“Environmental Flows for enhanced Biodiversity and Poverty alleviation in the deltas of Mozambique (EFlows-Moz)”

SIXTH WIOSAP PSC
NOSY BE, MADAGASCAR

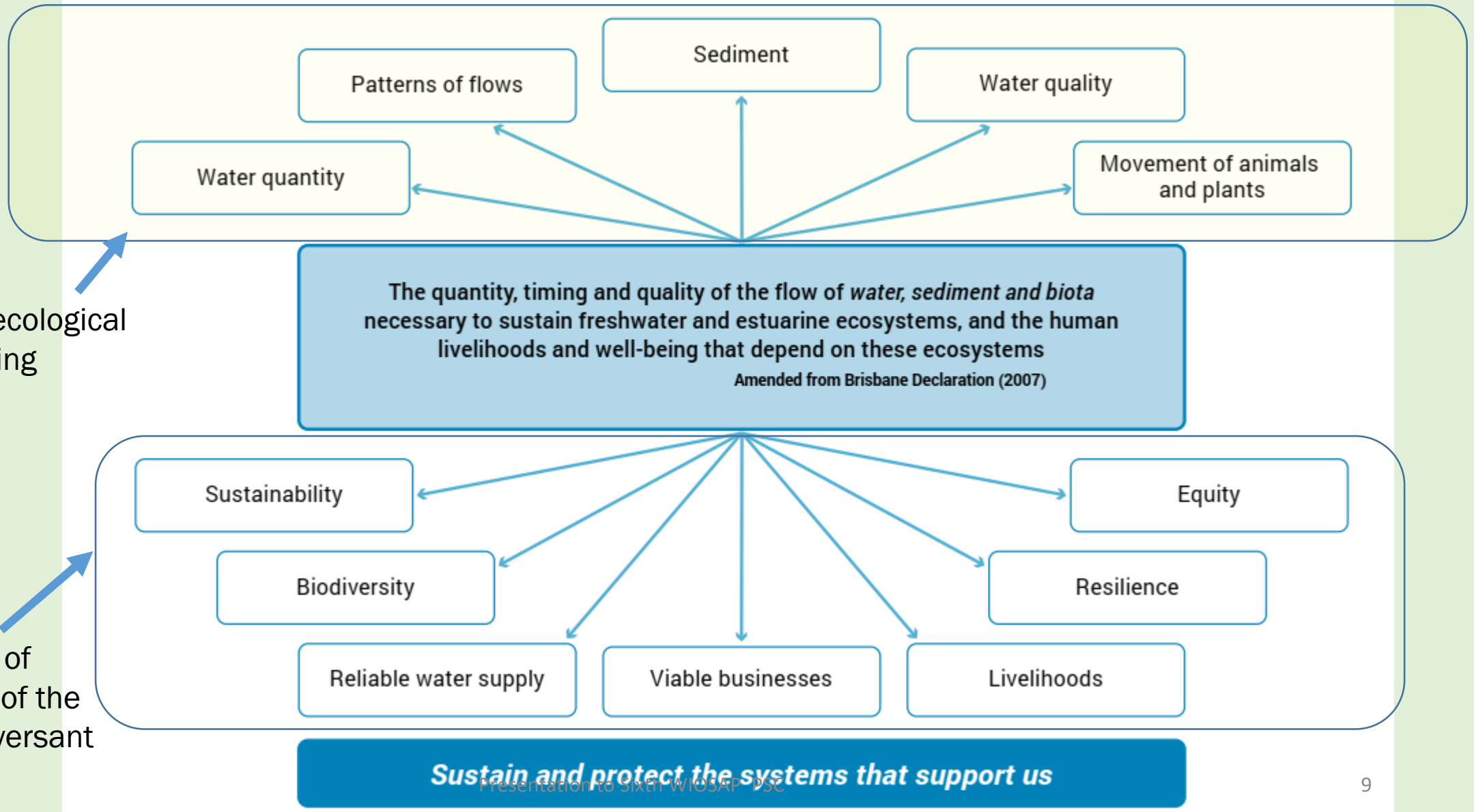
“Eduardo Mondlane University, Mozambique”
Presented by: Dinis Juízo

PROJECT OBJECTIVES

Design environmental flows that would **maintain and enhance biodiversity values** and the **functioning** of the estuarine and deltaic ecosystems of the Lower Incomati in order to **optimise the delivery** of a number of key **ecosystem services** to a range of stakeholders and with the **well-being of vulnerable user groups a priority**.

Testing of the WIOSAP EFA guidelines, and their adaptation to the **Mozambican context**.

