Access and Utilization of Climate Services among Vulnerable Communities in Nigeria: A Case Study of Isoko Communities in Delta State

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ABSTRACT

The devastating impacts emanating from climate related hazards cast doubts in the accessibility and utilization of climate services. This survey aims at investigating access and utilization of climate services among vulnerable communities in Nigeria using Isoko communities in Delta State as a case in point. Isoko land was selected for the study due to its high vulnerability to climate change especially as cause by flooding. Data for the study were obtained through questionnaire administration and content analysis of official documents. Analysis of data was done with the use of Statistical Packages of the Social Sciences (SPSS). Results indicate among others poor understanding of climate services by vulnerable communities in the study area a high positive correlation between usage of climate services and income, ownership of radio and television as well as local community groupings. The survey consequently calls for greater enlightenment programmes and the integration of local medium in the communication of climate services in the region for effective access and utilization of climate services by vulnerable communities in the region.

Keywords: *Climate; Services; Access; Utilization; Vulnerable; Communities; Niger-Delta*

INTRODUCTION

With rising and clear cut evidences of changing climatic conditions and its associated negative impacts on livelihoods, property and the ecosystem, the need for improved access and utilization of climate services by vulnerable communities has been recognised by governments and other stakeholders. Climate services play critical roles in providing Early Warning Systems (EWS), increasing awareness and adaptation practices among vulnerable communities (Nyenzi and Malone, 2005). Effective climate services offer great potential to inform decision making in the face of increasing uncertainty, improve management of climate-related risk and help individuals to adapt to change (Tall *et al.*, 2012). Climate services are scientifically based information and products that enhance users' knowledge and understanding about the impacts of climate on their decisions and actions. Climate services deliver data, statistical analyses, tools, and other information resources about historical weather patterns and expected future climate conditions including temperature and precipitation scenarios, sea-level changes and their potential impacts on agriculture, infrastructure, health, and other sectors. It has been shown to be useful in planning various activities that depend on climate information. In the agriculture sector, farmers are able to

select more effective planting times, and choose the most appropriate crops for the coming season. In the health sector, it is used in designing early warning systems to improve surveillance on diseases affected by climate conditions (such as Malaria, Dengue Fever, and so on) and help mitigate against the suffering resulting from weather extremes such as heat waves and winter cold, and urban smog events (Nyenzi and Malone, 2005; Ayubu, Malongo, Siza and Respickius, 2012). In the construction industry, planners and engineers use long-term climate forecasts to decide where buildings should be sited as floodplains move, or how to design bridges to ensure they can withstand increasingly heavy storms (McMichael *et al* 2003, Patz, 2002).

Despite the significant potential of climate services in aiding vulnerable groups in better coping with climate variability, save lives, and preserve livelihoods, there are only a few haphazard instances of successful transmission and use of climate services and other climate risk management tools by policy makers and communities at risk (Suarez, 2009; Onwuemele, 2013). One of the most widely reported application of climate services was the October 18, 2013, Cyclone Phailin, which tore through the Indian states of Odisha and Andhra Pradesh. It was the equivalent of a category 5 hurricane as strong as Hurricane Katrina, which devastated the US Gulf Coast in 2005 with a death toll of 1, 836 (Federal Emergency Management Agency, 2005). Thanks to climate services utilization by the Indian Government which led to the evacuation of more than 800,000 people from coastal areas and hence the casualties figures were as low as 21 but that number was far fewer than the 10,000 people who died in a storm in the same area in 1999 (United Methodist Committee on Relief (UMCOR), 2013).

In Nigeria, the Nigerian Meteorological Agency (NMET) has the mandate to provide climate services for sustainable development and safety of life and property in the country. In response to this mandate, the agency produces Seasonal Rainfall Prediction (SRP) in the first quarter of every year. In addition, the agency provides daily weather forecasts which are disseminated through the electronic media. Apart from NMET, academic institutions such as universities, non-governmental organizations and research institutions are other main sources of climate services in Nigeria (Onwuemele, 2013). Despite the availability of these institutions and their services, the devastating impacts emanating from climate related hazards such as flooding in the last decade cast doubts in the accessibility and utilization of climate services by vulnerable communities in Nigeria.

