

Contribution to CCLME Project Inception Workshop (2-3 November 2010, Dakar, Sénégal)

**The social-ecological system approach :
a concept to assess the consequences of climate alterations on
CCLME coastal communities
and to propose governance adaptations**

**Social-environmental vulnerabilities, societal resilience factors, governance
adaptations**

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Big fishing canoes in Missirah (Saloum Delta)

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Traditional drying of mullets in Iwik (Parc national du Banc d'Arguin) © *Bozena Stomal*



A definition of a social-ecological system

A **social-ecological system** is characterized by dynamic interactions between an ecosystem and human communities. The notion of social-ecological system is highly pertinent when the communities are greatly dependent on environmental conditions and natural resources for their livelihoods (Berkes & Folke, 1998 ; Walker et al, 2002; Ostrom, 2009).

A definition of the governance

The governance is the whole of public and private interactions initiated to solve societal problems, to create societal opportunities. The governance includes the formulation and application of principles guiding those interactions. (Kooiman and Chuenpagdee, 2005). Societal includes everything which refers to the structure, the organization or the functioning of a society

Utility of this approach

➤ **Utility** : a concept tool to assess the impacts of climate alterations on coastal communities because the use of ecosystem goods and services involves endogenous modifications or modifications resulting from external forcings to which the communities have to adapt

Objective of this approach

A proposal for adaptation of the governance of social-ecological systems allowing to reduce vulnerabilities and to increase the capabilities of CCLME coastal communities impacted by climate alterations (climate variability and sea warming, sea level rise and coastal erosion etc...)

How to reach this general objective

- **1. An assessment of impacts of climate alterations on the studied communities**
- **2. A categorization of socio-environmental vulnerabilities,**
- **3. An identification of functionings and capabilities of persons and households,**
- **4. A pointing out of factors of coastal community societal resilience**
- **A method**
- **Present case studies**

Some definitions

- **The functioning** is an achievement of a person: what she or he manages to do or be, a functioning refers to the use a person makes of the commodities at his or her command (Sen, 1999)
- **A capability** reflects a person's ability to achieve a given functioning (doing or being.) (Sen, 1999)
- **The livelihoods** : the whole of capabilities, assets (including both material and social resources) and activities required for a means of living (Carney, 1998).

1. The assessment of climate alterations on communities

- A focus on the modifications of ecosystem goods and services linked to these alterations
- A retrospective livelihoods strategies analysis (thirty years) taking in count the environmental variations and focused on the evolution of sensibility points
- this assessment helps to identify and localize the impacted communities, the type and level of this impact for each main livelihood

2. The categorization of social-environmental vulnerabilities of coastal communities

- **A description of the chain of causes, and of the hierarchization of causes** in distinguishing between distant “root” causes and unsafe conditions (Wisner et al, 2004)
- **The drawing of a vulnerability matrix** proposed by Cannon (2000) which points out the components of the vulnerabilities, the variables, the socio-economic and technical determinants.
- **The assessment of livelihoods vulnerability indexes** (Hahne et al, 2009) **and economic vulnerability indexes of households** (Devereux, 2001; Béné, 2010)

3. The assessment of capabilities

This assessment is linked to the diverse combinations of functionings that an individual or an household can implement (Sen, 2000), for example in front of climate alterations. Two major groups of components have to be taken in count :

- the perceptions and general socio-economic consequences of these alterations
- the revenue variability, the activity diversification, the level of insertion within social networks, the external help (mutual aid and monetary transfers), the formulation of projects for the future (Gondard-Delacroix et Rousseau, 2005)

4. The pointing out of societal resilience factors

The drawing of a DROP model (*Disaster Reliance of Place Model*) which helps to have a better understanding of the resilience of a community facing natural disasters including environmental risks or alterations (Cutter et al, 2008). Societal resilience is defined as the capacity of a social system to react facing to alterations, risks or disasters. We can point out two steps for the research effort:

- the identification of resilience factors in distinguishing between inherent resilience (diversification of activities, informal insurance mechanisms, free loans, monetary transfers) and the adaptive resilience (decrease of inputs etc.)

- the identification of resilience indicators (Schneiderbauer and Ehrlich, 2006 ; Paton and Johnston, 2006).

5. The proposal of an adaptation of the governance to face up to climate alterations

- **the analysis of effects of national or regional public policies considered as driving forces.** The study of structural effects of national or regional public policies on social-ecological systems governance has to be focused on the consequences of development plans
- **the analysis of impacts and adaptability of local governance facing environmental alterations.** The study of modalities of local governance adaptability has to point out the failures, the various answers depending of the type, the extent and consequences of alterations (Ostrom, 2009 ; Anderies et al, 2004).
- A special focus on **the capacity of protected areas to be an option for a better adaptation of social-ecological systems governance facing environmental alterations**

6. Method

- **The observation unit is the household, and the village community** as an aggregation of households having in share the same social-ecological system
- **A compilation of documents** relating to livelihoods strategies of selected communities to point out sensibility points as observed during the last thirty years
- **A compilation of development plans** relating to public policies
- **A compilation of institutional and judicial texts on local governance** of selected social-ecological systems, of activity reports from institutions involved in local governance

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- **A completion of the social-ecological governance analysis framework** by defining the problems that governance raises, classifying the actors of governance, describing the norms which governance complies with, identifying nodal points where the actors' strategies confront, reconstructing the process having led to the governance system
- **A completion of village monographs** on the environmental alterations, socio-environmental vulnerabilities, functionings and capabilities, as well as societal resilience factors at the level of the community
- **A carrying out of an household sample-based survey** relating to the perception of environmental alterations, the categorization of socio-environmental vulnerabilities, household functionings and capabilities, societal resilience factors
- **Mapping of** climate alterations, and of socio-environmental vulnerabilities of coastal communities

7. Our case studies in West Africa
(AMPHORE Project, workpackage on « governance »)

- **The Imraguen social-ecosystem in the Banc d'Arguin**

- **The Bamboung marine protected area social-ecosystem**