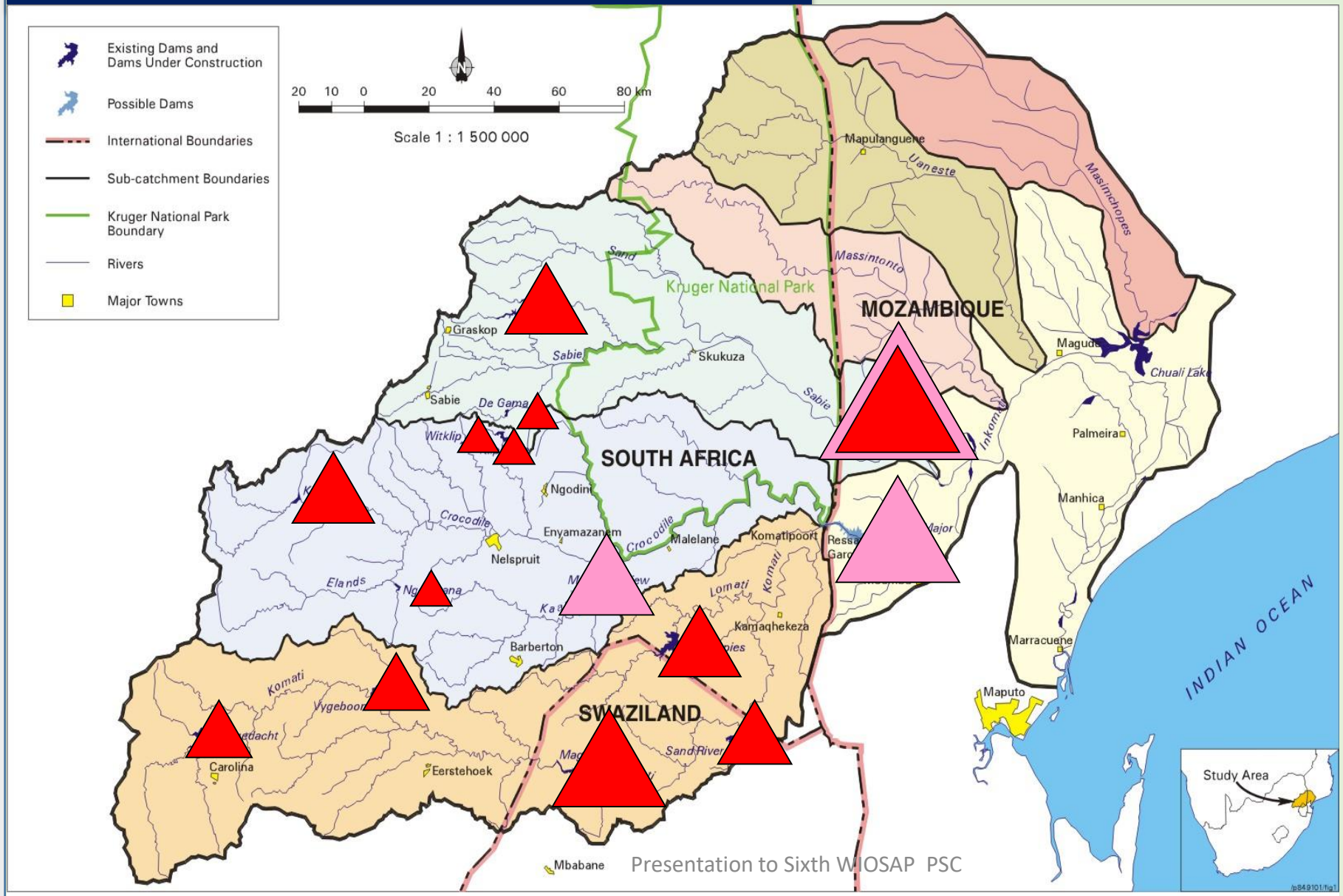
Fostering of local multidisciplinary team working to interface natural and social sciences.



Hydro-ecological modelling

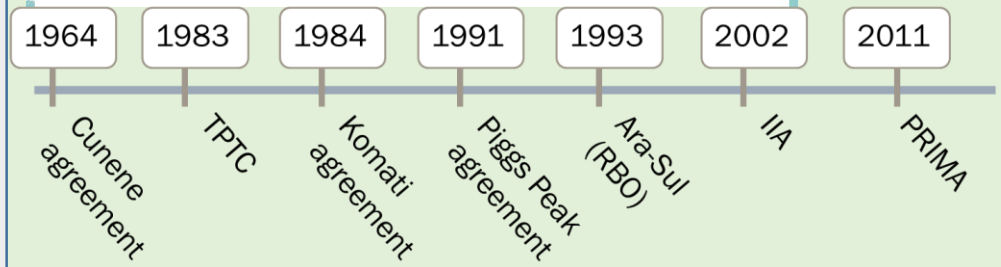
Needs of actors of the basin-versant

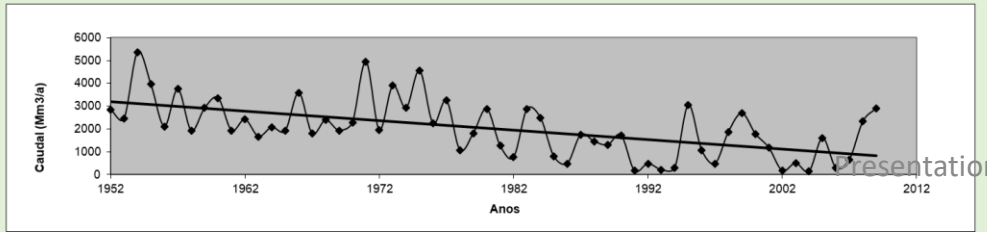
STUDY SITE



- A large basin 68% of the watershed in RSA and Eswatini = 96% of the flow
- 1950 had and average of 200 m3/s
- 1991 Piggs Peak agreement: cross border flow 2m3/s,
- Where is the missing Water?

APPROACH





Project components:

1 – setup multidisciplinary team

2 – extensive mapping of habitats, biodiversity values and their historical evolution.

3 – assessment of freshwater fluxes patterns and relation to main habitats, the role of tidal water influxes.

4 – assessment of relationship between fluxes and productivity of the wetlands using proxies as ecological indicators.

5 – Assessment of ecosystems services.

6 – trade-off analysis

7 – scenario analysis.

PROJECT TEAM

Environment Programme

Hydrology


Dinis Juizo


Clemencio Nhantumbo


Vania Covel


Omar Khan

Governance


Stéphanie Duvail (Geography)


Dercio Alberto (Hystory)


Catherine Prost (Anthropology)


Nicia Giva (Agronomy)


Mary Shirima

Ecology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Olivier Hamerlynck


Salomon Bandeira


Vilma Machava


Taimo Torres


Anária


Yolanda

SIG Remote sensing

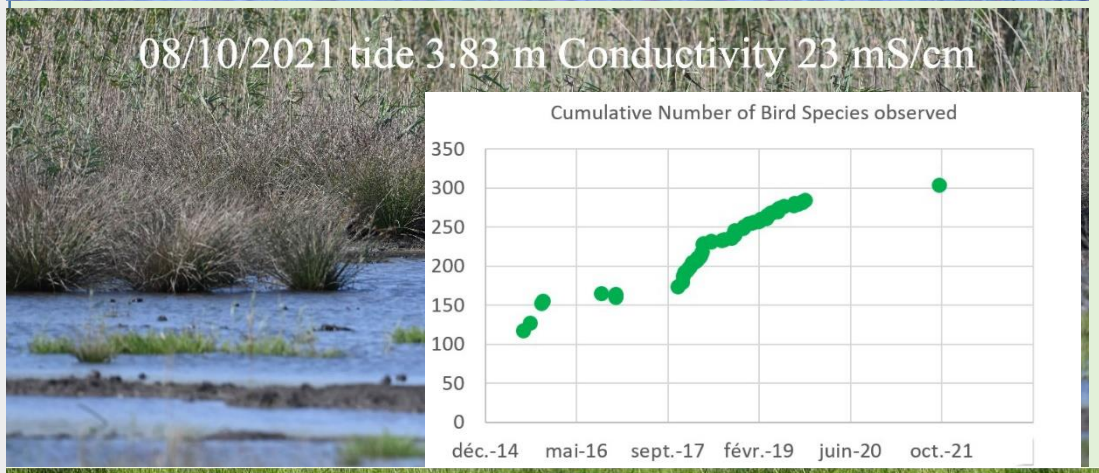

Paolo Paron (Geomorphology)


