



La Fondation de toutes les causes



Conservatoire du littoral



ARESMA

Acting on the resilience of socio-ecological mangrove systems of Mayotte

Claire Golléty

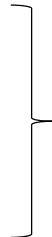
Esméralda Longépée

Linda Rasoamanana

Jean-Jacques Salone

Brice Anselme

Frédéric Bertrand



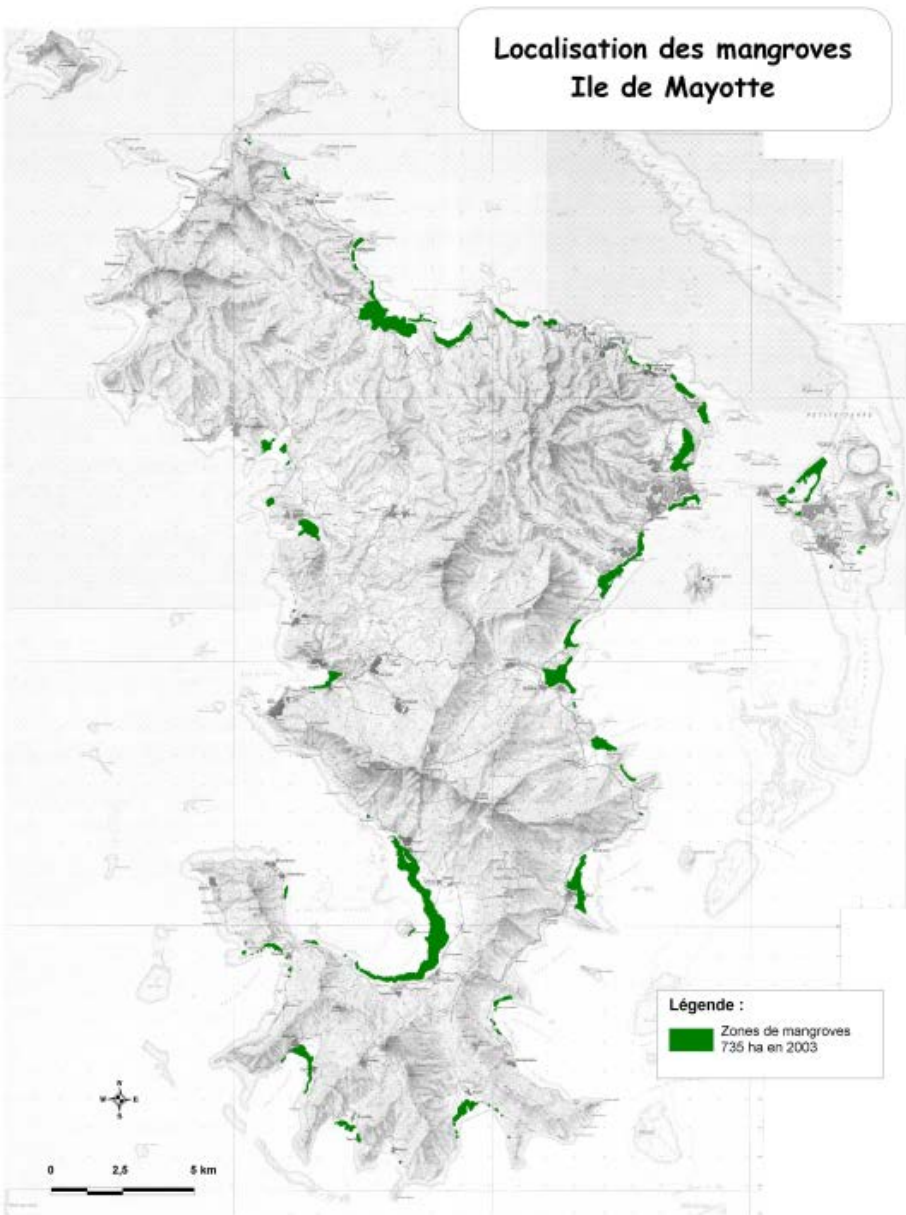
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Paris Sorbonne Université



