Fishing and climate change in Saloum estuary: Between drought and advancing sea

Adama MBAYE¹
Aliou Ba², Patrice Brehmer¹, Jörn Schmidt³, Djiga Thiao¹, Abdoulaye Sarré¹
¹ ISRA/CRODT, 2 IRD ISRA/CRODT, 3Kiel University,
Introduction

- Saloum estuary has experienced major changes for several years;
- Changes caused by a set of complex natural factors which act with variable intensity;
- Main natural factors affecting biodiversity in Saloum are the decreasing rainfall, saltwater intrusion and coastal erosion.
These factors are also usually influenced by human activities, which are locally affected by changes in the environment and natural resources.

Through the project PREFACE we tried to:

- analyze the empirical knowledge of local populations on perceived changes on climat factors
- analyze the impacts of these changes on their activities;
- analyze adaptation strategies
Methodology

- Literature review;
- Individual interviews
And
- focus group
with local actor
Results

Years of Drought

- Over 60 years in the time series (since 1918) the rainfall are always below average;
- Since 1968 a continuous period of decreased rainfall started with very large deficit phases from 1972 to 1973 and from 1980 to 1983;
Comparing the average of the periods 1961-1990 and 1971-2000, confirms the very pronounced deficit in rainfall during the last four decades;

Relatively normal rainfall conditions are seen between 2000-2010;

However, there have been large changes in spatial and temporal distribution of rainfall with a marked decrease in duration of the rainy season.

Source ANAMS
Increasing temperatures

- Temperature represents, after rainfall, the most important climate factor;
- Strong increase in global temperatures since the 19th century.

Source: ANAMS
Temperature data collected in Kaolack show increasingly positive anomalies up to almost 2 °C, twice the average increase recorded on African continent;

Rising temperatures recorded from 1980 onwards.

Source ANAMS
Rivers in the Saloum are heavily influenced by seawater intrusion due to their weak slope;

The salinization process has greatly increased in recent decades due to long periods of drought and reduced rainfall input.

Source: ANAMS
Impacts on human activities

- Deteriorating weather conditions significantly affecting traditional production systems (agriculture and livestock);
- Cultivation of groundnuts and rice are significantly affected by drought and salinization of land;
- Some people have turned exclusively to fishing activity;
- This results in more pressure on the fishery resources in the Saloum;
Impacts on fishing

- Degradation and loss of mangroves affect the breeding, feeding and resting habitat for many marine species;
- Decrease in productivity of estuarine fish species;
- Reduction in size and weight of certain fish species;
- Shrimp fisheries disappear if the salinity increase above 53 ‰ (Rest, 1994), actually this is the case in Saloum nowadays;
- Seasonal variations in total catch and individual shrimp weight is inverse to salinity;
- Sessile species such as shellfish are disappearing in some areas.
The harvest of salt as an adaption strategy of local communities

- Local communities are faced with decrease in fishing opportunities and the loss of arable land;
- Salt harvest could become the main activity of many people;
Feedback of human activities

- However, this activity seems to aggravate the degradation of the ecosystem at the Saloum;
- Salt production aggravates the local salinization on estuary banks;
- Remains of salt on the production area increase the salinity all around the salt production area, after each water renewal.
Aggravated effect on the resource – vicious cycle

- Increased mortality of fish and other species and degradation of mangroves;
- Mortality of fish increases especially in the dry season;
- Therefore catch decrease during the dry season;
- Only a small period during rainy season with increased fishing leads to increased pressure on the resource.
Effect of change in strength of coastal currents

- Breaking up of the sand spit Sangomar led to increase seawater flows in the Saloum.

Figure 14. Evolution de la pointe de Sangomar de 1986 à 2002

Enlargement has led to erosion, flooding and silting of mud flats; But the entry of seawater has reduced the salinity (Saloum is an inverse estuary) in some areas and allowed a recovery of fishing.
Effect on the human activity

- The increase in the coastal currents facilitate the use of drift fishing gears;
- However, it is increasingly difficult to use fixed fishing gears;
- → communities forced to adapt to change fishing technology.
Conclusion

- Impact of climate change is well observed in Saloum;
  - Decreased rainfall;
  - Increase of temperature;
  - Salinization of land and the estuary become inverse;
  - Erosion, seawater inundation and accumulation of mud;
- The main adaptation strategy i.e. salt production, aggravates the degradation of coastal habitats;
- Are the current adaptation programs be harmonized with expectations and needs of local communities?
- This issue is the subject of the second stage of our work in the PREFACE project.
THANK YOU FOR YOUR ATTENTION