

Climate change and socio-economic development in Ca Mau Province

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Socio-economics development since 2006

- GDP growth: 15,08%/year
- GDP per capita: 923USD/year in 2008
- Industry-construction: 35.45%
- Agriculture & forestry: 41.1%
- Service: 23.45%
- Investment has focused on: transportation, power, irrigation, urban, culture, health, education

Trends in Ca Mau Provinces

- Frequency and level of damage on socio-economics have been increasing
- Forest destruction and over exploitation of resources, emission, industrial wastewater...
- Most causes are human-induced – but storms, tides and flooding and increasing factor

Plans and Objectives for 2011-2015

- Growth rate expected to reach 18.44%/year
- Growth rate of export expected to reach 10%/year
- Growth rate of total retail and revenue from service expected to reach 31%/year.

Total GDP from industry and construction

In 2015 (according to Decision 163/2008/QĐ-TTg)

- Industry-Construction: 37.8%
- Fishery-Agri-Forestry: 28.7%
- Service: 33.5%

Target is to 2015, 98% of households have access to national power grid

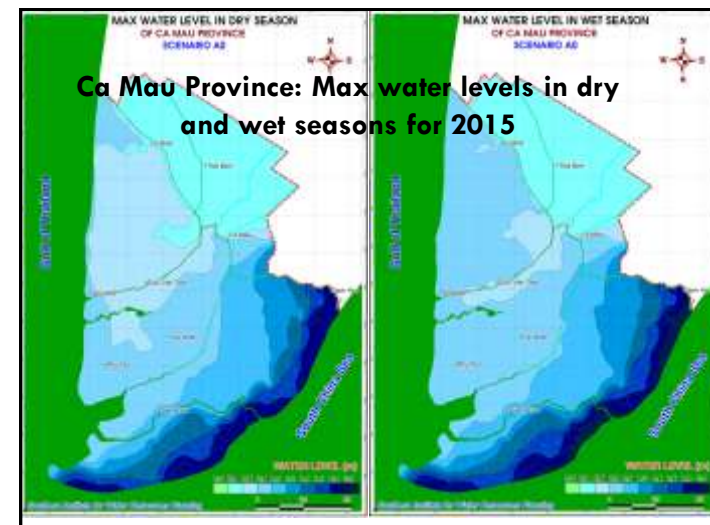
Impacts of climate change on the sector

Challenges

- Activities to cope with Climate Change
- Policy for agricultural and rural development
- Policy for exploitation, protection and development of natural resources.

Impacts of natural disaster on industry and trade sectors

- Linda storm in Nov. 1997 affected the processing plant, aquaculture, and exploitation of aquatic resources.
- In recent years, saline intrusion and sea level rise have reduced production of aquaculture

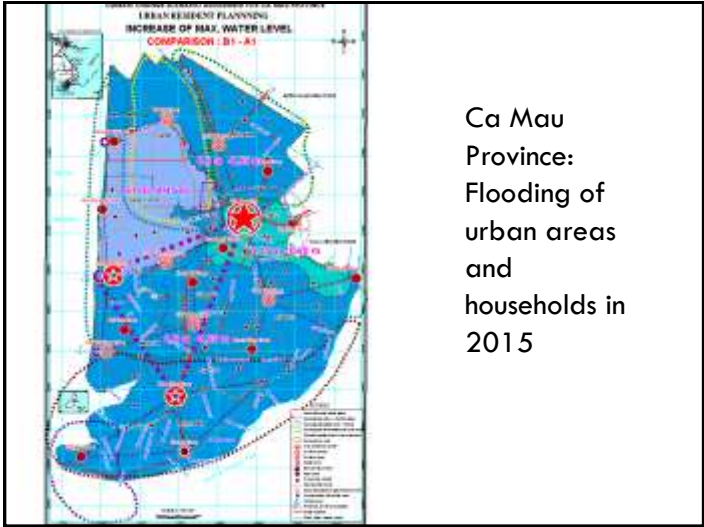
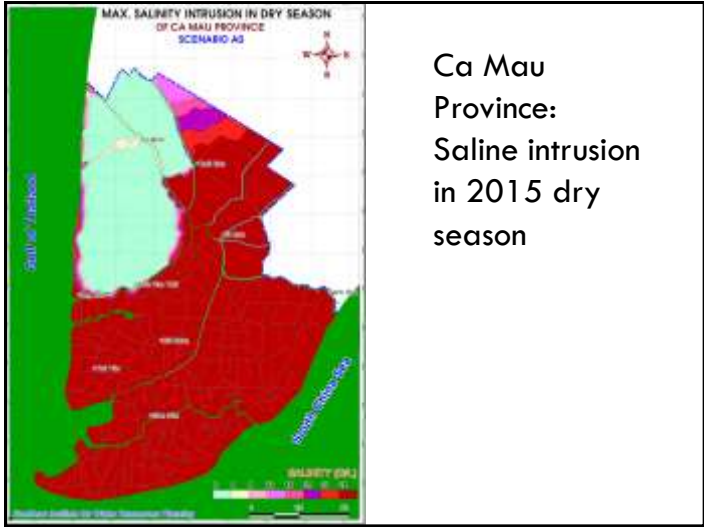