Nordino Paluluane


Leovigildo Custódio


Eric Delaitre

Salinity-Waterbirds



In wet season, the main high water roost had some 20 piscivorous waterbirds, i.e. a consumption of 2 kg of fish

In dry season, on a similar tide, but with salinity 8 times higher there were no piscivorous waterbirds, only some crab and benthic invertebrate feeders

The piscivorous birds had moved North to areas with lower salinity that still have a lot of fish

In principle, with bird counts/salinity measurements we will be able to establish correlations between salinity and bird trophic group presence and then extrapolate

Hypotheses – salinity, productivity, fish and birds, connections…

November – December = most big fish gone but rainfall= frogs = small « PV » birds

September – October = fish big, many big PV birds and fishers

June – August = young fish grow, many medium PV birds, some big PV birds

April – May = fish reproduce, more small fish, more small PV birds, medium PV birds

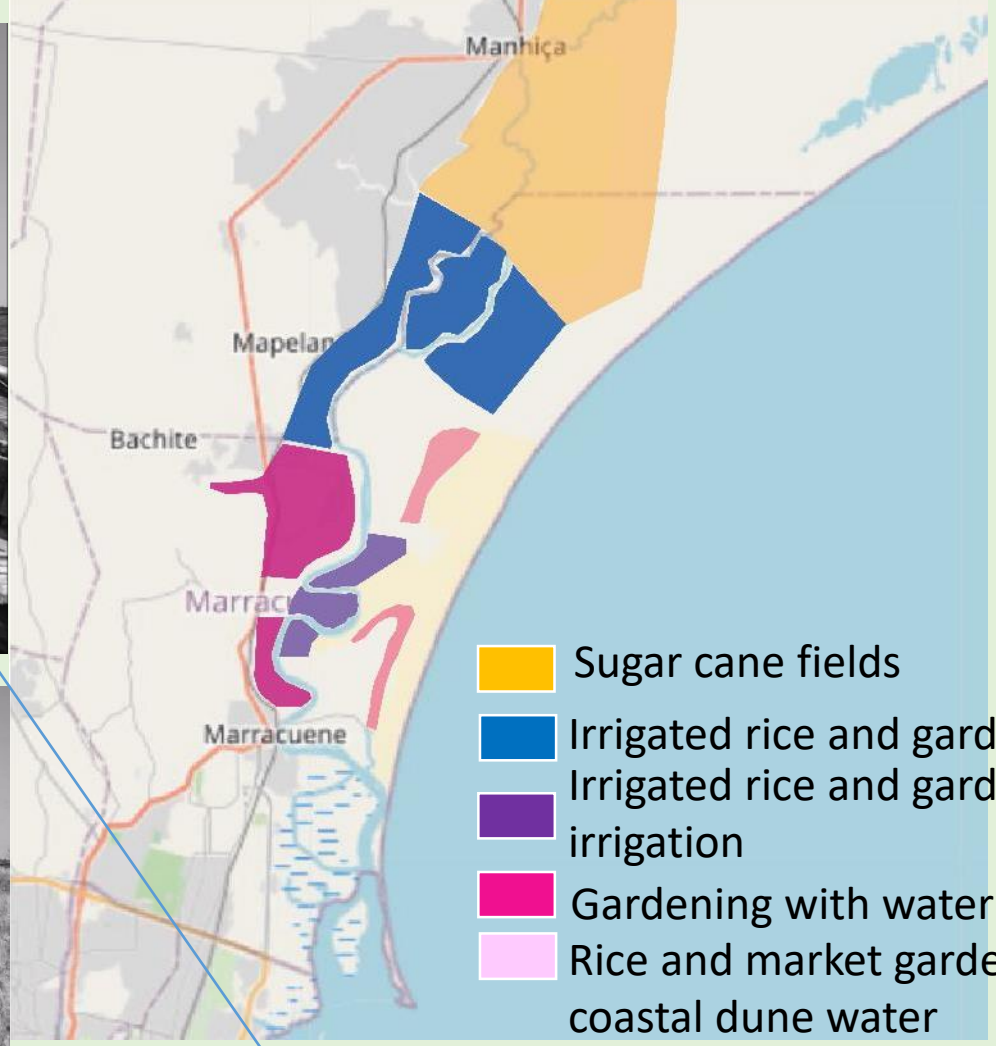
Flooding February – March = small fish and shrimp = small piscivorous birds

