Climate change effects and adaptation strategies in a Nigerian coastal Agro-ecological zone

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2nd International Symposium on effects of Climate Change on the World's Oceans, May 13 – 20, 2012, Yeosu, South Korea

Introduction

- Scientific evidence confirms the vulnerability and low adaptive capacity of Sub-Saharan Africa and other poor developing countries of Asia and South America to climate change effects (Allison et. al., 2009)

- Approximately 64% of the most vulnerable countries are African, including Nigeria

- In particular, fisheries-dependent communities are vulnerable to climate change effects; and need to develop adaptation strategies to sustain food security (The World Fish Center, 2009; Ziervogel and Ericksen, 2010, Cinner, et. al., 2011).

Definition of terms

Vulnerability: The degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes

Adaptive capacity: Abilities and resources to cope with climate-related changes. Adaptation may be anticipatory (before impacts), autonomous (spontaneous) or planned (the result of deliberate policy decisions) and can occur at different scales: individual, household, government institution, local and national

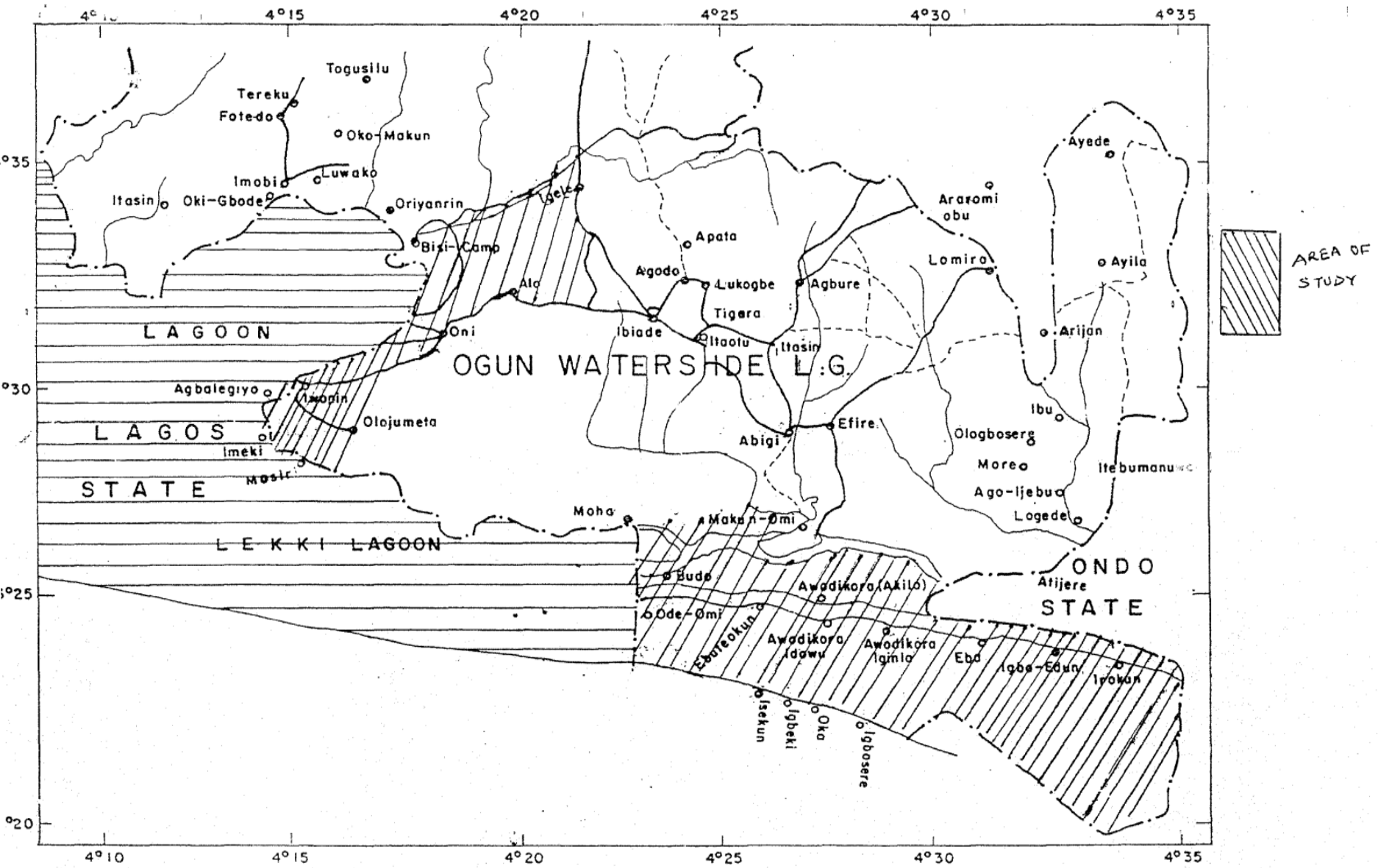
Mitigation: Human intervention to reduce the anthropogenic forcing of the climate system, including strategies to reduce greenhouse gas sources and emissions and enhance greenhouse gas sinks (Adapted from Adger, 2006 and IPCC, 2007).

