Multidisciplinary approach of information system for integrated water resources management and biodiversity data gathering: an example for benefits from cross-linking project cooperation
Climate Change:

- Sea level rise will lead to:
  - Increased coastal erosion
  - Changed sedimentation
  - Ecosystem changes

Source: IPCC 2007
The Project „Sustainable Management of Coastal Forest Ecosystems in Bac Lieu province“:

- Funded by the German Ministry for the Environment
- Operative since May 2009

Main objectives:

- Coastal forest rehabilitation
- **Biodiversity** enhancement

need for high resolution mapping of current species
Track&Tracing biodiversity in Mangroves is challenging:

- most unfavourable environment for pen+paper recordings
- GIS-referencing only clusterwise possible
- information gathering only feasible with several people
- data digitilization always a potential source of error
Using “rugged mobile phones” for GIS-referenced biodiversity data gathering:

- water- and shock-resistant
- mobiles are always at hand and usually operational (fully charged)
- single spot entries are possible (no transsect clusters needed)
- one person can do the job
- recorded data can not be lost
- no additional data digitilization needed
- Satellite images:
  - limited availability of updated high resolution images
  - cloud covering
  - very expensive

just providing one layer of reference information (2 dimensional, no topography, no socioeconomic data, no hydrology etc...)
As GTZ-Bac Lieu we are piloting the introduction of mobile GIS-referenced biodiversity information gathering tailored software for data proofing and compilation

- open source
- available in Vietnamese
- WISDOM compatible

- different information layers available from WISDOM for generating analytical maps
  - No extra purchase for updated “own” satellite images needed.
  - No own additional research regarding cross-linking information needed (e.g. hydrology, topography, socio-economics etc).
WISDOM: Water Related Information System for the Sustainable Development of the Mekong Delta

Vietnam: 86 Mio. Inhabitants

Mekong: 4,500 km
Basin: 800,000 km²

Tibet, through China, border between Myanmar/Laos Thailand/ Laos, through Cambodia, into South Vietnam

Delta: 70,000 km²

**Challenge:** cross boundary issues, dam building in North, China not in MRC, etc.
High Population Pressure in the Cities

Challenge of Land Consumption, Infrastructure, Pollution
Houses in Suburban Areas along the Mekong

Challenge of insufficient drinking water supply.
Mekong Delta: Rice and Aquaculture
Challenge of Over-Application of Fertilizer, Pesticides etc.
Partners of the WISDOM Project

**German Partners**
- DLR
- Uni Würzburg
- UNU-EHS
- ZEF
- INRES
- GFZ
- IWK
- Eomap
- DHI

**Vietnamese Partners**
- SIWRR,
- VAST GIRS
- Sub-Niapp
- SISD
- CTU
- SRHMC
- VNU
- IDR

6 Mio € budget, 60 scientists, 15+5 PHDs students
All WISDOM PhDs over one year in Delta
1 CIM Position at MOST
Results of Research:

- Water Quality, Pollution
- Water quantity, demand, reliability
- Climate Change and Vulnerability Analyses

Basin characteristics
EO based Monitoring

Analyses of Legal System

Mekong Information System

Institutional Mapping

Landuse Change

Training, CB

Social Change

Every partner: sustainability concept: how will data / answers be generated, when project is over → Ownership, Implementation !!!
The WISDOM Restaurant

- **Components**

  - Menu
  - Restaurant
  - Kitchen
  - Storage
  - Delivery

- **Components**

  - Ability
  - Availability
The WISDOM Restaurant

Ordering

Menu
- Sensor data
  - Water level
  - Pesticides
- Thematic maps
- Statistics
- Geographic data
- Yellow pages

„The XY-Water-Level a’la Wisdom, please“
„One second“
The WISDOM Restaurant

- Order taking
The WISDOM Restaurant

- Ingredients gathering

„Fresh Water level measures for the mekong delta at position XY, please“
The WISDOM Restaurant

- Cooking
The WISDOM Information System Prototype

- Components

- Data Entry Portal
- User, Web Application
- Information Processing Environment
- Database, Data Storage

Web services
Welcome

Hello DLR BLR

Last login: 2009-06-22 15:17:15

Welcome to the WISDOM prototype portal. From here you can access the main applications or jump to the WISDOM homepage. You can check your last editing session and view your last datasets you worked with. You can also get other accompanying information.

Prototype Entry Portal

Featured datasets

- GFZ: Hydrological sensor measures during 2008 in the Ton Nong area
- Historical Water levels and discharge in the Mekong Delta
- Watermarks from satellite imagery for 2007 and 2008 in Mekong Delta
- Water bodies in rivers and coastal areas from satellite imagery for the Mekong Delta in 2007 and 2008
- Landcover classifications in the Mekong Delta since 2001
- Postflood measures in the Caii Rang area in 2008
- Statistics on livelihoods in the Mekong delta since 2000
- Statistics on aquaculture development in the Can Tho province since 2004
- Organisations working in the water sector

Recently integrated products

<table>
<thead>
<tr>
<th>Dataset name</th>
<th>Content of product</th>
<th>Creation date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Cover Classification 2009 from Can Tho Province from Sst &amp; data</td>
<td>Landcover</td>
<td>05.02.2009</td>
</tr>
<tr>
<td>Watermark from Envisat ASAR/WK0B swath Mode satellite image 2009-05-17 Mekong Delta</td>
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<td>Watermark from Envisat ASAR/WK0B swath Mode satellite image 2009-05-17 Mekong Delta</td>
<td>Watermark</td>
<td>20.11.2009</td>
</tr>
</tbody>
</table>
Socio-Economic Data in the Information System
WISDOM Information System Prototype
Sea Level Rise: Special Threat in Delta Areas

Climate Change:

Sea level rise will lead to:

- Delta flooding
- Increased coastal erosion
- Changed sedimentation
- Salinisation of water resources
- Salinisation of soils
- Ecosystem changes
- Expected migration of population
- Threats to industry

Source: IPCC 2007
National Water Resources Strategy (→ 2020, MONRE)

Major Challenges identified by ADB (amongst many):

„The collection, management and archive of information on water and land resources are still dispersed. Data in different agencies is inconsistent and not exchanged among state agencies“

„The monitoring, warning, and information systems for water quality, … flood and drought prediction, .. have not been properly developed“

Implementation measures (amongst many):

„Set up of general Land- and Water Information Systems, flood and drought monitoring systems, flash flood warning systems …“
Main synergies from the cooperation (1):

- GTZ will have projects running in all coastal provinces and WISDOM covers Mekong Provinces since 3 years
- Different disciplines complement each other ➔ value adding
- Data exchange, with low maintenance costs (Open Source)
- Data dissemination independent from location, soft- and hardware
- WISDOM provides neutral platform for data exchange – data ownership can be ensured
- Joint standard allows easy map calibrations, valididations and comparability of results
Main synergies from the cooperation (2):

- More easy access for further RS data
- Bunch competences to approach threats of the Mekong Delta
- Increased efficiency for spatial and non-spatial data management
- Semantic enabled data identification
- Automatic integration of spatial data
- Easy extendable to other regions
Planned steps of cooperation:

- Applying the information system together
- Exchange of information, data, capacity building
- Introducing the WISDOM data standard for data originating from Coastal Management Projects
- Jointly developing and applying one method of landcover classification