One region in Nigeria that is vulnerable to climate change is Isoko land in the Niger-Delta. Isoko communities are noted for high agricultural activities but highly vulnerable to climate change impacts especially flooding and suffered severe impacts during the 2012 flood disaster in Nigeria. The level of access and utilization of climate services among vulnerable communities in Nigeria have not been fully investigated. The questions then are: What are climate services and what are the available climate services and channels of communication in Nigeria? How accessible are the available climate services and to what extent are they utilized in planning for adaptation and mitigating practices? It is on this premise that this study aims at investigating access and utilization of climate services among vulnerable communities in Nigeria.

MATERIALS AND METHOD

The cross sectional survey design was adopted for the study. The population of the study consists of household heads in Isoko communities. Eight communities (Uzere, Umeh/ Erohwa, Olomoro, Irri, Otibio, Orie, Ofagbe, Ovrede) were randomly selected from a list of communities in Isoko land. Thirty (30) copies of structured questionnaire were randomly administered to each of the selected community. A total of two hundred and forty (240) copies were administered in all. Data for the study were obtained through the questionnaire administration. In addition, content analysis was carried out on key official documents of NMET which is the officially recognised climate services agency in Nigeria. Analysis of data was done with the use of statistical packages of the Social Sciences (SPSS) using mainly descriptive statistics while the official documents were content analysed.

RESULTS AND DISCUSSION

Socio-Demographic Characteristics: Out of the 240 copies of the questionnaire administered to the respondents, 234 representing 97.5 per cent were retrieved. Of this, 56.8 per cent were males while 43.2 per cent were females. The majority of the respondents are married (Figure 1 and 2). Results further indicates an average household size of 5 persons per household and about half of the respondents have between 4-6 children and 29.5 per cent have between 7-9 children (Figure 3). Also, Figure 4 indicates that the majority of the respondents have secondary school education while about 13.0 per cent have no formal education. Education is considered as a key determinant of public access to information (Etta and Parvyn Wamahiu, 2003). Therefore, the relatively moderate educational qualification of respondents will play significant roles in helping respondents in accessing climate services from the available sources in the study area. Table 1 shows the occupation and income of the respondents. Table 1 indicates that the majority of the respondents are engaged in trading/business activities while only 14.1 per cent are engaged in farming activity as a source of livelihood. The few number of respondents engaged in farming activity may not be unconnected with the apathy associated with farming due to degradation in soil quality and the seasonal flooding that destroys crops and fish ponds annually (Onwuemele, 2009). With respect to income, about 19.2 per cent of the respondents earned less than ₦10,000 per month. This translates to about ₦333 per day and given an average household size of five, the ₦333 per day is reduced to ₦66 per day which is below the internationally recognised poverty benchmark of $1 per day. Another 34.5 per cent of the respondents earned between ₦11,000 and ₦20,000. This translates to about ₦666 per day and given an average household size of five, the ₦666 per day is reduced to ₦ 133 per day. To stay above the poverty line, each household is expected to earned at least ₦22,500 per month. If poverty is defined globally, as living below the equivalent of $1.00 per capita/day, then, it implies that one out of every ten respondents is currently living below the poverty line. To a very large extent, the income of an individual determines the quality of his/her life and where income is low, as with the case of the study area, the quality of life will be correspondingly low such that the ability to purchase newspapers and domestic ICT facilities as well as radio and television are hampered.

Respondents Household Assets: Availability of key household assets is generally important for household sustainability and even important in improving household's resilience to climate change impacts. With respect to access to climate services, the availability of reliable electricity supply, radio/television sets as well as telecommunication are fundamentally important. In spite of this, the respondents in the study area do not posses significant household asset (Table 2). For instance, the majority of the respondents indicate the availability of electricity connections in their households but it is not reliable. Again, the majority of the respondents respectively indicate the availability and reliability of radio/ television sets and telecommunication. However, the epileptic power supply poses a major challenge for effective sustainable utilization of these assets. In addition, about 70.5 per cent of the respondents belong to community groups. The above scenario has serious implications on the part of the households in accessing the available climate services.

Availability of key household assets is generally important for household sustainability and even important in improving household's resilience to climate change impacts. With respect to access to climate services, the availability of reliable electricity supply, radio/television sets as well as telecommunication are fundamentally important. In spite of this, the respondents in the study area do not seem to posses' significant household asset (Table 2). For instance, the majority (52.1%) of the respondents indicated the availability of electricity connections in their households but it is not reliable. Again, the majority (63.7%) of the respondents respectively indicated the availability and reliability of radio/television sets and telecommunication; however, the epileptic power supply poses a major challenge for effective sustainable utilization of these assets. In addition, about 70.5 per cent of the respondents belong to community groups. The above scenario has serious implications on the part of the households in assessing the available climate services.