States in Nigeria, including coastal States: Lagos, Ogun, Ondo, Delta, Bayelsa, Rivers, Akwa Ibom and Cross River

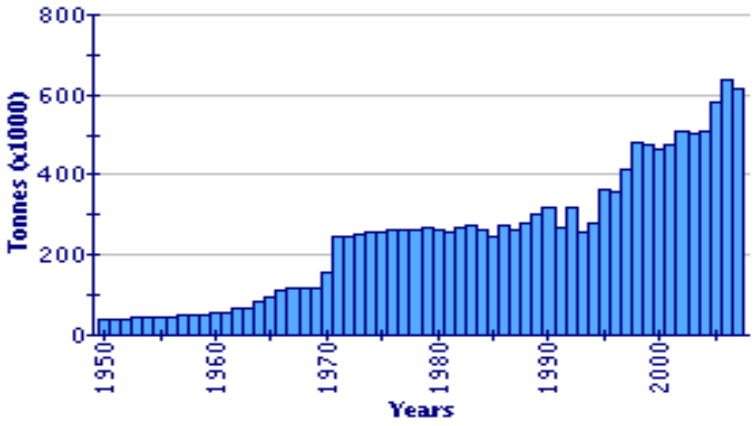
- **Nigeria is bounded on the south by the Atlantic Ocean, and has 8 maritime states including: Lagos, Ogun (area of study), Ondo, Delta, Bayelsa, Rivers, Akwa-Ibom and Cross River states**

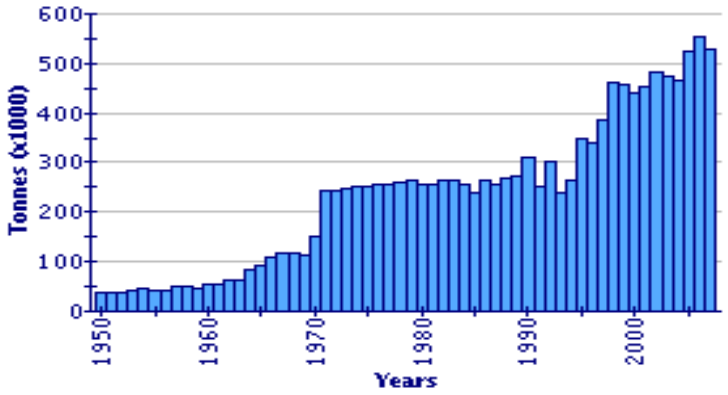
- **Nigerian maritime states are generally densely populated; and home to fisheries-dependent communities with a population of about 40 million people representing over 24% of total population in Nigeria (National Census, 2006)**

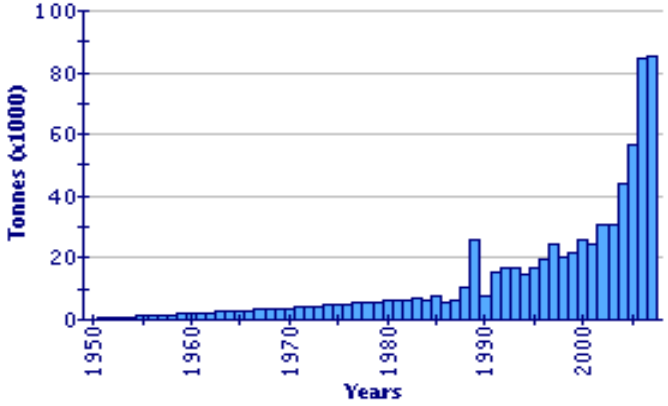
FIG 1.0 MAP OF OGUN WATERSIDE SHOWING AREA OF STUDY.

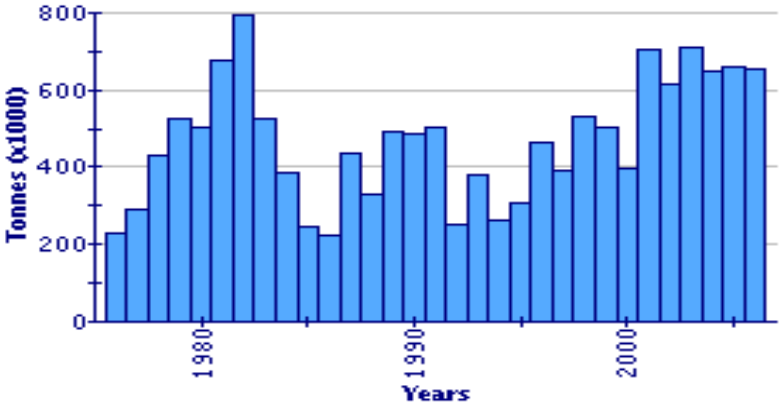


Nigeria's total, capture and aquaculture fish production and trade: 1950 - 2008 (FAO, 2010a,b).









Study objectives

- Evaluate fisher folks' perception of climate change and its effects
- Identify and document fisher folks' coping strategies
- Make policy recommendations for building climate change resilience at the state and national levels
- Facilitate knowledge sharing for potential climate change adaptation strategies for Nigeria.