Ca Mau Province: Water levels in dry and wet seasons for 2015

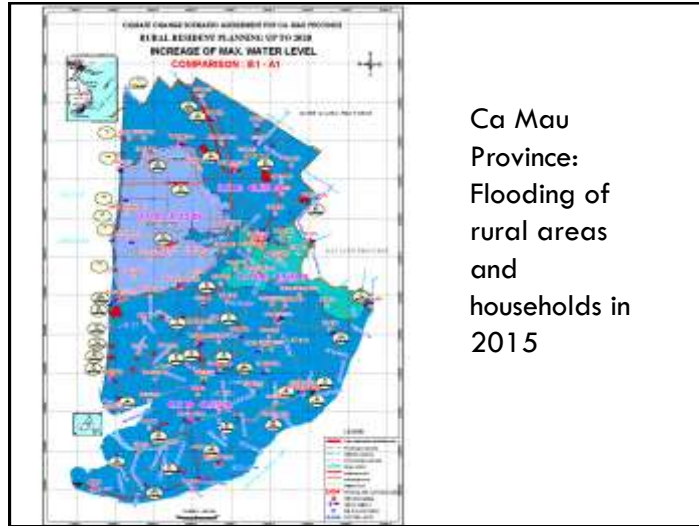
Water Level	Dry season		Wet season	
	Area	%	Area	%
0.4 - 0.6m	1,457.38	26.5	0.00	0.0
0.6 - 0.8m	853.75	15.5	1,455.30	26.5
0.8 - 1.0m	1,333.38	24.3	1,898.76	34.5
1.0 - 1.2m	675.20	12.3	773.91	14.1
1.2 - 1.4m	290.25	5.3	394.30	7.2
1.4 - 1.6m	258.91	4.7	260.10	4.7
1.6 - 1.8m	281.40	5.1	255.57	4.6
1.8 - 2.0m	347.07	6.3	270.33	4.9
> 2.0m	0.00	0.0	189.07	3.4
Total	5,497.34	100.0	5,497.34	100.0

Saline intrusion by 2015

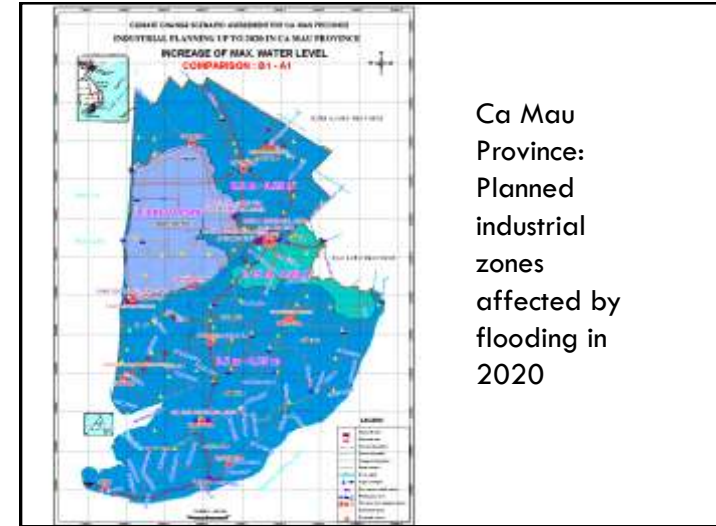
- ❑ In Ca Mau province, salinity intrusion under the existing tidal regime is so extensive that climate change is not predicted to have a major effect on the 2015 salinity profile.
- ❑ Existing salinity levels approach oceanic concentrations (28g/L compared to 32g/L) and penetrate the peninsula as far north as Tran Van Thoi Town and Ca Mau City
- ❑ The exception is under a high SLR and extreme climate event scenario, in which salinity in the province south of Tran Van Thoi Town and Ca Mau City reaches 32g/L. However, the Chac Bang Canal prevents additional areas in U Minh district from being effected.



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Ca Mau Province:
Flooding of rural areas and households in 2015



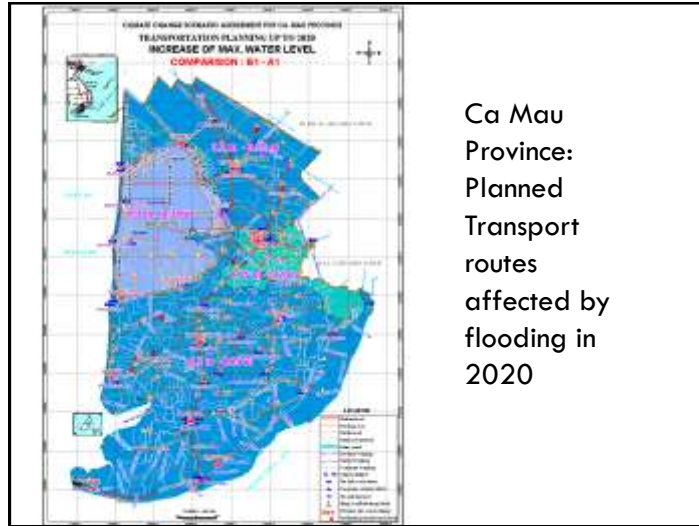
Ca Mau Province:
Planned industrial zones affected by flooding in 2020