Regional Context



Mangroves of Small Islands

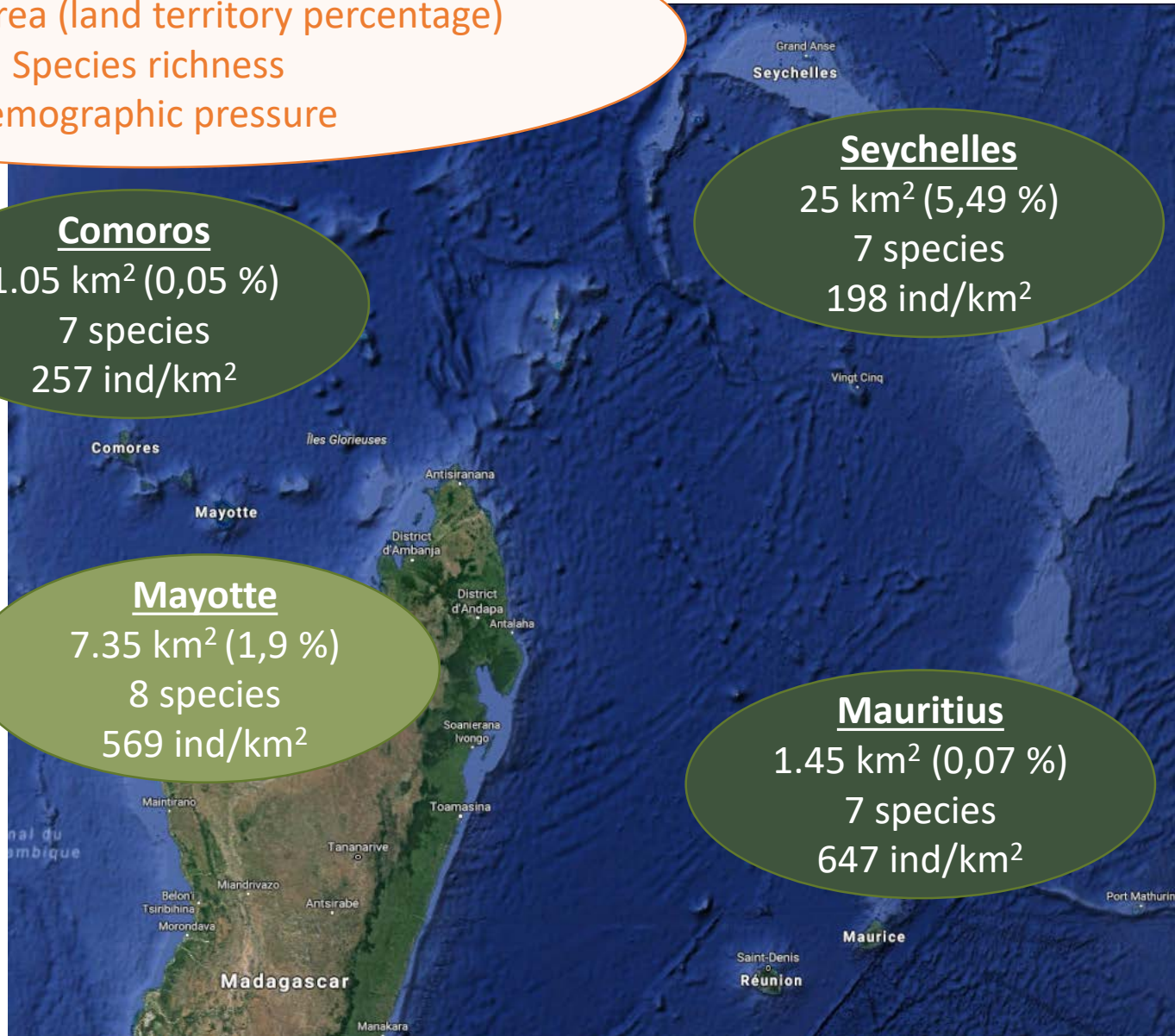
Mangrove area (land territory percentage)
Species richness
Demographic pressure

Comoros
1.05 km² (0,05 %)
7 species
257 ind/km²

Mayotte
7.35 km² (1,9 %)
8 species
569 ind/km²

Seychelles
25 km² (5,49 %)
7 species
198 ind/km²

Mauritius
1.45 km² (0,07 %)
7 species
647 ind/km²



Dominant anthropogenic pressures



Land reclamation



Waste and pollution



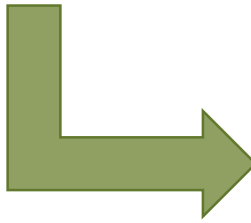
Clearing



Before 2011:

- Low photographic resolution
- Mangroves sometimes omitted
- Different mapping methods

Area estimations difficult to follow through time



lack of :

- Jurisdictional information
- Law enforcement
- Monitoring procedure

Since 2012:

- National coastal protection agency = responsible for mangrove areas
- Marine protected area of Mayotte = includes good mangrove management for good water quality objectives
- National Forests Office = responsible for mangrove management plan by end 2017

