

**Workshop on SEEA-Experimental Ecosystem Accounts**

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# **Tools and Models in Project for Ecosystem Services (Proecoserv)**

**Dr Pushpam Kumar, ([pushpam.kumar@unep.org](mailto:pushpam.kumar@unep.org))**

**Chief, Ecosystem Services Economics Unit United Nations  
Environment Programme (UNEP)**



# Project for Ecosystem Services

## Objective

To reduce threats to globally important biodiversity through integrating the findings and tools of ecosystem service assessments in policy and decision making

- **Components of ProEcoServ**

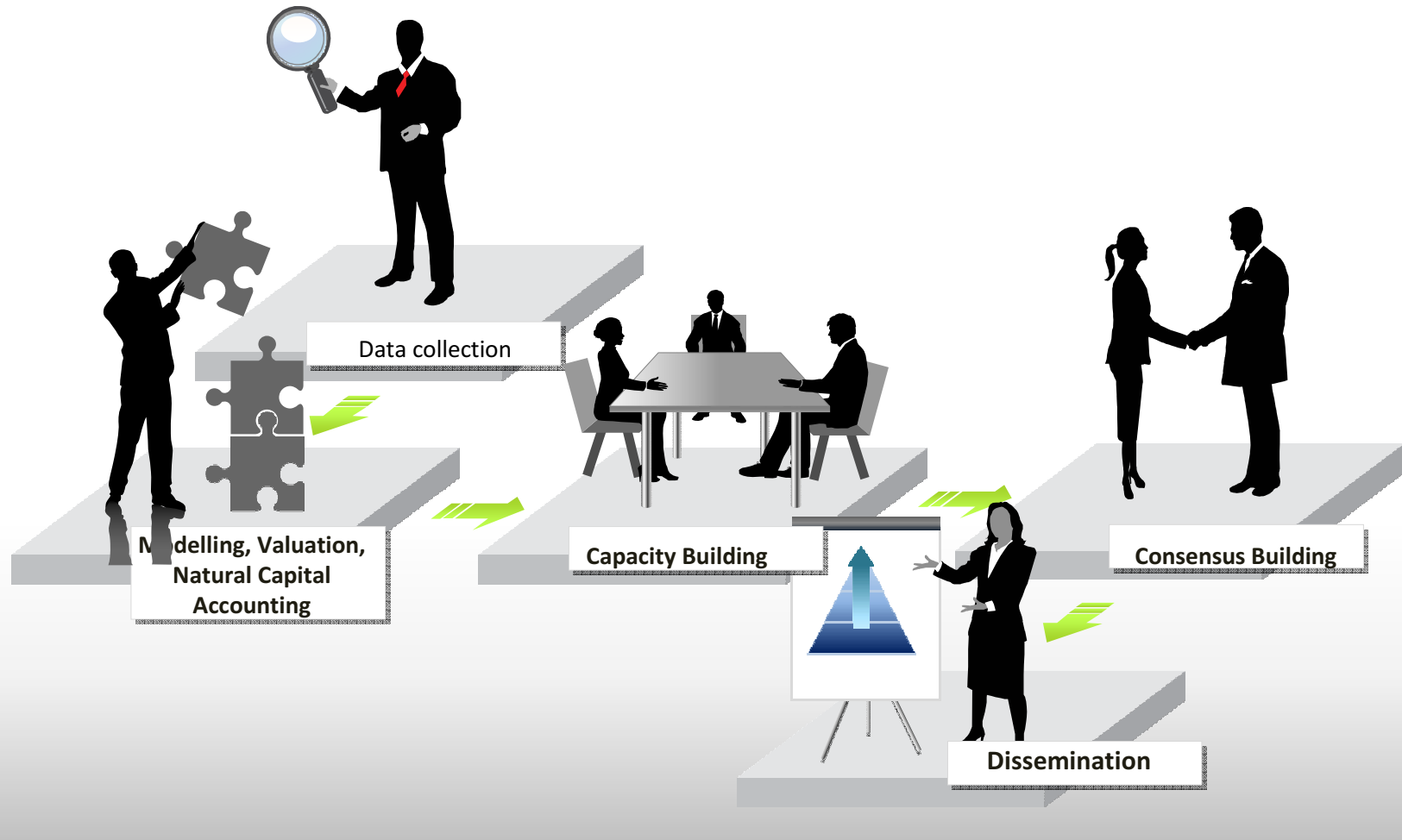
1. **Development and application** of multi-scale and locally valid tools and decision-support models;

2. **Support** application of ecosystem service management approaches at national/international levels;

3. **Strengthen** science-policy interface



# ProEcoServ Activities

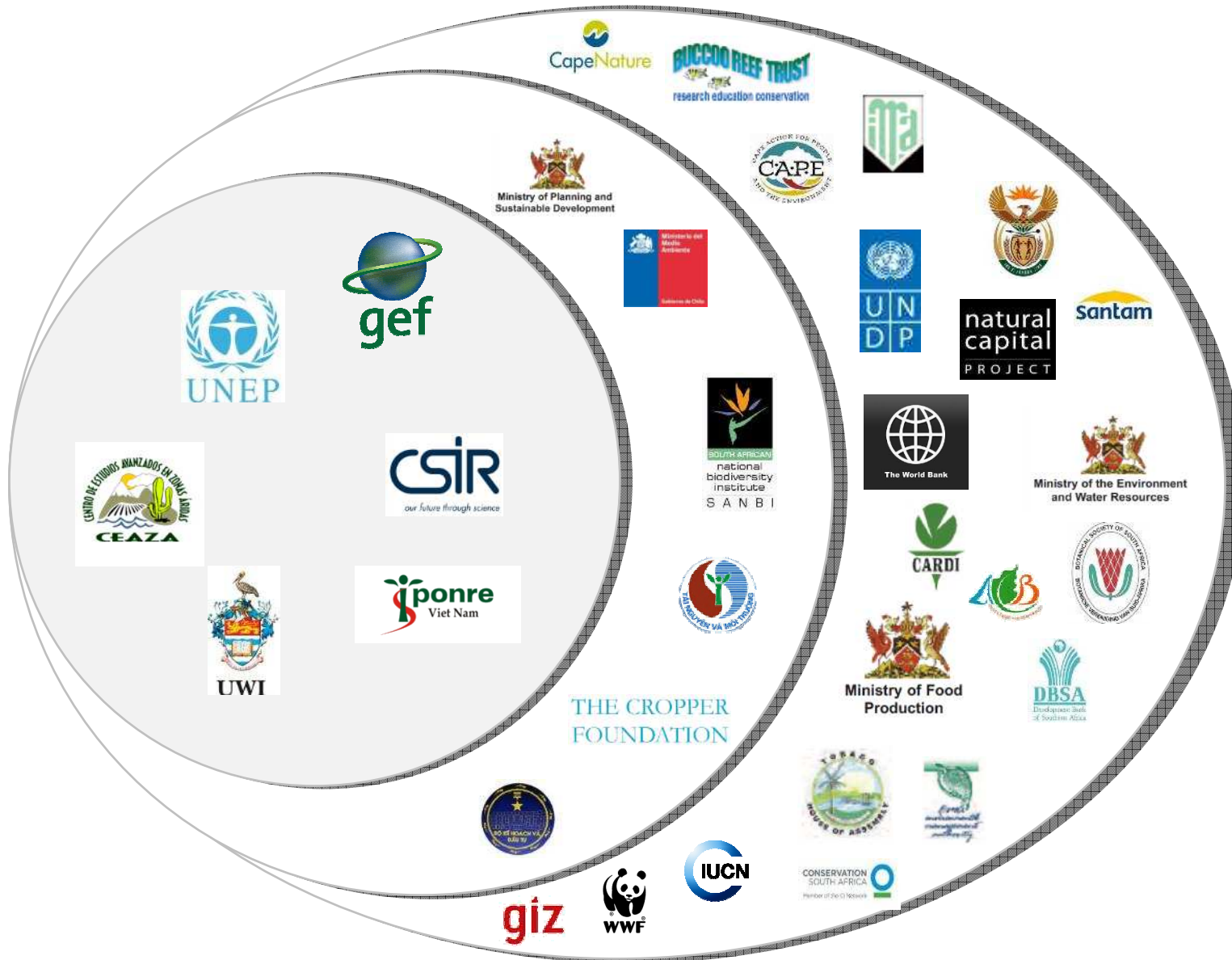


# Implementation Arrangement

- National Teams – Main Partner Organizations
  - The Centre for Advanced Studies in Arid Zones (CEAZA), Chile
  - The Council for Scientific Research (CSIR), South Africa
  - University of West Indies (UWI), Trinidad and Tobago
  - The Institute of Strategy and Policy on Natural Resources and Environment (ISPONRE), VietNam



