Climate Change Affecting Land Use in the Mekong Delta: Adaptation of Rice-based Cropping Systems (CLUES)

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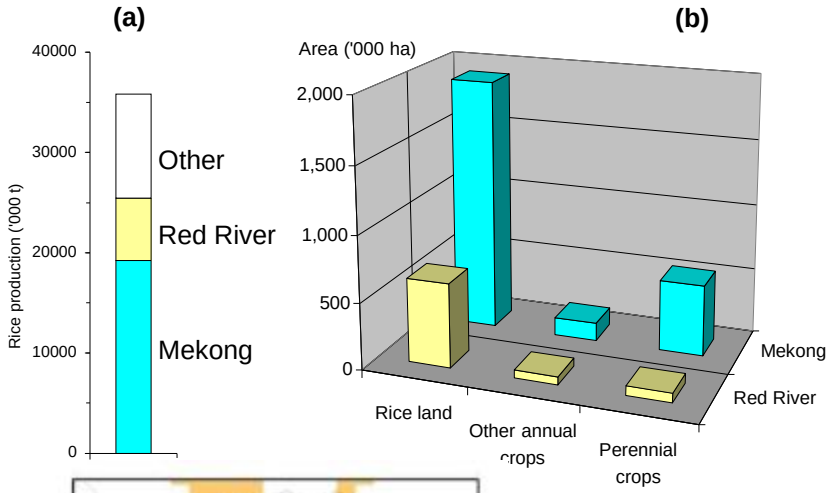
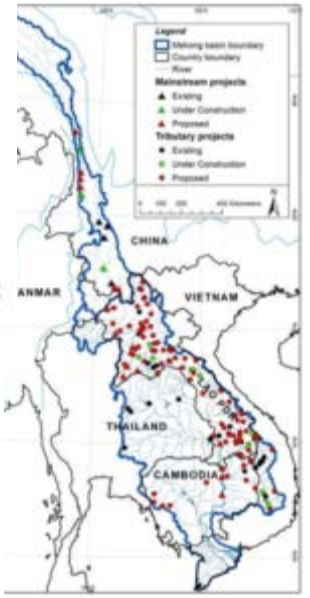
Why CLUES?

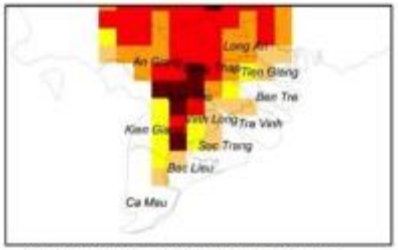
- **Main rice production:**

  > 50% rice (~20 mil tons/year)

- **Threats**
  - Problem soils: 60 % (acid sulphate & saline soils)
  - Dry season:
    - Reduce fresh water resources
    - Local droughts
    - Salt water intrusion .
  - Rainy season:
    - tidal flooding
    - extreme weather events
  - Upstream development (more water uses, hydro-power dams)
  - Climate change and sea level rise







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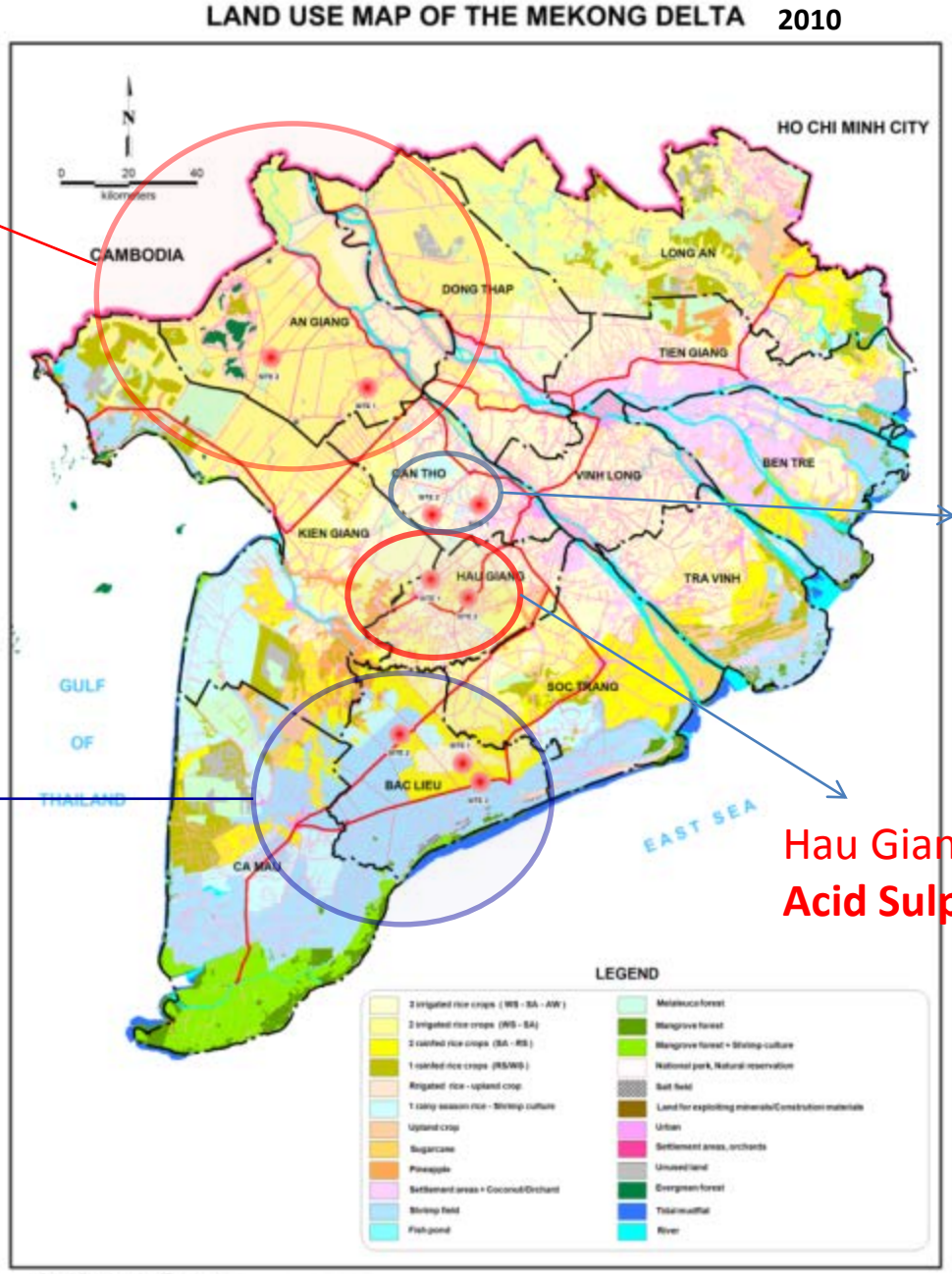
- Overall objectives is **to increase the adaptive capacity of rice production systems** in the Mekong Delta Region.
- Its immediate objective **the provision of technologies and knowledge to farmers and management agencies** that will improve food security in the Mekong Delta.

