Climate Change on the Vietnam, Mekong Delta

Expected impacts and adaptations

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Overview

1. The Mekong and the Mekong Delta
2. Expected Climate Change Impacts on the Mekong Delta
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1. The Mekong

- Upper Mekong Basin – China (22%)
- Lower Mekong Basin – Myanmar (3%), Lao PDR (25%), Vietnam (8%), Cambodia (19%), Thailand (23%)
- Mean annual discharge 475 billion cu m (#8 in the world)

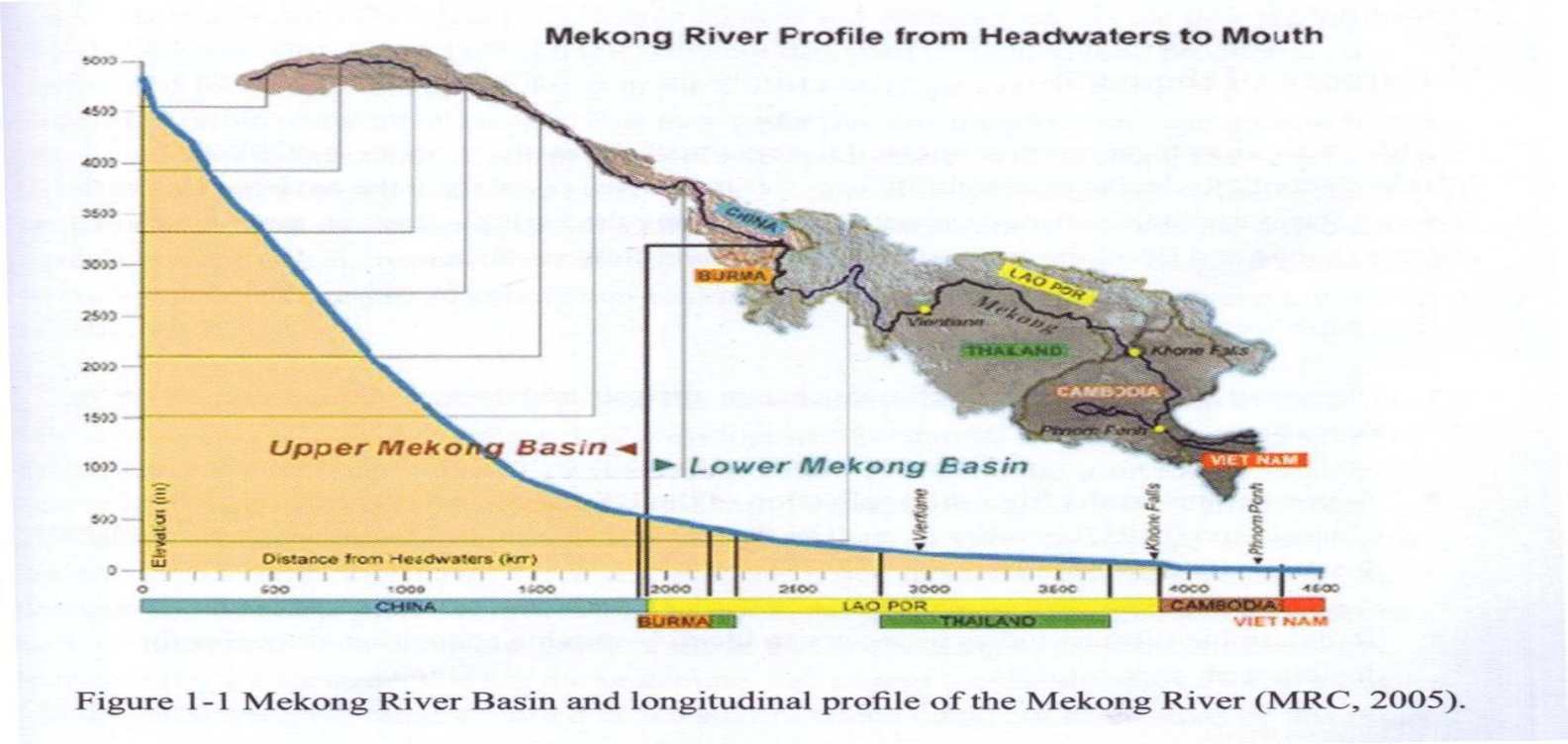


Figure 1-1 Mekong River Basin and longitudinal profile of the Mekong River (MRC, 2005).

