



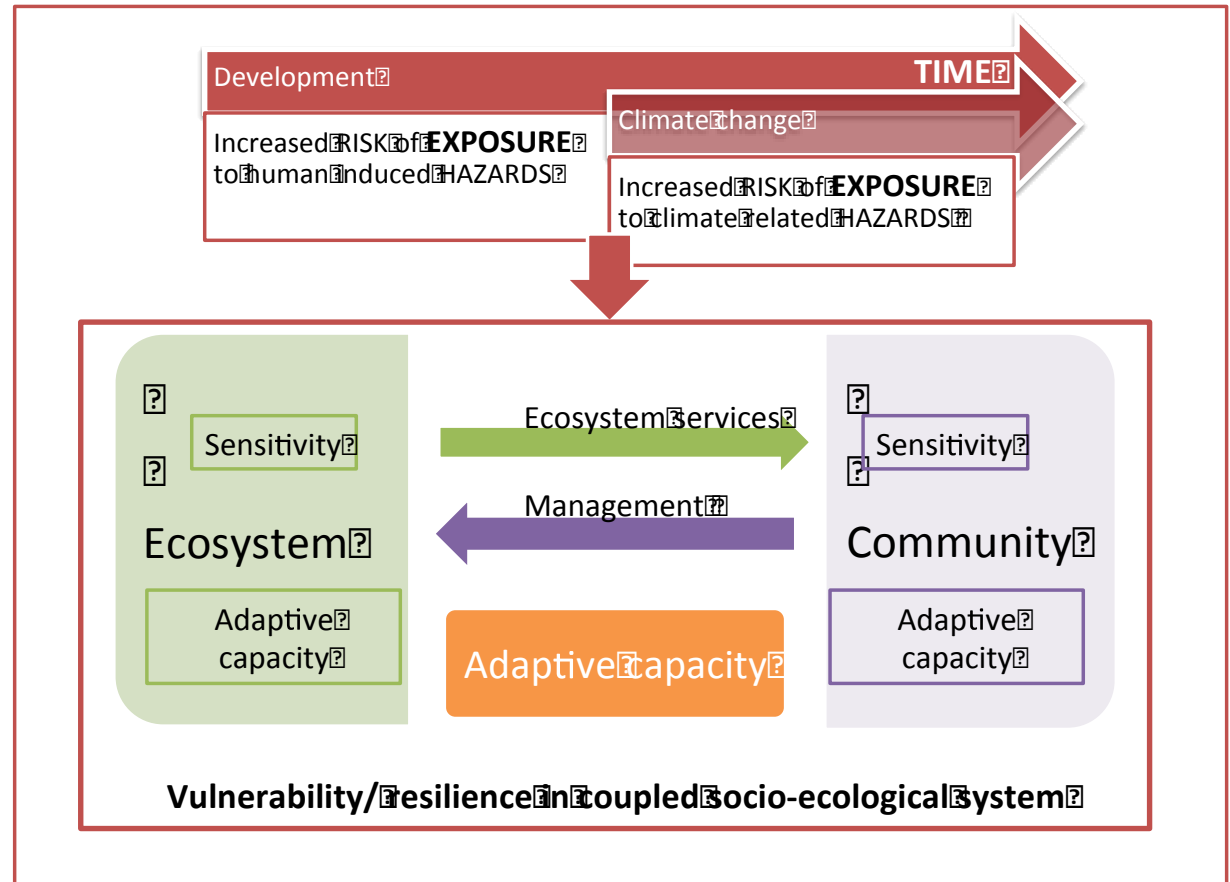
**PANEL 1.4 ECOSYSTEM-BASED ADAPTATION:  
PRINCIPLES AND LIMITS  
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OCTOBER 1 2014**





# ECOSYSTEM BASED ADAPTATION

Ecosystem-based adaptation (EbA) is the use of **biodiversity** and **ecosystem services** as **part** of an overall adaptation strategy **to help people to adapt** to the adverse effects of **climate change**.





