



## Participatory Assessment Of Climate Change Impacts On Agriculture And Strategies For Adaptation



## **RURAL LINKAGE NETWORK (RULIN)**

Our Mission is to link up the deprived, neglected and uncared for rural people with a world that cares, where their hopes and aspirations could be actualized and poverty and diseases are eradicated through research, education, capacity building, empowerment, infrastructure and skill development.

RULIN works in collaboration with health care policy-makers; environmental protection policy makers; gender experts, managers, service providers, and other key stakeholders in a bid to help close the gap between knowledge and action in various aspect of human development. RULIN has worked with USAID, UNDP, MSH, Ministry of Environment Delta state, ministry of health, Africare, EU-MPP3. DELSACA and IHVN.

RULIN's major objective is to increase the participation of rural communities in developmental efforts by empowering them to solve their own problems through capacity building and participatory rural appraisal exercises.

RULIN VALUES are Accountability, probity, transparency, Credibility and Diligence, positive contribution to social justice, personal integrity, commitment to our shared mission and excellence in our work.

### **RULIN Standards of Performance:**

1. Demonstration of Integrity and patriotism in the Conduct of Work
2. Work Effectively and Collaboratively with all colleagues
3. Seek and use resources wisely and productively
4. Anticipate and avoid problems through planning
5. Manage time and other resources effectively
6. Willingly accept reasonable work and offer to help others
7. Within job constraints, seek opportunities to develop skills, knowledge and experience
8. Engender Trust and Cooperation showing respect and courtesy at all times
9. Mainstreaming gender in all aspects of our operations.

**Our focus is Community Development** which covers: Care for Orphans, Out of school Teenage girls & boys, HIV & AIDS education, Research, Situation & Needs assessment, Environmental Protection & climate change; Policy Advocacy, Gender services, Human Resource development and Capacity building.

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**Project Title:** Participatory assessment of impact of climate change on agriculture and strategies for adaption;

**Project Number:** NGA/SGP/OP4/RAF/10/018;

**Grant Recipient:** Rural Linkage Network, No. 15 Good Street, Boji Boji Owa, P.O Box 1119, Agbor, Delta state, Nigeria;

**Location of Project:** Oko-Amakom, Oshimili South Local Government Area, Delta State, Nigeria

**Target beneficiaries:** Farmers in Oko- Amakom Community including women and youths

## **ACKNOWLEDGEMENT**

We in Rural Linkage Network are grateful to the Small Grant Projects (SGP), Global Environmental Facility and United Nations Development Programme (UNDP) for the support given to us to provide information, education and build capacity for mitigation of climate change and adaptation strategies in a rural community (Oko-Amakom) that is already suffering from the devastating impact of climate change.

We use this opportunity to empathize with members of the Oko-Amakom community and other coastal communities who lost their entire livelihood and households that lost family members during the September 2012 massive flooding that affected twenty one states in Nigeria. It is obvious that the time to curb our carbon footprints and act to combat the debilitating impacts of climate change is no other time than now.

Join us in our campaign to **CUT CO<sub>2</sub> TO 350PPM. Save our earth and save generations after us!**

**Project Director:** Prof. Patrick N. Okoh

**Project Description:**

The objective of the intervention was to increase community knowledge and response to climate change events through a participatory approach that ensured community ownership from inception.

The mission of the project was to achieve the project objectives through training and providing support to increase the number of farmers planting adaptive trees and high performance arable crops, producing and using compost manure, fabricating and using fuel wood efficient stoves that would reduce deforestation.

The intervention was carried out through participatory assessment of impact of climate change on agriculture and delineation of strategies for adaptation. The project was implemented as designed to reach over 250 persons within the community through consultation, awareness, sensitization and advocacy visits; and to select fifty pilot farmers in Oko-Amakom community. Through activities that involved training and focal group discussions, the fifty pilot community project farmers identified by participatory approach the climate change issues confronting the community and how to adopt new strategies for adaptation to impact and mitigation of climate change. For the mitigation of the impact of Climate change and reduction of deforestation, community members were introduced to the fabrication and use of efficient fuel wood stoves and the production and use of compost manure to reduce the use of organic fertilizer. These services were provided to the fifty pilot farmers through the five farmers' clubs of ten farmers each. The fifty project pilot farmers are now serving as change agents to affect the other members of the community and beyond. The project has been implemented as designed with community participation and

ownership, youth participation and gender sensitive programming and mainstreaming.

### **Climate Change Context in Oko-Amakom:**

Oko-Amakom is located on the Eastern part of Oshimili south Local Government Area of Delta State. It is bounded on the North by Asaba town, South by Uchi, West by Ibusa, East by Odekpe/River Niger. Oko-Amakom is an Igbo speaking community.