Climate Change Impacts and Types Affecting Households in the study area: The study further attempts to determine if the study area has been affected by climate impacts in the past years and the types of impacts they have experienced. Table 3 shows households that have been affected by climate change in the study area. Table 3 indicates that over 90 per cent of the respondents had experienced climate change impacts in the past years. This very fact clearly demonstrates the importance of enhancing climate services access among households in the area. Again, Table 4 shows that flooding is the dominant climate change impacts in the study area. More than half of the respondents identify flooding as the dominant climate change impacts closely followed by heavy rainfall and sea level rise. The above finding may be justified by the geographical location of the study area and its proximity to the Atlantic Ocean. In the light of the above finding, the study further attempts to identify respondents that are using climate services in the area of study. Despite the importance of climate services in climate change adaptation, among vulnerable communities, only 31.2% of the respondents in the study area are using climate services in planning for adaptation while the majority noted that they are not using climate services (Figure 2). The above findings not only confirm the fact that there is poor access to climate services, but it also indicates that there is poor utilization of climate services in the study area. This finding is supported by Tall *et al*. (2012) who indicate that there is gross under utilization of

climate services particularly in the developing countries including Nigeria. Among the reasons advanced are the absence of sustained dialogue between climate services providers and end users and the information provided by climate services providers was largely incomprehensible to decision maker/disaster manager.

For the thirty-one respondents who indicate that they are using climate services, it was important to determine the sources of their access to climate services and Table 5 shows that more than half of the respondents that have access to climate services got it through radio and television. This result is also in line with Onwuemele (2012) who identifies the mass media as the main source of climate information dissemination in Nigeria. However, this finding is in contrast to Lwoga, Ngulube and Stilwell (2010), who reveal that Information Communication Technology (ICT) including radio, TV and telecenters are not utilized by local communities. Also, about 16.1 per cent received the climate information through relatives and friends while 12.9 per cent received it through newspapers and journals. Table 5 further shows that about 40.4 per cent of the respondents utilize climate services in the planning of flood mitigation while 33.7 per cent used it in planning for agricultural operations. Also significant is the fact that 16.9 per cent of the respondents that use climate information apply it in taking decision on when to harvest fish from local ponds. The harvesting of fish from local fish ponds is one major economic activity in the study area. Local fish ponds are found around the homes of the respondents and are usually harvested before the rainy season commences but changes in climatic condition often times force the rain to commence earlier. This earlier rain contributes to seas level rise which leads to flooding in the communities and destroying of the local fish ponds. Plate 1 and 2 show some of the local fish ponds in the study area.

With respect to the 86.6%-of the respondents that do not use climate services, it was important to identify the reasons behind their non utilization of climate services. Table 5 indicates that about half of the respondents did not understand the meaning of climate services. The rural nature of the study area may account for this observation and about 42.0 per cent of the respondents state that climate services are not readily available. Furthermore, 2.4 per cent and 5.9 per cent note that it is not usually accurate and not regular respectively. These findings have serious policy implications especially the issue of non availability of climate services. The non-availability of climate services to these respondents does not imply the absence of up-to-date and accurate climate services in Nigeria, it only implies that the methods of communication of the available climate services have to be reviewed especially for local communities that may not have access to radio and television, newspapers and journals and other electronic media such as Internet and small message services (SMS) support services.

Types of climate services needed by Respondents and Preferred Channels of Communication: At this juncture, it became pertinent to determine the kind of climate services needed by respondents and their preferred channels of communication. Table 6 reveals that about 61.1 per cent of the respondents require early warning systems as their main climate services while 25.6 per cent require climate services on rainfall prediction. However, only 4.7 per cent of the respondents demand climate services on drought

prediction. The excessive rainfall in the study area may account for the high number of respondents requiring climate services for rainfall prediction. Table 6 also indicates that the preferred channel of communication of climate services is dominated by community channels accounting for 52.1 per cent. In view of the above findings, it is important to include community channels such as the use of community groups (men, women and youths groups) in the dissemination of climate services information at the community level. The results on Table 7 show the relationship between usage of climate services and basic demographic characteristics and household assets. Usage of climate services increase with income, ownership of radio and television, membership of community groups and access to telephone. On the other hand, neither the level of education, household size, nor sex are significantly correlated with the usage of climate services.