# RELATIONSHIP BETWEEN ECOSYSTEM AND CONSTITUENTS OF WELL-BEING.

## Ecosystem Services

### Supporting services

Services necessary for the production of all other ecosystem services

- Soil formation
- Nutrient cycling
- Primary production
- Provision of habitat

### Provisioning services

Products obtained from ecosystems

- Food
- Fuel wood
- Fibre
- Biochemicals
- Genetic resources

### Regulating services

Benefits obtained from regulation of ecosystem processes

- Climate regulation
- Disease regulation
- Water regulation
- Water purification

### Cultural services

Nonmaterial benefits obtained from ecosystems:

- Spiritual and religious
- Recreation and ecotourism
- Aesthetic
- Inspirational
- Educational
- Sense of place
- Cultural heritage

## Constituents of Wellbeing

### Security

- Personal safety
- Secure resource access
- Security from disasters

### Basic material for life

- Adequate livelihoods
- Sufficient nutritious food
- Shelter
- Access to goods

### Health

- Strength
- Feeling well
- Access to clean air and water

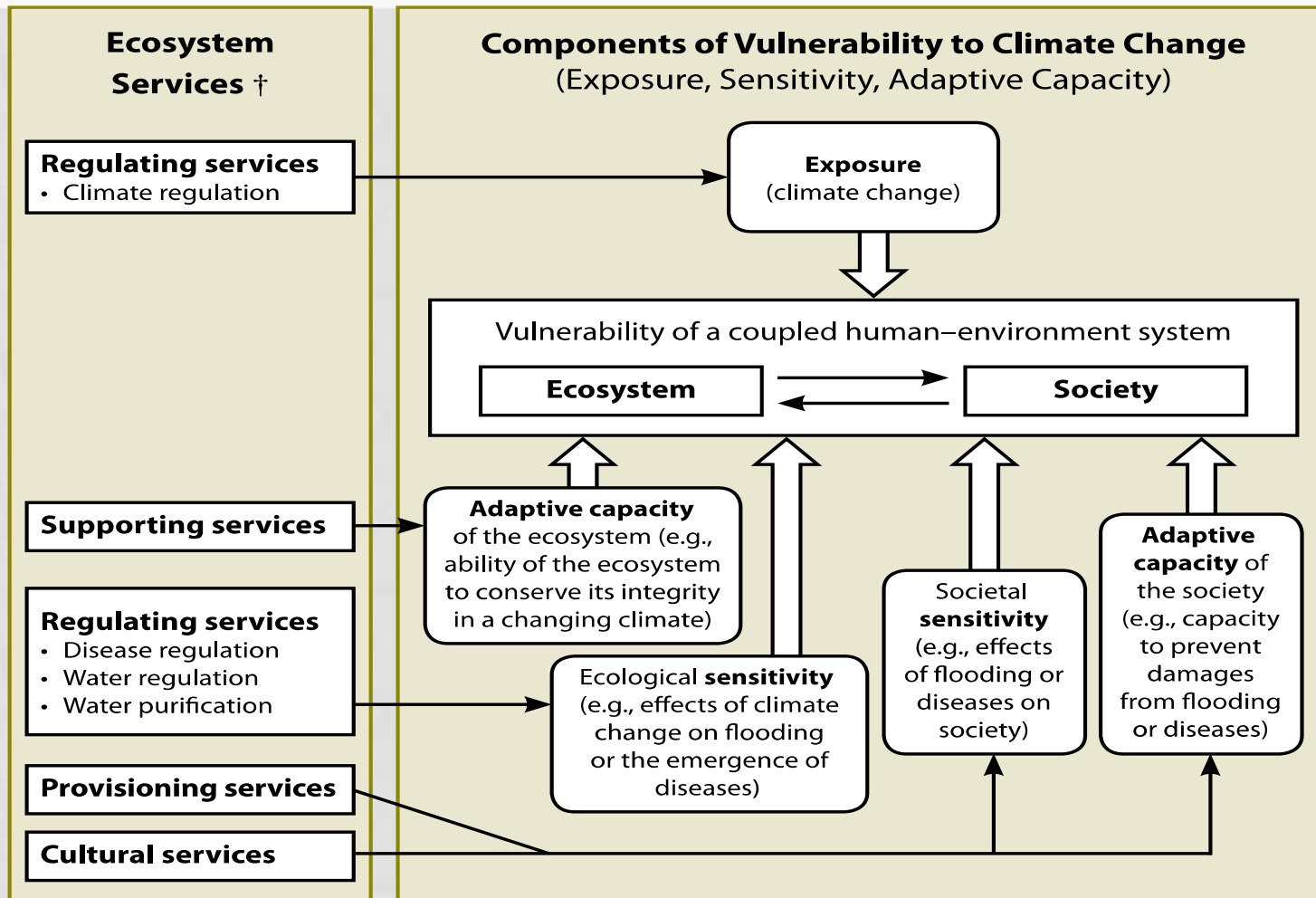
### Good social relations

- Social cohesion
- Mutual respect
- Ability to help others

**Freedom of choice and action**



# THE SCIENTIFIC CASE FOR EBA: LINKING ECOSYSTEM SERVICES AND COMPONENTS OF VULNERABILITY



Source: Locatelli, 2008



# HOW DO WE EVALUATE THE EFFECTIVENESS OF EBA INTERVENTIONS?

Made difficult by two issues:

- Adaptation is a relatively new concept and therefore, any 'adaptation projects' are unlikely to have any results so far (Doswald, 2011)
- There is currently much debate on what constitutes successful or effective adaptation.