Multiple users, all impacted by salinity

Agriculture

Fishing

Livestock-keeping, Reed collection



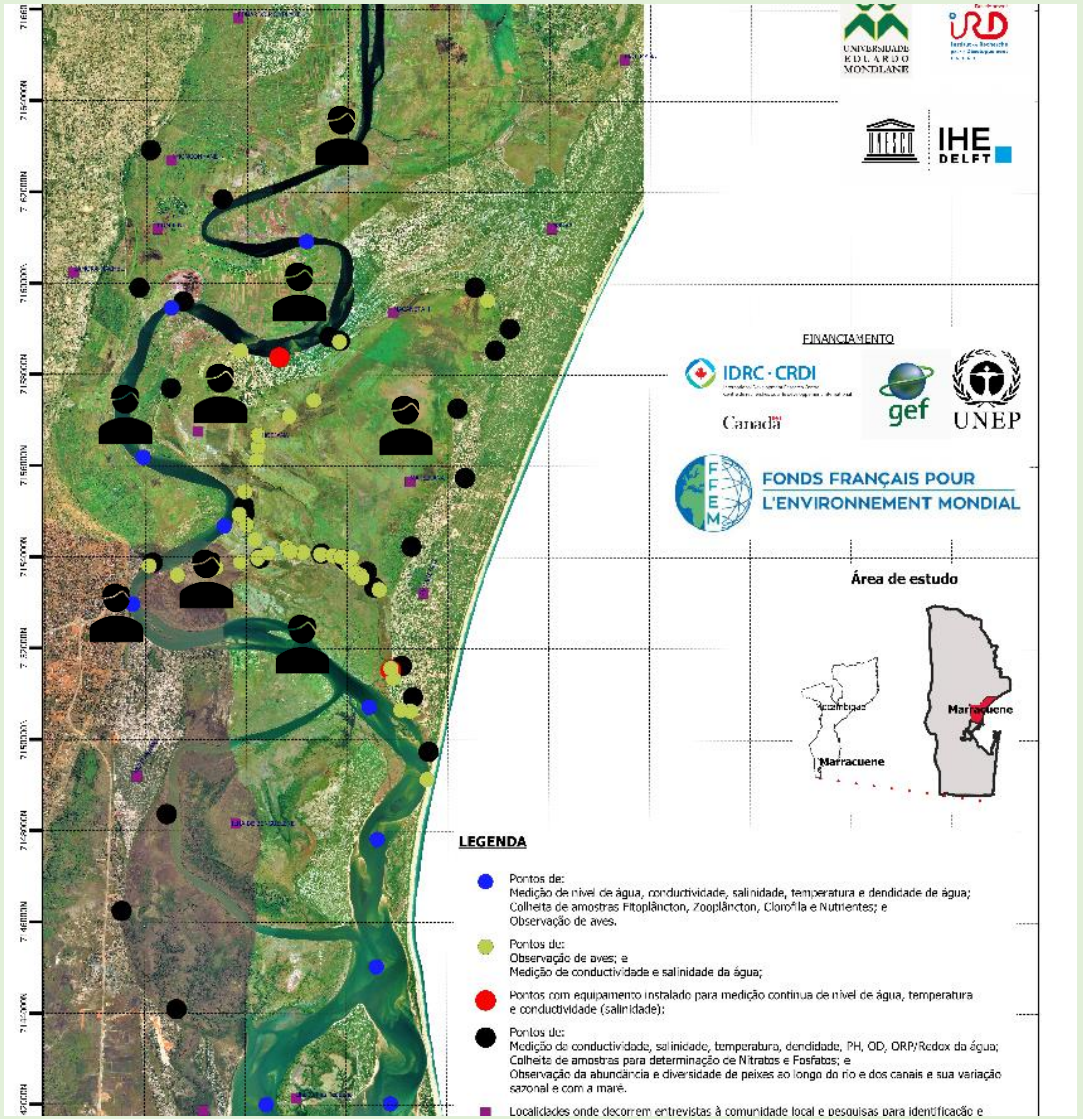
Very diverse fishing, fish estuary, freshwater shrimp, Crabs
A profession rarely women practiced in combination with rice cultivation

Photos: Denis Rion

In depth interviews and biographies to understand the evolution of the landscape and impacts on uses

Farmers
Fishers

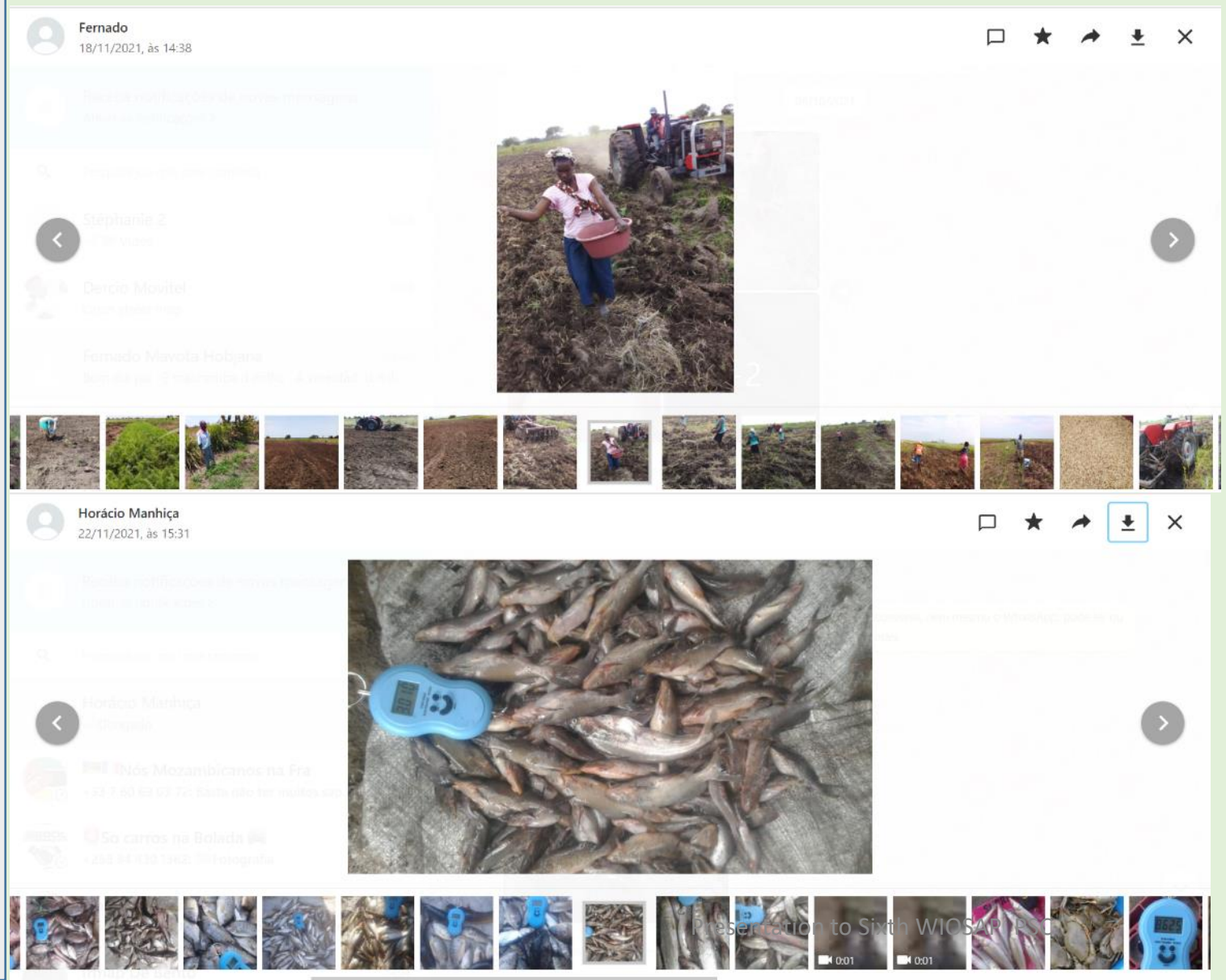
Monitoring of change and functioning of the wetland. Local observatory of salinity (dataloggers) and impacts on uses (diaries of local observers)



