

# Climate change impacts and adaptation in coastal communities in Ouidah and Grand-Popo, Bénin and the Saloum Delta, Senegal

Sebastian Weissenberger (1), Élyse Lacoste-Bédard (1),  
Thoto Fréjus (2), Abdourahmane Kane (3), Omer Chouinard  
(4)

(1) UQAM, (2) ACED-Bénin, (3) DEEC, (4) Université de Moncton

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MINISTÈRE DE  
L'ENVIRONNEMENT ET  
DU DÉVELOPPEMENT  
DURABLE DU SÉNÉGAL



NB

Saloum Delta  
Sénégal

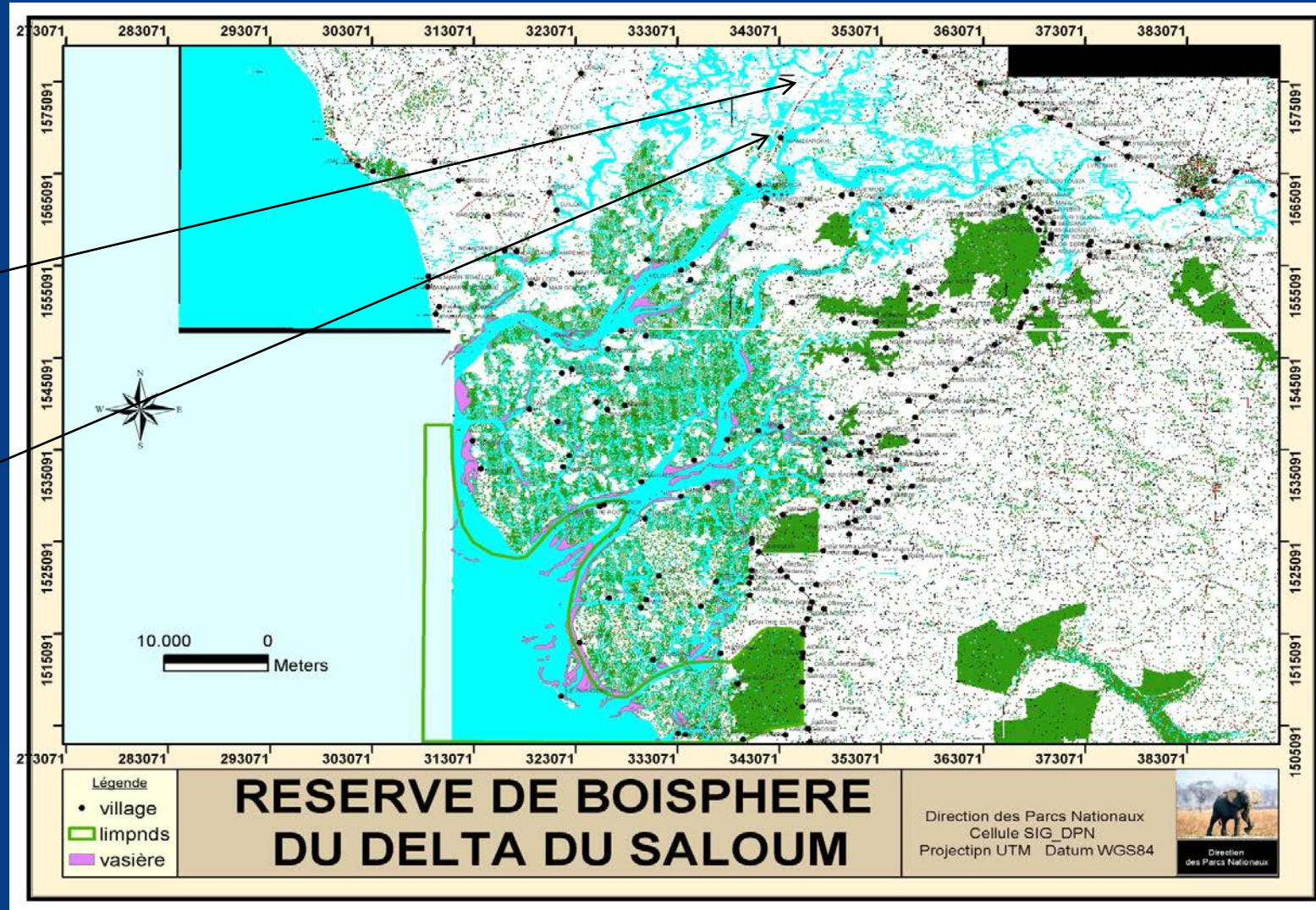
Ouidah-Grand-Popo  