March-2011 to Sep-2015

Field study sites



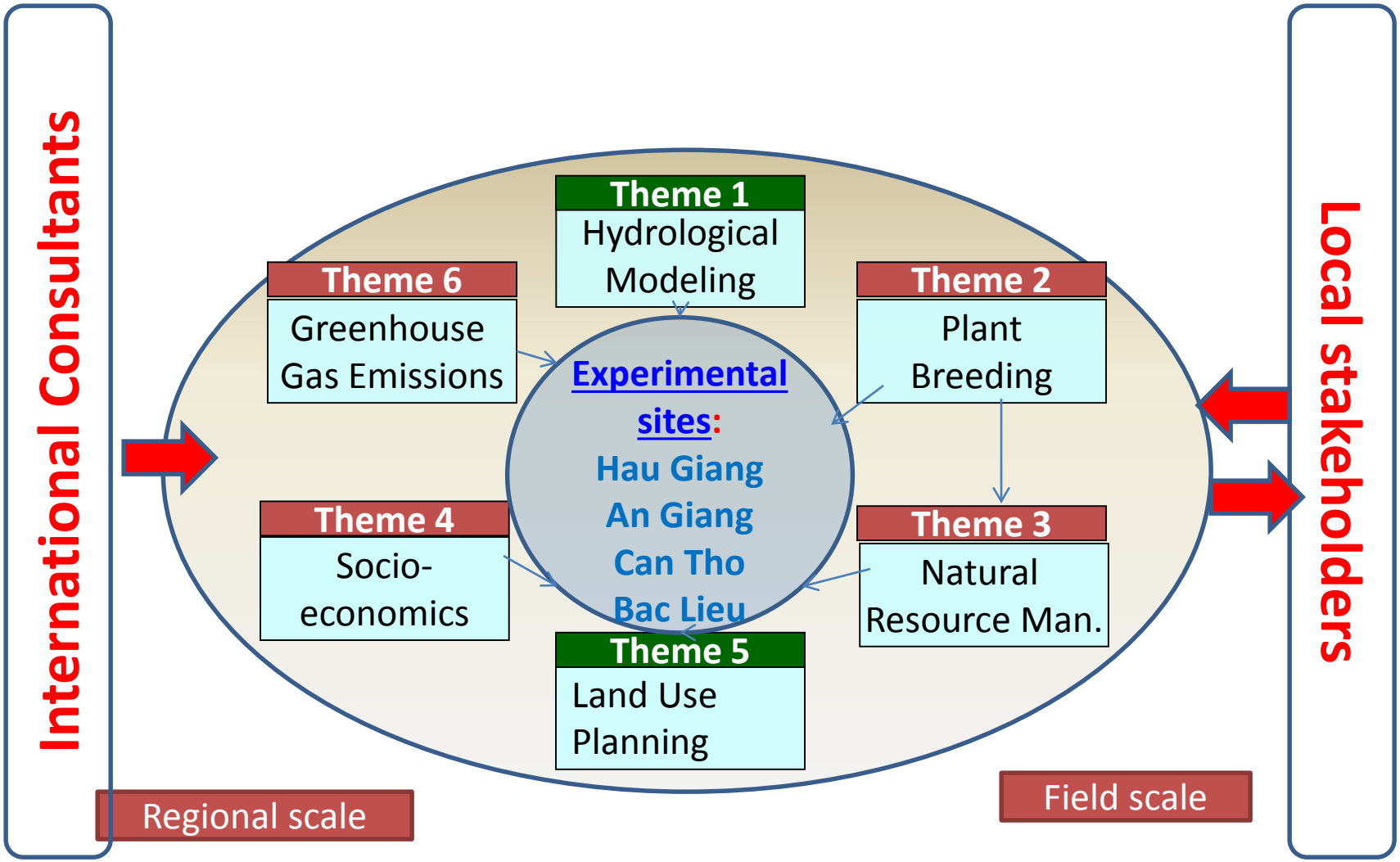
An Giang:
Deep Flood Zone

Can tho:
Alluvial soil

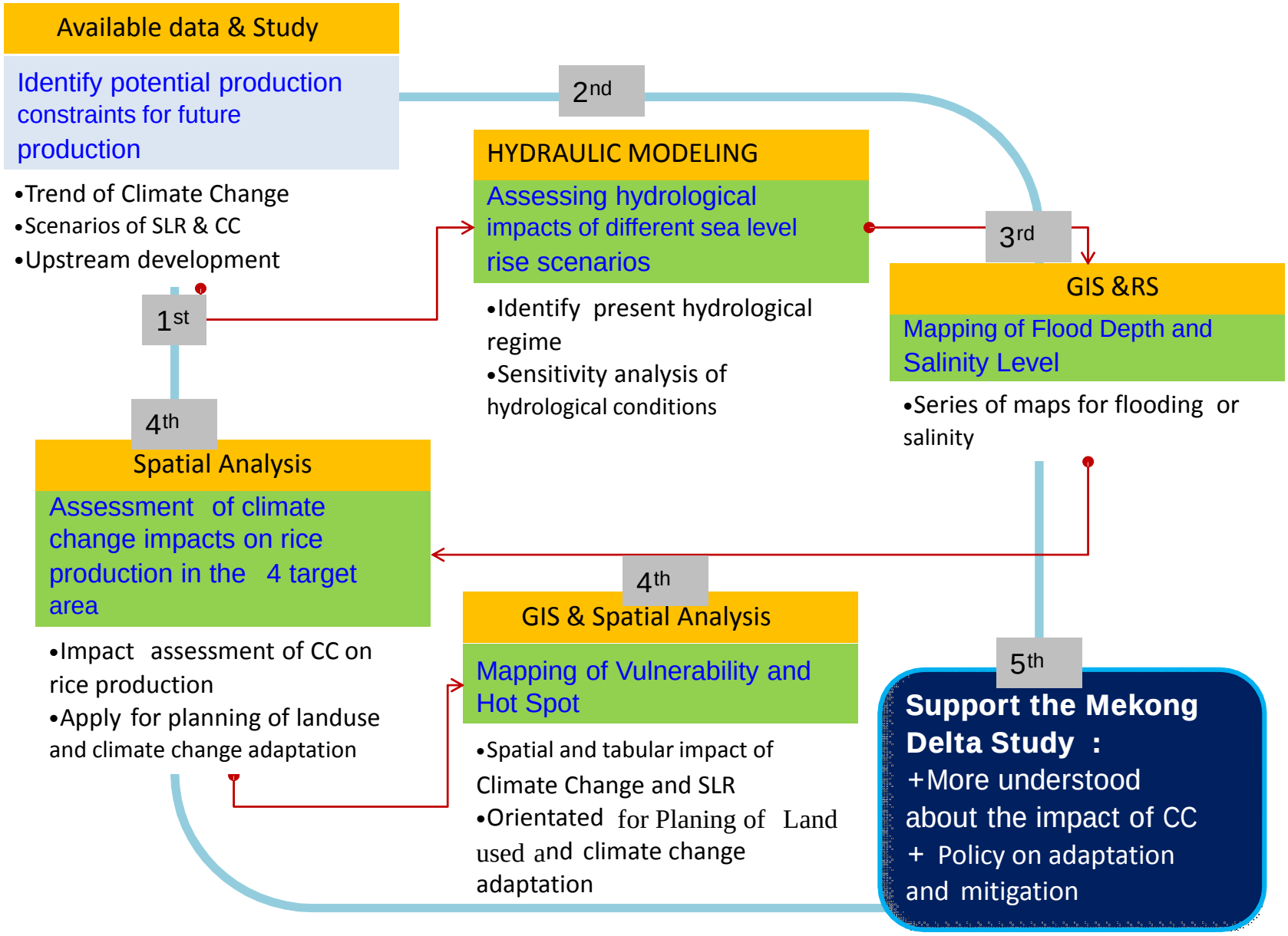