Land & water uses monitoring according to transects

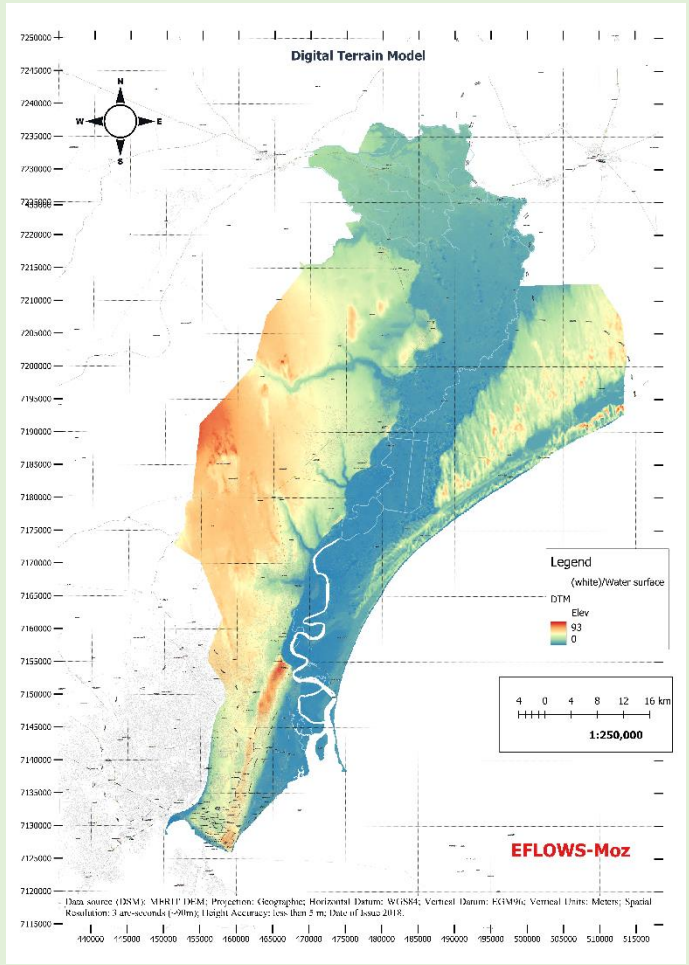
Sand	*Clay*	*Riv.*	*Clay*	*Sandy-clay*	*Sand*	*Sandy-clay*	*Clay*	*Sandy-clay*	*Sand*
Urban	Gardens	Fishing	Rice	Sweet Potato	Village	Sweet Potato	Reeds coll. Grazing cows	Rice	Urban
Groundwater	Canal irrigation + ground water		Canal irrigation	Groundwater	Groundwater	Ground water		Ground water	Groundwater

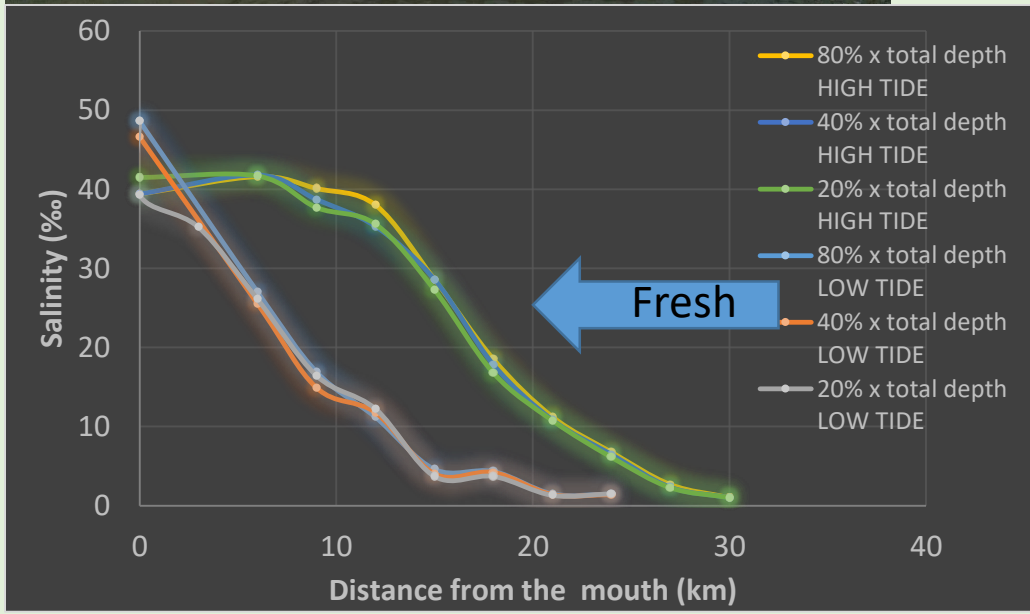
PARTICIPATORY OBSERVATORY

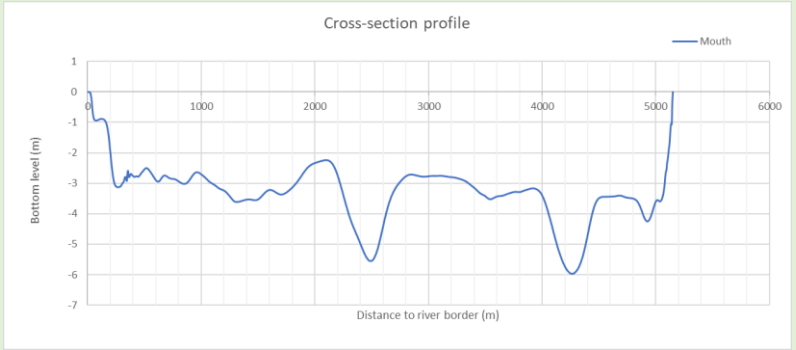


15 river observers and their activities (logbooks in photos)