Bénin



# SENEGAL

Fayako

Felir

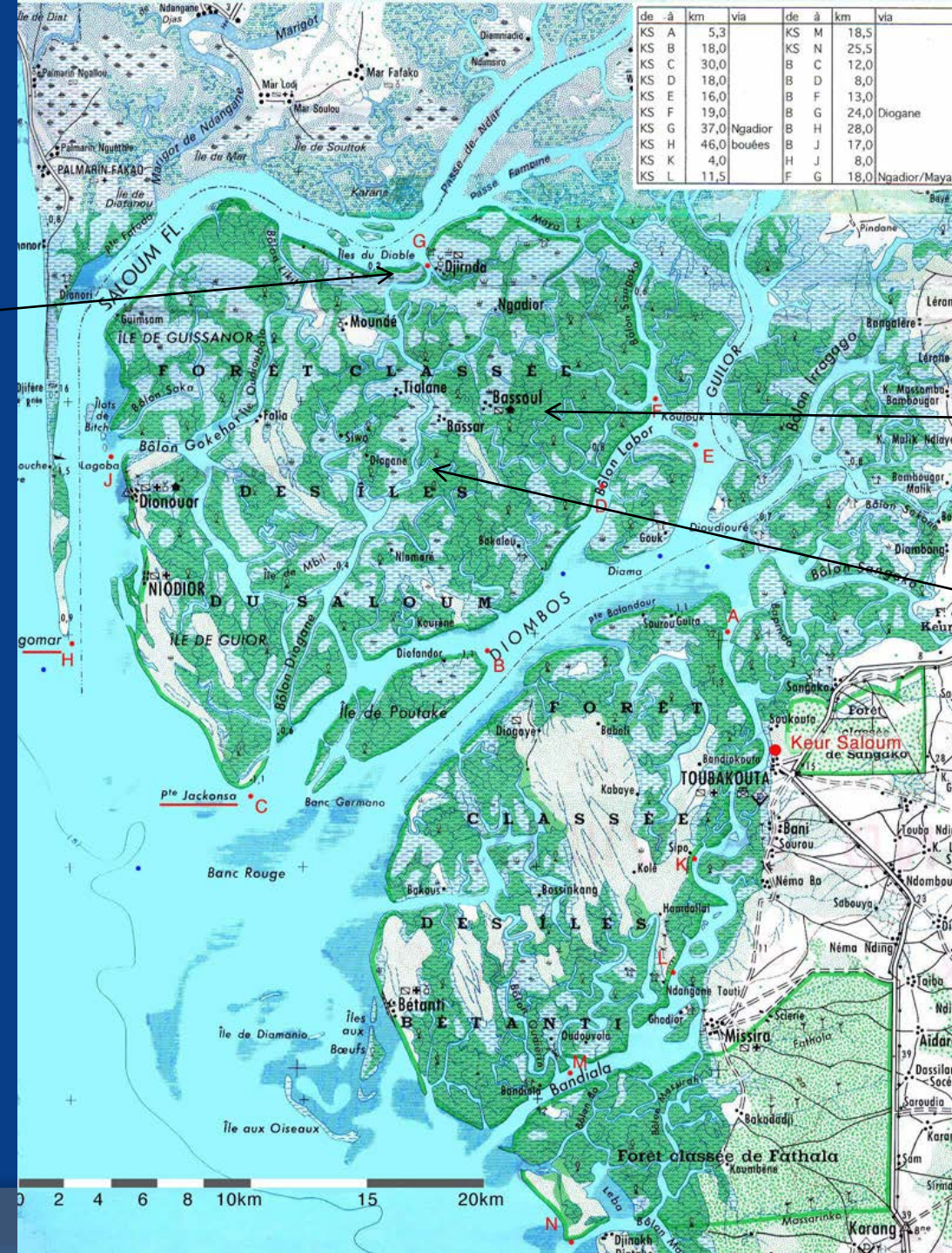




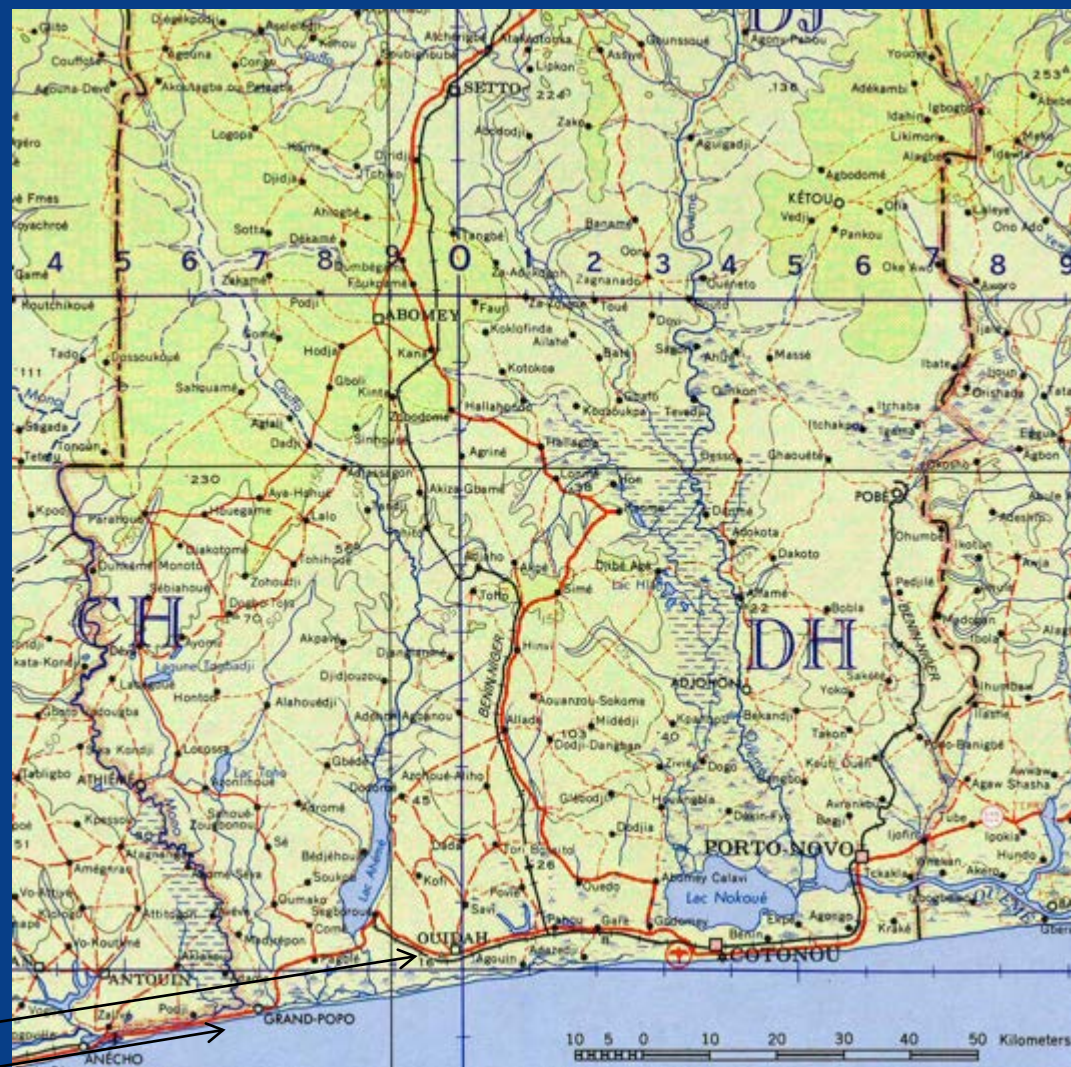
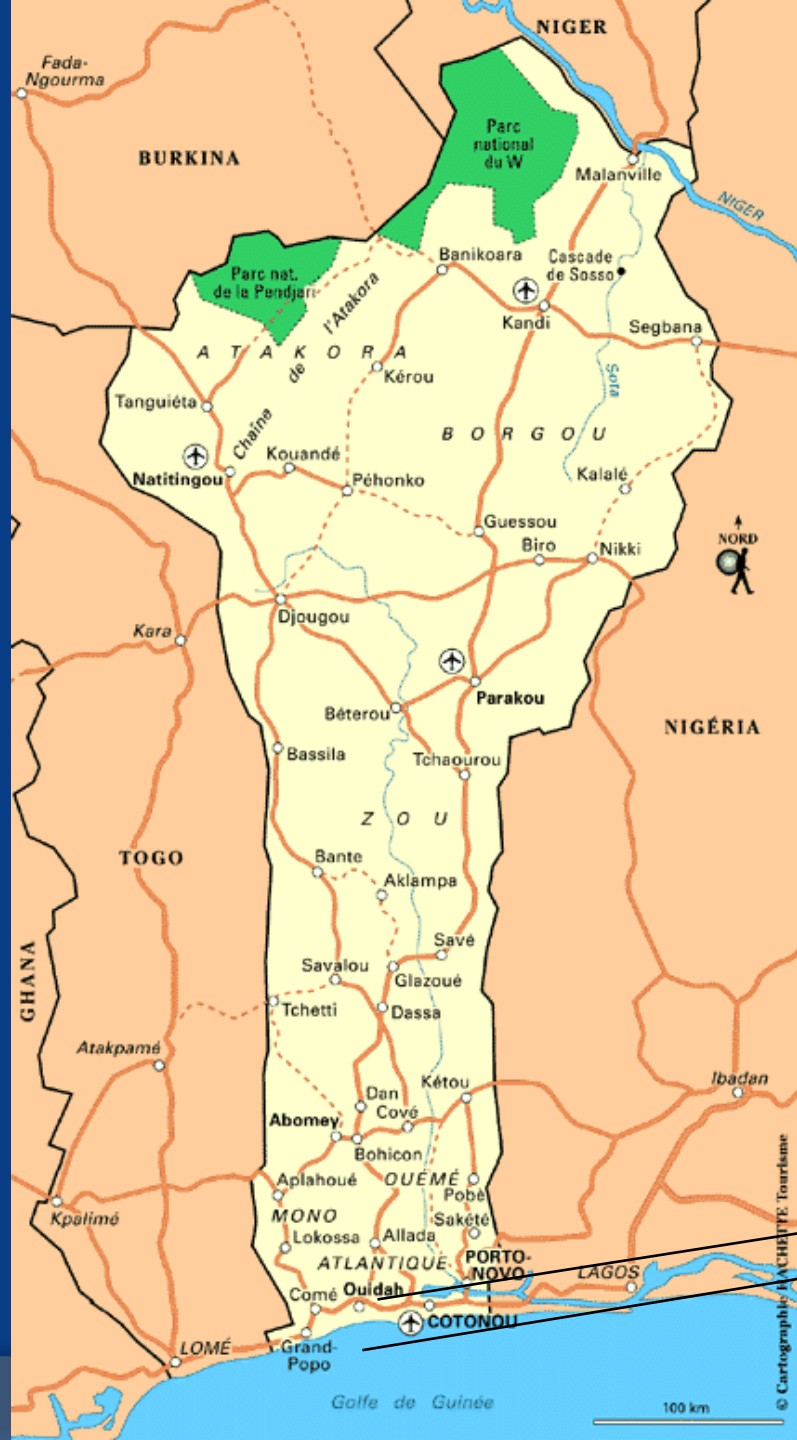
Djirnda

