WORLD ENVIRONMENTAL CONSERVATION CONFERENCE

2023

CLIMATE CHANGE PARTNERSHIP ACTIONS FOR SUSTAINABLE FUTURE AND RESTORING LIFE ON EARTH

Proceedings of the 6th edition of World Environmental Conservation Conference

18th – 21st October, 2023

EDITIORS: Agele, S. O. (PhD), Balogun, I. A. (PhD), Oluleye, A. (PhD) and Oladeji S. O. (PhD)

Production of Proceedings

Netlink Environmental Conservation Organisation

Room 21 Abubakar Adamu Bulding

Federal University of Technology, Akure.

Design amd Printing of Proceedings

Maryj Printing Press

ACAD Fagbote Filling Station Akure-Ilesha Expressway

Phone number: +23407063411658

Copies of Proceedings

Dr. S. O. Oladeji

President, Netlink Environmental Conservation Organisation (NECOR),

Room 21 Abubakar Adamu Building

Federal University of Technology, Akure.

P. M. b. 704, Akure, Nigeria

E-mail: sooladeji@fita.edu.ng.

sooladeji@necorng.org

info@necorg.org.

www.mecorng.org.

ISSN: 2705-2850

Scientific Review Committee

Prof. S. O. Agele- Chairman Scientific Committee
Department of Crop, Soil and Pest Management, FUTA
+2348035784751
soagele@futa.edu.ng

Prof. I. A. Balogun
Department of Meteorology,
Federal University of Technology,
Akure.
iabalogun@futa.edu.ng.

Prof. A. Oluleye
Department of Meteorology,
Federal University of Technology,
Akure.
aoluleye@futa.edu.ng.

Dr. S.O. Oladeji
Department of Ecotourism and Wildlife Management, FUTA.
Executive Director, NECOR
+2348030698896
sooladeji@futaedu.ng.
sooladeji@necorng.org

PREFACE

There is a growing concern on the adverse impacts of climate on biodiversity. This phenomenon is greatly manifested in form of shifting weather patterns threatening global food security, health and species existence. Humanity is at the receiving end of the consequences of climate change hence there is a need to step up actions on all fronts- overtime, everywhere all at once.

This calls for collaboration, partnership and networking to strengthening synergy among relevant stakeholders in a bid to tackling climate change menace. This forms the basis for the theme of this year world Environmental conservation conference: **CLIMATE CHANGE PARTNERSHIP ACTIONS FOR SUSTAINABLE FUTURE AND RESTORING LIFE ON EARTH.** The theme is conceived with a view to create an interface for information sharing and offer opportunities for participants to refine their commitments and pledges in the quest to achieving Sustainability in the face of climate change.

This year World Environmental Conservation Conference is memorable in the sense that it received overwhelming funding from the host - West African Science Service on Climate Change and Adapted Land use). WASCAL is posed to provide information and knowledge at the local, national and regional level to cope with the adverse impacts of climate change. Thus, this conference will offer opportunities for participants to learn from good practices demonstrated and showcase by WASCAL during the course of the conference. It will also strengthen staff-student exchange and provide prospect for Doctorate Research Doctoral Research in West Africa Climate System Programme (DRP WACS) – WASCAL among others.

Special appreciation goes to the management of The Federal University of Technology, Akure the host institution, National Park Service and African Regional Center for Space Science and Technology Education-English (ARCSSTE-E) that co-host this conference. We equally acknowledge other private, individual and corporate organizations that have contributed towards the success recorded in this event.

All the submitted articles were subjected to strict double blind peer-review process by the reviewers that are experts in the area of the particular submitted manuscript. The accepted manuscripts are published in WECC 2023 proceedings and also available for download on the organization website (www.necorng.org).