Hydrological and Hyrodynamic Modelling



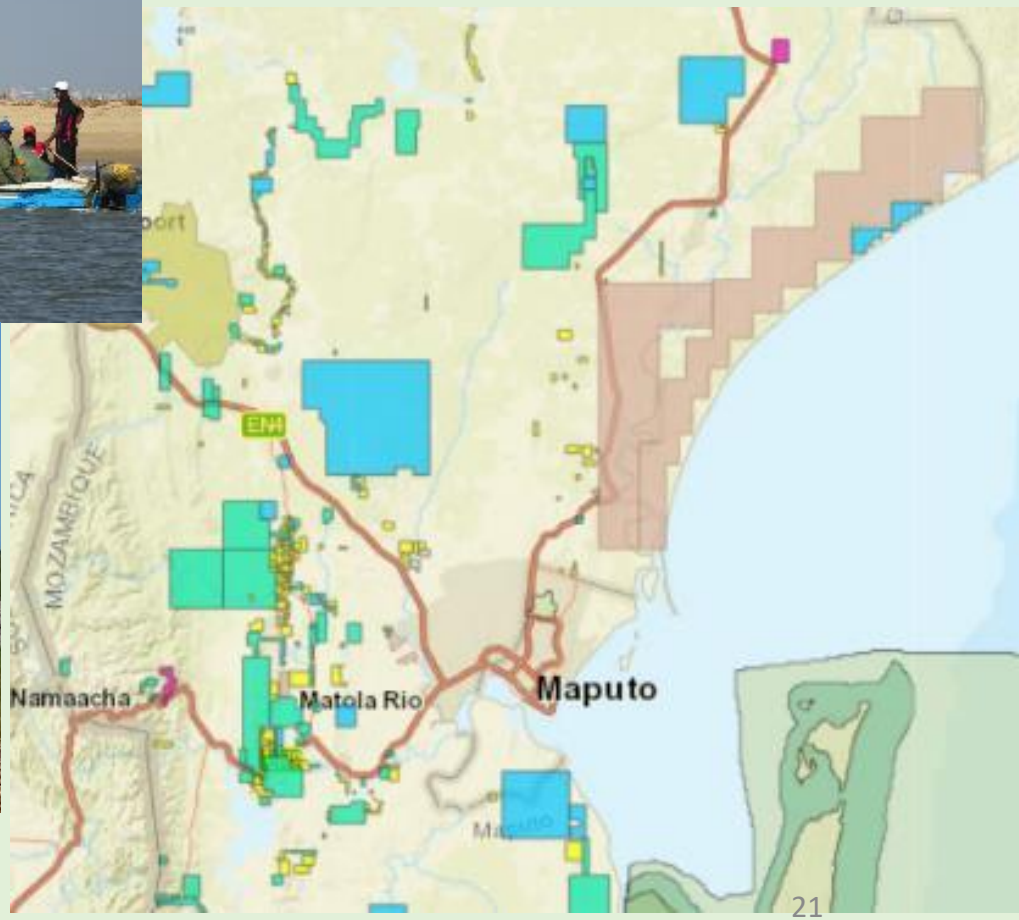




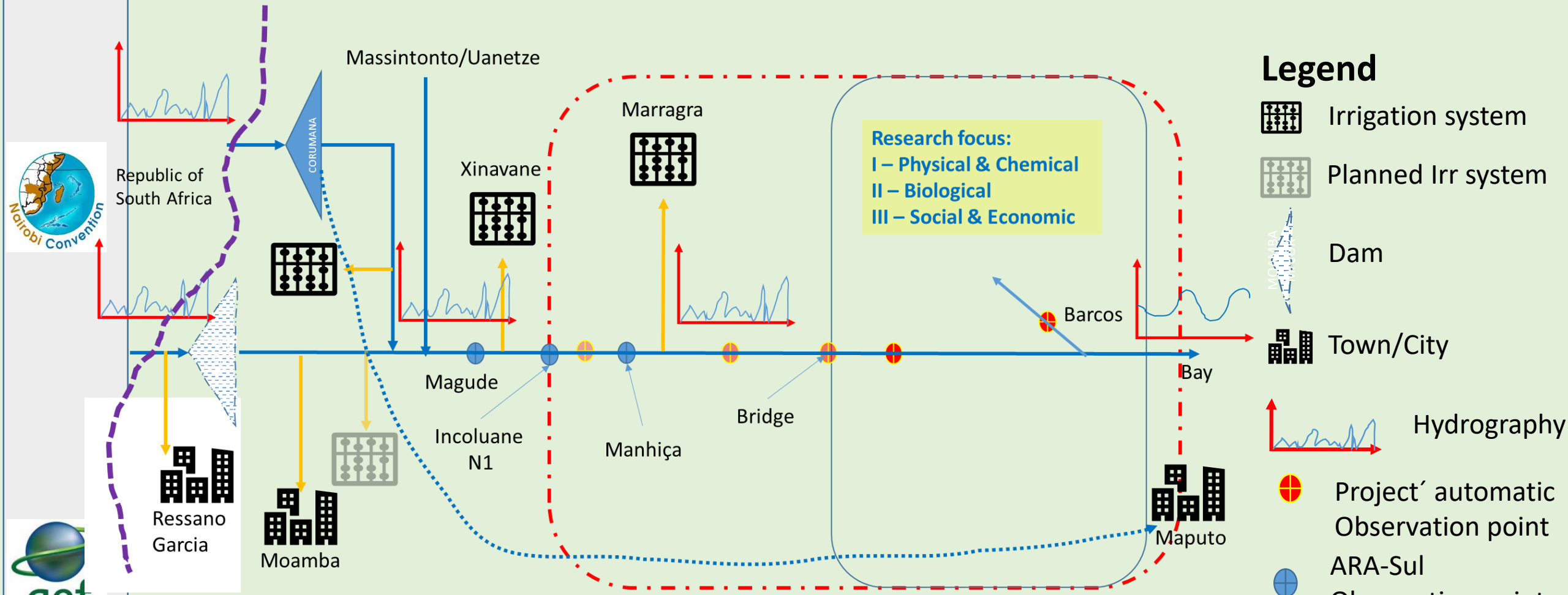
TENSIONS ON THE TERRITORY

Productive wetland with local users and high biodiversity
AND
Proximity to Maputo from the bridge= urbanization and tourism infrastructure on the coastal dune
Highly competitive projects:

- Sugar cane
- Protected areas
- Titanium sand mines
- Tourism, golf project
- (etc.)