Households affected: 2015-2030

- Climate change is expected to effect 275,000-325,000 households in the Ca Mau peninsula.
- By 2015, 275,000 households are likely to be effected,
- By 2030, this figure rises to 325,000.
- In general more rural households will be affected than urban households.
- The continuation of current development strategies will not prevent flooding and damage to rural and urban households
- In Ca Mau province, urban households tend to have better connectivity to health and civil infrastructure, making them less vulnerable to risks posed by climate change.
- Some 585 hospitals and health centers will be effected

Industry by 2015

- Industrial activity is concentrated in northern Ca Mau City, Song Doc and Nam Can, with smaller scale activity in Cai Doi, Dam Doi and Toi Binh.
- 172 existing industrial zones are likely to be effected, which will increase the risk of further pollution problems.
- All industrial zones, except for southern parts of the Ca Mau City industrial area lie in areas predicted to experience the greatest increase in max water levels.
- This correlates to an expected 20-25cm increase during the wet season.



Agriculture and irrigation by 2015

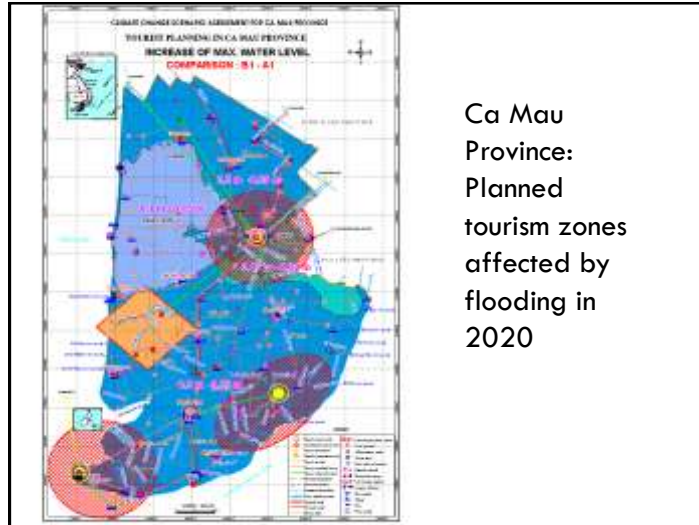
- The farming sector comprises: shrimp, fishery, rice, rice-fish, rice-shrimp, vegetables and annual plants, and perennial plants.
- The Overall Risk that climate change poses to the farming sector is: HIGH
- More than 45,000km of irrigational works are to be effected by climate change, the majority will be within interior fields, and primary and secondary embankments

Transport by 2015

- The majority of impacts to the transportation sector are likely to be on local roads.
- Under SLR scenarios approximately 4,500km of road is expected to be effected.
- This figure jumps to ~13,000km when considering extreme climatic events and storms.
- By 2030 a 25cm SLR will result in more than 90% of the effected local roads experiencing rises of 20-25cm

Aquaculture and forests by 2015

- **Shrimp farming:** the Overall Risk that climate change poses to the forestry sector is HIGH
- During extreme storm events the vast majority of affected areas are likely to experience increases of between 30-50cm
- **Forestry:** the Overall Risk that climate change poses to the forestry sector is HIGH
- Approximately 108,000ha of forested areas are expected to be effected,
- Productive forests are likely to be the most affected (~60% of the total effected area), followed by protected forests (~24%) and specialized forests (~16%).



Measures undertaken for mitigating impacts of Climate Change

- Planning for specialized farming areas
- Developing the industrial processing establishments
- Encouraging the processing plants of aquatic products, rice mills, food processing plants to invest in new equipment and technology, improve productivity and quality of products.

Plan for coping with Climate Change

- Evaluate the appropriateness of land use plan
- Evaluate the appropriateness of the development plans of the sectors in view climate change
- Project the trends of environmental change on ecosystems in order to come up with coping plans.
- Project the degradation of biodiversity under the impact of climate change.
- Research on the functions for regulating surface water and ground water.

Adaptation in rural areas

- **Rural households:** Given the vulnerability of rural households, revisions to existing management plans will need to explore emergency evacuation and long term relocation options.
- **Natural systems:** water resource management has not incorporated the buffering capabilities of the provinces mangroves
- Great emphasis is needed on the role and rehabilitation of forests and natural systems to complement engineering approaches to adaptation
- **Agriculture and fisheries:** Provincial and national authorities periodically reassess the best mix of aqua/agriculture for Ca Mau province, based on available scientific information and expressed desires of local farmers. This process needs to consider climate change

Adaptation in infrastructure

- Planners and provincial authorities should review development plans to upgrade and strengthen secondary infrastructure works (i.e. secondary embankments/canals and local/district road networks).
- Also better understanding is needed of sediment and erosion processes, as these are one of the main causes of inefficiency and failure in canal performance.
- Complementary environmental works like revegetation of river banks could provide long term preventative benefits for the infrastructure sector.

End



Thanks for listening