The accepted manuscripts fall within the underlisted subthemes:

- Climate change adaptation strategies in Agriculture, Forestry and Other Land Use (AFOLU)
- Climate smart city and architectural landscape design
- Retrofitting and decarbonization in tourism and hospitality industry
- Indigenous knowledge and local innovation in climate change adaptation
- Climate risk management, health, safety and hygiene
- Carbon credit-offset marketing/circular economy
- ICT development in environmental conservation (image processing and acquisition, computer vision, graphics, speed, interface technology, HMD devices, GIS: Body Tracking, AI and IOT, VRT, IVE).

We commend our keynote speaker Prof. Douda Kone Director Capacity Building Department, WASCAL Headquarter, Ghana and other guest speakers Prof. Babatunde Rabiu, Director General, Chief Executive Office, African Regional Centre for Space Science and Technology Education-English (ARCSSTE-E) and Dr. Goni I. M., Conservator General National Park Service.

It is hoped that researchers, students and policy makers will find the papers in this book very useful. Even though all the papers were reviewed and edited, the content and option expressed remain essentially that of the authors and not necessarily that of Netlink Environmental Conservation Organization.

Dr. Oladeji S. O.

President Netlink Environmental Conservation Organization

Convener World Environmental Conservation Conference

TABLE OF CONTENT

EMERGENCY PREPAREDNESS MEASURES ADOPTED BY FISH FARMERS TO CLIMATIC HAZARDS IN SOUTHWEST NIGERIA

Ayodele T. Awolala[1], Taye T. Amos[2], O.O. Akinrinola[3], D.O. Awolala[4] and O.A.Thompson[5]

[1,2,3,4] Department of Agricultural Resource and Economics, Federal University of Technology, P.M.B 704, Akure, Nigeria.

Phone Number: +2348163052169, +2348053408799

Corresponding author: Ayodele T. Awolala[1]

E-mail: teodele9@gmail.com or awolalaat@futa.edu.ng

ABSTRACT

The study focused on the emergency preparedness measures adopted by fish farmers to climatic hazards in Southwest Nigeria. A multi-stage sampling technique were used to select the respondents for this study. In the first stage, Ondo, and Ogun States were purposively selected in the tropical rainforest zone of the Southwest Nigeria. These States have coastlands in addition they are prominent for fishing activities and climatic hazards as well as water logged area is a common occurrence. In the second stage, stratified random sampling of two (2) Local Government Areas (LGAs) namely Ilaje LGA and Ese-Odo LGA in Ondo State while Odogbolu LGA and Ijebu Water Side LGA were selected in Ogun State. The Selection of the LGA's was based on was based on the fact that these LGAs were the prominent ones where intensive fishing activities take place. In the third stage, four (4) fishing communities were randomly selected from each LGA while in the final stage, sixteen (16) respondents were randomly selected in each of the community. The respondents were expected to be 256 but only 220 questionnaires were returned. Therefore, a sample selection of 220 respondents were sampled for this study. Data collected from 220 respondents were analyzed using frequency table, descriptive statistics and charts. The average age of the respondents was 49 years, 56.36% of the respondents observed flood as the major climatic hazards in the study area, followed by erosion (19.55%) and change in rainfall pattern (12.27%) respectively. The most of the important adaptation strategies adopted is building embankments to prevent flooded water, planting of shaded crop to prevent erosion, improved fish managements, procurement of weather/water monitoring kits, insurance policies and diversification measures were adopted in the study area to cushion the effects of being vulnerable to various climatic hazards in the study area. Therefore, policy and local development practitioners should give priority to highly vulnerable households by encouraging them to practice climate smart agriculture and improved fish farming management as well as insure their business to ameliorate the effect of climate risks on their business.