# Partners and Stakeholders

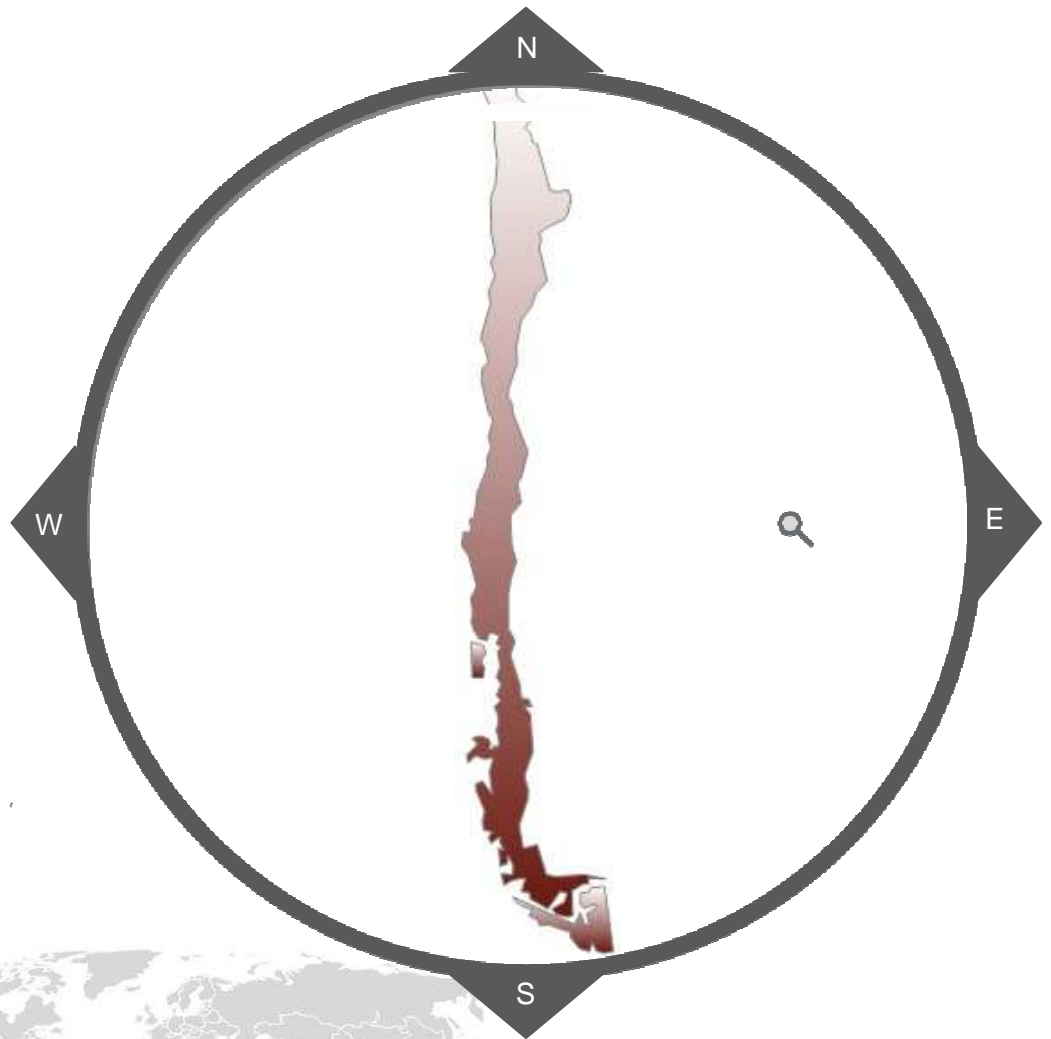




# Chile

## Background and Baseline

- Diversity of climate, ecosystems and habitats,
- San Pedro is located in the “the driest area of the world”,
- Sub-global assessment was conducted in the San Pedro De Atacama (2004-2005)
- Threats to the water cycle: additional water demands of mining and tourism,
- Limited capacity for development and implementation of sustainable water use policy, legal framework, and tools for ES.





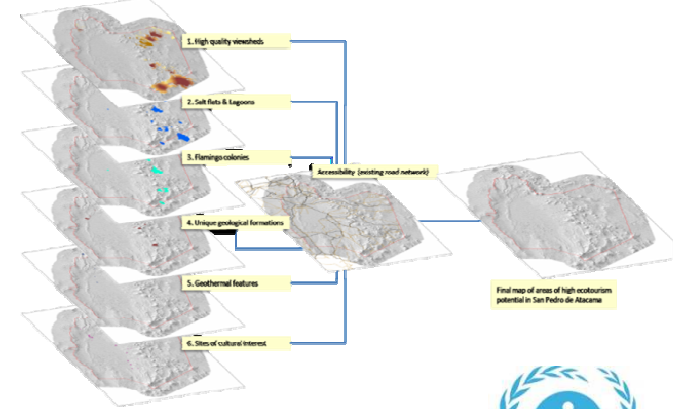
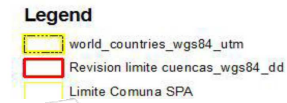
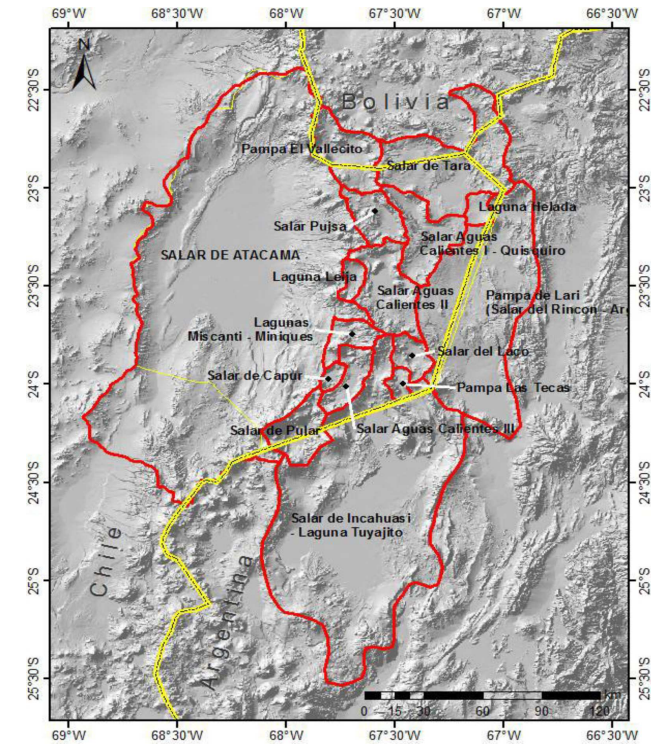
# Tools Developed

## Water Provision Services

- Current situation (data gaps, disperse data, stakeholder mistrust) unables development and integration of a water management tool
- water balance model and water table
- Additionally planned: flood risk map

## Recreation Services

- Aim: combination of GIS-based multi-criteria decision analysis approaches and InVEST models
- > two main objectives:
1. characterize provision of recreation services
  2. understand how human activities impact on these ecosystems





# South Africa

## Background and Baseline

- Sub-global assessment was conducted in (2004-2005)
- The most diverse ecosystems in the world,
- Project will focus on Eden District Municipality, and the grasslands biome of South Africa and catchments of Lesotho,
- Project attempts to bridge the gap between science and policy in ecosystem management,
- ES are absent in most development and growth policies, no national ES strategy or plan.





# Multi-scale approach

Integrating ecosystems and their services into policy and local action

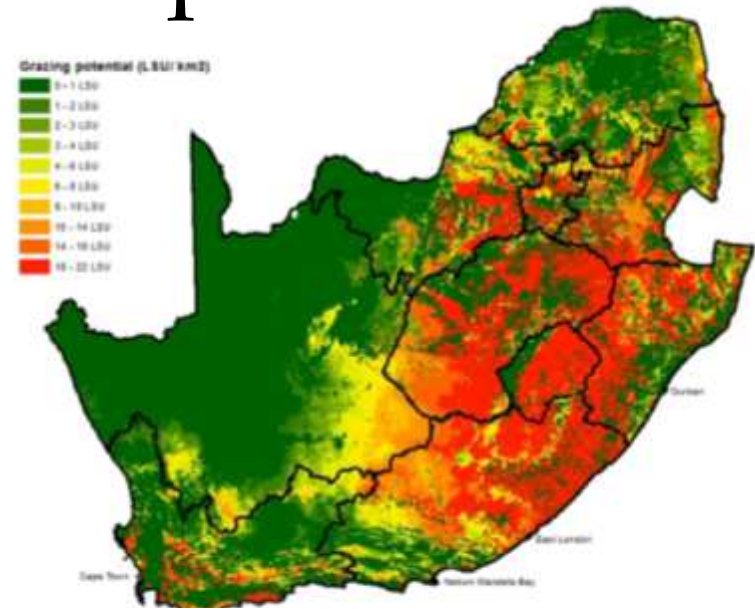


- Local policy
  - Disaster Risk Reduction
- Catchment policy
  - Integrated water resources management
- National policy
  - Presidential national development planning
- Regional transboundary policy
  - Lesotho Highlands dam and water transfer schemes

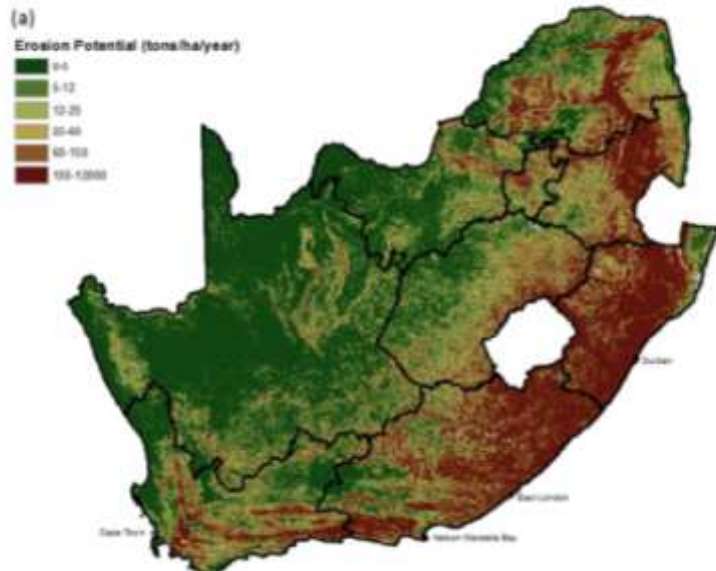
# Policy-linked national maps of ecosystem services



