



## REGIONAL STRATEGY FOR THE SUSTAINABLE LONG TERM DEVELOPMENT IN THE VIETNAM MEKONG DELTA

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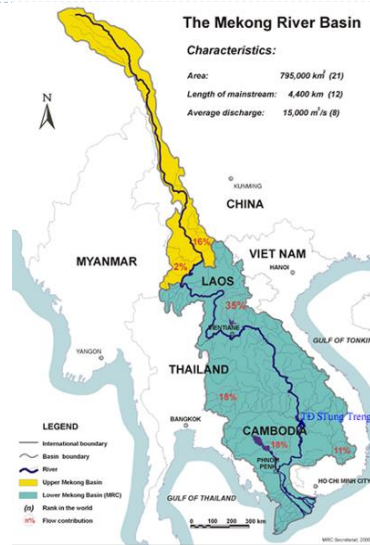


## The Mekong Delta



## Physiography

- ▶ One of the ten largest rivers in the world;
- ▶ Flowing through 6 countries to the East Sea of Vietnam
- ▶ Total length of 44,000km
- ▶ Average annual flow of 475 billion m<sup>3</sup>
- ▶ Catchment area of 795,000 km<sup>2</sup>.
- ▶ Habitat of around 60 million people



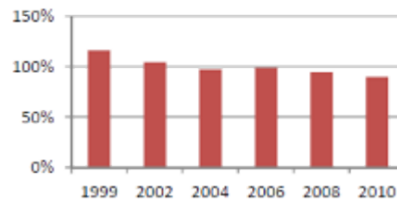


## Economic development



- ▶ Largest agricultural field, contributing:
  - ▶ 18% of the national GDP
  - ▶ 90% of rice
  - ▶ 70% of fruit production
  - ▶ 60% of fishery production

- ▶ High density population (20% of Vietnamese Population)
- ▶ Urbanization rate is 25%, lower than the average of Vietnam (32%)
- ▶ Income gap increases from 6.5 to 7.5 times in 2004 – 2008
- ▶ GDP of Mekong Delta remains below the average



## Economic development priorities

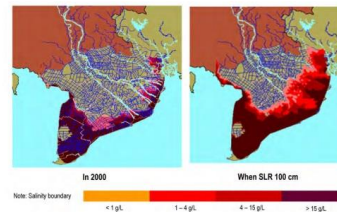


- ▶ Urbanization and Industrialization



- ▶ Flooding management

- ▶ Infrastructure Development



- ▶ Salinity Intrusion

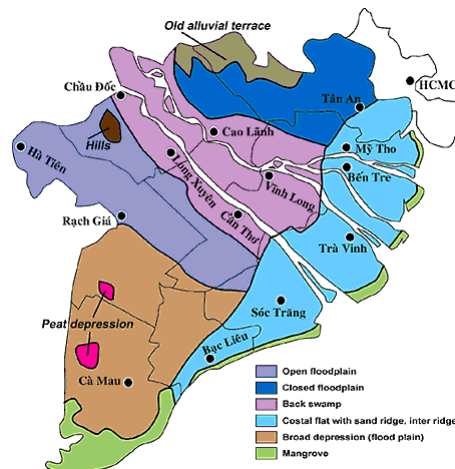


## Climate Change in Mekong Delta



### Highly vulnerable to impacts

- ▶ Suffering from all types of short to long-term impacts
- ▶ Increasing frequency and magnitude of tropical cyclones, sea level rise, floods, salinity, droughts, etc.
- ▶ Both physical and social vulnerabilities rapidly emerging;
- ▶ Climate change impacts getting more unpredictable and abnormal;
- ▶ Risks of reversing all socio-economic development achievements