Keywords: *Emergency Preparedness; Fish Production; Climate Change; Climatic Hazards and Fish Farmers.*

INTRODUCTION

Fisheries production especially from marine is important for the socio-economic development of Nigerians and its contribution to the nation's economic growth through the Gross Domestic Product (GDP). Nigeria is blessed with enough marine fisheries resources that could enhance increased fish production (Olaoye and Ojebiyi, 2018). Aquaculture is currently the fastest growing livestock production sector in Nigeria and worldwide. The contribution of the Nigerian aquaculture production has been increasing since 1995 with the contribution of 0.07% to world aquaculture production and 0.42% of world aquaculture production in 2014. The above classification into capture (fishing) and culture fisheries (aquaculture) is based on the culture/management system. The fisheries sector is a means of growing the economy, creating jobs, enhancing food security and reducing poverty (Asiedu *et al.,* 2017; Garlock *et al.,* 2020). In sub-Saharan Africa, it plays a major role in the livelihoods and food and nutrition security of people (Aheto *et al.,* 2019). Fisheries accounted for about 20% of the global animal protein production and provide protein to one-fifth of the global population (Falola *et al,* 2022). The identified problems led to questions that are raised on the perceived effects of climatic hazards on aquaculture production prevails in the coastal areas and the autonomous coping measures had been adopted to manage Climatic hazards in the study area.

Therefore there is a need to assess the socioeconomic characteristics of fish farmers and the perceived effects of climatic hazards on aquaculture production and autonomous coping measures in managing climatic hazards in the study area. The objectives of the study is to describe socioeconomic characteristics of aquaculture fish farmers in the coastal communities of Southwest Nigeria and the perceived effects of climatic hazards on aquaculture production and autonomous coping measures in managing climatic hazards in the study area.

LITERATURE REVIEW

Concepts of Disasters and Hazards

Disaster refers to a slow or fast destructive event that causes loss of lives, injury to people, damage of properties, disruption of economic activities that resulted to loss of livelihood and/or causes environmental and ecological degradation. UNISDR (2007) defined disaster as a

serious disruption of the function of a community or society, which results in widespread damages and losses that are more than the ability of the affected community or society to cope using its own resources. A hazard is a dangerous phenomenon, substance, human activity or condition that may cause loss of lives, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. IPCC SREX (2012) defines hazard as the potential occurrence of a natural or human-induced physical event that may cause loss of lives, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, and environmental resources with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.

MATERIALS AND METHODOLOGY

Study Area

This study was carried out in Ondo State and Ogun State in the Southwest part of Nigeria. The South West region of Nigeria offers a wide range of sights and experiences from the beaches in Lagos to the natural springs in Osun State and from the historical City of Ibadan to the mountain caves of Ogun State. South West Nigeria has six states namely Ekiti, Lagos, Ogun, Ondo, Osun and Oyo (My Guide Nigeria, 2017).

Sampling Techniques

A multi-stage sampling technique were used to select the respondents for this study. In the first stage, Ondo, and Ogun States were purposively selected in the tropical rainforest zone of the Southwest Nigeria. These States have coastlands in addition they are prominent for fishing activities and climatic hazards as well as water logged area is a common occurrence.

In the second stage, stratified random sampling of two (2) Local Government Areas (LGAs) namely Ilaje LGA and Ese-Odo LGA in Ondo State while Odogbolu LGA and Ijebu Water Side LGA were selected in Ogun State. The Selection of the LGA's was based on was based on the fact that these LGAs were the prominent ones where intensive fishing activities take place. In the third stage, four (4) fishing communities were randomly selected from each LGA while in the final stage, sixteen (16) respondents were randomly selected in each of the community. The respondents were expected to be 256 but only 220 questionnaires were returned. Therefore, a sample selection of 220 respondents were retrieved for this study.

Primary data were collected though a field survey at rural households' level through the use of structured questionnaire among fishermen in the selected communities. Personal interviews with the fishermen and women who lives in coastal areas were conducted to provide baseline information on the effects of exposures to climatic hazards and coping strategies common in the study area. Key Informant Interview (KII) and Focus Group Discussion (FGD) were conducted with men and women groups to ascertain the prevailing circumstances such as the effects of salt water on their aquaculture business, among other salient issues

Method of Data Collection

Primary data were collected on farmers' perceptions on impacts, socioeconomic profiles and adaptation strategies) were collected using a well-structured questionnaire administered to rural households. Interviews and Focus Group Discussions (FGDs) were also used to collect cross section on perceptions and adaptations to climate changes among respondents. Secondary data on Temperature and rainfall were collected from gotten from the Nigerian Meteorological Agency (NIMET).

