OVERALL VULNERABILITY of the coastal fishery system to global change in the estuarine front of the Rio de la Plata


GOAL
To develop a predictive understanding of the climatic and non-climatic factors that affect the Vulnerability of the Coastal Fishery System, so that effective, cost-efficient adaptation solutions can be devised

PROBLEMS
An artisanal fleet exploit fisheries a few miles off the Uruguay coast in the Estuarine Front (EF) of the Rio de la Plata (FIG 1)

The location of the EF therefore the accessibility of exploited resources depends on ENSO-related variability of river flow

Artisanal fishermen are highly vulnerable to both climate and non-climate constraints (regional economic crisis since late 2001)

Coastal community has low adaptive capacity

The development of symptoms of eutrophication during the last decades is deteriorating the ecosystem

VULNERABILITY MATRIX OF COASTAL FISHERIES

<table>
<thead>
<tr>
<th>Proxy Variable</th>
<th>Vulnerability</th>
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<td>Social</td>
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<td>Economic</td>
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<td>Environment</td>
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ARTISANAL FISHERIES GROSS INCOME SCENARIOS

The minimum income scenario (green, -50%) is mainly associated with Low NINA, and the maximum (red, +30%) with socio-economic and environmental factors, the reference long term scenario is the blue one.

Note: the peak of fish captures is between October and January, a period highly sensitive to ENSO events

MONTHLY FISHERMEN MIGRATION INFERENCE

Pathways of Vulnerability and Adaptation Response of Human system (Fishermen) and Natural System (Eutrophication) to Climate Change, El Niño and Human Drivers

DRIVERS

CLIMATE CHANGE

Air Temperature
Precipitation

ENSO VARIABILITY

Land misuse / Cover Change
Nutrient Point Sources

POPULATION GROWTH

RIVER FLOW

IMPACTS

HYDROLOGIC ENVIRONMENT

Water temperature
Freshwater volume
Salinity
Vertical Stratification
Displacement of the Est Front

 человеческая система

Population Change: fisheries accessibility
Fish catch: economic benefit

ADAPTATION

AUTONOMOUS ADJUSTMENTS

Salinity changes & Fish Migration

FISHERMEN MIGRATION

Fishermen Migration
Both fishing activity and Settlements

Anticipatory Measures

Increase in Capture

• enhancement of weather/climate forecasting for fishermen
• increase in the number of (good) fishing days
•amelioration of traditional conditions of fishermen

Reduction of Vulnerabilities

WIND VARIABILITY AND FISHING ACTIVITY

Wind velocity limits the fishing trips during the peak period. Despite unfavorable conditions (winds > 8 m/sec) since September 2001, the economic crisis forced fishermen to increase their activity, without improving capture (unsuccessful autonomous adaptation).

CONCLUSIONS

The Coastal Fishery System is highly vulnerable to both Climate (ENSO, winds) and Socioeconomic constraints (social organization, prices)

Adaptation must target the peak capture period which is highly sensitive to ENSO