# Climate Change Scenarios

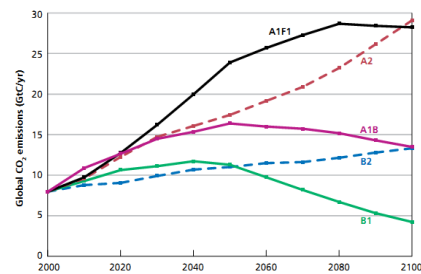
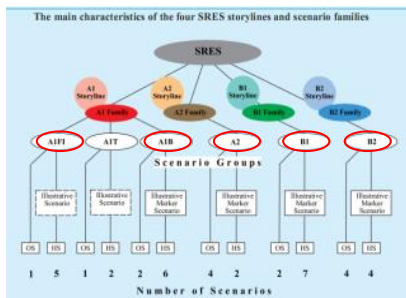
## Emission Scenarios

- Low emission scenario (B1);
- Medium emission scenario (B2)
- High emission scenario (A2, A1FI)

## Models Applied

- *Statistical Downscaling:*  
SDSM, SimClim
- *Dynamic Downscaling:*  
AGCM/MRI, PRECIS

*Baseline: 1980-1999*

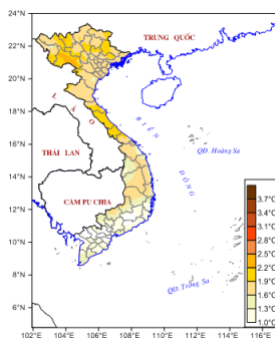


GHG emission scenario (IPCC)

# Climate Change Scenarios

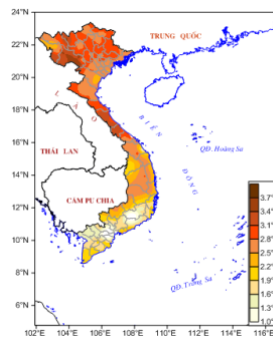
- Temperature in Winter: XII-II
- Temperature in Spring: III-V
- Temperature in Summer: VI-VII
- Temperature in Autumn: IX-XI
- Yearly Average Temperature
- Extreme Temperature in Winter
- Extreme Temperature in Summer
- Annual Extreme Temperature