Research until now:

- Percentage cover change & description of species diversity composition and extent
- hydro-sedimentary dynamics
- bioremediation capacity
- Threats (type and location)
- some practices and perceptions
- Very limited humanities research: contradictory results on attachment feeling towards mangroves

**Literature : analysis of short stories to identify representations of mangroves of Mayotte
Rasoamanana (accepted)**

16 short stories out of a local writing contest (adults and teens, 2015)

- Ecological
- Aesthetic
- Pragmatic
- Spiritual

Major themes:

Positive = protection, filtration, diversity, communication with brightness
Negative = dangerousness, maze nature, ugliness, stench

Longer short story: Jaomanoro D. 2005. *Pierrot*

- More in-depth vision of social representations linked to the ecological role of the mangrove

Landscape degradation of the island reveals the societal upheaval of a territory where tradition and modernity, poverty and consumerism struggle to coexist



Recent studies

Geography : study of perceptions, knowledge and practices of Mayotte inhabitants and stakeholders

Survey (Longépée & de Souza , 2017) = See poster session

Perception of mangroves by Chirongui inhabitants

Geography : study of perceptions, knowledge and practices of Mayotte inhabitants and stakeholders

Semi-structured interviews with key informants frequently accessing mangroves for work (Longépée & de Souza, in prep):

More in-depth vision of social representations linked to the role of the mangrove

Public agencies	Environmental associations	Engineering consultancy	Nautical agencies
12	4	1	5

Geography : study of perceptions, knowledge and practices of Mayotte inhabitants and stakeholders

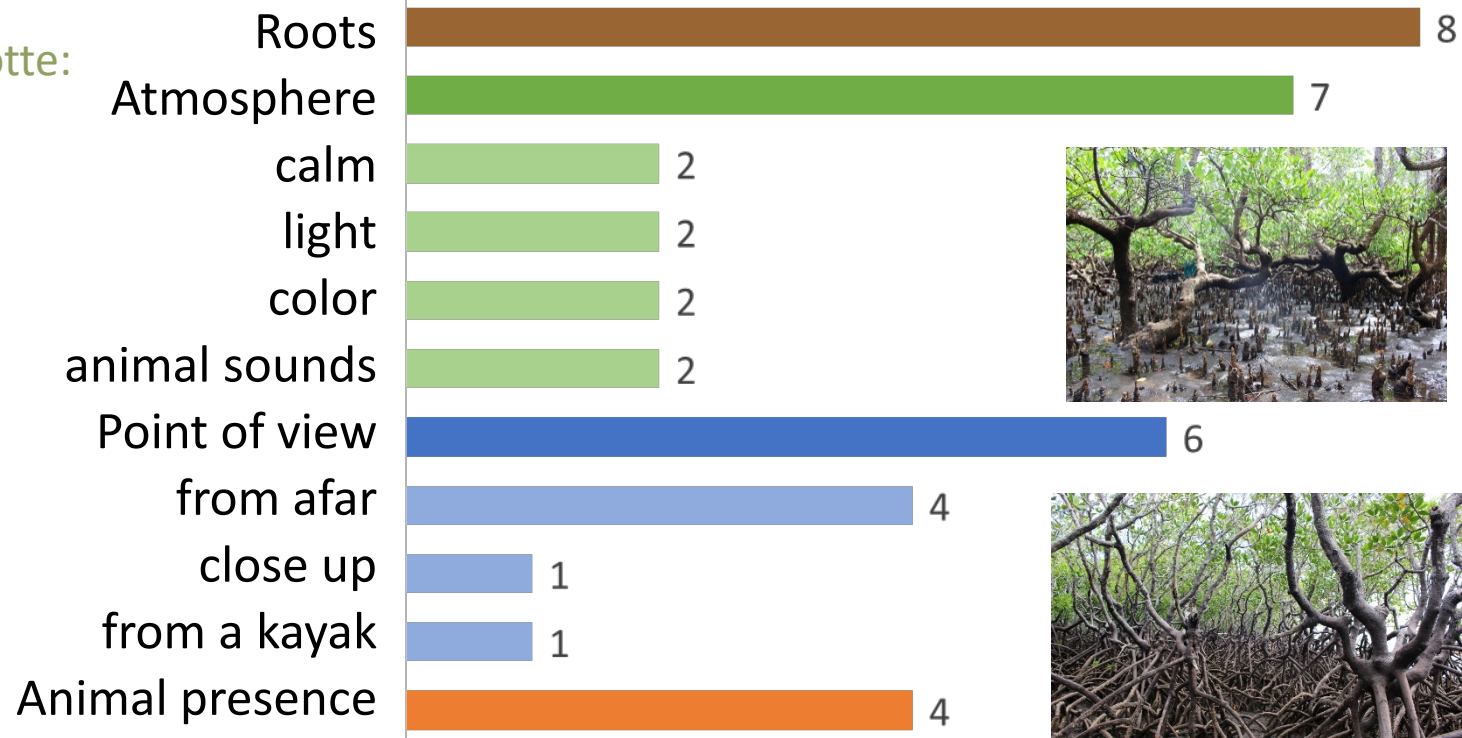
Semi-structured interviews with key informants frequently accessing mangroves for work (Longépée & de Souza, in prep):