Bac Lieu:
Saline Zone

Hau Giang:
Acid Sulphate soils

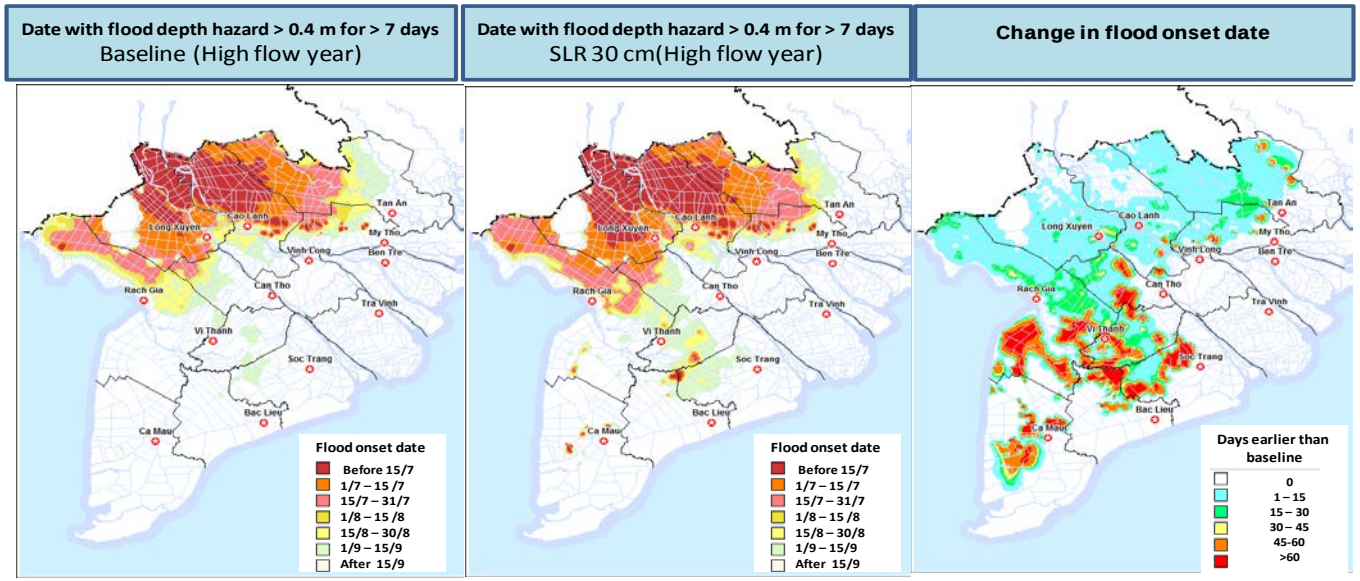
Disciplinary Fields in CLUES

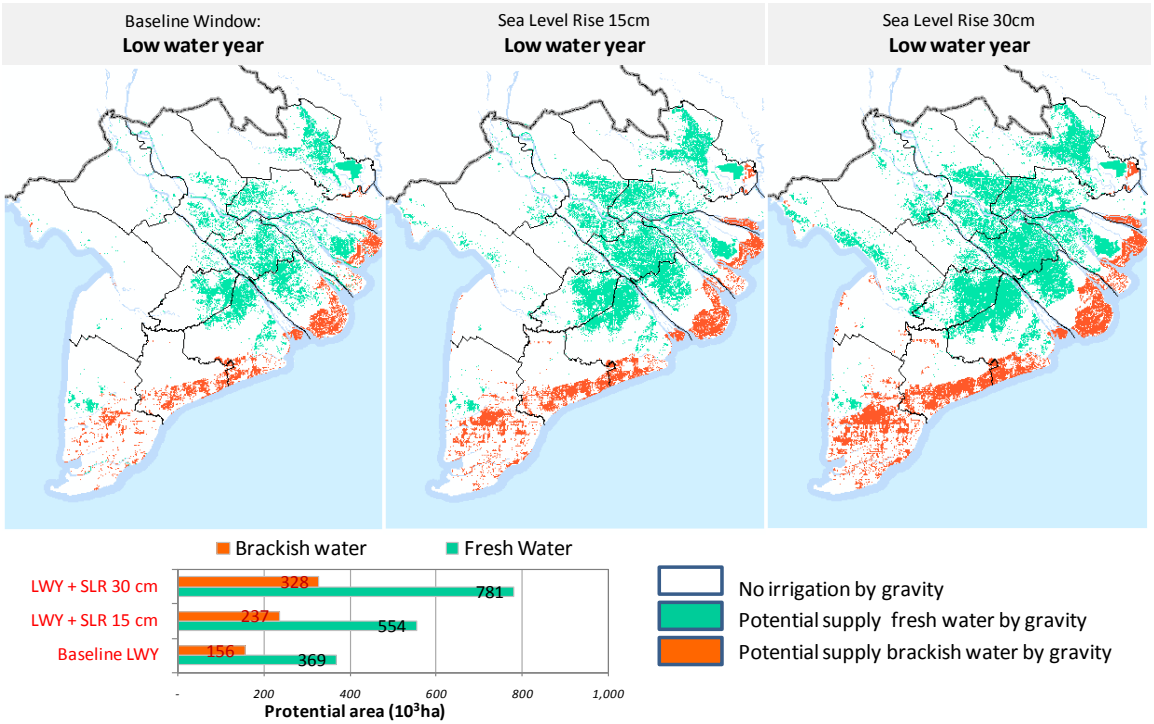