RESULTS AND DISCUSSIONS

Socio-economic Characteristics of the Respondents

The distribution on Table 1 indicates that 67.3% of the respondents are male while 32.7% are female. This shows the dominance of male farmers in fish farming activities than female in the study area. The production enterprise is male dominated, climate change adaptation decisions might likely be favoured and supported for action.

Table 1 further presents that 60.9% of the respondents have spent between 10 and 20 years in fish farming, another 13.6% have spent between 21 and 30 years in the fish farming business while 22.3% of the sampled fish farmers have less than 10 years farming experience in the fish farming business. The result also showed that 2.3% of the respondents have between 41-40 years farming experience and few fish farmers 0.9 % have above 40 years experiences in fish production as mean of livelihood. This suggests majority of the respondent have acquired farming experience of between 10 to 20 years. Experience plays a prominent role in agribusiness or farm enterprise. The sampled farmers are in better position and frame of mind to accept innovations and knowledge of climate related production technologies and adaptation strategies that will enable them adjust in their coping mechanisms. A sampled farmer has been in farming for an average of 14

years. Similar result were reported by (Gega *et al*, 2018) which showed 84% of the respondents were reported to be males and only 16% were females and this indicates that farming is predominantly males business who have a greater responsibility of providing food and other basic necessities to the family. 53.5% of the respondents fall within the age range of 41-59 years, and about 90.1% were found to be married, moreover, the highest level of education among the respondents is secondary with 56.4%.

Table 1: Distribution of Respondents by Selected Socio-Economic Characteristics

Sex	**Frequency**	**Percentage**
Male	148	67.3
Female	72	32.7
Total	220	100.0
Farming Experience(Years)	**Frequency**	**Percentage**
Less than 10	49	22.3
10-20	134	60.9
21-30	30	13.6
31-40	5	2.3
Above 40	2	0.9
Total	**220**	**100.0**

Source: Field Data, 2023.

Coping Measures Adopted by the Respondents in the Study Area

Figure 1 shows that majority of the respondents (32.27%) adopted building of embankments around their pond as their coping measure, 15.45% adopted planting of cover/shade over their ponds, 15.0% adopted improved fishing managements, 12.73% procure weather/water monitoring kits, 12.27% adopted clearing drainage and river course as coping measure, 10.91% insured their fish farm while 0.91% and 0.45% adopted various diversification measures and building ponds closer to the water course as coping measures respectively.

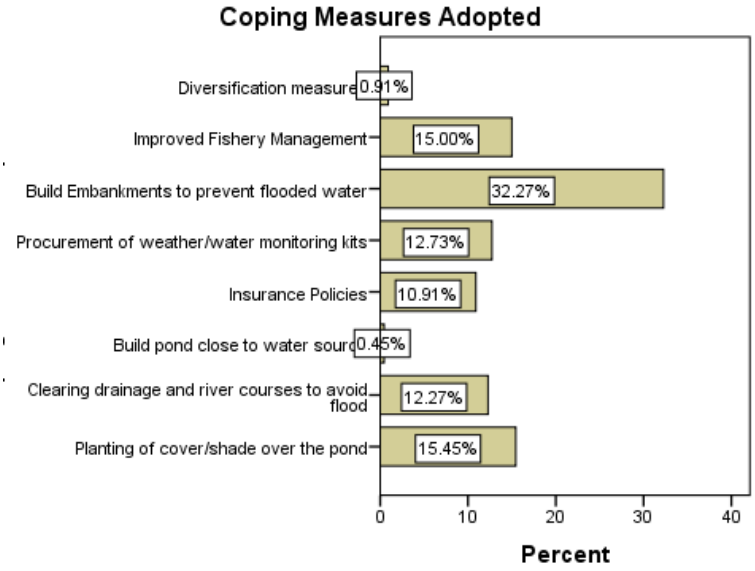

Figure 1: Various Coping Measures Adopted by Fish Farmers in the Study Area

Perceived Effects of Climatic Hazards on Aquaculture Production and Autonomous Coping Measures in Managing Climatic Hazards in the Study Area

