Impacts of Climate Change on Fisheries: Implications for food security in sub-Saharan Africa

Dr Essam Yassin Mohammed
Senior Economist and Programme Lead
Ocean and Fisheries Economics
International Institute for Environment and Development (IIED)
Background

- Fisheries play important roles for food supply, income generation and nutrition
- Employs 10 million people and main source or animal protein for 20% of inhabitants in SSA.
- Fish is one of the most traded commodities
  - Source of cash to import food when needed
- Climate change poses significant threat
  - Lower fish yield
  - Displacement of fish species
  - Reduced fish production for export
  - Reduces resilience of coastal communities and infrastructures
Background (2)

- Why Sub-Saharan Africa?
  - Home to >300 mill people under poverty line
  - Limited literature on the impact of CC on fisheries
  - Lower adaptive capacity
  - Millions of poor communities in the region rely on fisheries

- Lacks sufficient attention
  - Analysis of PRSPs of 29 SSA countries, fisheries was effectively mainstreamed in 3 countries only (Ghana, Guinea, and Senegal) (*Thorpe et al. 2004*)
  - Still remains a neglected area in climate adaptation policy (*Badjeck et al. 2010*)
### Climate change, fisheries and food security nexus

<table>
<thead>
<tr>
<th>Climate change impacts</th>
<th>Impact on fisheries</th>
<th>Implications for food security</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical changes</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Temperature rise       | ☐ *Direct:* affects physiological process  
                         ☐ *Indirect:* affect upwelling along the Gulf of Guinea | ☐ Significant decline in fish stock in most of Bangwa Rivers >> less fish available for consumption |
| Sea level rise         | ☐ Salt stresses on fish  
                         ☐ Negative impacts on coastal habitats (spawning and nursery grounds)  
                         ☐ Fishing facilities (jetties, storage facilities etc) | ☐ Negative impact on fish production  
                                                                 ☐ Limited access to food (fish) |
| Increasing salinity    | ☐ Affects the ability of organisms to osmoregulate  
                         ☐ Habitat destruction (e.g. destruction of >60% of mangrove areas in Senegal) | ☐ Less fish production  
                                                                 ☐ Limited access to fish (physical) |
| Ocean acidification    | ☐ Physiological process (e.g. growth of calcified structures, impaired fertilization etc) | ☐ Lower productivity  
                                                                 ☐ Tremendous impact on mollusc population (socio economic impact) |
| **Biological changes** |                     |                                |
| Changes in 1° production | ☐ Lake Taganyika: 20% reduction in 10 production (30% decrease in yields) over the past 80 yrs)  
                         ☐ Thermal stability | ☐ Lower productivity  
                                                                 ☐ Mainly in densely populated regions of the world (large lakes) |
| Changes in fish distribution | ☐ Changes in the migration patterns  
                         ☐ Esp. low latitude countries  
                         ☐ ~40% drop in the tropics | ☐ Reduced landing  
                                                                 ☐ Limited access (economically prohibitive to follow fish stock) |
Fisheries and prevalence of hunger

Hunger Index:
proportion of people who are undernourished + prevalence of underweight in children younger than age five + mortality rate of children younger than age five (IFPRI, 2011)
Fisheries and prevalence of hunger (2)

Graph showing the relationship between annual food supply per capita from fish and fishery products and hunger index. The data points are plotted on a scatter plot with the linear regression line and equation:

\[ y = -0.3021x + 23.728 \]

\[ R^2 = 0.127 \]
Per capita food supply from fish and fishery products in Sub-Saharan Africa and developing countries.
Conclusion and Recommendations

- Livelihood diversification to reduce dependence on fisheries
- Market development
  - Investment to support sustainable artisanal fisheries
  - Market infrastructure to address post-harvest and income loss
- Governance Structure
- Economic incentive mechanisms
- Recognition by policy makers - economic and social significance of the sector (esp. artisanal fisheries)
- More research to increase our understanding on the magnitude of the impact of climate change on fisheries