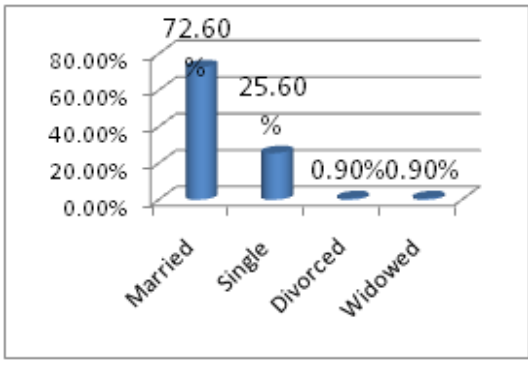

Figure 1: Gender of Respondents

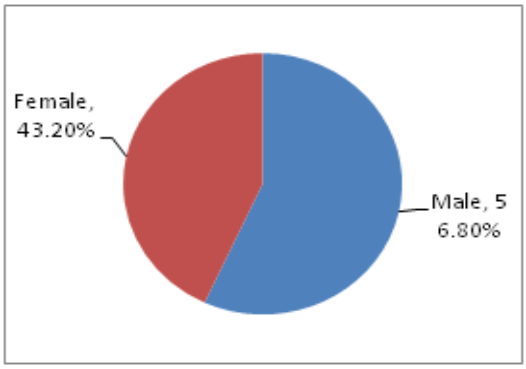

Figure 2: Marital Status of Respondents

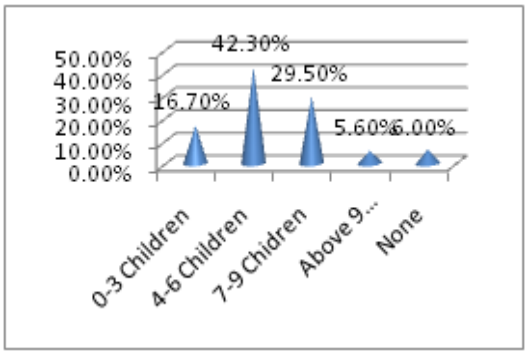

Figure 3: Household size of Respondents

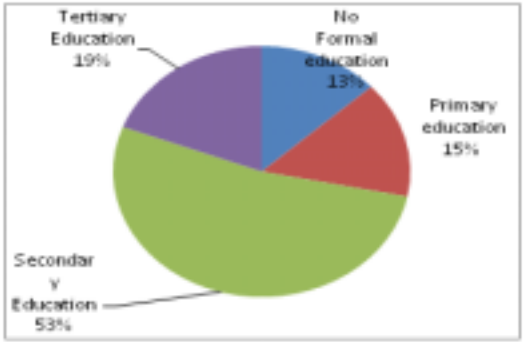

Figure 4: Educational Qualification of Respondents

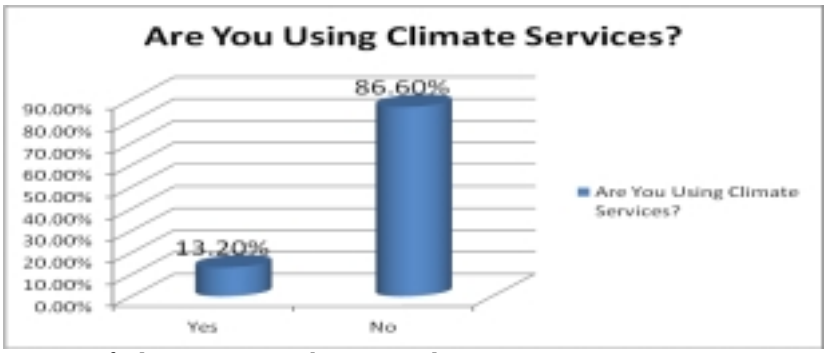

Figure 5: Usage of Climate Services by Respondents

Table 1: Occupation and Income of Respondents

Occupation:	**No. of Respondents**	**Per cent**
Farming	33	14.1
Trading/Business	117	50.0
Civil/public servants	10	12.8
Transport	15	6.4
Artisans	39	16.7
Total	**234**	**100.0**
Income Per Month:		
Below ₦10,000	45	19.2
₦11000-₦20,000	81	34.6
₦21,000-₦40,000	62	26.5
₦41,000-₦60,000	33	14.1
Above ₦60,000	13	5.6
Total	**234**	**100.0**