The Mekong Delta: overview

- 5.9 million ha of which Vietnam covers 3.9 million ha (12% of the territory, 27 % of agriculture land);
- Population of 18.6 million people (i.e. 22% of national population);
- Predominantly agriculture - 80 percent lives in rural areas and 76 percent of its population engaged in agriculture;
- Economic importance - 40 percent of the country's agricultural production, more than 50% of agriculture exports, 52 percent of national rice production (and nearly all rice exports), 65 percent of fruit production, and 60 percent of its combined fisheries and aquaculture output.

The Mekong Delta: Characteristics

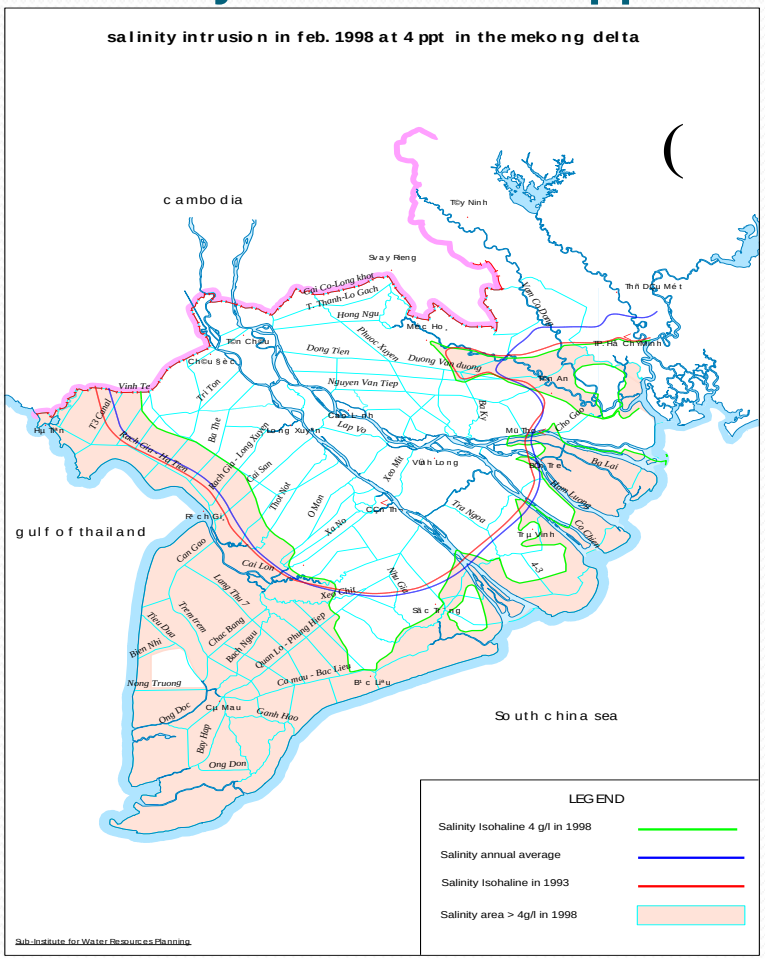
Can be segmented into three sub-regions

(a) an eastern part (east from the Tien River up toward Ho Chi Minh City) – low agriculture potentials due to its acid sulphate soils

(b) a central part (between the Tien River and the Hau River) – emerging horticultural production, but experienced rapid urbanization

(c) a western part – rice and aquaculture production, taking advantage of salinity intrusion

Isohaline of Salinity Intrusion at 4 ppt



The Mekong Delta: Historical Prospective

1975 – 1990: Rice First for Subsistence – investment in the primary and secondary to increase irrigation area;

1990 – 2000: Multiple crops– tertiary canals, flood protection dykes and primary sluice gates to control salinity;