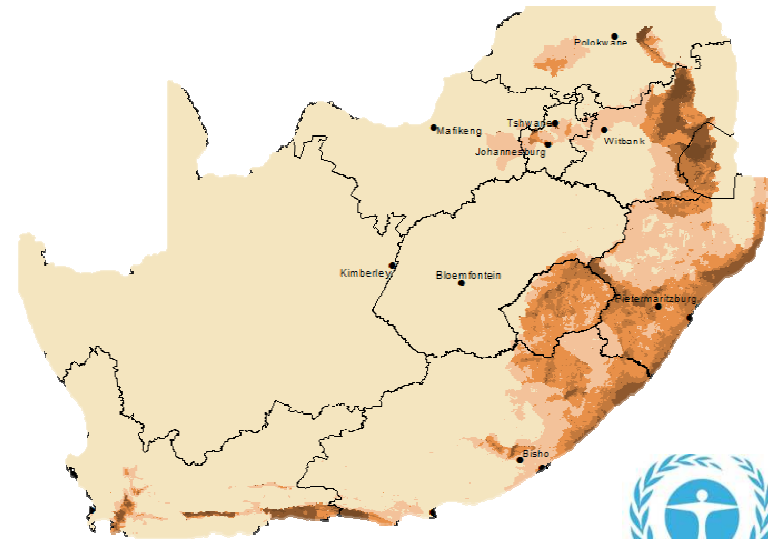
Strategic water source areas



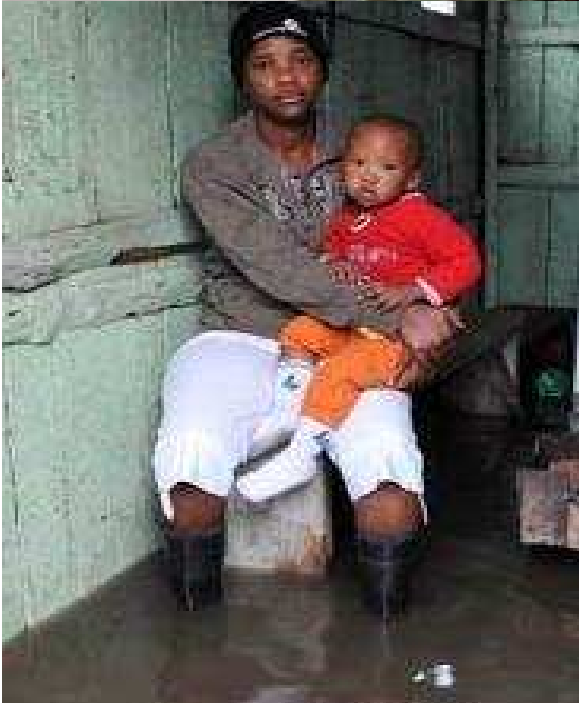
Grazing management for livestock



Erosion control for dam management & agriculture



Drought mitigation areas



- Flood, fire, drought and sea storm damages: \$175 million (2003-2008)
- = 3.5 x annual household income in rural areas
- Insurer losses \$6 million since 2000 (78% of these in the last 5 years)

# Is there a link?

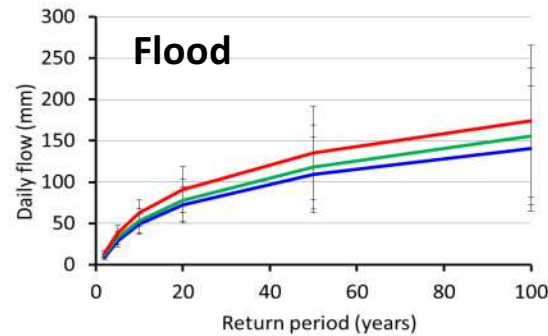


Scenario-based  
modelling of landscape  
and climatic drivers of  
natural hazards:

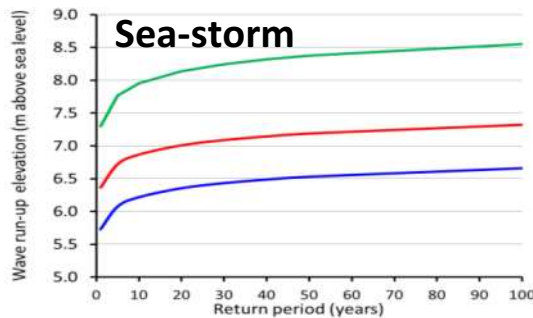
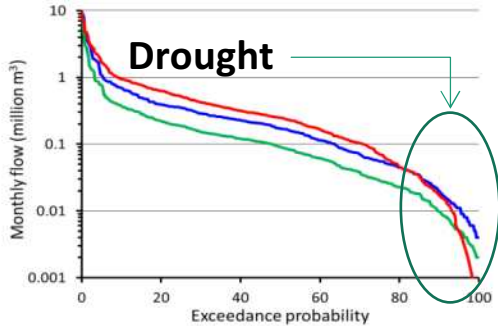
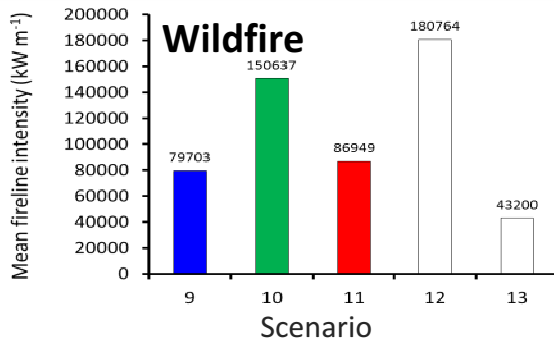
Flood, drought, wildfire,  
sea-storm