More in-depth vision of social representations linked to the role of the mangrove

❖ Professional relationship to mangroves of Mayotte:

- Global perception
- Aesthetical value
- Professional tasks
- Knowledge
- Issues
- Planning

Public agencies	Environmental associations	Engineering consultancy	Nautical agencies
12	4	1	5



« I am very impressed by the pneumatophores, I find it brilliant [...]. Then, the stilt-roots of *Rizophora* are frankly impressive » (E19)

Geography : study of perceptions, knowledge and practices of Mayotte inhabitants and stakeholders

Semi-structured interviews with key informants frequently accessing mangroves for work (Longépée & de Souza, in prep):

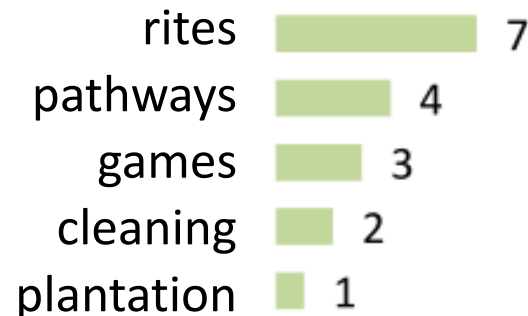
Public agencies	Environmental associations	Engineering consultancy	Nautical agencies
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More in-depth vision of social representations linked to the role of the mangrove

Uses



Practices



❖ Point of view of these professional on inhabitants' relationship to mangroves:

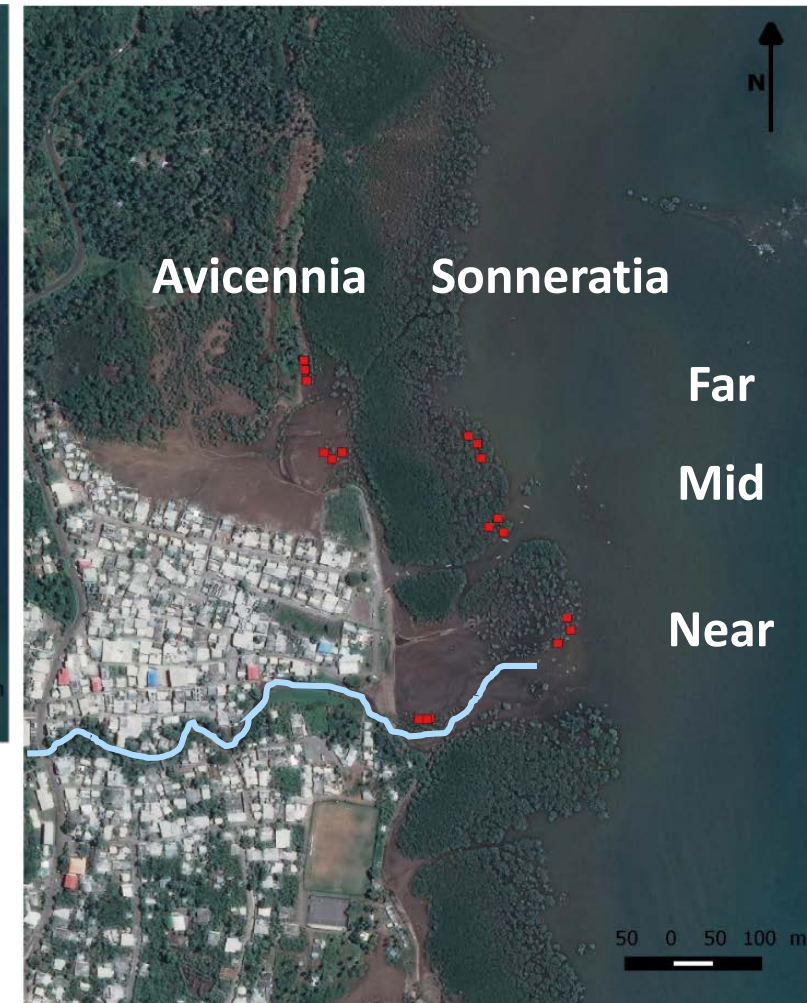
- Frequentation and practices
- Naturalist and cultural knowledge
- Personal investment on mangroves