Source: Fieldwork, 2014

Table 2: Respondents Household Assets of Respondents

Electricity:	**No. of Respondents**	**Per cent**
Not Available	16	26.5
Available but not reliable	122	52.1
Available and Reliable	50	21.4
Total	**234**	**100.0**
Radio/Television:		
Not Available	43	18.4
Available but not reliable	42	17.9
Available and Reliable	149	63.7
Total	**234**	**100.0**
Telecommunication:		
Not Available	44	18.8
Available but not reliable	41	17.5
Available and Reliable	149	63.7
Total	**234**	**100.0**
Membership of Group:		
Yes	165	70.5
No	69	29.5
Total	**234**	**100.0**

Source: Fieldwork, 2014

Table 3: Households Affected by Climate Change

Survey Questions	**Yes**	**No**	**Total Respondents**
Have your community or households negatively affected by climate change impacts over the years?	213 (91.4%)	20 (8.6%)	223 (100%)

Source: Fieldwork, 2014

Table 4: Types of Climate Change Impacts

Types of Impacts	**No. of Respondents**	**Percent**
Floods	132	56.4
Heavy rainfall	76	32.5
Sea level Rise	19	8.1
Shift of Seasons	7	3.0
Total	**234**	**100.0**

Source: Fieldwork, 2014

Table 5: Sources, Usage and Reasons for not Using Climate Services

Sources of Climate Services	**No. of Respondents**	**% of Respondents**
Printed materials	1	3.2
TV/Radio	16	51.6
Newspapers/Journals	4	12.9
Workshops	3	9.7
Friends/Relatives	5	16.1
Social Media (facebook, Twitter)	2	6.5
Total	**31**	**100.0**
What are you using climate using climate services for?	**No. of Respondents**	**% of Respondents**
Planning mitigation for flooding	13	40.4
Taking decision on when to plant crops	10	33.7
taking decision on when to harvest from local fish ponds	6	16.9
General daily activities	2	6.7
Total	**31**	**100.0**
Why are you not using climate services?	**No. of Respondents**	**% of Respondents**
Dont know what it means	102	49.8
Is not readily accessible to me	86	42.0
Is not usually accurate	5	2.4
Is not usually regular	12	5.9
Total	**205**	**100.0**

	Age	**Household Size**	**Income**	**Membership of Groups**	**Access to TV/Radio**	**Educa-tion**	**Access to Telephone**	**Sex**
Usage of Climate Services	-.0564 (0.456)	0-.160 (0.140)	0.154** (0.018)	0.190*** (0.004)	0.248*** (0.000)	0.057 (0.384)	0.174** (0.007)	0.010 (0.883)

Correlation between Usage of Climate Services Basic Household Assets

Demographic Characteristics

*p-value in parentheses, ***p < 0.01, **p < 0.05*

Plate 1: Local Fish Pond at Ofagbe

Plate 2: Local Fish Pond at Umeh/Erowa

Table 6: Kinds of climate services Needed by Respondents and Channels of Communication

What kinds of climate services do you need?	**No. of Respondents**	**% of Respondents**
Data	10	4.3
Maps/Graphics	10	4.3
early warning Systems	143	61.1
Rainfall Prediction	60	25.6
Drought Prediction	11	4.7
Total	**234**	**100.0**

Which of the channels do you prefer to obtain your climate services?	**No. of Respondents**	**% of Respondents**
Radio/TV	60	25.6
Newspapers/Journals	23	9.8
Social Media	17	7.3
Printed materials like posters	12	5.1
Community channels (extension officers, local governments, town hall meetings, community associations)	122	52.1
Total	**234**	**100.0**

Source: Fieldwork, 2014

CONCLUSION AND RECOMMENDATIONS

The utilization of climate services has proved to be effective in the mitigation and adapting to climate change impacts. Considering the vulnerability of the study area to the vagaries of climate change impacts, there is urgent need to improve access of vulnerable communities of the region to climate services. The need to improve access to climate services to the people of Nigeria to enhance adaptation also stems from the strategic importance of the area with respect to the generation of revenue for the country. As a matter of fact, the country cannot afford loss of lives as well as major oil installations in the region to the vagaries of changing climate such as flooding and sea level rise which is a daily threat in the region. While climate services are available from Nigerian Meteorological Agency (NIMET) and other institutions, the effective dissemination of climate services to the last mile to reach the most vulnerable communities is the major challenge. In the light of the findings of this study, the following are proposed for the dissemination of climate services in Nigeria.

1. States and Local Government Councils in Nigeria should embark on enlightenment campaigns to increase awareness among vulnerable communities on the usefulness of climate services in planning for adaptation activities.
2. NMET should integrate community channels in the dissemination of climate services.
3. It is important that NMET work with local communities to determine the climate services needs and this could guide the kind of services that NMET provides for end-users.

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