after the intervention**.** It is therefore affirmed that the EU-MPP6 water supply and sanitation projects in Imo State have contributed to the socio-economic well-being of the benefitting rural people.

TABLE 21: TWO-TAILED T-TEST-STATISTIC BASED ON PURPOSES FOR WHICH WATER FETCHED BY HOUSEHOLDS IS USED BEFORE AND AFTER THE EU-MPP6 WATER SUPPLY AND SANITATION PROJECT INTERVENTION

		TWO-TAILED T-TEST				
SN	YB	YA	Di =abs(YB-YA)	Di^2	$(\Sigma\ Di)^2$ =	956484
C1	69	516	447	199809	$\Sigma\ Di^2$ =	264472
C2	235	358	123	15129	$N.\ \Sigma\ Di^2$ =	1851304
C3	220	380	160	25600	$N.\ \sum Di2 - (\sum Di)^2$ =	894820
C4	240	362	122	14884	N . (N - 1) =	42
C5	107	88	19	361	S^2 =[N. ∑ Di2 - (∑ Di)2]/ [N.(N-1)] =	21305.24
C6	90	75	15	225	$S = \sqrt{(S^2)}$ =	145.9631
C7	0	92	92	8464	t = DA * √(N)/S =	2.532
		SUM	978	264472	EGREE OF CONFIDENCE, θ	90%
		AVERAGE	139.7142857		α = 100 -θ =	10
		Σ Di =	978		For two tailed, α/2 =	5
		DA = Σ Di / N =	139.7142857		(100 - α/2)=	95
					$t_{6,\ 95}$ =	1.943

NOTE: C1-C7=NUMBER OF CASES; YB=RESPONSES BEFORE; YA=RESPONSES AFTER

CONCLUSION

Inequitable access to water poses a serious and growing threat to sustainable development and protection of the environment. Human health and welfare, food security, industrial development and the ecosystems on which they depend are all at risk, unless water and land resources are managed more effectively than they have been in the past. There is need for new approaches to management of water resources, which can be brought about through the involvement from the highest levels of government to the smallest communities. Commitment will need to be backed by investments and capacity building programmes. Effective management of water resources demands a participatory approach, wherein decisions are taken at the lowest level, with full consultation and involvement of users of the project. The results obtained from this study have explicitly shown that the strength of EU projects lie in community participation, for it made the programme possible. Now it is clearly evident that overall well-being of beneficiaries has improved and their involvement with the projects has built the capacity of benefiting communities. Thus, the programme has achieved its stated aim of improving the quality of life of the people. The European Union Micro-Projects Programme (EU-MPP6) on water supply and sanitation has significant impacts in the lives of the rural people of Imo State, Nigeria-the study area. This is evidenced in reduced water-related infection, improved personal hygiene, and time saved to expand productive activities. The implication of these observations is the need for more improved community-based programmes /strategies in externally-funded water and sanitation development actions in other rural communities in Nigeria, as this will go a long way in reducing the profile and trend of ineffective and unsustainable projects associated with externally-funded water supply and sanitation projects.

REFERENCES

Briscoe, J. & Ferranti, D. (2005). *Water for rural communities: Helping people help themselves*. Washington D. C.: World Bank.

Federal Ministry of Water Resources. (2000). *National policy on water supply and sanitation*. Abuja, Nigeria: Federal Ministry of Water Resources.

Fox, W. F. (2006). *Strategic options for infrastructure development in Nigeria.* Washington D. C.: World Bank.

Imo State Government. (2006). *Statistical year book 2006,* Owerri, Nigeria: Ministry of Finance and Economic Development,

Okereke, P.A., Udeagu, I.E., & Eze, U.E. (2000). *Water supply management in Nigeria examples in some states.* Owerri, Nigeria: M. Cojee Publicatons.

Okereke, P.A. & Onyenechere, E.C. (2009). Evaluating externally funded water supply projects in Nigeria. *Asian Journal of Water, Environment and Pollution 6* (3), pp. 61-65.

Okereke, P.A. (2010). An assessment of the performance of rural water supply schemes in Imo State. In U. M. Igbozurike, M. A. Ijioma, & E. C. Onyenechere (Eds.), *Rural Water Supply in Nigeria.* (pp. 37-44). Owerri, Nigeria: Cape Publishers.

Onyenechere, E. C. (2004). Water supply measures used by the rural people of Ebonyi and Enugu, Nigeria. *The Journal of Water Supply Research and Technology 3* (6), pp. 425-431.

Sahn, D.E. & Stifel, D. (2001). Exploring alternative measures of welfare in the absenceof expenditure data, Cornell University, Ithaca.

United Nations, (2001). *Millennium declaration*. New York: United Nation Economic and Social Council.

United Nations. (2003). Action plan for water. New York : United Nations.

World Health Organization. (2002). *Childhood diseases in Africa: Fact sheets*. Retrieved from **www.WHO.int/inf-fs/en/fact_109.html**.

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