Information provided by Community member during the scoping exercise showed that the area was already experiencing various climate change events such as; Sea level rise, Excessive heat, Sea surge, Flooding and Erosion. The extreme flooding of August to October 2013 led to the loss of all forms of livelihood assets.

The frequencies and cycles of occurrence of Climate Change events as assessed by members of the Community for the past 30 years showed that excessive heat was ranked highest, followed by flood and erosion respectively. The Climate change events by Community assessment affect all forms of livelihoods.

### **The Community identified the following as impacts of climate change:**

- i. Crops Production:
  - Inaccessibility to farmland
  - Low soil nutrient due to erosion and decrease in silt deposits
  - Damage to farmland especially due to flooding and excessive heat
  - Reduction of land available to farming
  - Crop failure due to excessive heat and flood
  - Inaccessibility of roads leading to inability to transport product to urban markets
- ii. Fish Production
  - Stream pollution due to turbidity results in low fish harvest
  - Destruction of fish natural habitat
  - Fish migration leading to reduced fish catch from the river
- iii. *Forest, biodiversity/wildlife*
  - *Reduction in economic trees and forest products*

- *extinction of wild species of plants and animals*
- *Reduction in biodiversity in plants and animals*

### ***Gender dimension of climate change***

The effect of climate change was noted to be affecting the entire community, men, women, youths and children. However, since women are more involved in crop production, natural resources dependence and fisheries than the men, they are affected by the climate change events than the men.

### **Impact of climate change events on physical environment:**

- Road
  - Inaccessibility of road due to flooding
  - Non availability of transport vehicles to convey farm produce to Urban towns leading to Agro -product spoilage
  - Increased cost of transportation which results in high cost of living and exacerbation of poverty
  - High cost of vehicle maintenance due to bad roads
  - Difficulty in movement due to muddy and marshy grounds
  - Overflow of pathways and roads with water
  - Haze and dust during the heat and dry season
  - Increased number of deep ditches and potholes on access roads rendering them impassable
- Power and energy
  - Destruction of electric poles because of high flood incidence leading to black-out
  - Reduction of business activities due to power shortage
  - High cost of using and maintaining Generator set.
- Other Impacts
  - High incidence of diseases due to heat
  - Migration of youths to cities because unfavorable living condition in the Community.

### **Coping and adaptation strategies in place before the project:**

The coping and adaption strategies by the community before this project included:

- i. Minor erosion control such as digging of channels to reduce flooding of the road
- ii. Early harvesting of crops during periods of unexpected flooding of farmland
- iii. Construction of wooden bridges to provide access roads in the flooded footpath
- iv. Adoption of fadama cropping.

**Problems the project sought to solve:**

The main problems the project sought to address were:

- Knowledge gaps of the community members on the causes and effects of climate change;
- Lack of capacity of the community members to respond to the impact of climate events;
- Ineffective adaptation measures;
- Inability to identify and adopt better adaptation measures and interventions to mitigate climate change impacts.
- Low level of skill being a major hindrance to adoption of GHG mitigation and climate change adaptation measures.
- High level of poverty and unavailability of resources (human & material) needed to mitigate the impact of climate change.

## Project Strategies, Achievements and Outcomes

### Strategy 1: Community engagement:

Community engagement on climate contexts was through participatory rural appraisal (PRA), Sensitization, advocacy and awareness visits.

### Project achievements and outcome:

- 260 committee members were intimated on challenges on Climate Change and the adaptation plan supported by UNDP and RULIN. Information on OKo-Amakom Climate Contexts were generated through focus group discussion and key informant interviews.
- 219 committee members were enlightened on Climate Change, causes, impacts and sensitised on appropriate responses, mitigation and adaptation strategies.
- The participatory approach ensured community participation, ownership and project sustainability.
- 50 pilot members were selected as pilot farmers for the project.



Project Director Prof. P. N. Okoh in community engagement/sensitization



Councillor welcoming RULIN team to Oko-Amakom community



*Team and community representatives on their way to farm site to collect soil and Water samples*



*Women Focus group discussion*

## **Strategy 2: Tree planting:**

Through participatory process and expert guidance from RULIN's Team of experts, economic trees were selected, supplied and planted.

### **Project achievements and outcome:**

- The following numbers of tree seedlings were planted:
  - 400 Kola nut tree seedlings
  - 100 Lime tree seedlings
  - 100 Sweet orange tree seedlings
- It is expected that the kola nut trees will sequester 80 tons of Carbon dioxide equivalent (CO<sub>2</sub>e), the lime and orange trees will sequester 20 tons of CO<sub>2</sub>e each.
- The trees will help to mitigate green house gases (GHG) in the atmosphere.
- The trees will help to reduce the high rate of deforestation in Delta state where forest cover has reduced to 28%.
- When they are matured they will produce fruits that can be sold to generate income for the households.