Days it takes Flood to Disappeared in the Study Area

Figure 2 showed that majority of the respondents (21.36%) observed that it takes 7 days for the flood to disappeared from their fish farm, 17.73% said it takes 6 days, 15% said it takes 5 days while a few as 9.09% and 0.45% observed that flooded fish farm took 12 days and 20 days for the flood to disappeared. The implication of this is that when farms were flooded the fish farmers lost a lot of fishes and it leads to reduction in their income.

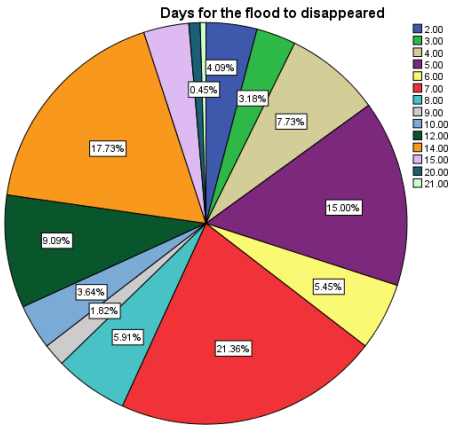

Figure 2: Days for floods to disappear

Frequency of Experiencing Climatic Hazards in the Study Area

Figure 3 shows that majority of the respondents (40.91%) experienced climatic hazards annually, 37.27% experienced the hazards once in every two years, 20.45% experienced climatic hazards once in three years while a few as 1.36% experienced climatic hazards once in four years. The implication is that the fish farmers in the study area are aware of various climatic hazards common in their areas as well as how often it happened. Hence they have adequate climatic information to plan for emergency relief when disaster occurred.

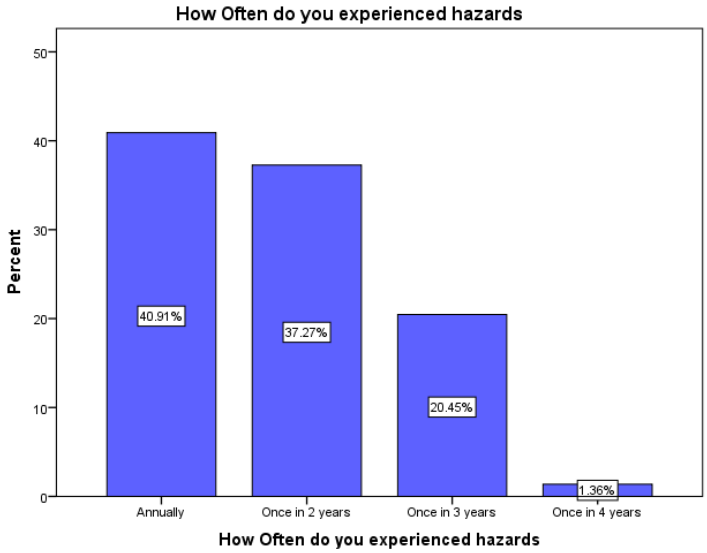

Figure 3: Frequency of Climatic Hazards Occurrences

The Interval between Climatic Hazards and Occurrence

Figure 4 shows the interval between expectation of climatic hazards and it is actual occurrences. The figure showed that majority of the respondents (83.63%) are informed about the likelihood of occurrence of climatic hazards a month earlier while 16.36% have advance information about occurrences of climatic hazards every week. The interval between information about climatic hazards and its actual occurrences is keen to preparation of adaptations measures to combat the effect of climate change in the study area.