# Overall findings

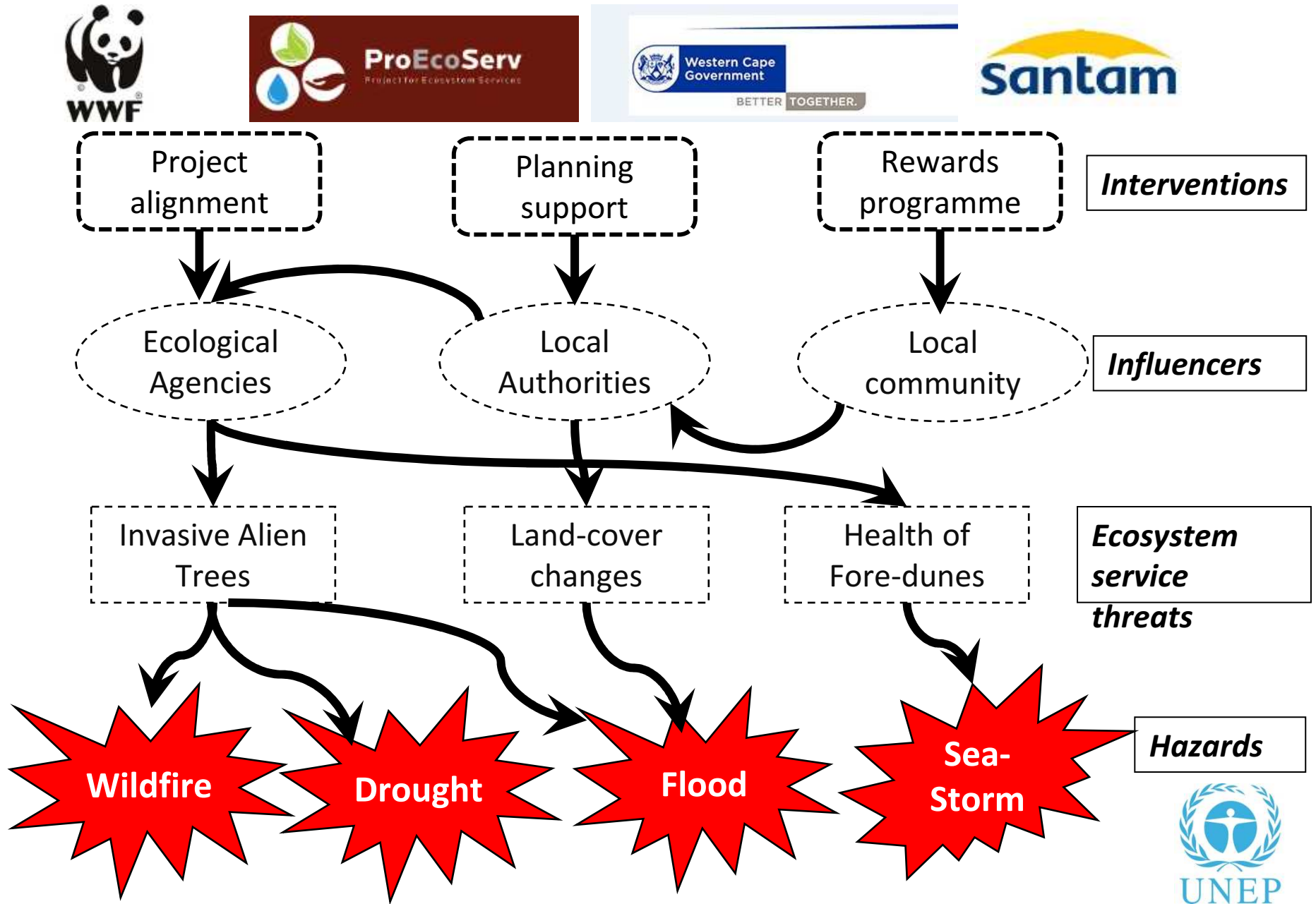


— Baseline  
 — Landscape change  
 — Climate change

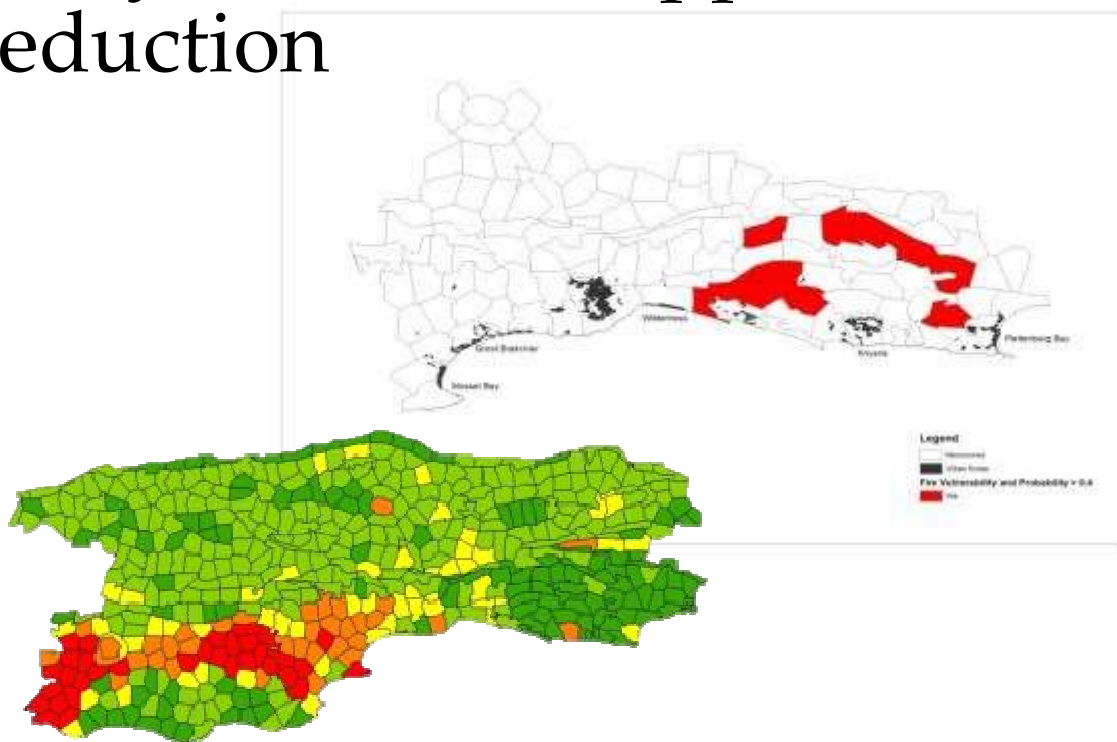


- Climate change will increase natural hazards
- Land use is as important → message of hope
- Clearing invasive alien trees
  - Halves wildfire and drought hazard
  - Lowers flood hazard by 20%
- Restoring coastal foredunes drastically lowers sea-storm hazard

# Framework: from shared risk to shared response



# Maps of risk hotspots and guidelines for ecosystem based approaches disaster risk reduction



## Growth and Development Strategy

Taking the Eden Growth and Development Initiative Forward

Eden Local Economic Development Strategy  
Eden Growth and Development Summit, 24 November 2006

Final Document

Short Version

January 2007

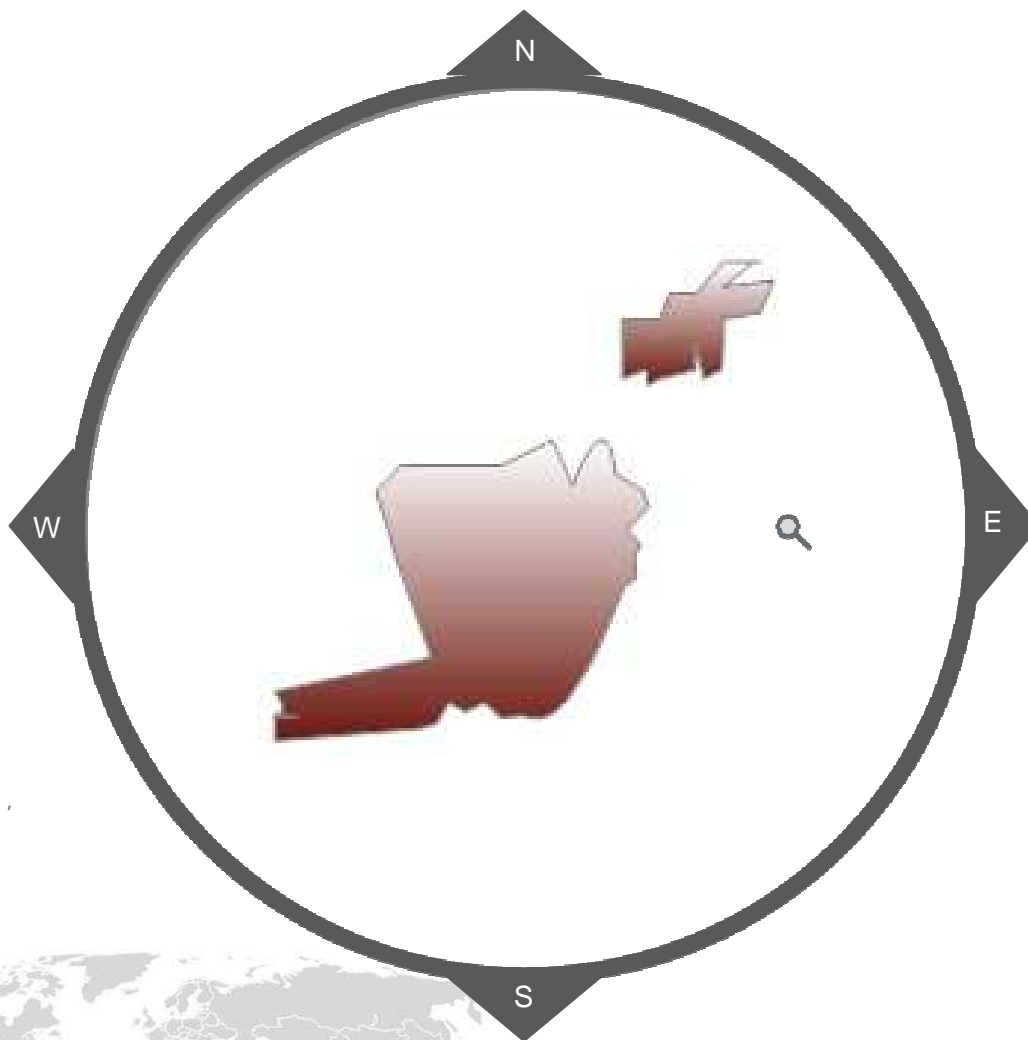




# Trinidad and Tobago

## Background and Baseline

- The most industrialized country in the Caribbean,
- Project will focus on Nariva Swamp, Northern Range Trinidad, Buccoo Reef and Bon Accord Lagoon Complex,
- Two sub-global assessment was conducted in the Trinidad and Tobago (2005 and 2007),
- The need for land for industrial development, ports, and hotels as well as for housing has led to a significant rate of land clearing especially in the coastal zone,
- Main challenges: Data gaps, limited experience in mainstreaming ES, slow response time from Government agencies,