Bassoul

Diogane







Ouidah      Grand-Popo



## **Economic activities:**

Fishing and transformation  
Seafood collection  
Agriculture and cattle  
Services  
Tourism

## **New sectors:**

Crafts  
Salt production  
Apiculture





## Impacts of climate change: coastal erosion



Delta du Saloum  
Photo É. Lacoste-Bédard, 2015



Ouidah-Grand-Popo  
Photo ACED-Bénin, 2015



## Impacts of climate change: disappearance of beaches



Sénégal petite côte  
Photo M. Noblet, 2014



Ouidah-Grand-Popo  
Photo ACED-Bénin, 2015



## Impacts of climate change: Impact of extreme weather events



Inundation in Ouidah-Grand-Popo  
Photo ACED-Bénin, 2015



Damage from strong winds  
Photo É. Lacoste-Bédard, 2014



## Impacts of climate change: damage to houses



Sénégal Petite Côte  
Photo M. Noblet, 2014



Ouidah-Grand-Popo  
Photo ACED-Bénin, 2015



Intrusion de sel, Saloum  
Photo É. Lacoste-Bédard, 2008



## Impacts of climate change: salt intrusion



Salt intrusion in agricultural fields, Félir  
Photos É. Lacoste-Bédard, 2015



## Impacts of climate change: submersion of mangroves



Submerged mangroves, Saloum Delta  
Photo É. Lacoste-Bédard, 2015



Submerged mangroves, Ouidah-Grand-Popo  
Photo ACED-Bénind, 2015

## The research project

- Comparative study of the Saloum Delta and Ouidah-Grand-Popo (and New Brunswick)
- Evaluation of vulnerability (index)
- Sampling of adaptation actions and strategies
- Quantitative and qualitative methods:
  - Questionnaires
  - Semi-directed interviews
  - Expert interviews (academics, administrators)
  - Focus groups
  - Participant observation
- Analysis of geospatial data (Benin only)



Focus group with men in the Saloum Delta  
Photo A. Kane, 2015



## The research project

### Senegal

- 14 expert interviews
- 12 semi-directed interviews with villagers
- 7 focus groups with 73 participants
- 73 questionnaires

### Benin

- expert interviews
- focus groups
- 80 questionnaires and directed interviews

# Results

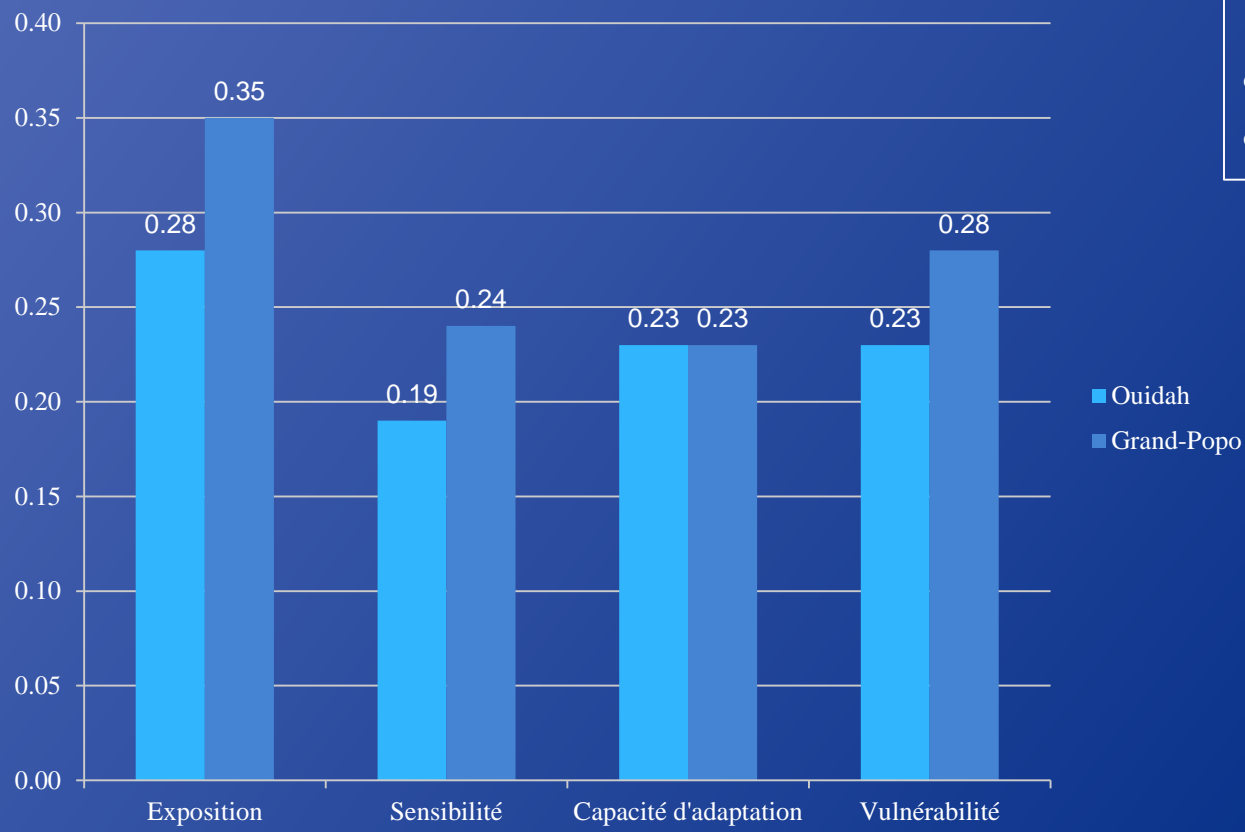
## Ranking by villagers of environmental issues

