

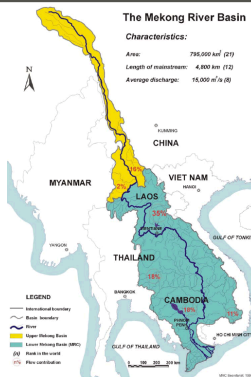


## Water Management Challenges the Mekong Delta under a changing climate

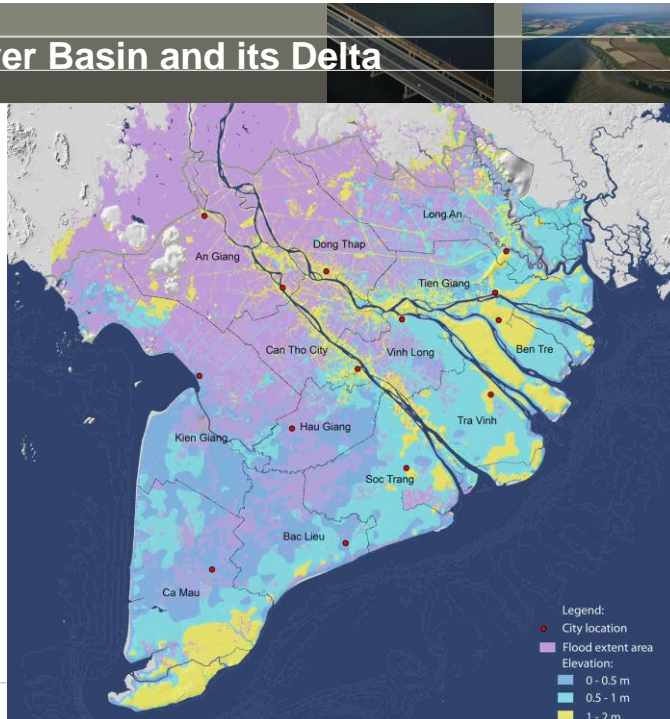
Marcel Marchand

Rotterdam, September 2014

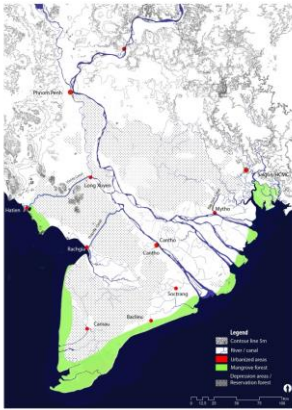
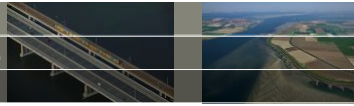
### Mekong River Basin and its Delta



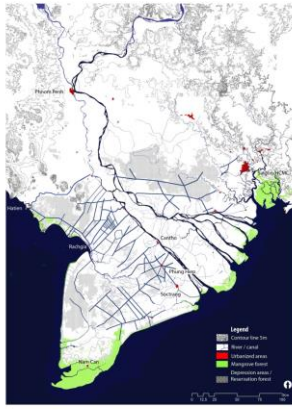
17 million people  
 5.5 million ha of which  
 3.9 million in VN  
 1.9 million flooded / y  
 13 provinces  
 730 \$ per capita



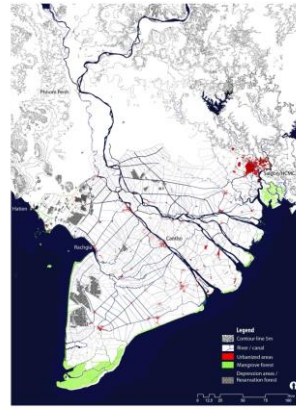
## A rapidly changing landscape



19<sup>th</sup> century



20<sup>th</sup> century

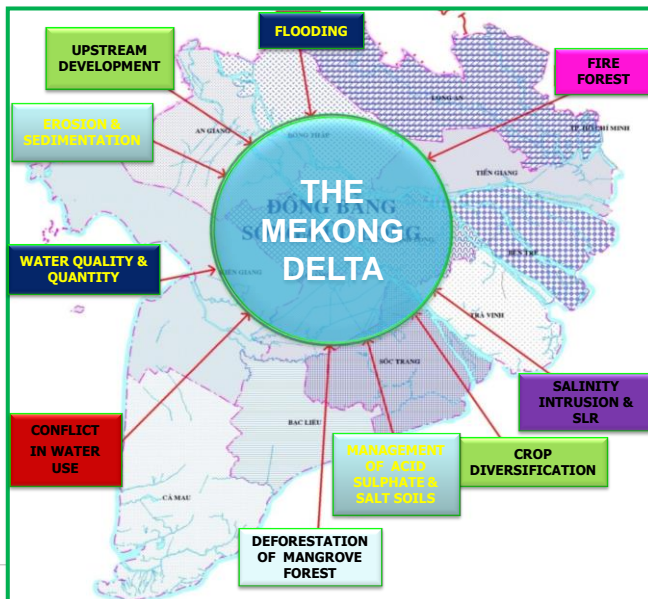
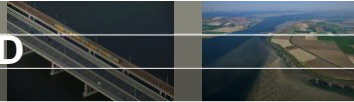