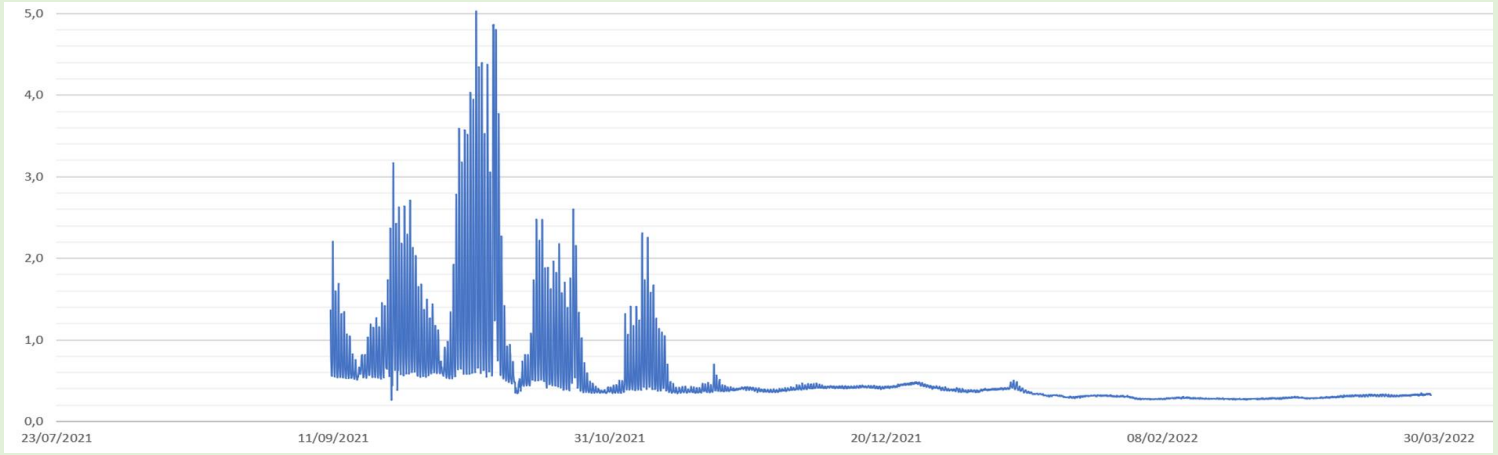


HYDROLOGICAL TRANSLATION



CO-CONSTRUCTION OF SCENARIOS

Balance sheets of the current year



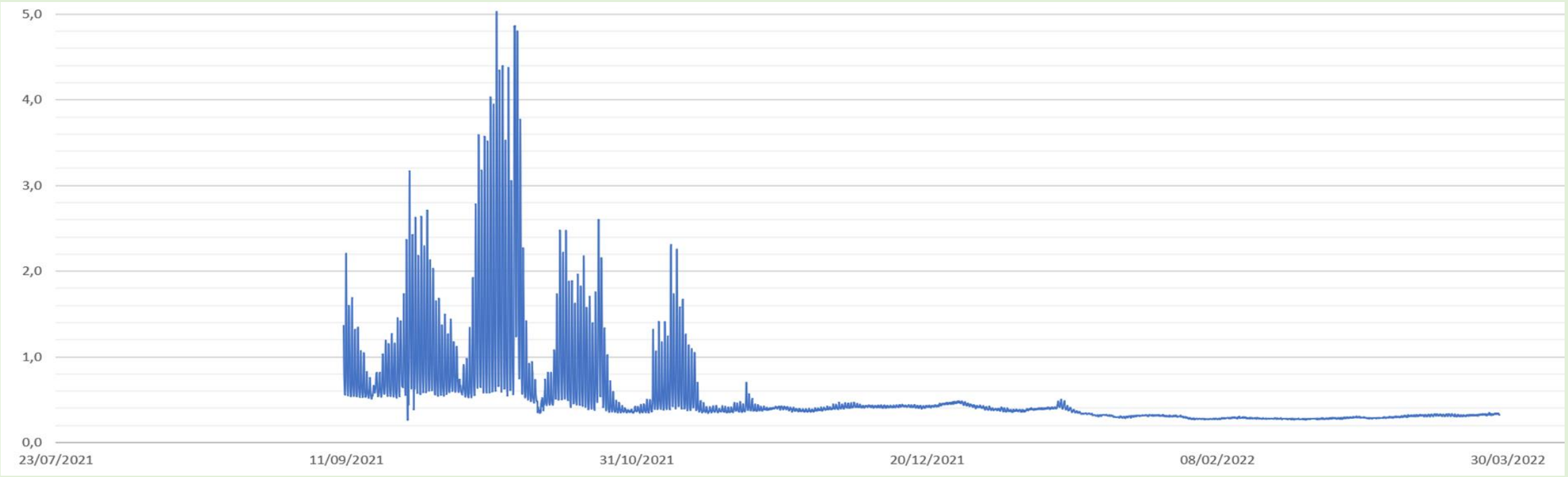
		Sept.	Oct.	Nov.	Dec.	Jan.	Fev.	Mar.	Apr.	May	June	July	Aug.
Fishing	**Fishing in the River**	Shrimps crab tilapia	Catfish	Shrimp, estuarine fish									
Farming	**River bank**	Plowing with tractor	Sowing maize		Maize growing, water melon	Flooding	Maize harvesting						
	Floodplain		Plowing with tractor	Rice sowing, More plowing	Rice sowing	Flooding	Irrigation with motor pump	Rice harvesting	Rice harvesting				
	Dune slope	Maize harvesting	Sweet potato harvesting, sowing maize	Potatoes and carrot harvesting			Maize and Kassava harvesting						
	Dune	Onions irrigation and weeding	Onions harvesting										
	Other events	Wild pigs	Net repair	Seeds distribution by Sustenta, wild pigs	Hippotamus begin starting	Canoe sinking		Lack of irrigation in the floodplain					