<b>Fayako</b>	<b>Felir</b>	<b>Djirnda</b>	<b>Bassoul</b>	<b>Diogane</b>
1. Salt intrusion in soils 2. Encroachment of the sea 3. Degradation of the mangrove 4. Scarcity of the resource 5. Displacement of residents	1. Salt intrusion 2. Salt intrusion by capillarity in houses 3. Inundations 4. Wind erosion	1. Encroachment by the sea 2. Salt intrusion in soils and dug wells 3. Destruction of coastal wells 4. Loss of sand dunes to erosion 5. Lack of rain 6. Scarcity of the resource 7. Power of the sea	1. Salt intrusion in soils 2. Encroachment by the sea 3. Scarcity of the resource 4. Coastal erosion 5. Lack of rain	1. Salt intrusion in soils 2. Encroachment by the sea 3. Loss of spots to collect seafood 4. Degradation of the mangrove 5. Scarcity of the resource



# Results

## Vulnerability index



Benin

## Exposure – Sensitivity – Adaptation Capacity

- Based on individual indicators from questionnaires and geophysical data
- Indicators normalized
- Weights by principal component analysis

Exposure	n.d.
Sensibility	0.41
Adaptation capacity	0.43
Vulnerability	0.42

Senegal (all villages)

## Recurrent themes

- Development in risk zones
- Increase in the value and attractiveness of the coast
- Lack of support from authorities
- Absence of a long term vision
- Deficit in scientific information
- Reactive adaptation with improvised means
- Adaptation strongly focused on – often unrealistic – protection
- Vulnerability of women

« Developed » countries often display the same vulnerability as « developing » countries



# Adaptation

Protection – Accommodation – Retreat

Specific (CC) – General (Env C)

Reactive – Planned



Improvised anti-erosion barrier,  
Saloum Delta  
Photo A. Kane, 2015



« Avant les maisons des habitants de  
Fayako allaient jusque là. »  
Photo E. Lacoste-Bédard, 2015



Concrete dike in Felir, Saloum Delta  
Photo É. Lacoste-Bédard, 2014

*Fayako: “The community retreated to the higher grounds  
in the center of the island, there is enough space there.”*

## Adaptation: some examples

- Dikes made with haphazard materials (Fayako)
- After inundations, wait for the water to retreat and use what is left (Fayako)
- Increase agricultural yields by using better machinery (Fayako)
- Hosting visitors to study the impacts of climate change (however “*They just discuss, but that’s all. There has not been any significant change*”) (Fayako)
- Building a dike with the help of PAPIL (Djirnda, Felir)
- COMFISH program and establishment of a MPA (Djirnda)
- Apiculture project (Djirnda)
- Replanting of mangroves (Diogane)
- Acquisition of a chicken enclosure (Diogane)
- Construction of a rainwater collection basin (Félir)
- Seasonal migration to Dakar and other cities

Restauration of natural capital – diversification of the economy



## **Adaptation: selected general conclusions**

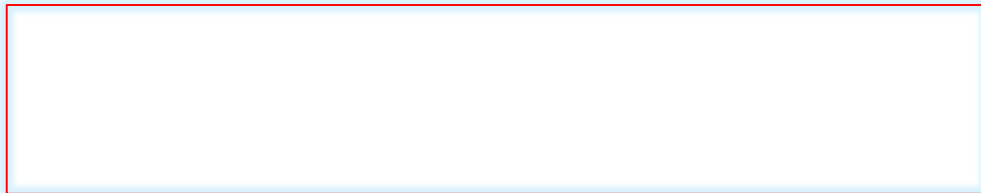
- Impacts of climate change already visible
- Villages suffer from climate change and environmental changes (incl. overexploitation of resources)
- Main economic activities (fishing and agriculture) are severely impacted
- Some human intervention compound environmental problems (sand dredging, coral collection, river regulation, berms upstream, ...)
- Women are more vulnerable
- Associations & NGOs play an important role in adaptation
- Adaptation relies on local governance, not the state (as in NB)
- Lessons from Benin and Senegal are relevant for Canada and vice versa