### Strategy 3: Agricultural technology transfer:

- (i) High yielding improved cassava variety TMS-9810581 was introduced in Oko-Amakom Community through the fifty pilot farmers. The variety is characterised by:
  - Early tuber formation,
  - large and heavy tubers;
  - low tuber water content; and
  - continued propagation by the stem without losing its yield efficiency.
  - It is very economically beneficial investment for the cassava farmers who are mainly women.
  - 12,500 heads were planted in the community.
- (ii) Yam minisetts technology: to make yam production more cost effective yam minisetts technology was introduced. The farmers were trained on how to produce minisetts. 19,750 yam minisetts were supplied as each pilot farmer received 395 yam minisetts.

**Yam minisetts for planting in Oke-Amakom**



**Yam tuber obtained from minisetts harvested prematurely**



**Local cassava variety**



**RULIN variety (TMS-98/0581)**



**Large stems of RULIN variety (TMS-98/0581)**



**Large tubers of RULIN variety (TMS-98/0581) harvested after only 8 months**



**Strategy 4: Production and distribution of energy saving wood stove:**

- (i) Production and distribution of energy saving wood stove: RULIN obtained a proto-type of energy saving wood stove from Maiduguri, produced 60 pieces of it. Each pilot farmer in Oko-Amakom received a stove.
- (ii) Capacity building for community artisan: The community chosen representative was trained and his skill was developed to produce the energy saving wood stove within the community.
- (iii) Capacity building and sensitisation for the use of the energy saving wood stove was conducted for the pilot farmers.



***Training session in Oko-Amakom: Project Director displaying the energy saving wood stove***



## Strategy 5: Production of compost manure:

The traditional method for handling agricultural biomass has been “the slash and burn” process that generates and releases a high amount of biogases, such as, nitrous oxide, carbon dioxide, carbon monoxide, methane and others into the atmosphere. It also destroys the top soil. The compost manure has been found to be more climate and environmentally friendly and more cost effective than inorganic fertilizers.

The 50 pilot farmers had the opportunity to have “hands-on” training on the production of compost manure using cut vegetation and at little or no cost to them.



### **Strategy 6: Capacity Building:**

Capacity building was an important component of the project in Oko-Amakom. The 50 pilot members and the CPMC members went through series of trainings on various aspects of the project activities.



### **Strategy 7: Monitoring & Evaluation and Extension services:**

Monitoring and Evaluation (M&E) was an integral part of the project. Extension services were provided for farmers on how to tend the tree seedling, the cassava and yam minisetts.



RULIN staff on evaluation of the impact of flooding in Oko-Amakom

### **Strategy 8: Production of Information, Education and Communication (IEC)**

**Materials:** Guidelines on production of yam minisetts and production of compost manure were produced for farmers.



### **Economic Impact of the Project**

1. The new variety of cassava yielded 100% more than the traditional variety in half the time of cultivation and growth.
2. It has increased food supply and increased household income.
3. The yam minisetts technology produced twenty (20) tubers of seed yams from one tuber. This has increased food supply and income for household that were able to harvest before the great flood of August to October, 2012.
4. The stove energy saving stove has helped to
  - Reduce the quantity of firewood used for cooking
  - Reduced the time taken by women and girls in search of fuel wood.

- Reduced the amount of Green House Gases released into the atmosphere
- Reduced dangers posed by inhaling much smoke by women, girls and the entire household when cooking with fuel wood.
- It reduced the cooking time and gives women and girls more time to do other useful social, economic and political activities.

## **Sustainability**

- The key components that make the project sustainable include: training, human resources, capacity building, community participation, awareness and organizational support.
- The expert support provided by Rural Linkage Network through regular monitoring, advisory services and evaluation visits has continued to sustain the community's tempo to hold on to the tenets of the project particularly after the devastating flood of 2012.
- The production of handbooks for instruction on how to handle various issues arising from climate change, multiplication of yam seedlings and production of high efficiency cassava variety has left a lasting legacy for the farmers' future emancipation from poverty.
- Other communities who wish to create effective and sustainable development and are willing to adopt these new ideas from Oko-Amakom are already approaching Oko -Amakom community for access to the new technology, particularly the improved cassava stems and the energy saving wood stove.

## Challenges

1. The very bad road to Oko-Amakom has posed a serious challenge to the project team.

The RULIN team has been stranded on many occasion and RULIN vehicles have lost many parts in the often flooded and muddy road. This has cost our organisation a lot of money in repairs.

2. The community is difficult to mobilize. They have many belief that make it difficult to assemble anytime we want them to.
3. Extreme flood of 2012 was devastating and led to losses of houses, household properties and over 70% of farmers' farm investments in 2012.



Figure 1 RULIN Vehicles damaged on Oko-Amakom bad road





only means of transportation to Oko-Amakom during the flood

Canoes are the

## The Project Team



The Project management team



***Community Project Management Committee Members in Oko- Amakom Community***

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