**Number of Days with Temperature > 35°C**



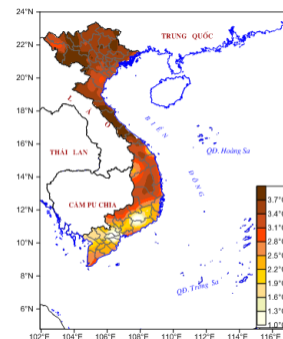
increase of temperature in winter

**B1**



increase of temperature in winter

**B2**



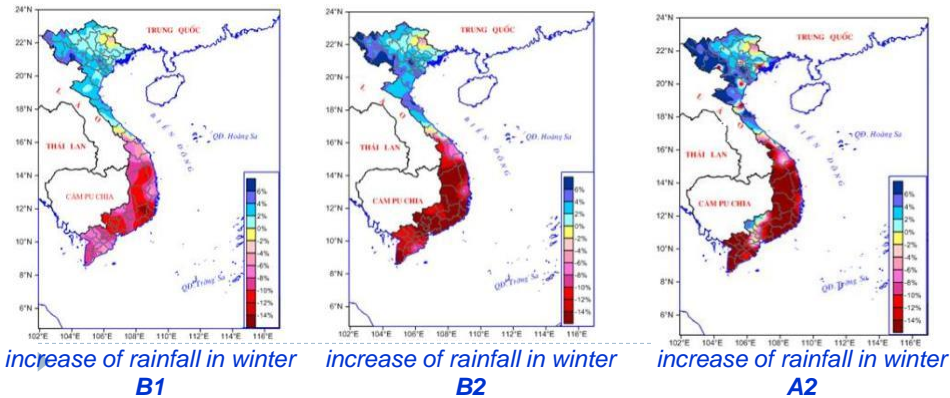
increase of temperature in winter

**A2**



## Climate Change Scenarios

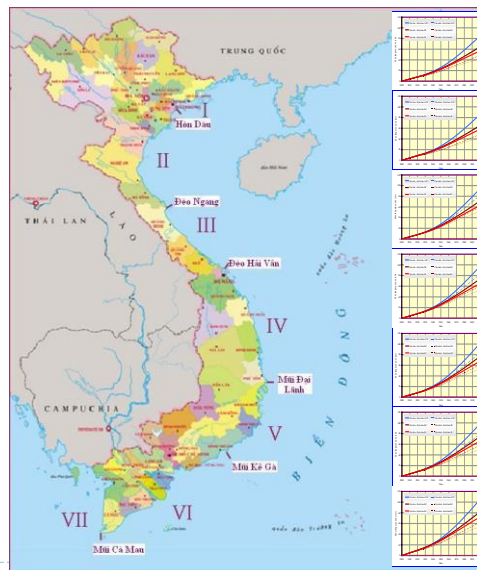
- Rainfall in Winter: XII-II
- Rainfall in Spring: III-V
- Rainfall in Summer: VI-VII
- Rainfall in Autumn: IX-XI
- Annual Rainfall
- Maximum Daily Rainfall



## Sea Level Rise Scenarios

Three sea level rise scenarios are constructed for seven coastal regions of Vietnam including:

- (1) Mong Cai to Hon Dau;
- (2) Hon Dau to Deo Ngang;
- (3) Deo Ngang to Deo Hai Van;
- (4) Deo Hai Van to Mui Dai Lanh;
- (5) Mui Dai Lanh to Mui Ke Ga;
- (6) Mui Ke Ga to Mui Ca Mau; and
- (7) Mui Ca Mau to Ha Tien.





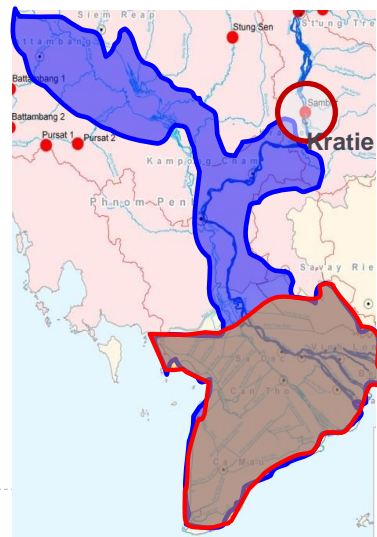
## Climate change scenarios in Mekong Delta

	Medium scenarios		High scenarios	
	2050	2100	2050	2100
<b>increase wet season flow</b>	no change	10%	0 – 10%	20 – 50%
<b>increase wet season rainfall</b>	0 – 5%	5 – 10%	10 – 20%	10 – 30%
<b>dry season flow</b>	+/- 5% (higher or lower)	5% higher or 15% lower	10 – 30% lower	30 – 60% lower
<b>decrease dry season rainfall</b>	0 – 10% less	5 – 15% less	10 – 20% less	20 – 40% less
<b>increase salinity intrusion</b>	slight	moderate	moderate	dramatic
<b>sea level rise*</b>	20 – 30 cm	57 – 73 cm	40 – 60 cm	78 – 95 cm

