

# Assessment of Impacts, Vulnerability and Adaptation to Climate Change in the Niger Delta

By

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**Research Policy Brief**

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## **Project Description:**

At the current level of coordinated response to climate change challenge in Nigeria, vulnerability of Livelihoods supported by the Niger Delta communities are shrouded in uncertainties. This project was aimed at generating information to unravel these uncertainties and to adequately describe the impact of climate change related hazards on biodiversity and livelihoods, the vulnerability and adaptation to climate change and taking cognisance of the gender dimensions of climate change in the Niger Delta region of Nigeria. The three states, Bayelsa, Delta and Rivers, described as the core Niger Delta states were studied. A total of 1630 community members participated in providing information for the research. In compliance with the National policy on gender (MoWASD, 2007) selection process gave equal opportunity for men and women to participate. Due to the crosscutting nature of the impacts of climate change a multidisciplinary team of researchers and development practitioners were engaged in the study. The Sustainable livelihood framework using a structured questionnaire survey combined with participatory rural appraisal (PRA) and community dialogue were adopted to generate information with which inference was drawn and conclusions reached.

## **The major Climate change hazards identified in the Niger-Delta communities**

The most pervasive hazards are those associated with increasing temperature. In the Niger Delta, using monthly average temperatures and rainfall data for 1976 to 2009, maximum temperatures in Warri rose by  $0.0226^{\circ}\text{C}$  while in Port Harcourt they rose by  $0.025^{\circ}\text{C}$  on the average. Rainfall rose on the average by 0.962mm and 0.498mm for Warri and Port Harcourt, respectively. The forecast values for average temperatures for Warri and Port Harcourt by the year 2100 were  $0.145^{\circ}\text{C}$  and  $0.092^{\circ}\text{C}$ , respectively. The forecast values for average rainfall for Warri and Port Harcourt by the year 2100 were -0.338mm and -4.328mm, respectively. In the presence of delayed onset of rainfall accompanied by excessive heat, crops were scorched in Oko-Amakom, Uzere, Bebelebiri and the other communities to a lesser degree. These findings are in consonance with the predictions of IPCC, 2007.

The second most pervasive of the hazards are the impacts associated with rainfall patterns in terms of timings and volume. In line with the IPCC(2007a) observations, Precipitation levels are on the downward trend. According to IPCC (2007b), patterns of precipitation change are more spatially and seasonally variable than temperature changes. The perception of the respondents are in line with trends computed from NIMET time series data on rainfall and the predictions by IPCC for tropical regions IPCC(2007c) which has predicted that “even in areas where mean precipitation decreases, precipitation intensity is projected to increase but there would be longer periods between rainfall events”. This corroborates the observations in the Niger-delta region. Observations show that changes are occurring in amount, intensity and frequency of precipitation. Rainfall in the months of June and September, which are the peak periods, also showed an increasing trend. The communities have observed increase in time intervals between rainfalls.