Theme 1: Location-specific impact and vulnerability assessment



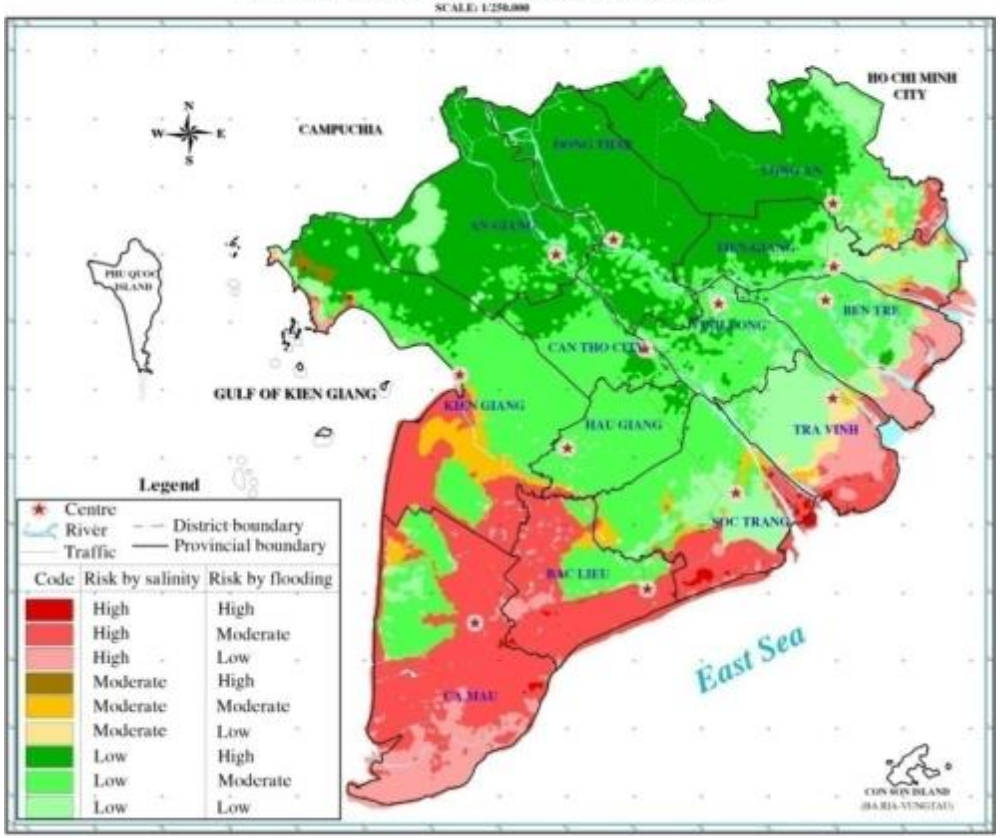
Effect of Sea Level Rise 30 cm on changed in flood onset date