# Objectives of ProEcoServ TT

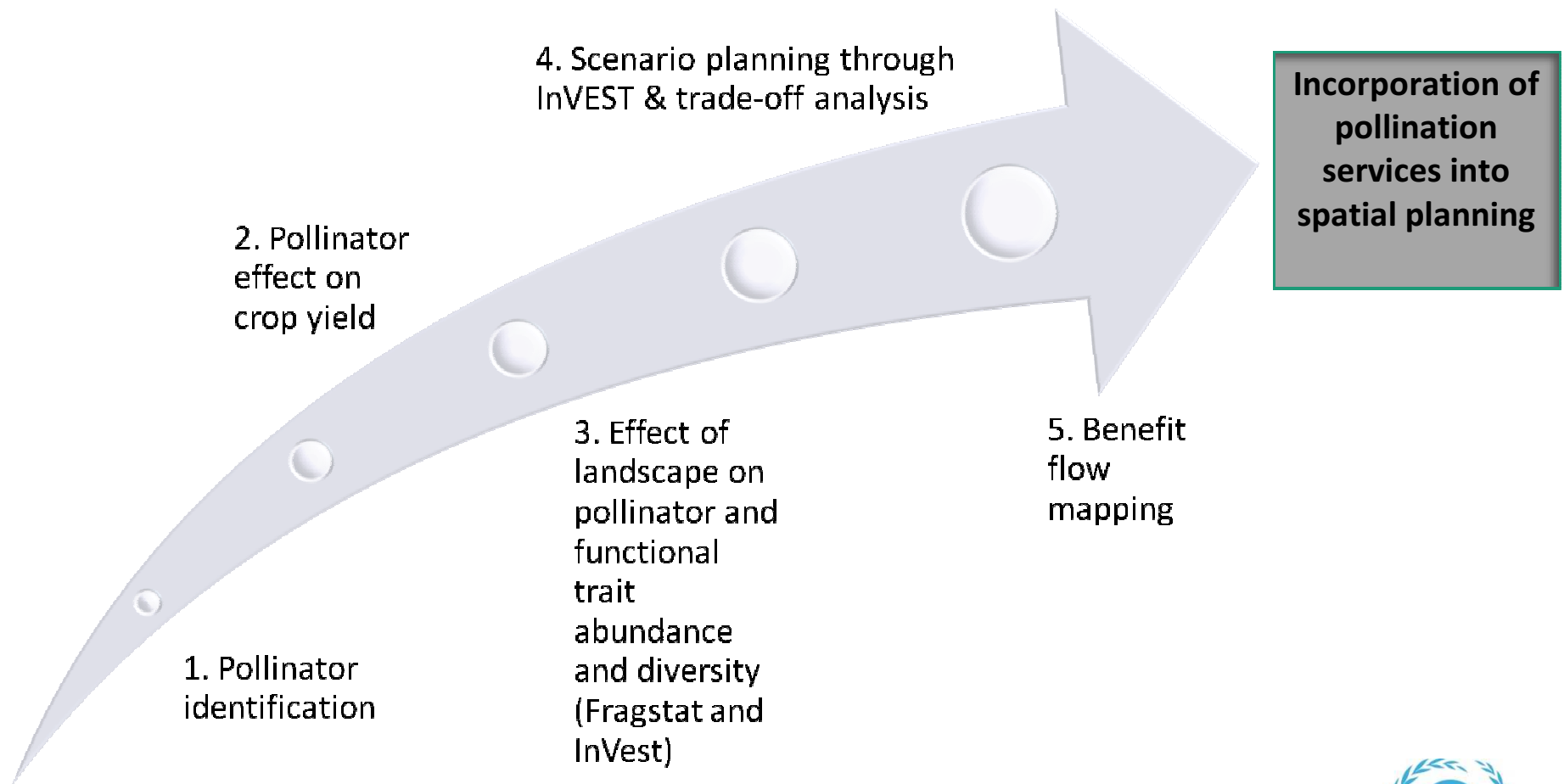
1. Introduce GIS-based ES maps and an associated Decision Support System into Spatial Development Planning in T&T
  - National Spatial Development Plan
  - National Hillside Policy
2. Introduce Experimental Ecosystem Services Accounting into the T&T National Accounts
3. Develop a pilot Eco-finance scheme (e.g. PES)
  - T&T Green Fund

# Pilot Sites and ES Focus

- Nariva Swamp (Trinidad)
  - Crop pollination & Habitat Quality
  - Carbon sequestration
  - GHG emissions reduction
  
- Northern Range (Trinidad)
  - Erosion Regulation
  - Water purification
  
- South-west Tobago
  - Shoreline protection
  - Blue Carbon



# Nariva – Pollination Research Focus



# Modeling and mapping

- erosion regulation service provided by ecosystems (forests) in Maracas and Caura watersheds of the NR (RUSLE & InVest)
- water purification service provided by ecosystems (forests) in the Caura watershed (InVest)



# Valuation – Recommended Methods

## Nariva Swamp

- Value of agricultural output attributable to insect pollination (*Morse and Calderone, 2000*) -  $V_{ip} = \sum(V_x * D_x)$ 
  - Scale up using national agriculture values and projected production

## Northern Range

- Replacement cost
- Damage cost avoided (*reservoirs*)



## Southwest Tobago

- Damage cost avoided (*building on 2008 WRI study*)



# VietNam

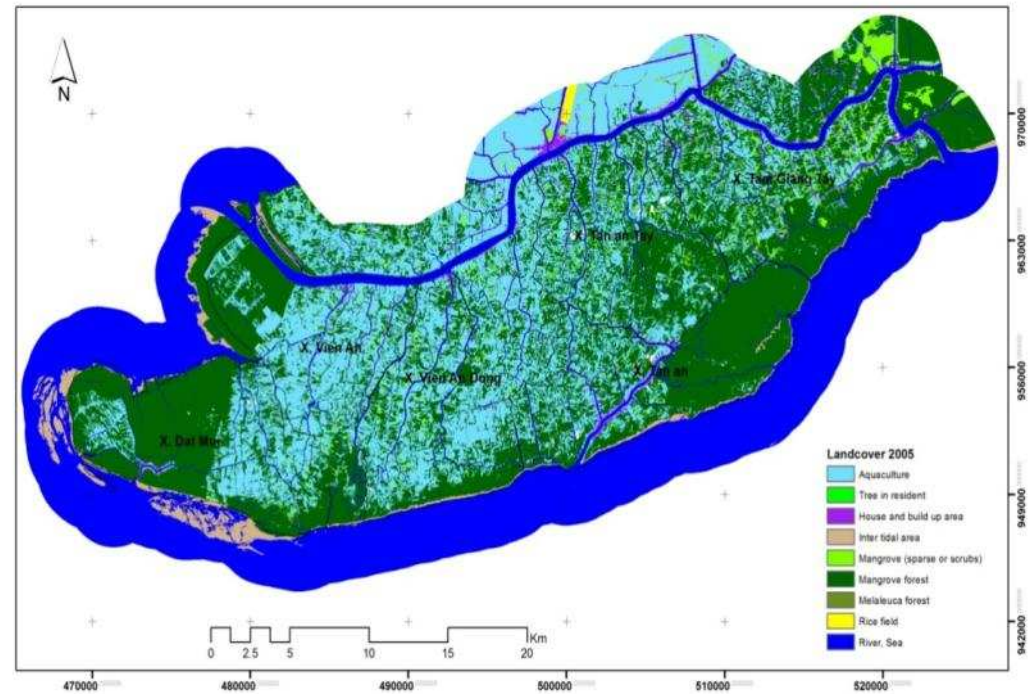
## Background and Baseline

resources are part of the country's economy and culture,

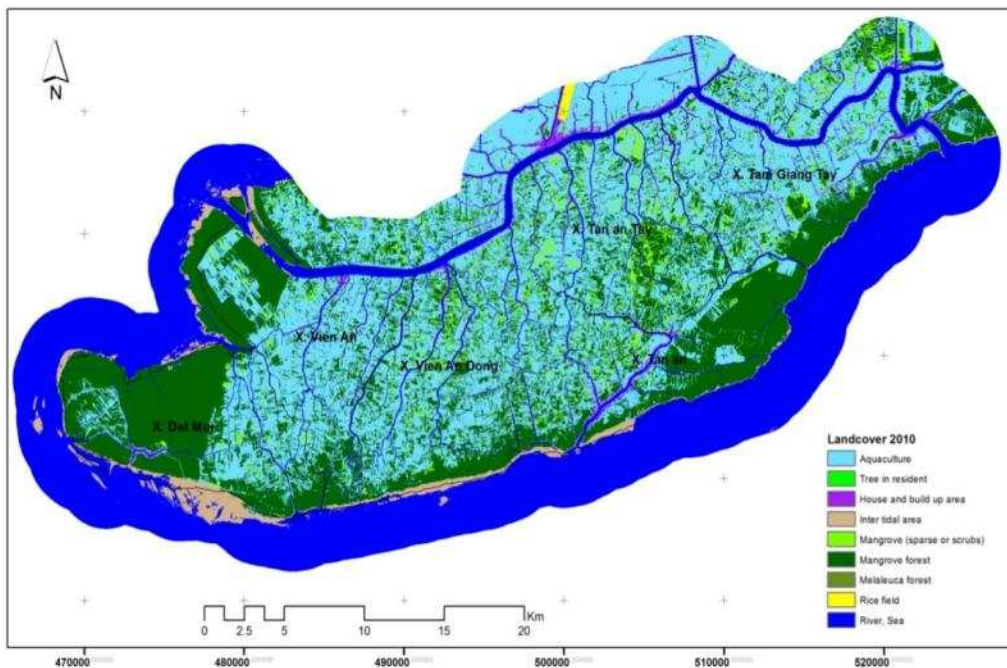
- Pilot region: Ca Mau Province which situates in the southern tip of Viet Nam,
- Sub-global assessment was conducted in the Downstream Mekong River Wetlands (2003-2005)
- Large areas of mangrove in Ca Mau province have been destroyed due to expansion of shrimp farming,
- Implementation: a) ISPONRE as project management Unit, b) Project steering committee, c) Technical Working Group.