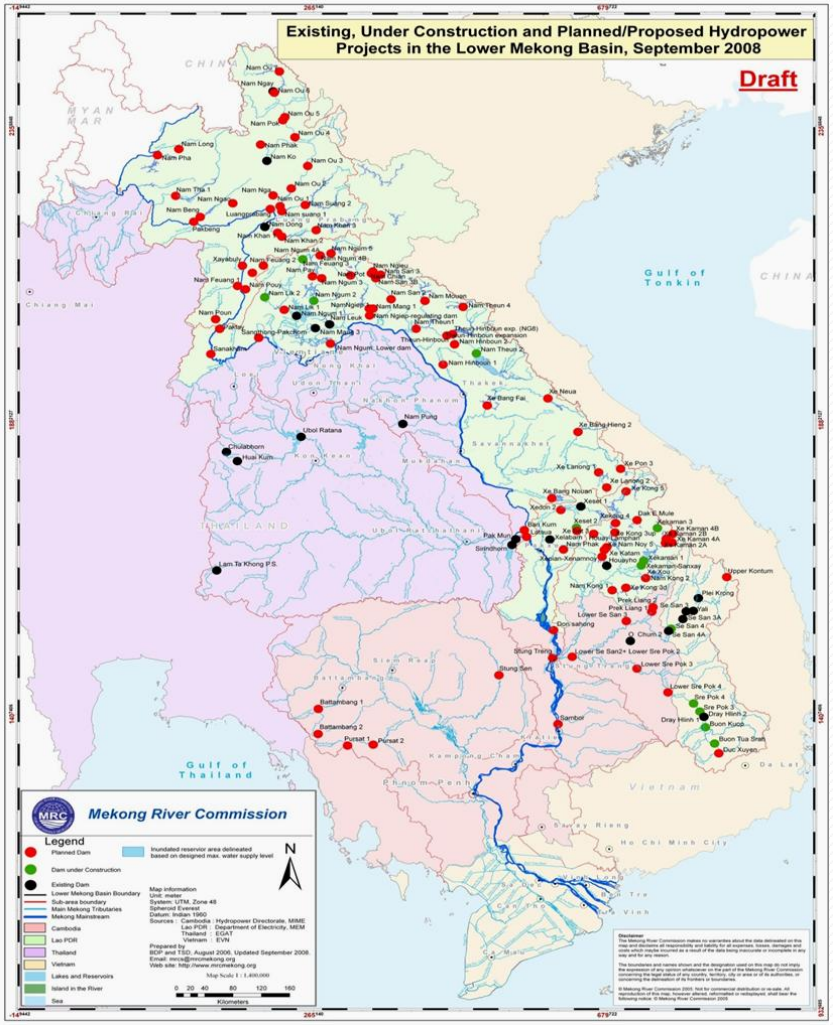
2000 – 2010: Diversification (mainly aquaculture) – tertiary canals and secondary/tertiary sluice gates

The Mekong Delta: Crops patterns

	1975	1990	2000	2009
Crop patterns (ha)				
Rice land	2,040,000	2,080,000	2,070,000	1,920,000
Traditional (One) Crop	1,860,000	470,000	545,300	414,000
Double Crop Rice	180,000	963,000	1,724,000	1,963,000
Triple Crop Rice	-	140,000	158,000	430,000
Orchards and Vegetable	-	145,000	537,000	750,000
Aquaculture	-	241,000	357,800	737,600
Coastals hrimp	-	110,000	338,000	703,000
Rice and Shrimp	-	-	40,000	130,000
Rice Production (ton)	6,000,000	9,400,000	16,520,000	20,483,000
Aquaculture production (ton)	-	126,400	365,200	1,869,500
Shrimp production			68,700	309,800
Average rice Yields (ton per hectare)	2.00	3.30	4.19	5.30

The Mekong Delta: Future Challenges due to Mekong Mainstream Development

- Significant change in water flow and flood pattern starting in 2015 when 6 china dams are in full operation and this will change salinity intrusion and flood patterns; additional changes due to mainstream dams in LMB and 20 year s development scenario would be about 10-15%;
- About 50% of present sediment (160-165 million tons/year) will be reduced by the China dams and 3S dams while addition of 25% will be reduced from the proposed 12 mainstream dams in LMB.
- 75% reduction of nutrient from the present load (26,400 tons/year) would be likely and could reduce productivity of coastal and marine fisheries.