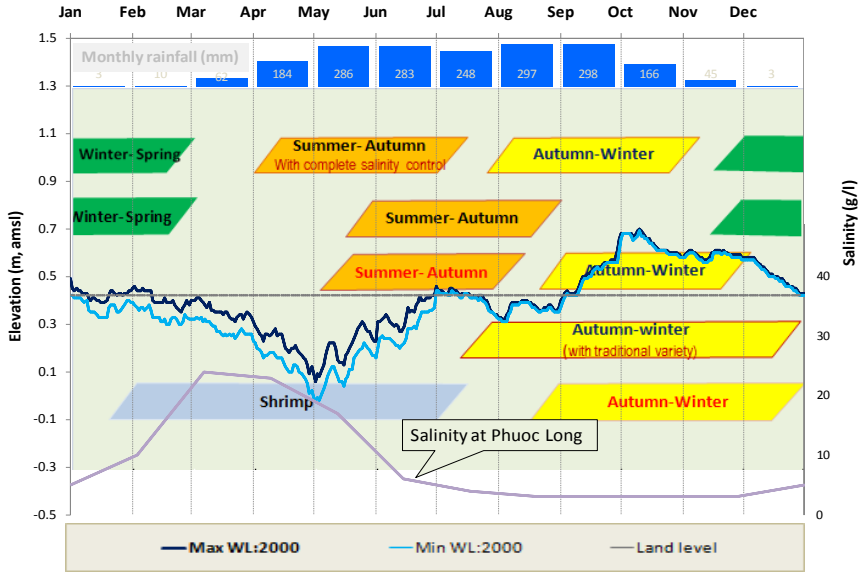


HOT SPOT MAP BY SALINITY AND FLOODING OF HIGH WATER YEAR 2000 WITH BOTH SCENARIOS OF SEA LEVEL RISE AND CLIMATE CHANGE IN THE YEAR OF 2030 OF MEKONG DELTA