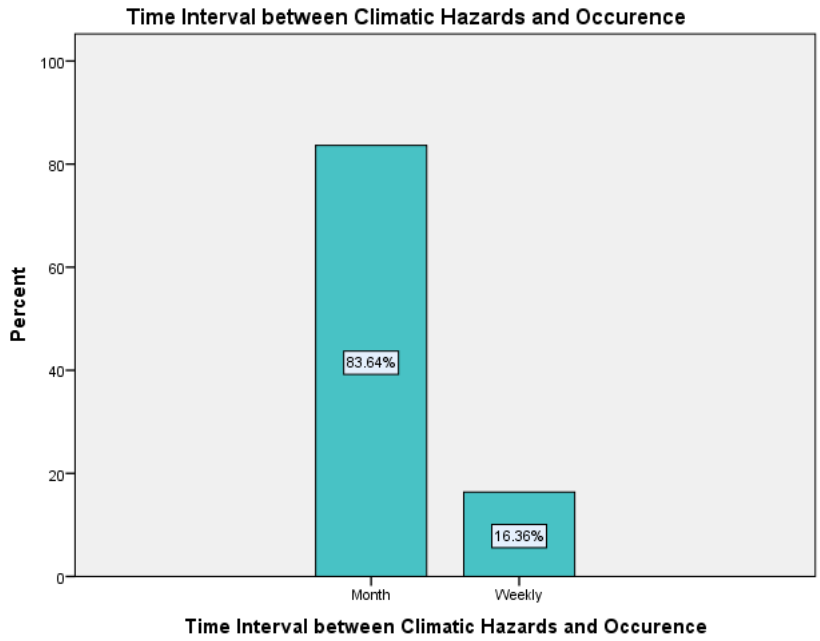

Figure 4: The Interval between Climatic Hazards and Occurrences

CONCLUSIONS AND POLICY ISSUES

The study showed that majority of fish farmers' have adopted various coping measures such as building of embankments around their pond as their coping measure, planting of cover/shade over their ponds, improved fishing managements, procure weather/water monitoring kits, clearing drainage and river course as coping measure, insured their fish farm and various diversification measures in the study area. The study also showed that most fish farmers received information about the likelihood occurrence of climatic hazards at least two weeks in advance, at most a month in advance, this give them sufficient time to plan for emergency measures to ameliorate the effects of climatic hazards and build resilience towards reduction of damage and loss.

Government should encourage fish farmers to engage in climate smart agriculture and insured their business against risks and eventuality. These outcomes will assist decision makers, donors and government agencies in making decisions on interventions with regard to institutional supports for climate-smart developments, thereby reduce the over-arching effect of climate-driven production changes in fish production in Southwest, Nigeria.

REFERENCES

Aheto D.W, Acheampong E, Odoi J.O (2019). Are small scale freshwater aquaculture farms in coastal areas of Ghana economically profitable? Aqua. Int. 27: 785-805.

Allison, E.H., Perry, A., Badjeck, M.C, Adger, W.N, Brown, K., Conway, D, Halls, A.S., Pilling, G.M., Reynolds,J.D, Andrew, N.L. and Dulvy. N.K. (2009). Vulnerability of National Economies to the Impacts of Climate Change on Fisheries. *Fish and Fisheries* 10(2): 173–196.

Asiedu. B, Adetola J. O, Odame K.I, Yildiz. F (2017). Aquaculture in troubled climate: Farmers' perception of climate change and their adaptation. Cogent Food Agri. 3(1): 1296400.

FAO (2016). The state of world fisheries and aquaculture. Rome: Food and Agriculture.

Intergovernmental Panel on Climate Change (IPCC), (2013). Summary for Policymakers. In *Climate Change 2013: The Physical Science Basis*. Contribution of the Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, UK: Cambridge University Press.

IPCC SREX Glossary (2012).http://ipcc-wg2.gov/SREX/images/uploads/SREX-Annex_FINAL.pdf.

My Guide, (2019). https://www.myguidenigeria.com/regionalinfo/south-west-region

My Guide Nigeria (2017). South West Region, March, 2017.

Olaoye, O.J, and W. G., Ojebiyi (2018). Marine Fisheries in Nigeria: A Review.Marine Ecology - Biotic and Abiotic Interactions. .DOI: 10.5772/intechopen.75032.