Methodology

- **A multi-stage sampling procedure involving random sampling of three rural communities selected from a village listing of the study area was obtained from the Agricultural Development Programme (ADP), the Agency responsible for field level agricultural extension services in the State**

- **A sample of 41 stakeholders (selected on the basis of the variety of agricultural activities in each community) from each of the 3 communities was then selected from a list purposively compiled for the project. Thus 123 stakeholders covering the broad range of farming system practices in the area were selected for interview by trained enumerators. Thereafter, a focus group meeting of major stakeholders was also held.**

Methodology continued

- Structured questionnaire was administered to respondents. One hundred and nineteen (119) questionnaires were retrieved and used for further analysis.
- Data obtained were organized and analysed using the Statistical Package for the Social Sciences (SPSS) & other tools including:
  - Descriptive statistical tools (to describe data trends and patterns)
  - Chi square analyses (to test hypotheses on data obtained at ordinal level)
  - Product Moment Correlation Analysis (to test set hypotheses on data at interval level)

The decision to reject or not to reject each hypothesis was based on $p < 0.05$.

Results: Socio-economic characteristics of Stakeholders

Variables	Swamp (n=119) %
Gender	
Female	17.64
Male	82.35
No response	0.00
Marital Status	
Divorced	0.00
Married	90.76
Single	0.00
No response	9.24
Age (Mean = 48.57 years)	
21 – 40 years old	10.08
41 – 60 years old	84.03
61 – 80 years old	5.88
Above 80 years old	0.00

Highest level of formal education attained	%
Adult education	0.00
Modern School	0.00
No formal Education	7.56
Primary	51.26
Secondary	31.93
Tertiary	5.88
No response	3.36
Religion	
Christianity	52.10
Islam	39.50
Traditional	0.00
No response	8.40
Household size (Mean = 5.69 persons)	
Less than 3 persons	14.28
3 – 6 persons	28.57
6 – 10 persons	45.38
More than 10 persons	11.76

Respondents' ranking of observed livelihoods

Enterprise	Swamp (n=119) %
Crop production	37.82
Crop processing	2.52
Livestock production	0.84
Fishing/fish farming	53.78
Fish processing	5.04
Tree cropping/forestry	0.00
Other enterprises	

Climate change effects observed by fisher folks

- Rising temperatures
- Sea level rise, flooding
- Inaccessibility of fishing grounds
- Capsizing of fishing boats
- loss of fishing gear
- Loss of lives
- Biodiversity loss
- Reduced fish catch
- Reduction in catch size
- Reduction in productivity

Other observed climate change effects

	Swamp (n=119) %
No response	78.15
Persistently cloudy sky	0.00
Delay in commencement of rain	1.68
Longer period of Harmattan	0.84
Irregular rainfall patterns	0.00
Prolonged drought	0.84
Unpredictable rise in flood incidence	7.56
Unpredictable storm surges	10.92

RESPONDENTS' COPING STRATEGIES/TECHNOLOGIES	Agro-ecological zone
	Swamp (n=119) %
No adopted strategy	0.00
Land based aquaculture	86.55
Irrigation	0.00
Afforestation/planting of trees	0.00
Planting date adjustment	3.36
Channelization of beds	5.88
FADAMA	0.00
Fertilizer application	0.00
Mulching	0.00
Use of pesticides	0.00
Weather study	0.00
Planting of drought tolerant crops	1.68
Prayers to God	1.68
Provision of shelter	0.00
Others	0.84

Fish species rarely caught at present

- Red Snapper, *Lutjanus gibbus*
- http://en.wikipedia.org/wiki/User:Fir0002

Polydactylus quadrifilis

Chrysichthys nigrodigitatus

Concluding remarks

- Fishing communities in Ogun waterside LGA, Nigeria are already experiencing climate change effects

- In response to climate change effects, they are developing coping strategies by having secondary and sometimes tertiary livelihoods, like aquaculture, crop farming, tree planting, timber logging as observed by researchers

- **Majority of fisher folks prefer fisheries and aquaculture - related livelihoods**

- **Seaweed farming may be a viable alternative livelihood to develop in the coastal communities of South West Nigeria**

- **The Zanzibar success story refers:**
https://www.globalroomforwomen.com/global-heart-blog/entry/seaweed-farming-in-zanzibar-increases-womens-purchasing-power-and-social-empowerment-1.html

- **Coupled with the need to adopt Sustainable strategies for climate change mitigation and food security**

Acknowledgements

The lead author sincerely appreciates the following Organizations and individuals:

- African Technology Policy Studies Network (ATPS) for funding the study project
- The ATPS Research Team, particularly Dr. Kolawole Adebayo
- Co-authors of this paper, who could not make it to Yeosu due to financial constraints
- Most importantly, Yeosu, 2012 Symposium Organizers; and FAO for sponsoring my participation in the Symposium. Thank you!

THANK YOU FOR YOUR ATTENTION!