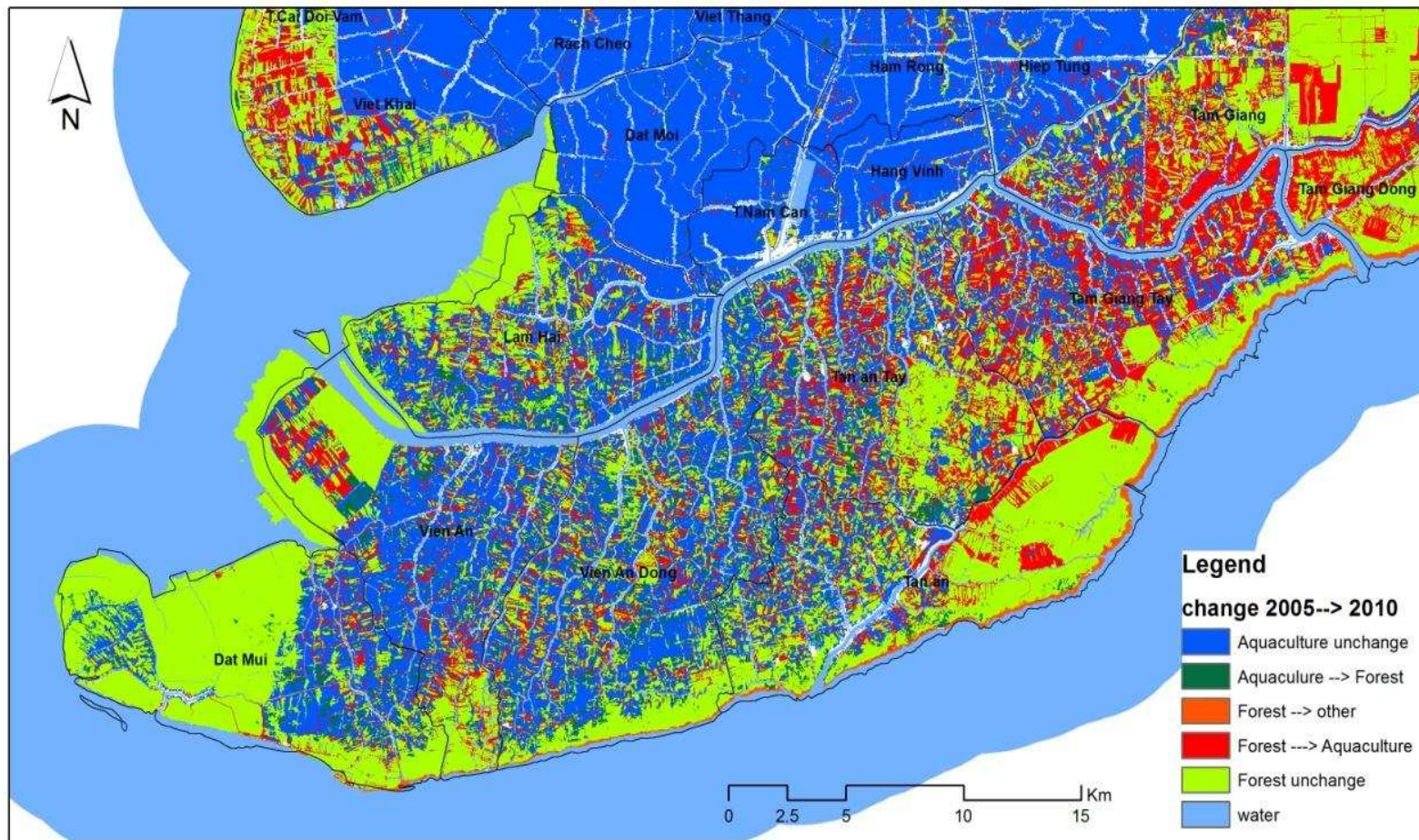
# Pressures on ecosystem services in Ca Mau



- Land use change
- Unsustainable resource use
- Population growth



# Land use change from 2005 to 2010





# Tools Applied

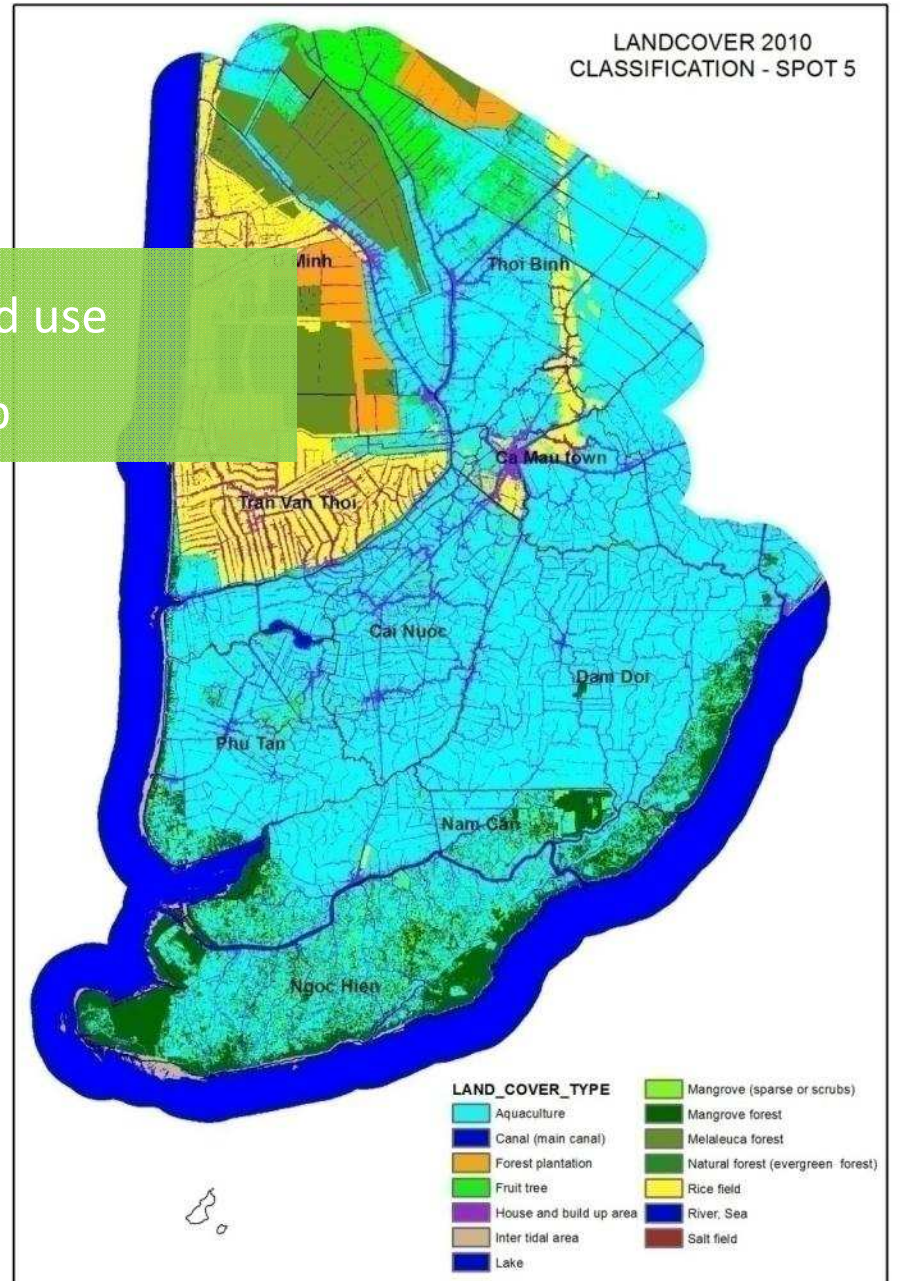
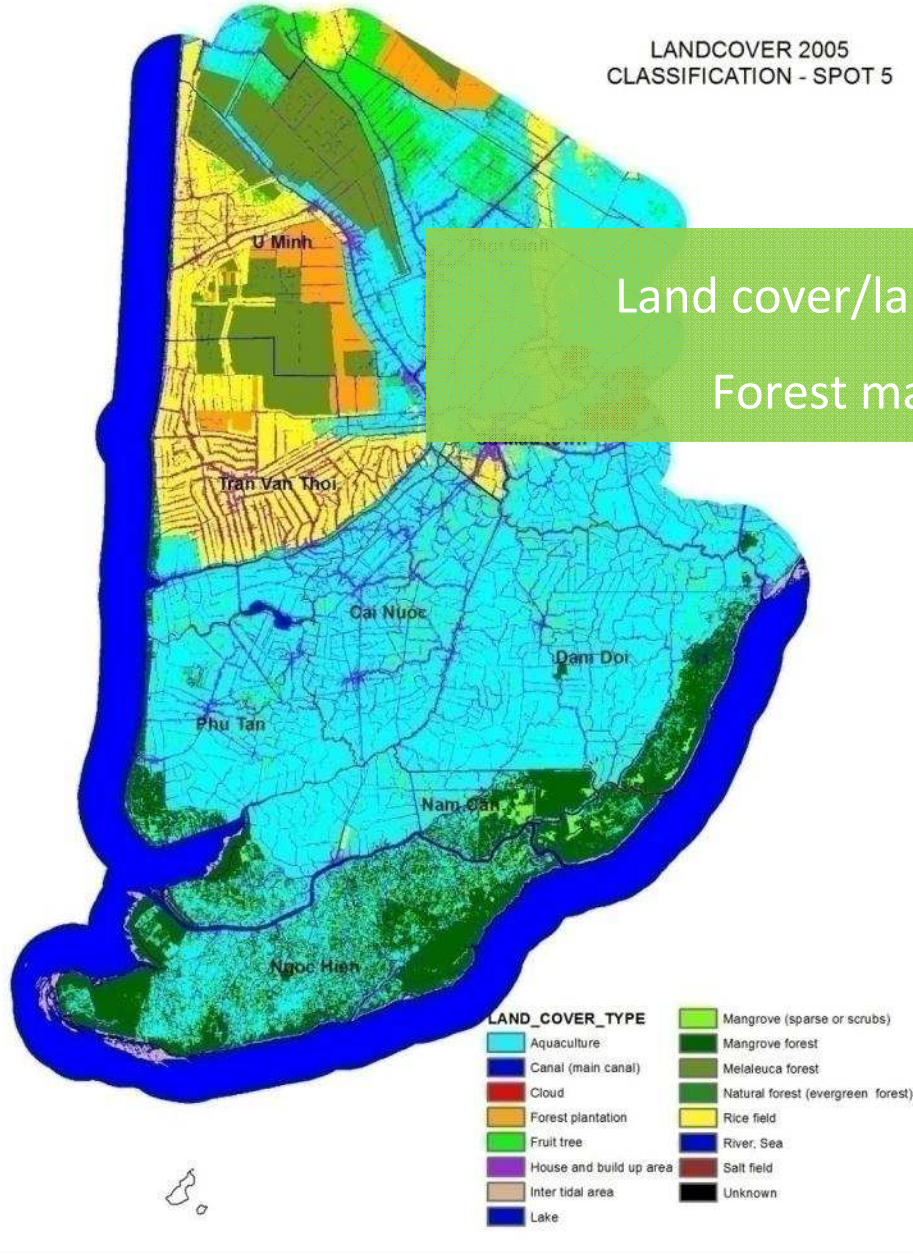
- InVEST model
- Focusing on two ecosystem services: carbon sequestration and coastal protection
- Consulting stake-holders