Ecology : Effect of presence of river on canopy structure and macrofauna community structure
Bradley & Golléty (In prep)

Dembéni



Bandrélé



10 m x 10 m quadrats:

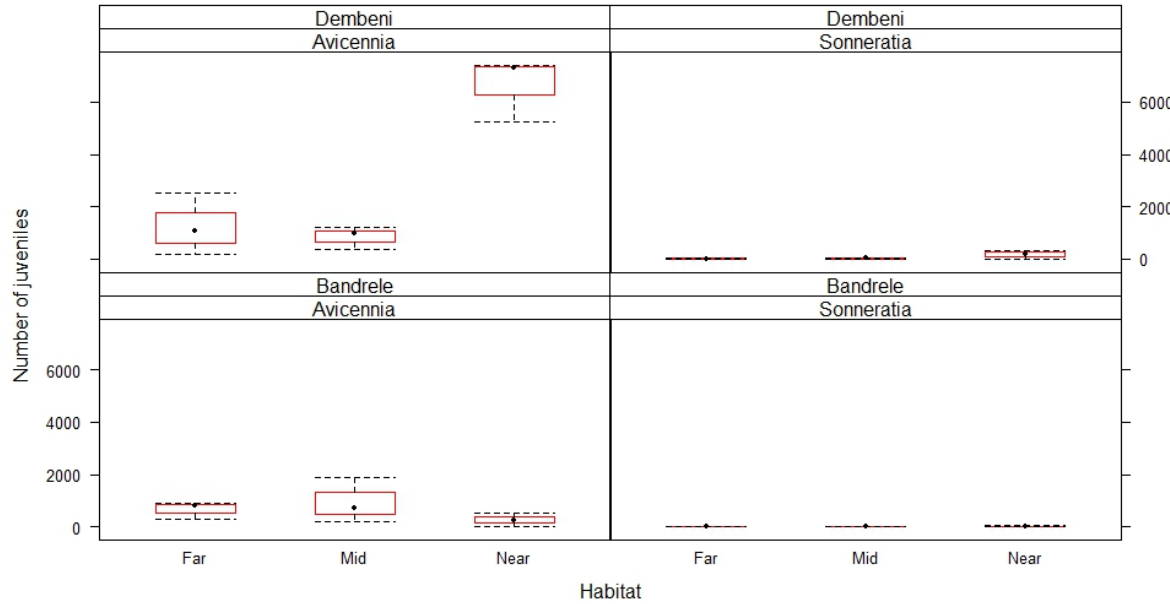
- Stem & tree density
- Species richness
- Tree height
- Basal area

Random triplicate 1 m x 1 m quadrats:

- Number of juveniles
- Number of pneumatophores
- macrofauna
- Surface salinity

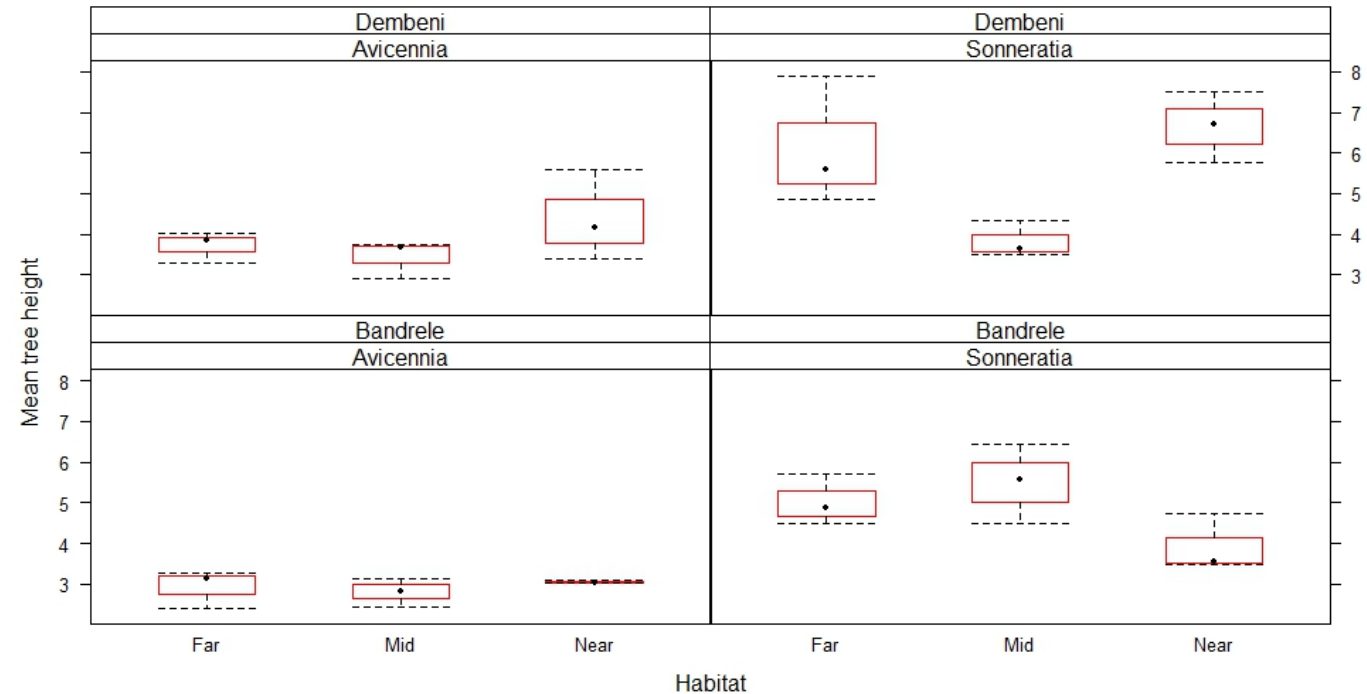
Recent studies

Ecology : Effect of presence of river on canopy structure and macrofauna community structure Bradley & Golléty (In prep)



More juveniles by the river on Avicennia at the Dembeni site only

Station effect in Dembeni only → River does not stimulate tree height



Need for new approach with both research and management objectives

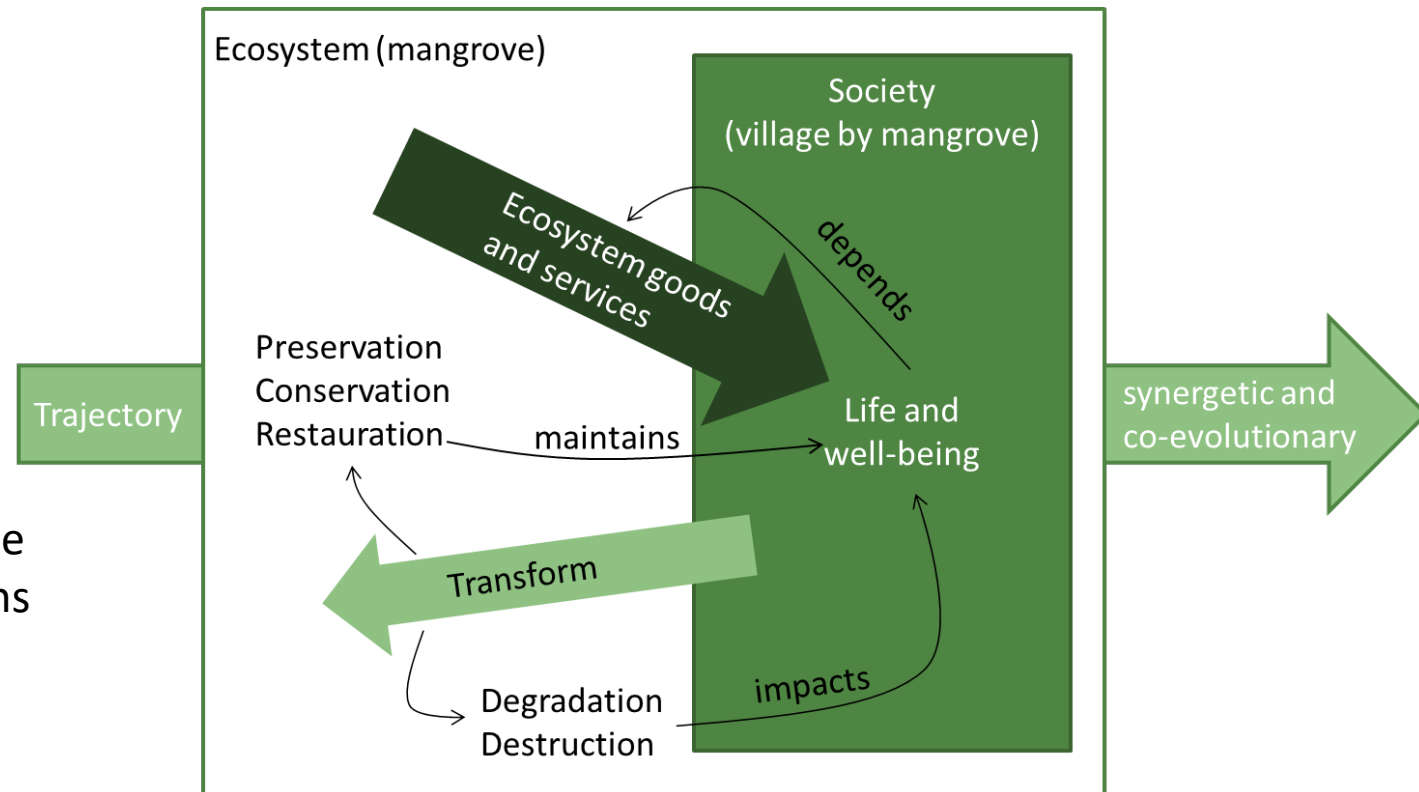
Improve knowledge on :