Multicriteria concept: environmental, social, economic and institutional dimension

Munroe and Doswald er al.2011

In Lao, the following criteria were used to prioritize the adaptation options:

**Effectiveness:** Will it achieve the adaptation objective/s identified?

**Cost:** How cost effective will it be?

**Feasibility:** How realistic will it be to carry out?

**Attractiveness:** How attractive is it for public and private funding?

**Capacity:** How well does it fit with current capacity?

These criteria were assigned different weights, and based on these criteria, the stakeholders ranked different adaptation options on the scale of 1 to 30.



# COST-EFFECTIVENESS ANALYSIS: SUMMARY OF WORKSHEET

SUMMARY OF WORKSHEETS	
Worksheet	Description
1. Cost Effectiveness Ratio	Provides a summary of the cost-effectiveness ratios for each scenario.
2. Effectiveness measure	Lists the effectiveness measure for each scenario.
3. Direct financial costs	Shows financial costs of each project option in appropriate year and by stakeholder group.
4. Indirect economic impacts	Shows wider economic impacts in appropriate year and by stakeholder group.
5. Provisioning services	Accounts for provisioning ecosystems services in the years in which they accrue and by stakeholder group.
6. Regulatory services	Accounts for regulatory ecosystems services in the years in which they accrue and by stakeholder group.
7. Cultural services	Accounts for cultural services in the years in which they accrue and by stakeholder group.



# COST EFFECTIVENESS ANALYSIS- EXAMPLE IN LAO

- **Effectiveness:** *Number of years in 10 in which food supply is not disrupted for more than 5 days in any village due to Climate related events.*

## TOTAL COST EFFECTIVENESS RATIO:

- Agricultural extension: 1 ( economic costs also included costs of degradation of forests and wetlands)
- Improved forest management: -592
- Improved wetland management: -1526

Discount Rate: 4%



# CEA – EXAMPLE FROM VIETNAM

## **Hard or engineered solution:**

Construction and upgrade of sea dikes in Thanh Phu, Ba Tri, and Binh Dai district..

## **Ecosystem-based adaptation**

**(EbA):** Reforestation and conservation of coastal forests with a total forest area of 5.100 ha (existing forest: 3897 ha and planting of new forest: 1.203 ha).

**Effectiveness:** number of people saved from floods

**Discount Rate: 10%**

## **Low Risk Scenario:**

### **Average cost per person saved from flood:**

Sea dike systems :138.8 mill VND/person.

Ecosystem based adaptation with coastal forest ecosystems : 1.7 mill VND/person.

### **More than 100% cost saving**

## **High risk scenario**

55%, 17%, and 5% cost saving by using EbA with sea dyke for Ba Tri, Binh Dai and Thanh Phu district.





## UNDER WHAT CIRCUMSTANCES HAS EBA BEEN ESTABLISHED TO WORK? NOT TO WORK?

- Monroe et al. reviewed 66 case studies
- Measures of effectiveness were not always obvious --outcomes monitored are not directly linked to what the adaptation intervention is trying to achieve.
- Measures from the other case studies are varied ranging from perceived protection capacity of mangroves to measurements of river flow, to crop productivity.
- The main ecosystems in which the effectiveness of EbA was found are 'artificial terrestrial landscapes' (for example, agricultural landscapes, pastures and urban areas), coastlines, forests and inland wetlands
- Does NOT mean that EbA does not work- by increasing ecosystem resilience, EbA always contributes to increase human well-being and to decrease vulnerability
- Sometimes- when the risks are too high, EbA may not work alone and needs to be considered together with other measures- such as planning for evacuation; hard infrastructure measures.
- ALWAYS combine EbA with CbA and soft adaptation measures



## HOW DO WE DISTINGUISH ADAPTATION FROM ENVIRONMENTAL AND DEVELOPMENT BENEFITS?

- Adaptation, environmental and developments are interrelated. Adaptation can not be a one-stop aim, it also needs to contribute to sustainable development.
- **Sustainable** development doesn't compromise quality of environmental services and helps to build environmental and human resilience helping in adaptation.
- Some adaptation strategies (eg. income diversification, watershed management etc.) can yield both adaptation and development/environmental benefits.
- Difference: Development and environmental conservation activities assume that climate is more or less static; adaptation does not
- Adaptation benefits should be able to address projected climate risks. Primary question to ask: do they reduce vulnerability of people/social-ecological system to future climate risks?