2. Expected Climate Change Impacts on the Mekong Delta

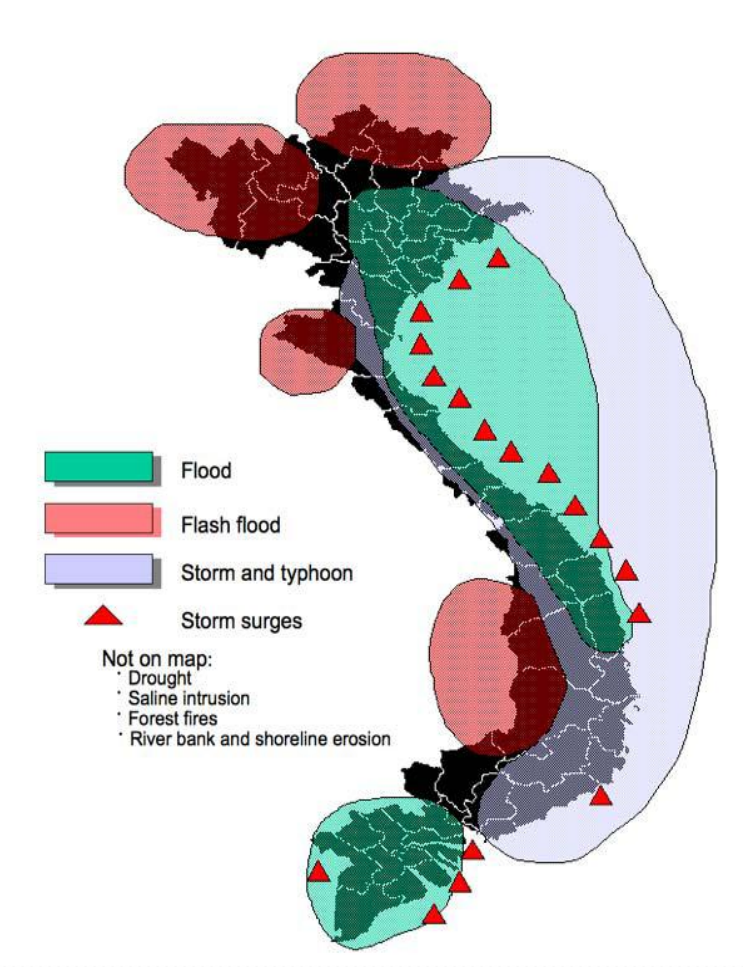
- Primary Impacts
  - Temperature Change 1.1 C (2050), 1.5 C (2070)
  - Precipitation Rainy Season: -5 to 5%, Dry Season: -5 to 0% (2050)
  - Strom serge; Sea level rise: 12 cm (already), 33 cm (2050), 45 cm (2070)
  - Increased frequency and intensity of typhoons

- Implied Impacts
  - More floods and droughts (less water during dry season)
  - Possible permanent inundation for some areas
  - Increased salinity intrusion (area and duration)
  - Increased risks of infectious diseases