21<sup>st</sup> century

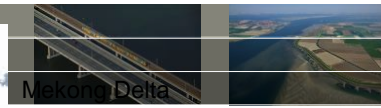
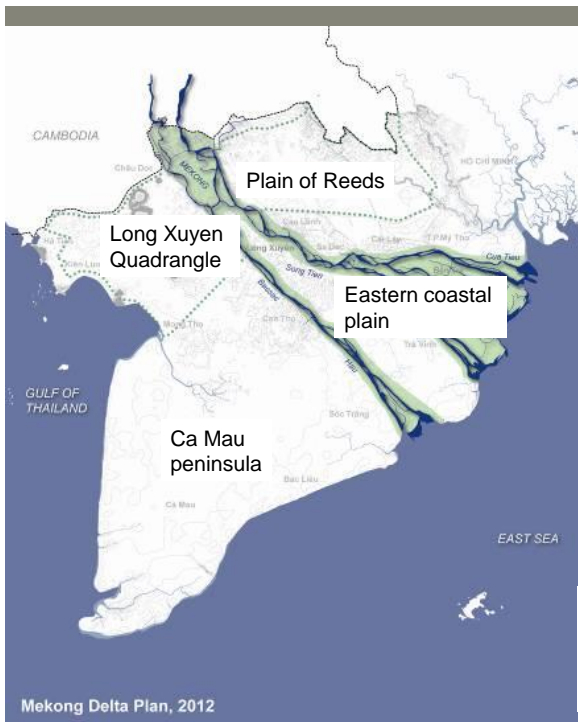
(Pham, 2012)

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## Main IWRM issues in the MKD



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Delta highly diverse in terms of soil characteristics, flood characteristics, cropping patterns, etc.

Four major zones can be distinguished:

- Plain of Reeds
- Long Xuyen Quadrangle
- Eastern Coastal Plain
- Ca Mau Peninsula

Alluvial soils (1.2 million ha)  
 Acid sulphate soils: (1.6 million ha)  
 Saline soils (0.75 million ha)  
 Other soils (0.35 million ha)

## Mekong Delta at a cross-roads

- “The development plans have included a strong belief in the human mastery over the nature and waters of the Mekong Delta. In many cases, water resources planners have underestimated the complexity and integrated nature of the ecology and livelihoods of the Mekong Delta” (Käkönen 2008).
- MasterPlan 2005 (MARD): increase water storage, closure of estuaries with sluices
- New plans for full flood control in upstream part (3 crops/yr!) but will cause more flood risk downstream (near Can Tho). And not all farmers are in favour.

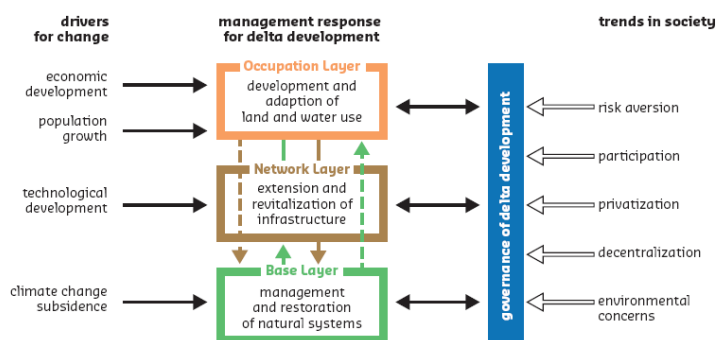
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## Climate Change and its impacts

- IMHEN institute prepared downscaled scenarios in 2009 (B1, B2, A2)
- Sea level rise 3 mm/y over past 15 years (~ global trend). ASLR for next 100 yrs 65, 75 and 100 cm, for the three scenarios
- Temperature rise 2100: 1.3 – 2.9 degrees (A2 and B1, resp.)
- All scenarios predict decreasing rainfall in dry season and increase in wet season
- Most important impacts on:
  - Flooding
  - Salinity intrusion
  - Cropping patterns

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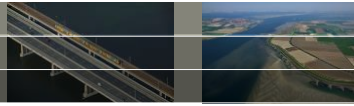
## Sustainable development and adaptive delta management



**It is all about one question: do we adapt our user demands or our infrastructure to the changes in the base layer?**

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## A resistance strategy?