## Plan de gestion intégrée de la zone côtière Carleton St. Omer, 2006



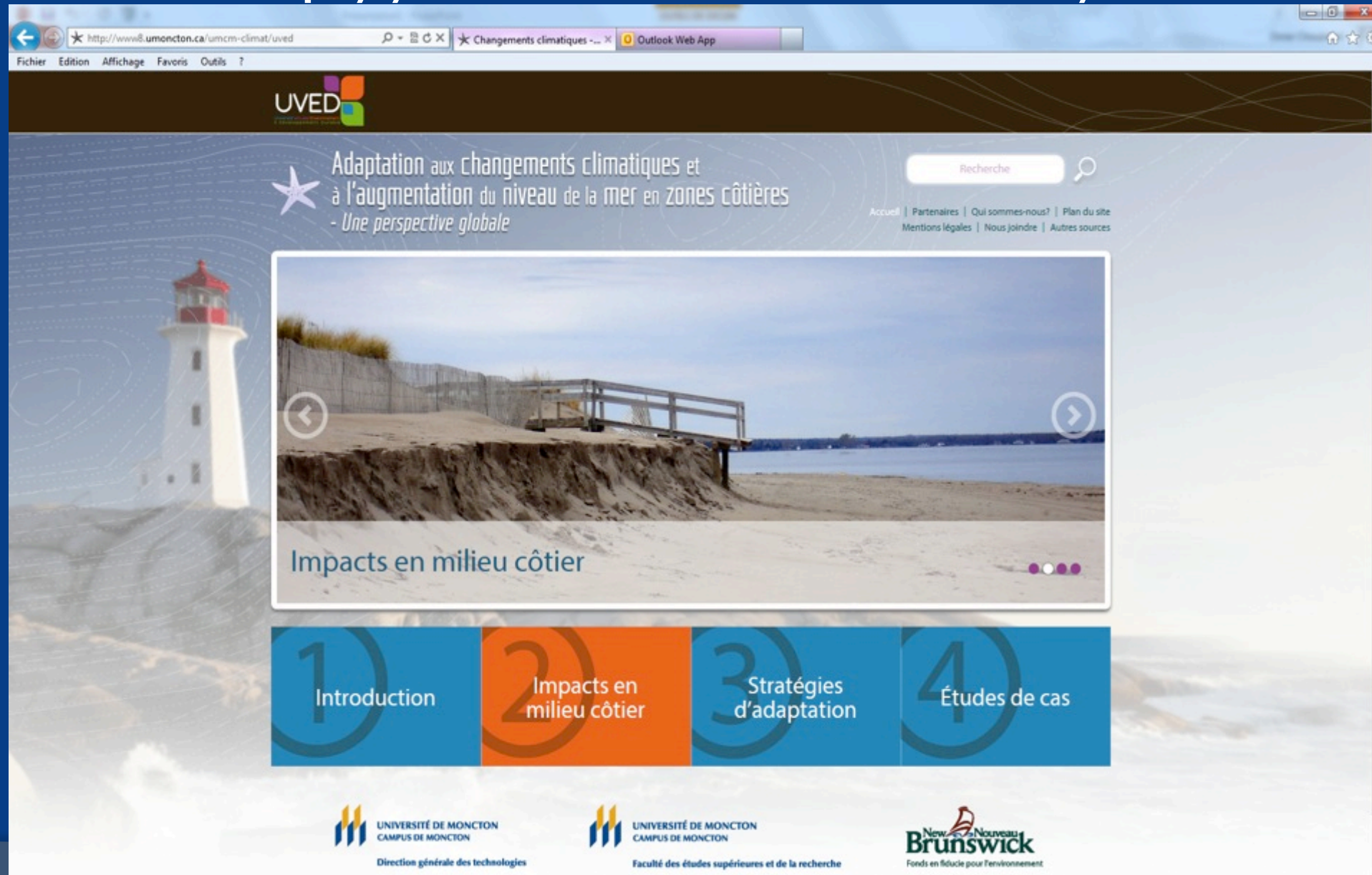
Barachois de Carleton

Guy Saviole





Web site <http://www8.umoncton.ca/umcm-climat/>



Thank you for your attention!