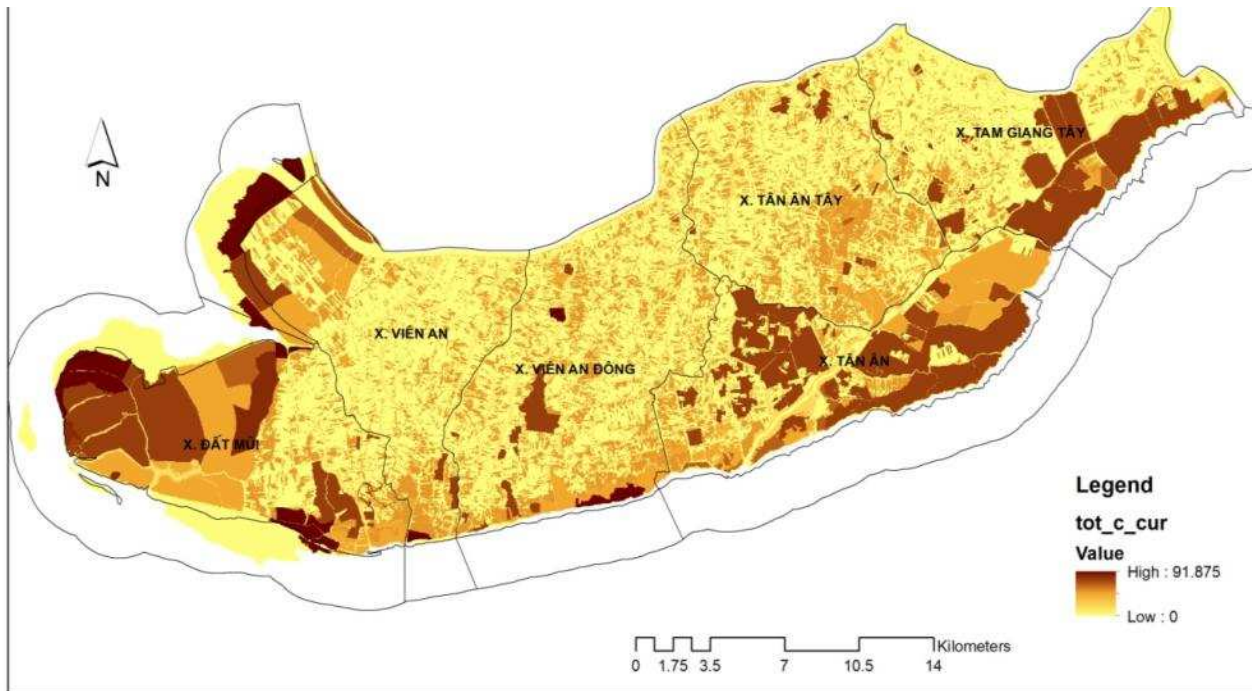


LANDCOVER 2005  
CLASSIFICATION - SPOT 5

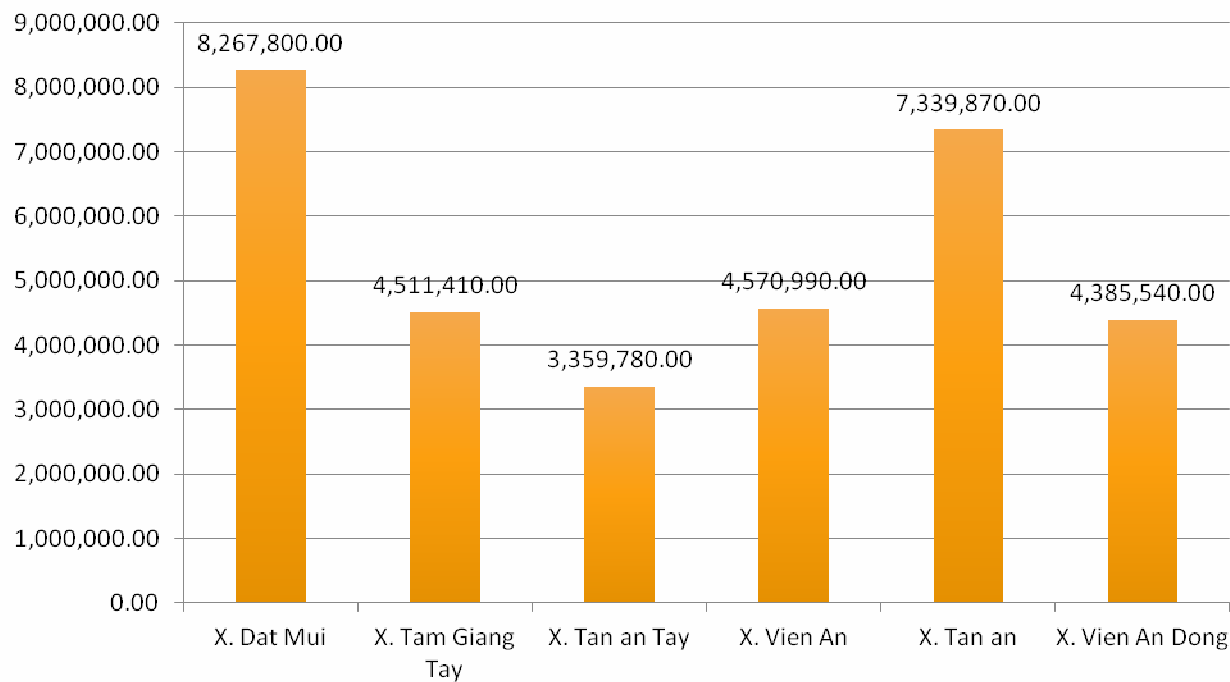
LANDCOVER 2010  
CLASSIFICATION - SPOT 5