Reinforcement of infrastructure:

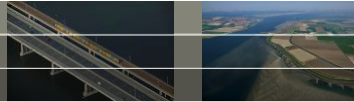
- Closure of estuaries with barriers: against floods and salinity
- Stronger and higher dikes: increasing flood protection
- Seawalls, revetments
- Upgrade of irrigation and drainage systems

Maintaining the rice bowl...

Is this the road to prosperity or is it a dead-end?



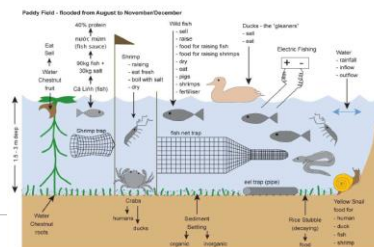
## A resilient strategy?



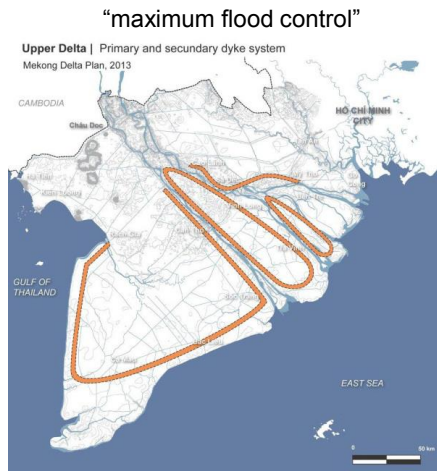
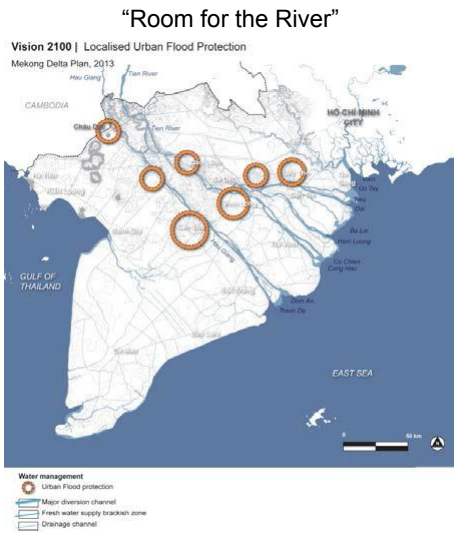
Adaptation to the changing environment:

- Mangroves for coastal protection: growing with the sea level
- Protection of residential areas
- Aquaculture
- Salt resistance crops
- Water harvesting
- Become less dependent on soil and water

Anticipating a shift from agriculture to industry and services. What will people do?



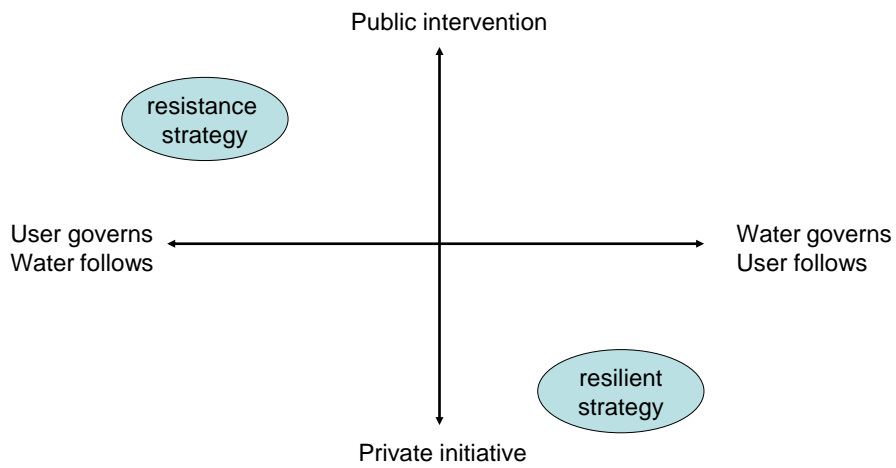
# Two alternative strategies for flood management



(Source: Mekong Delta Plan, 2013)

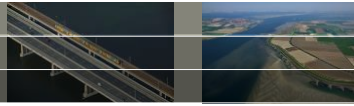
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# Two dimensions



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## Uncertainties and dilemmas



- What will climate change bring?
- What will upstream developments (esp. hydropower dams in mainstream) bring?
- Who will decide on major investments? (hydraulic bureaucracy...)
- Can Tho and other cities already face flood problems. Should they invest in local flood control or wait till regional flood embankments have improved?
- Full flood control or submersible dikes?

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