CO-CONSTRUCTION OF SCENARIOS

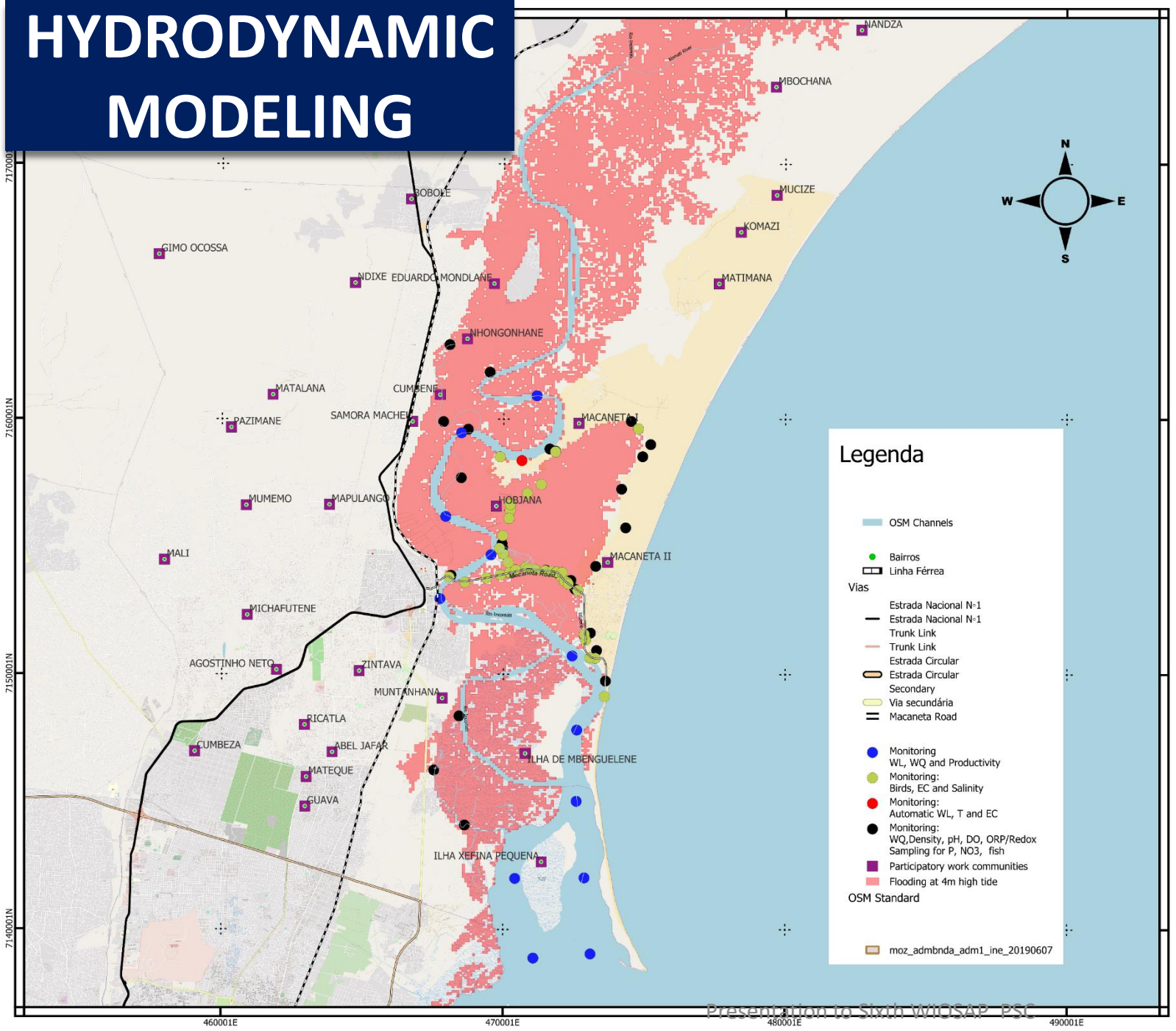
Serious Game of scenarios
and agricultural strategies
Wet year
Dry year
Year with softening
in September

ITERATIVE DIALOGUE

Scenario currently being tested:
Plausible action for lower salinity in September and October at the time of equinox tides



HYDRODYNAMIC MODELING



CAUDAIS AMBIENTAIS PARA FORTALECIMENTO DA BIODIVERSIDADE E ALÍVIO DA POBREZA NO DELTA DO INCOMATI, MOÇAMBIQUE 2020–2022 - E-FLOWS MOZ

IMPLEMENTAÇÃO

UNIVERSIDADE EDUARDO MONDLANE

IRD

UNESCO IHE DELFT

FINANCIAMENTO

IDRC · CRDI Canada

gef

UNEP

FFEM FONDS FRANÇAIS POUR L'ENVIRONNEMENT MONDIAL

MAPA DE DIVISÃO ADMINISTRATIVA DO DISTRITO DE MARRACUENE

ESCALA 1:50,000

4 0 4 km

Sobre: • Data do mapa: 2022-05-10 • Criado por: Nordino Paluluane • Project Path: C:\Users\Eflows\Desktop\EFlow\MAPA\MAPA.qgz • CRS: WGS 84. • Fonte de dados: EFlows-Moz

Potential extent of flooding during equinox tide (with observation sites)

PROJECT CO-FUNDING

DIDEM

Science-Decision-Makers Dialogue for integrated management of coastal and marine environments (2021-2024)

Volet A — ***Déployer des méthodologies et des outils innovants*** *au service de la décision publique et des initiatives régionales*

Volet B — ***Former des experts*** pouvant conseiller les décideurs des territoires littoraux et marins

Volet C — ***Impliquer la société civile*** *par l'éducation des jeunes et l'appui aux dynamiques partenariales multi-acteurs*

Comoros
Kenya
Madagascar
Mauritius
Mozambique
Reunion
Seychelles
Tanzania

Regional initiatives: Nairobi Convention, WIOSAP, WIOMSA, SAPPHIRE

Key Challenges and Recommendations

- Late start of the demo as compared to others
- COVID-19 interferences – procurement of field equipment, recruitment of students and international travels
- Limited project time – afecting stakeholders' engagement process and buy-in
- Local government initiatives investing in palliative solutions
- Resources mobilization – timing and lagged decision
- Prepared a new phase for testing of scenarios

Acknowledgements

- GEF support through WIOSAP
- FFEM
- CRDI
- IRD
- UEM management, staff and students
- Local communities for their enthusiastic participation and permission to work in the area.

Thank you!

Photos: Olivier Hamerlynck