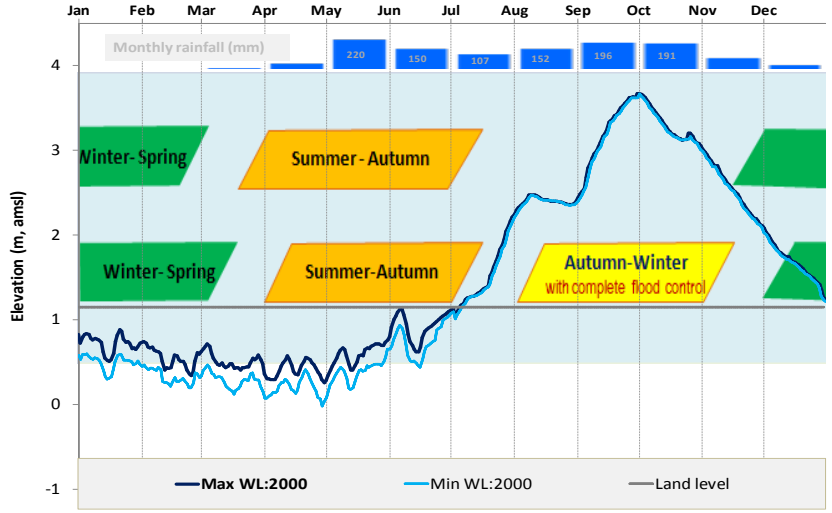
SCALE: 1:250.000



Hydrology - cropping systems in salinity-risk zone



Hydrology - cropping systems in flood-risk zone

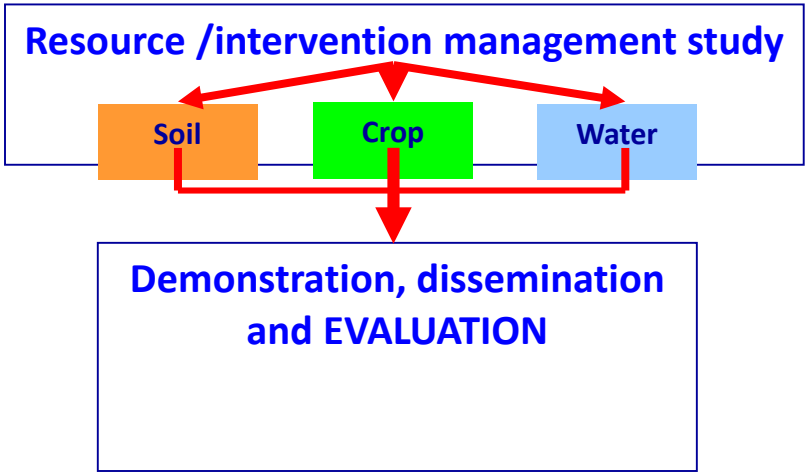


Theme 2. Improvement of salinity and submergence resilience of locally-adapted rice varieties and elite lines

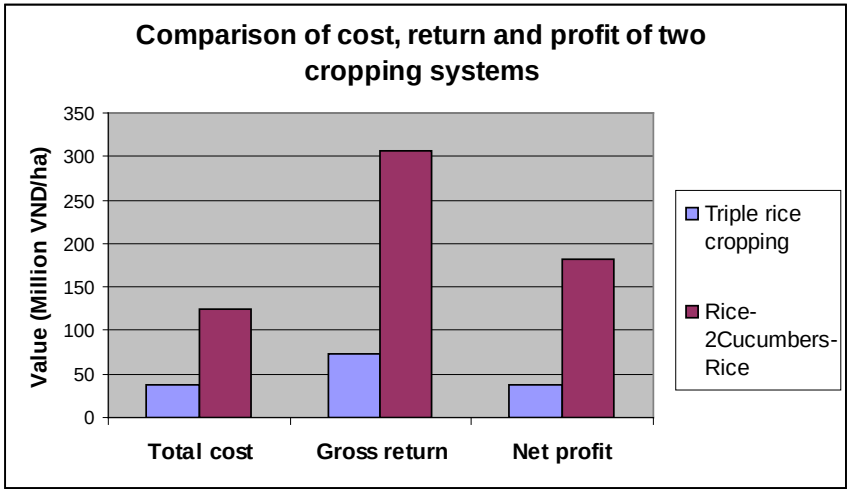
To improve tolerance of rice germplasm to a variety of direct and indirect impacts of climate change

Theme 3: Managing resources for resilient rice-based systems coping with rapidly changing environments

- Developing / refining farming management options for different agro-ecological zones
- Improved understanding of element cycling, soil-plant and cropping systems responses to altered hydrology (including impacts of CC and SLR).