- Mahoran society link to mangrove system : practices, uses, perceptions and social representations
- Ecological understanding for ecosystem-based management



Target Society – ecosystem interactions

Society : « the social in that it forms a non-reducible whole to the sum of its elements, in that it functions like a **system** » (Lussault, 2003a).

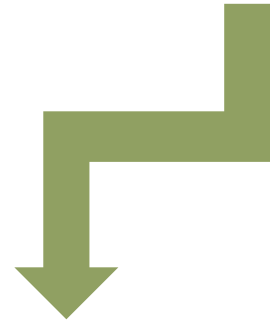


SOCIO-ECOLOGICAL SYSTEM

Need for new approach with both research and management objectives

Improve knowledge on :

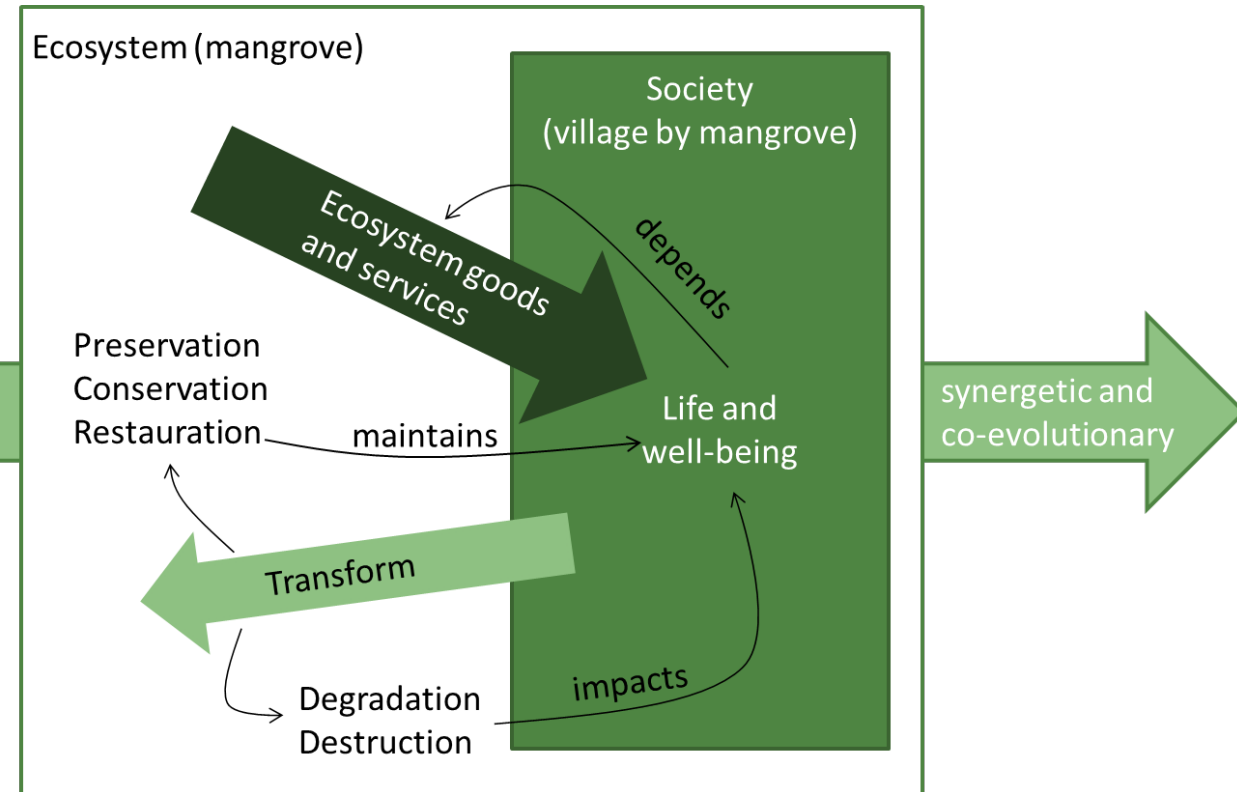
- Mahoran society link to mangrove system : practices, uses, perceptions and social representations
- Ecological understanding for ecosystem-based management