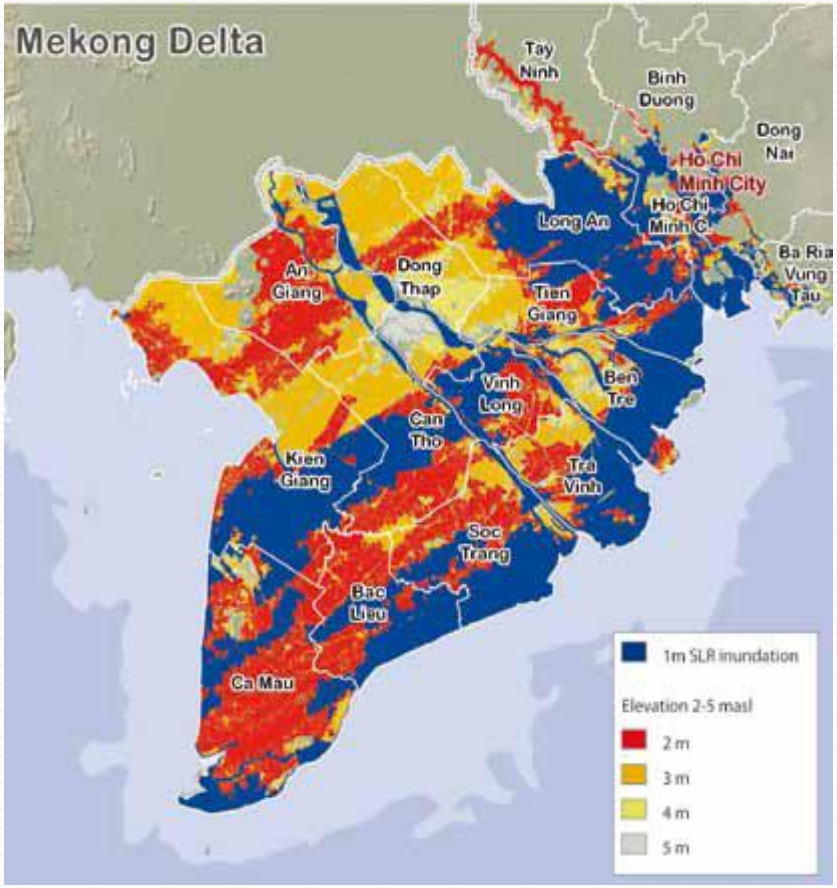
- Other factors to be considered
  - Upstream Development (hydropower stations and irrigation)
  - Urbanization

Storm Serge and Sea Level Rise

Storm surge –a WB study, 2009



Inundation areas with 1-5 m sea level rise



3. Emerging WRM Issues (1): *Planning, Water Productivity, Operation and Maintenance*

- ***Relevance*** *of the 1992 Mekong Master Plan and subsequent Provincial Investment Plan*; need to fine tune the existing provincial investment plan through the climate 'lense';
- ***Coordination*** *between MONRE and MARD*; good coordination between the policy/analysis and investment and operation on the ground;
- ***Water Productivity*** *at the on-farm level*; increase in water efficiency at the on-farm level critical to address possible dry season water shortage
- ***Timely Operation*** *of Sluice Gates*; more subtle operation needed for respond to the salinity intrusion
- ***Conflict*** *in Water and Land Use*; need to establish the WUOs to develop an internal mechanism to avoid
- ***Operation and Maintenance*****;** (a) need to allocate adequate funding for dredging; (165 million cum per year); and(b) establish WUOs at the tertiary level

Emerging WRM Issues (2): *Coordination with upstream riparian countries.*

- **Multilateral Coordination through the MRC**

  Through the MRC, there is increased effort to share economic benefits of the river and develop a coordinated WR development plan considering the downstream impacts.

- **Bilateral Cooperation With Cambodia:**
  - a stark contrast between impoverished provinces of Cambodia and the booming Mekong Delta economy of Vietnam
  - In Cambodia, lack of basic infrastructure in the Mekong Delta area bordering Vietnam has resulted in missed opportunities, and concerns about weak governance compound the challenge.

4. Adaptation Challenges for the Mekong Delta

- How to manage the opportunities and constraints in light of uncertainties related to upstream development, climate change impacts, poverty reduction, and hydropower development in the Mekong River Basin.

- How to effectively connect global knowledge to local actions on WRM and agriculture production given the different needs of adaptation measures and implementation capacity of key stakeholders;

- How to forge appropriate and continuous supports and commitments from policy makers, development partners, and famers on the IWRM process which requires significant time and resources for building trust and cooperation among water users/managers; This is critical for achieving sustainable development in the Mekong Delta.

5. Bank's Support for the Mekong Delta

- Two pronged approach – Regional and National
  - A regional project – Nurture coordination among the LMB countries and support implementation of the IWRM at the regional level
    - Flood and drought risk data collection and analysis at the regional level
    - Support for Transboundary dialogue toward Cambodia- Vietnam Management Plan for the Mekong Delta;
  - A National Project – Help Utilization of the Water Resources and strengthen the institutional capacity contributing to the climate change adaptation;
    - Urgent Investment - dredging, secondary and tertiary sluices, and dykes;
    - Planning – review and revision of the current provincial water investment plans;
    - Water Productivity , Operation and Maintenance; pilot on-farm water productivity improvement activities, institutional strengthening of the Irrigation Divisions, and establishment of WUOs.