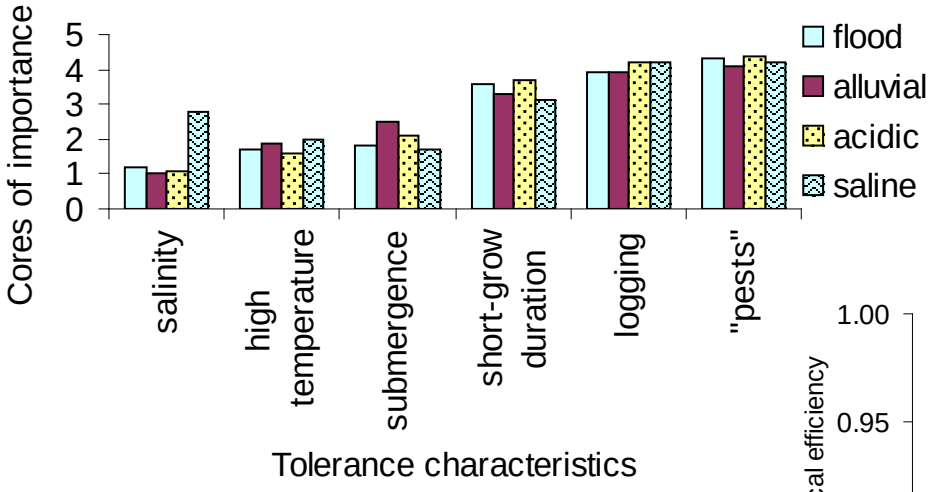


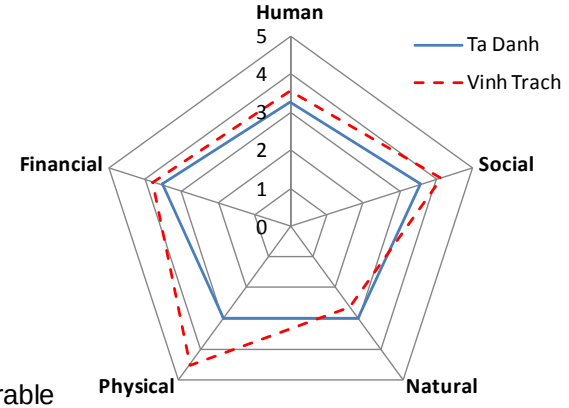
Applying of promising techniques:
- Alternate wet and dry (AWD)
- Reduced Phosphorus
- Cropping system of Rice+ upland crop, rice (short-duration, high yield) – shrimp.

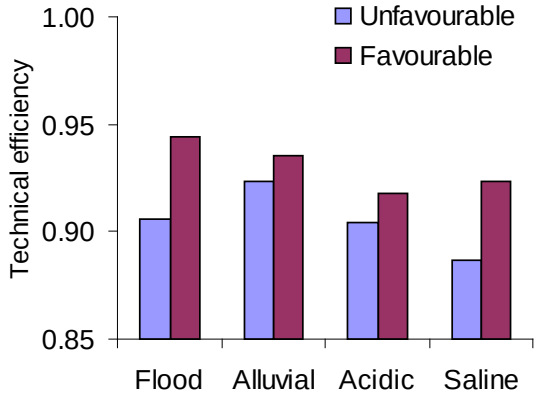


Theme 4: Analysis of farming systems and socio-economic settings in rice farming households

- identify the biophysical, social and economic factors determining the capacity of farmers to adapt to CC.
- understand the role of key institutions in influencing farmers' decisions and capacity to adapt, and
- evaluate the benefits of the new rice varieties in terms of the extent of adaptive capacity they are likely to confer under projected future CC and socio-economic conditions.







Theme 5: land use planning → An integrated approach with stakeholder engagement

Acts. 5.1, 5.2, 5.3: Biophysical condition mapping (Soils, water management)

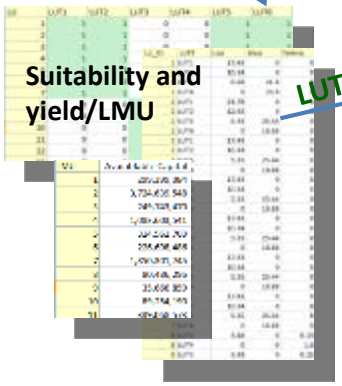
LMU

Available Area

Act 5.4. Biophysical Land Evaluation

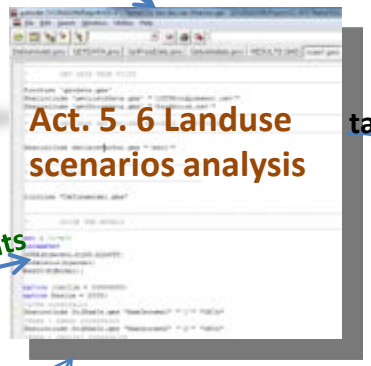
Land constraints

Suitability and yield/LMU

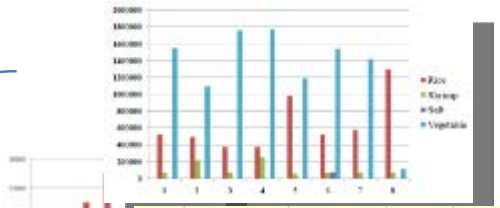


LUT outputs

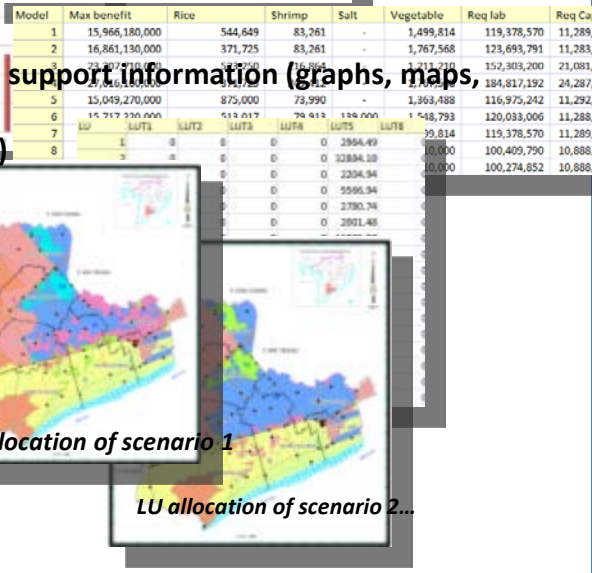
Act. 5. 6 Landuse scenarios analysis



Act. 5.7: Lesson learn for a new CCA land use strategy approach



Decision support information (graphs, maps, tables, reports)