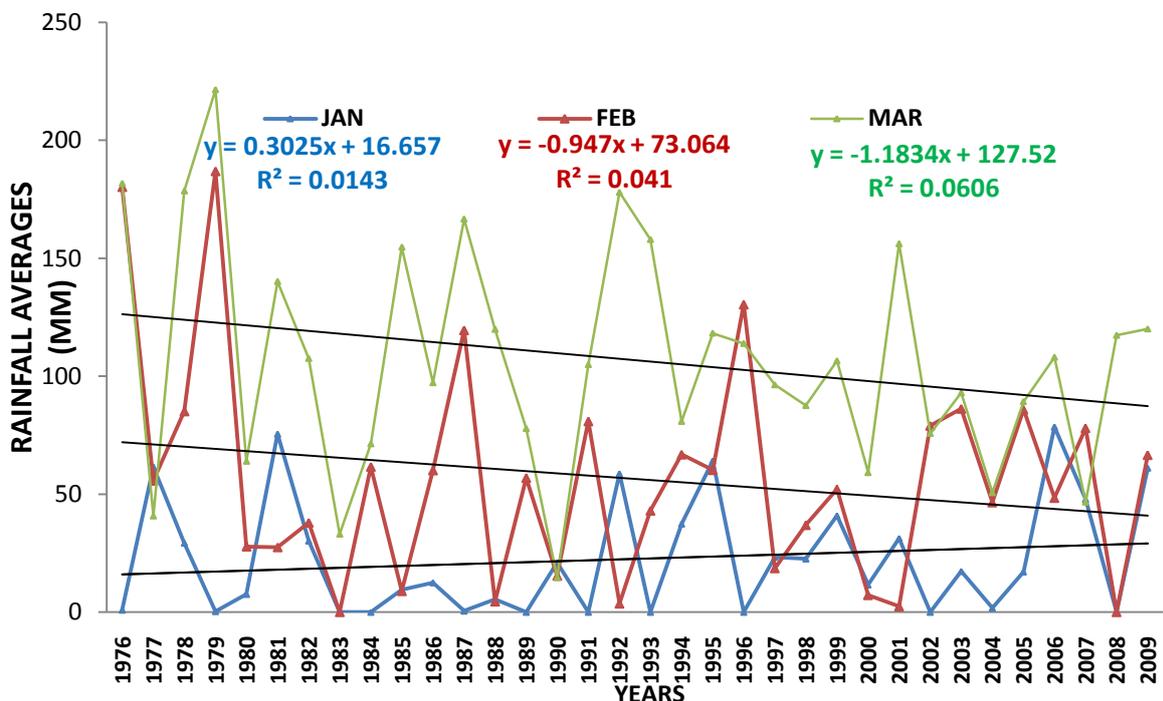


Figure1: Seasonal analysis for early rainfall pattern for Port-Harcourt

Figure 1 shows seasonal analysis for early rainfall pattern for Port-Harcourt and Warri. In both locations rainfall in January show increasing trend, while for February and March rainfall series show declining trend over the period 1976 to 2009. These findings lend credence to the respondents' perception of increasing early rains and declining early rains which were initially thought of as a contradiction.

The third most pervasive of the hazards of climate change is flood. This derives from overflow of the rivers, the Atlantic Ocean, River Niger and other rivers in the region. IPCC(2007) predicted that there will be increases in the occurrence of both floods and droughts. This is what has occurred in Oko-Amakom, by the bank of the River Niger. Other important hazards include coastal erosion and windstorm in Abari, sea level rise and sea surge. The later occurred in Rukpoku, Rumu-Orosi, Ndoni, Odi, and Uzere within the last 30 years.

#### Impacts of Climate Change on Agriculture and Biodiversity:

Changes in climatic variables and events have had profound adverse impacts on climate dependent livelihoods as uncertainties in the onset of the farming seasons, extreme

weather/climate events (such as, storms, high temperatures), crop pests, animal diseases, weeds and land degradation increase. The study revealed that the changes in the climate related hazards over the past 30years such as increased temperatures, dwindling and erratic rainfall patterns, flood, erosion, sea surges, sea level rise, thunder/wind/rainstorms have affected agricultural productivity and the stock of aquatic life adversely. Yield and output of crops, non timber forest products, wild life resources, fish stock production in river/streams, and fishery production have declined, while soil erosion, river bank erosion, weed infestation, premature ripening of fruits due to scorching heat and drought events increased.

### **Vulnerability of livelihoods to climate change**

The level of vulnerability of various livelihood capitals varied by asset type and by gender. The findings show that a majority of respondents observed a decline in their financial capitals over the past 30years. The women seem to have been affected most as 67.4% and 68.5% of them observed a decline in the income obtained from forest products and natural resources respectively, while 60.4% and 61% of the men observed a decline in the income obtained from forest products and natural resources respectively. This is not surprising as women depend more on natural capital. The findings from the field show that in the past 30years a majority of the respondents have witnessed a decline in the availability of a great number of those natural capitals. Both men and women found that water hyacinths have increased and become means of obstruction in most waterways in the Niger Delta region. They also witnessed increasing impact of climate change hazards on physical capitals. The most affected of these were educational buildings recording 70% and 68.6% by men and women, respectively.

The results further show that there have been increases in the various human capitals examined. The observations however varied for men and women. Death in the community recorded the highest percentage increases for both men (76.4%) and women (69.3%). The ownership of land, skilled labour, permanent and temporary migration have increased for men. The women on the other hand reported decline in land ownership as part of their lands were lost to floods and erosion. They also reported decline for availability of skilled labour and health of household members. Though 51.9% reported increase in consumption of meat, fish, egg, more women (61.2%) reported increase in consumption of starch, yam and garri the stomach filling foodstuffs. The results show that although there have been an increase in the social capital over the years for both men and women, the increases were higher for men, while increase in membership of CDC was seen to have increased by 79% of men, 65% for women, while 71% increase was recorded by men in sharing of responsibilities in the communities only 51% increase was recorded by women. This suggests that there are gaps in responsibility sharing and decision making in the Niger-Delta. The gender gap is not farfetched as there still exists negative socio-cultural stereotypes which tend to exclude women from decision making process in many communities.

### **Level of vulnerability by costs of the impact of climate change hazards on the Niger-delta communities**

Climate change comes with a high price tag for the Niger-delta, Nigeria and the rest of the world. The results showed that in the past 30years (as far as they can recall) livelihood capitals valued at ₦ 484,892,225 equivalent to US\$ 3,232,614.84 were lost to climate change hazards in the Niger-delta. When disaggregated by gender, the men lost ₦223, 446,113 equivalent to US\$1,742,970.09, while the women lost N261,446,113 which is equivalent to US \$1,742,970.09. This implies that the women are more vulnerable to the hazards of climate change. The highest losses were recorded in natural capital for both men and women while the women recorded losses valued at US\$1,021,620 the men recorded US\$ 786,740 showing that the women are more vulnerable in terms of natural capital. This is not surprising as

women depend to a great extent on collection of forest products, crop farming and fishing. Women depend on the rich bio-diversity of the Niger-delta for food, spices, and medicinal plants. The monetary values of losses by gender are shown on in figure 2.

