

PREFACE HIGHLIGHT

PREFACE focused on artisanal fisheries in Senegal for a detailed impact assessment. The effects of climate change on these fisheries may be severe, as the dependence on fish as a protein source and on fishing income is strong. We drove a bio-economic model with future climate change projections from two different PREFACE models and different fuel subsidy scenarios.

***Sardinella aurita* becomes more vulnerable to Senegalese purse seines over a certain time horizon, because the fish spend more time in the close-to-shore area.** In the long term, stock survival requires a stricter response to overfishing.



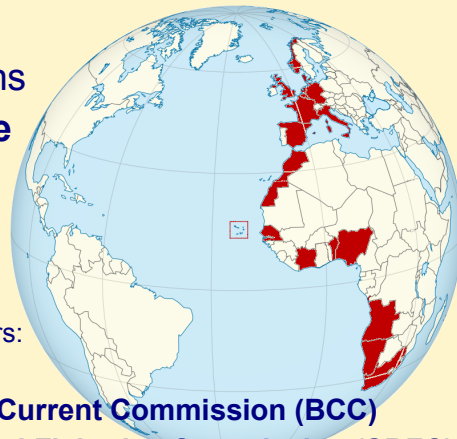
Bio-economic modelling shows that cancelling fuel subsidies for fisheries benefits the entire community. Thus, not only are **fuel subsidies expensive for taxpayers, but counterintuitively they also reduce welfare in total.** We find that in the future fisheries **will be more important as a source of income than as a source of nutrition** for the region. These results shed light on the effect of climate change and counteracting policy measures while incorporating self-driven adaptation of actors. **We explicitly show that policy choices, rather than climate model uncertainty, dominate socio-economic model outcomes.**

WHO WE ARE

**28 institutions
from Europe
and Africa**

Supported by 2
associate partners:

**The Benguela Current Commission (BCC)
The Subregional Fisheries Commission (SRFC)**



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Enhancing **PRE**diction of Tropical Atlantic **Climate** and its Impacts



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CLIMATE CHANGE IMPACTS

The tropical Atlantic climate recently experienced shifts of great socio-economic importance. The oceanic changes were largest in the eastern boundary upwelling systems, globally important regions for marine productivity. African countries bordering the Atlantic depend upon their ocean for societal development, fisheries, and tourism. They were strongly affected by these changes and face important adaptation challenges associated with global warming.

Within PREFACE, the research focus “**Impacts of climate change on pelagic functional diversity in the tropical Atlantic with effects on western African fisheries economies**”, aims to disentangle environmental and anthropogenic pressures on pelagic fish stocks in the tropical Atlantic, through exploratory analysis of historical and newly collected data. It also aims to better understand climate change effects on small-scale fisheries and coastal communities, and to assess uncertainties and implications for management.



Our approach was to develop socio-economic models, built on knowledge of the marine ecosystem and fishing communities, and to drive them with PREFACE climate change projections.

Socio-economic surveys were conducted in Senegal and Cabo Verde to understand the sensitivity and adaptive capacity of the fishing sector in the two countries.

For Senegal, specialization is at the individual level but on a rather diverse range of target species and gears used.

For Cabo Verde, fisheries depend to a dangerous degree on only six species, and most importantly, tuna.

Thus, while only individual sensitivity is high in Senegal and the artisanal sector itself is likely too diverse to be hit by singular species changes, the Cabo Verde fishery is very sensitive to certain species changes.



The economic analysis of the Senegalese fisheries on small pelagic species however, showed that this sector is indeed vulnerable to changes in catchability affected by changes in sea surface temperature. **A sea surface temperature shock during summer can increase the catchability by one third.** However, long-term effects can be negative due to decrease in population biomass.

In addition, economic drivers, like fuel prices also have a significant negative effect on the profitability of the purse seine and encircling net fisheries. **For the Senegalese purse seine fishery, operating costs have increased by 90% over the last twenty years, mainly due to an increase in fuel prices.**