Land cover/land use  
Forest map



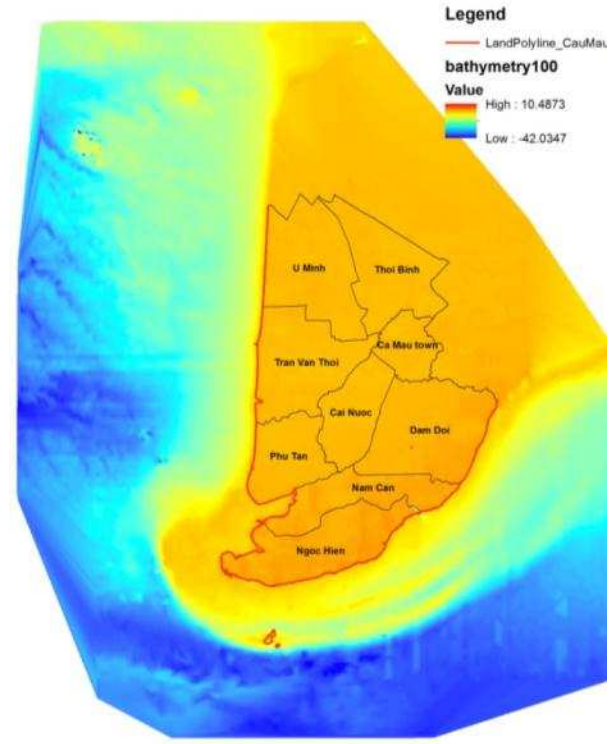
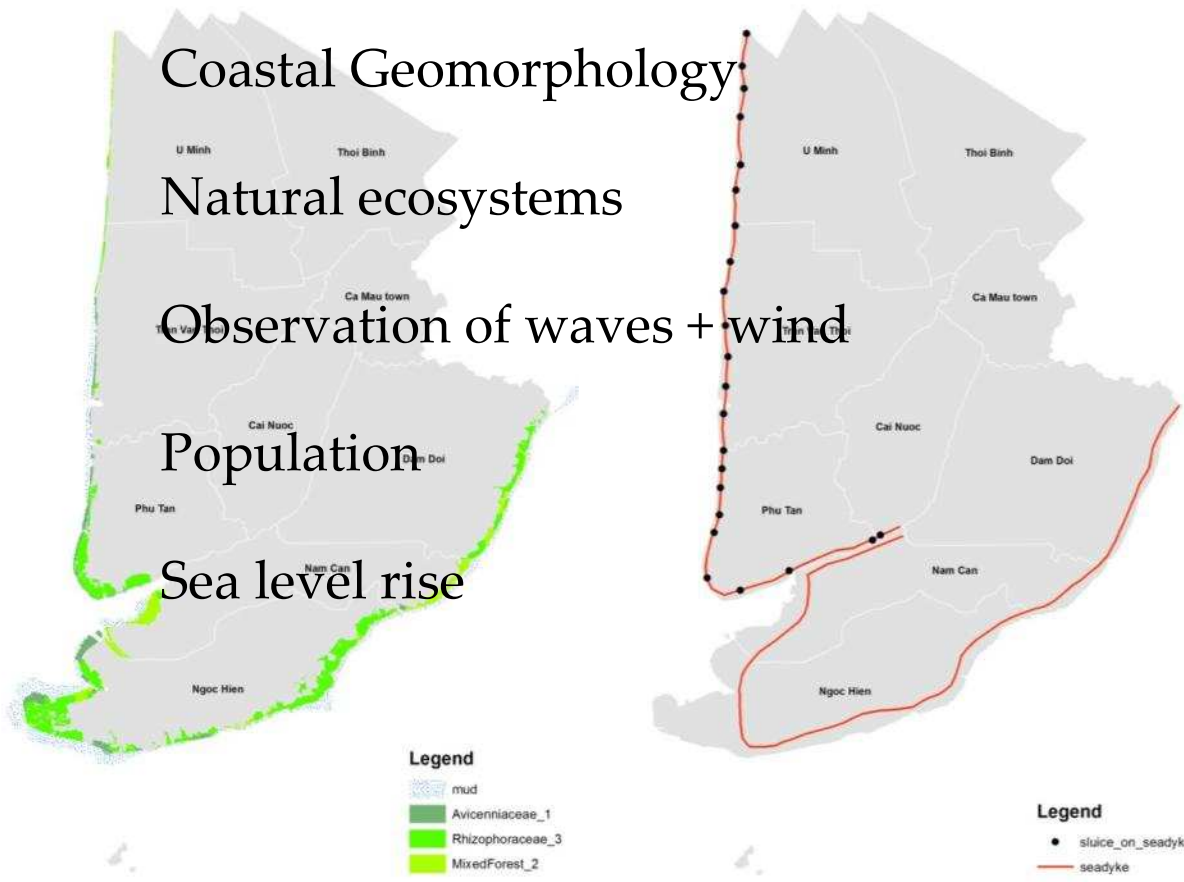


Total amount of carbon per unit per Commune



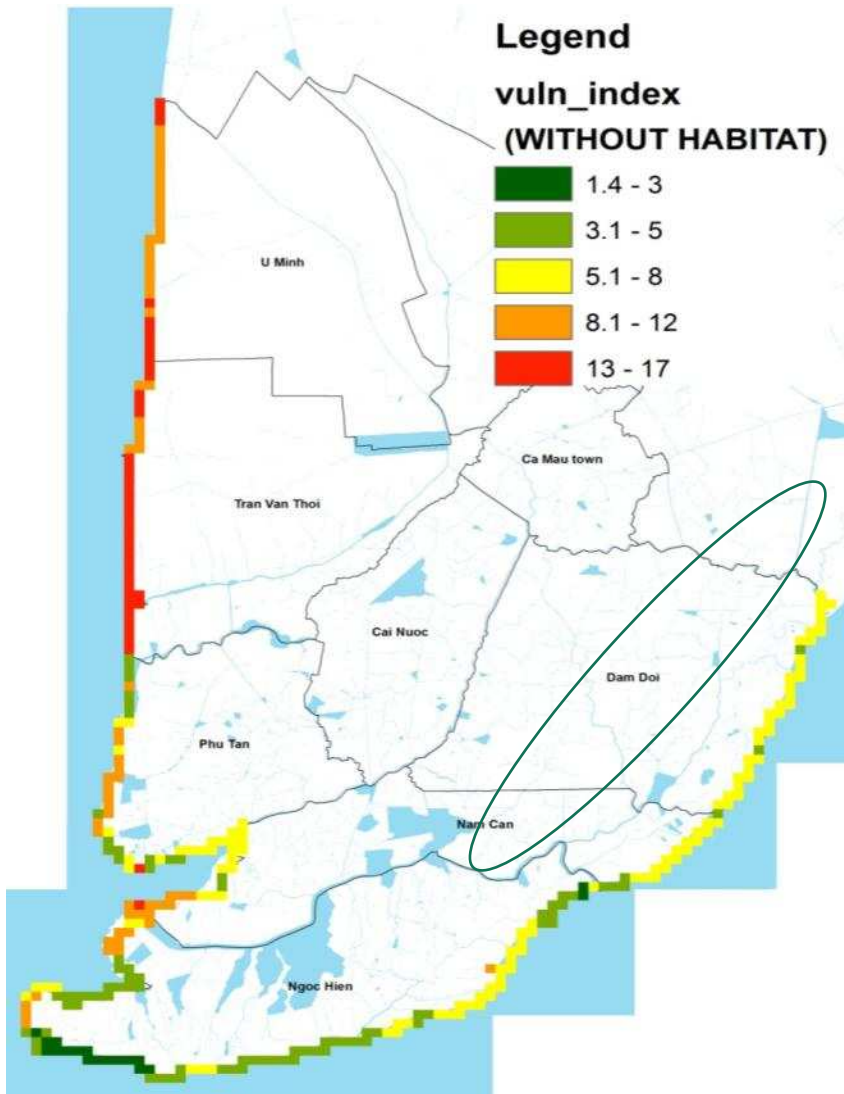
# Mapping Coastal Vulnerability

- Digital Elevation Model + Coastal
- seabed topography

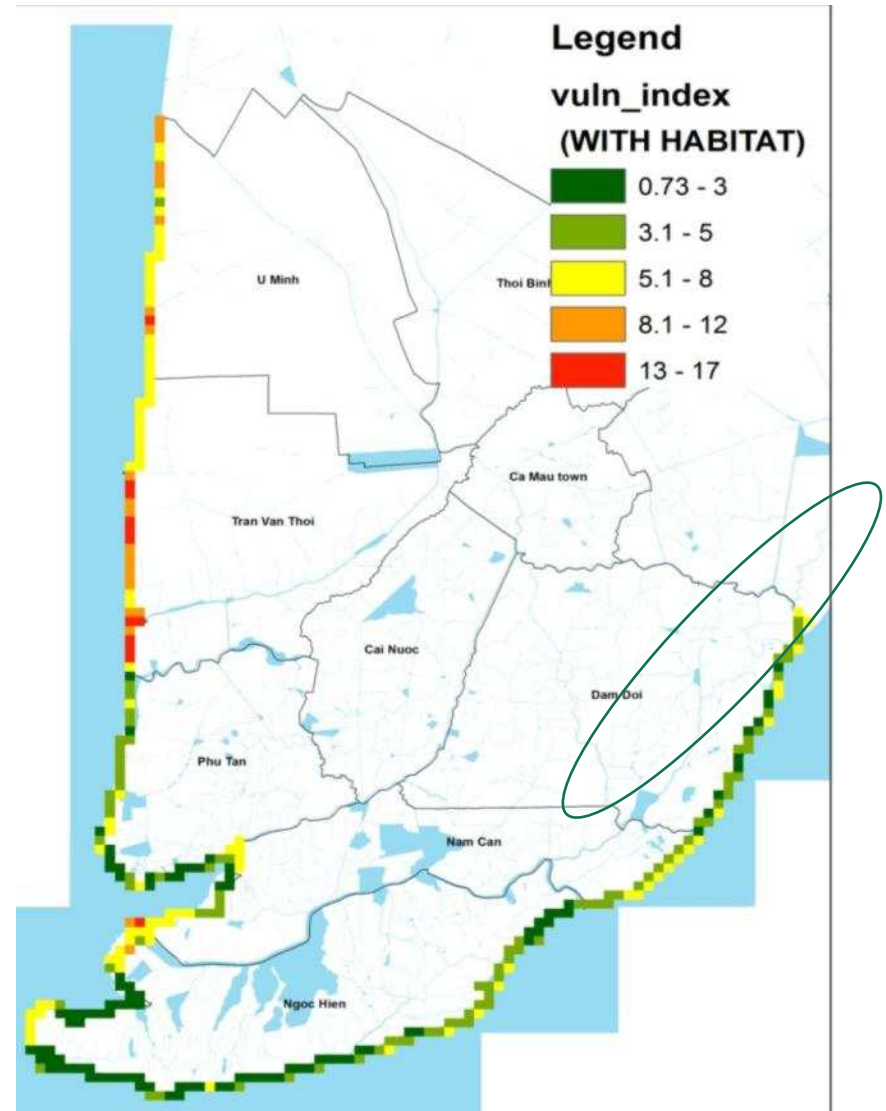


# Coastal Protection

## No mangroves



## With mangroves



# Mainstreaming of ecosystem services at national level

1. National Green Growth Strategy
2. National Strategy for Environmental Protection to 2020, vision to 2030
3. Party Resolution on Actively Responding to Climate Change, Strengthening Resource Management and Environmental Protection