Target Society – ecosystem interactions

Trajectory

Resilience: The ability of a **societal or ecological system** to absorb **disturbances** while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to **adapt to stress and change** (Holling 1973, Walker 2004, Folke et al. 2010)



RESILIENCE OF A SOCIO-ECOLOGICAL SYSTEM

RESILIENCE OF THE MANGROVE SOCIO-ECOLOGICAL SYSTEM

1st step = Identify and characterize the MSES variables and their interactions

Knowledge, uses, perceptions &
social representations of
mangroves

Place of the mangrove
within the mahoran space

Natural and anthropogenic
threats

**Thinking mangrove systems:
Build conceptual model for each site**

Heritage value given to mangroves

Ecosystem functioning of mangroves

Exposition to inundation risk and marine
submersion for populations living in back-
mangrove area

RESILIENCE OF THE MANGROVE SOCIO-ECOLOGICAL SYSTEM

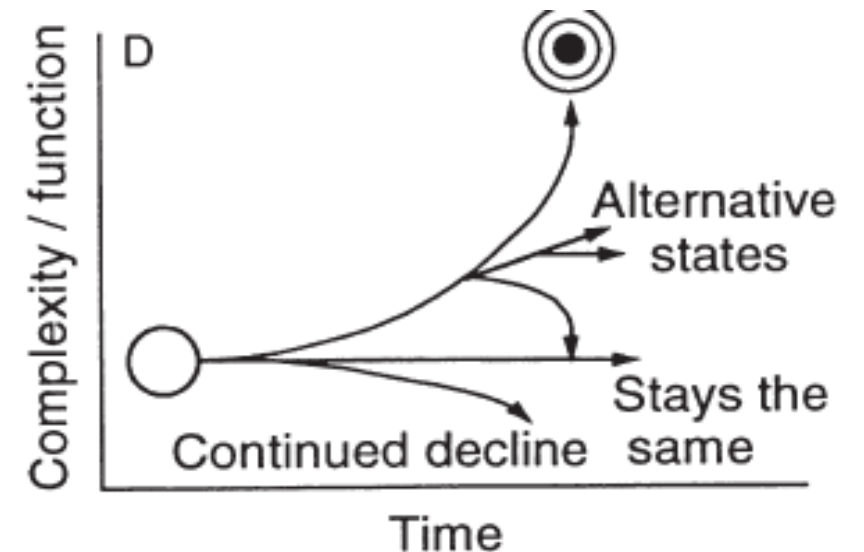
2nd step = Determine the key variables having a positive or negative influence on the resilience

Healing mangrove systems:
Estimating resilience to help with sustainable management

Variables that will bring the SES to the threshold of resilience

Property	Ecological example	Identity threshold example
Components	% area of mangrove	Loss of >40% area
Relationship (functionally relevant)	Food web	Loss of >70% decomposers
Continuity	Seed banks, number of juveniles	Absence of entire year-class

Level of resilience and resilience trajectory



RESILIENCE OF THE MANGROVE SOCIO-ECOLOGICAL SYSTEM

Deliverables:

General public:

- **Documentary** tracing the steps of the project, broadcasted on local TV, dubbed in local language
- **Tri-lingual posters exhibition** by the highly frequented ferry boarding area
- **Alphabet book of 'the mangrove, a natural and cultural heritage'** distributed for free in schools, townhalls, association bureaus, public libraries...
- **Information panels on good practice and preservation of restaured areas** by the study sites.

Managers:

- **Spatial data base including:**
 - Geophysical data (total area and species area)
 - Issues and vulnerability to inundation and marine submersion risk } GIS layers shared with local managers
- **Good practice guide for restauration** building from framework by Bosire et al 2008 and including recommendations for cost and planting methods
- **Report examining management obstacles, limits and possibilities** based on social representations of the mangrove, housing, uses and practices

Thank you for your attention