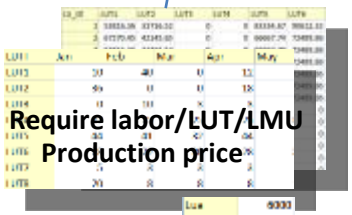
LU allocation of scenario 1

LU allocation of scenario 2…

LUT inputs

LUTs' cost/LMU

- Goals
- Gov's production target



Require labor/LUT/LMU

Production price

Available capital

Available labor

Current agriculture land use

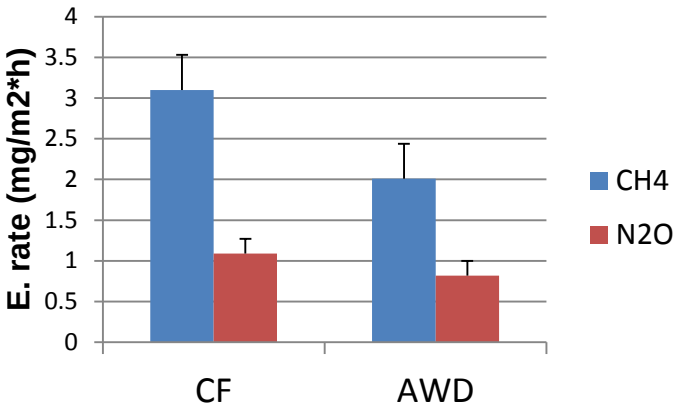
Act. 5.5. Socio-economic, policy analysis

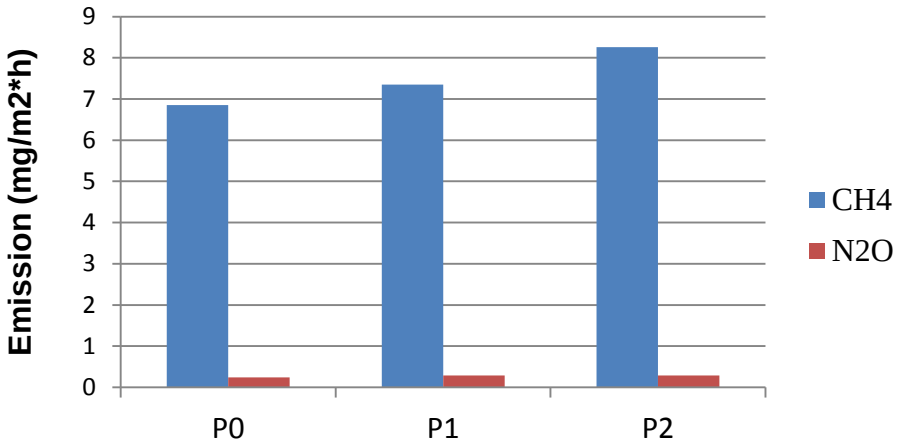
- Scenarios: Current, future (normal, dry, wet years), technical levels
- Obj functions: Regional income
- Constraints: Land, capital, labor
- Market limitation: Vegetable (≤ local consumption)
- Production targets: Rice, shrimp, salts production

Theme 6. Assessing GHG emissions and Capacity building

- Record baseline emissions from conventional management and adaptation technologies.
- Provide training and scientific infrastructure facilitating initial GHG emission measurements in rice systems.

parameters	Methodology	Notes
Water management	AWD CF	
P rates (P2O5)	P0 P1 (37,5) P2 (75)	P omission 1/3 Farmer dosage 2/3 Farmer dosage





Lessons learned

- Participatory approach → increase acceptability and applicability of the project outputs → reduce risks to the local people livelihoods.
  - Farmers: Participatory Variety Selection (Theme 2), Testing of new varieties, new farming techniques (theme 2, 3, 4), land use strategy for CCA (theme 5).
  - Seed companies (Theme 2 and 3).
  - Agriculture extension services (Theme 2, 3, 4, và 5).
  - DARD and DONRE (All themes).



Lessons learned

- Integrated approach → increase credibility of the project outputs including information to support decision marking in management, planning, and policy.
  - Multi- disciplinary: Natural (theme 1 and 2), environment (theme 6), socio-economic (theme 3,4, and 5). All aspects (theme 5).
  - Trans-boundary impacts (theme 1)
  - Agro-ecological specific of the MD.
  - Short term- Long term: Farming techniques at community, households (autonomous adaptation, short term) and provincial CCA land use strategy (planed adaptation, long term)

Lessons learned

- Capacity building:
  - Capacity for multi-disciplinary project management to coordinate different national and international research institutions.
  - Appropriate research approach, methodologies, and facilities for Vietnamese research university and institutes.
  - Strengthening the collaboration among Vietnamese and International research institution for further research in the Mekong Delta in specific, Vietnam in general.
  - Local stakeholders: knowledge on CC and CC's impacts (theme 1, 4, and 5), new farming technology (theme 2, 3), CCA land use analysis tools (theme 5)

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Reports: http://aciar.gov.au/publication/fr2016-07

Final Report for SMCN/2009/021: Climate change affecting land use in the Mekong Delta: Adaptation of rice-based cropping systems (CLUES)

smcn-2009-021_-

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Thank you for your attention