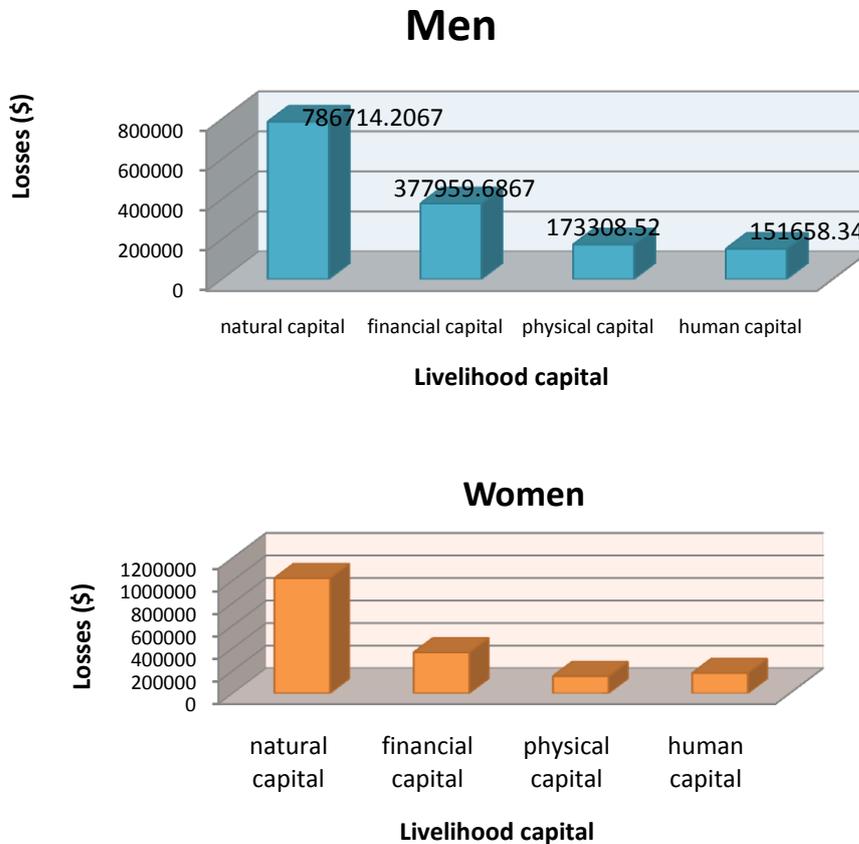


Figure 2: Monetary losses of livelihood capital caused by climate change hazards

### **Adaptive capacity**

The study has provided empirical evidence that gender, availability of technical skills and other vital resources, cultural compatibility and acceptability of adaptation, feasibility of adaptation option, speed of implementation, age of farmer, years of farming experience and income are determinants of adaptive capacity although each adaptation option had its own set of determinants, the results corroborate the report of the working group II to the third assessment report of IPCC (2001) and the Tearfund (2009) reports. Therefore in developing adaptation options for Niger-delta communities gender must be mainstreamed into policy, programmes and budgets at both local, state and national levels.

### **Adaptation Options for the Niger Delta**

The Niger-delta people understand the need to adapt to climate change as only 3% of respondents felt that there was no need to take action. The construction of concrete flood barriers ranked first having been selected by 94% of respondents followed by financial support for orphans, widows and other vulnerable groups (93%), construction of coastal protection (92%), include climate change issues in Government budgets at all Levels (90%) information on climate events/hazards and how to respond (69%) ranked second, third, fourth and fifth respectively. The Niger-delta people understand the need to adapt to climate change as only 3% of respondents felt that there was no need to take action.

### **Constraints to adaptation in the Niger-Delta**

The most critical of the constraint was governments' irresponsiveness to climate risk management. The next most critical constraints in descending order were lack of access to credit facilities, limited income the seemingly absence of "Government presence", lack of information as to what to, inadequate knowledge on how to or build resilience, limited availability of land for farming, limited access to weather forecast technology, poor information and absence of early warning systems, high cost of farmlands, poor access to information source low availability and access to improved farm inputs such as improved cultivars, seeds, seedlings and insecticides.

### **Conclusion:**

There is no doubt that climate change has had profound impact on communities in the niger delta.

### **Policy Options**

#### **(1) For the short term the following recommendations were made:**

- Provide early warning Information on climate event and how to respond;
- Training on how to respond to climate events;
- Create access to microcredit for affected households;
- Intensify the role of extension workers;
- Create **budget head for** climate related hazards;
- Train farmers on alternative agricultural and nonfarm enterprises with grants to launch out into the new enterprises;
- Declare emergency in affected communities and provide Emergency relief fund/interventions;

#### **(2) For the Long Term Needsthe following recommendations were made:**

- Concrete barriers/ embankment projects;
- Construction of shore protection/ sand filling;
- Biological control measures;
- Dredging and sand filling;
- Develop technology to use water Hyacinths;
- Relocate households from hazard prone locations;
- Massive tree planting along shorelines and everywhere and Operation plant 2 trees in place of 1 felled;
- New laws and regulations against forcing factors;

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