Source: Mekong Delta Plan, Long-term Vision and Strategy - 2013

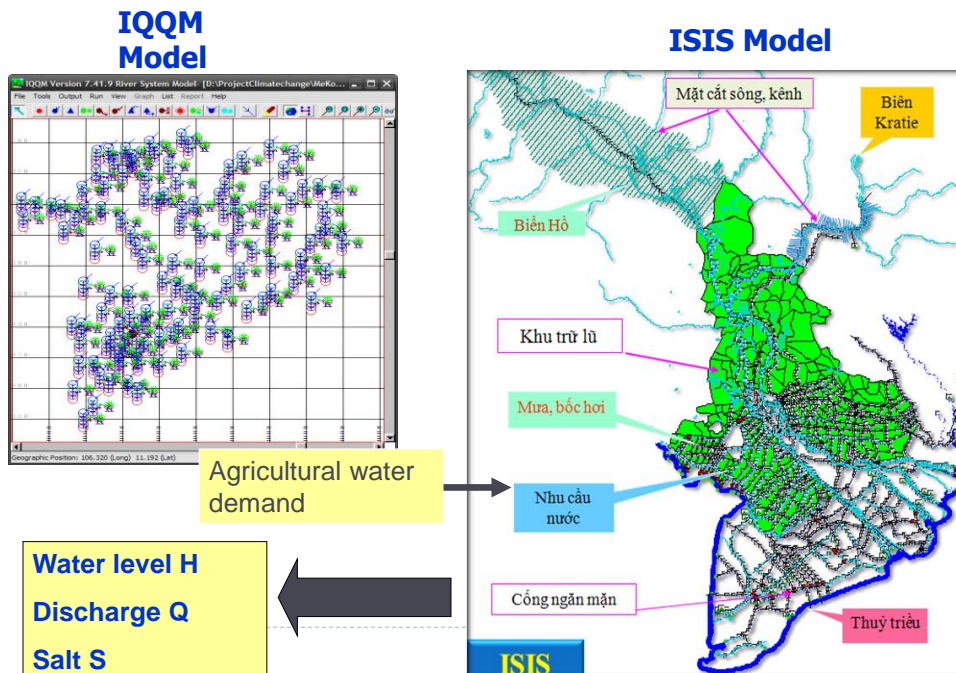
## Approach for CC impact assessment

- ▶ The study area of Mekong Delta.
- ▶ To assess impacts of Climate change on Water resources the Mekong Delta.
- ▶ The boundaries are: from Kratie and Great lake to the sea.



# Methodology

- ▶ Modelling system:
- ▶ IQQM to calculate water demand form sub-basins;
- ▶ ISIS to simulate hydraulic regime.







## Impacts on land resources, water resources, agriculture

- ▶ Soil drought and desertification;
- ▶ Salt water intrusion into rivers;
- ▶ Reduce freshwater resources for living and production;
- ▶ Fresh water shortage affects on the supply of fresh water activities and production, energy, conservation and biodiversity.



Droughts in Soc Trang



Shortage of fresh water in Ben Tre



## Impacts on aquaculture



The shrimps feeding in Can Gio district



Lacks of water in shrimp ponds, Soc Trang province

- ▶ Increasing temperature causes serious impacts to the growth of organisms in the aquaculture.
- ▶ Rainfall change alters the salinity and flow of the river and the estuary.
- ▶ Reduced productivity and quality of aquacultural products



## Impacts on biodiversity

- ▶ Sea level rising causes increasing shoreline erosion and deforestation
- ▶ Power generation reservoirs alter the flow regime and flood season, reducing sediment, causing coastal erosion and degrading eco-systems.



Reduced fish production in Vinh Long



Shoreline erosion in Tra Vinh

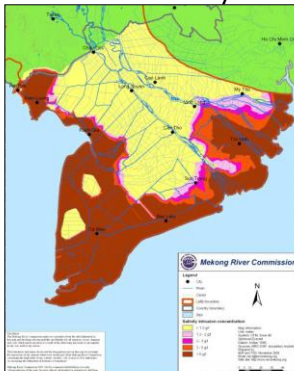


Hydropower dam on the Mekong

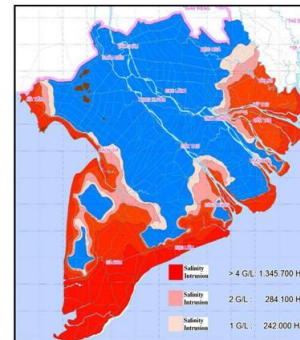


## Impact of Climate Change on Water resources

- ▶ Sea level rise will increase salinity in the river.
- ▶ A sea level rise of 1m would increase the area of 4 g/l salinity with 334,000 ha in relation to the benchmark year of 2004, a rise of 25%



Salinity in 2024 (B2 scenario) with 20 cm sea level rise. *MRC, 2011*



Salinity in 2004

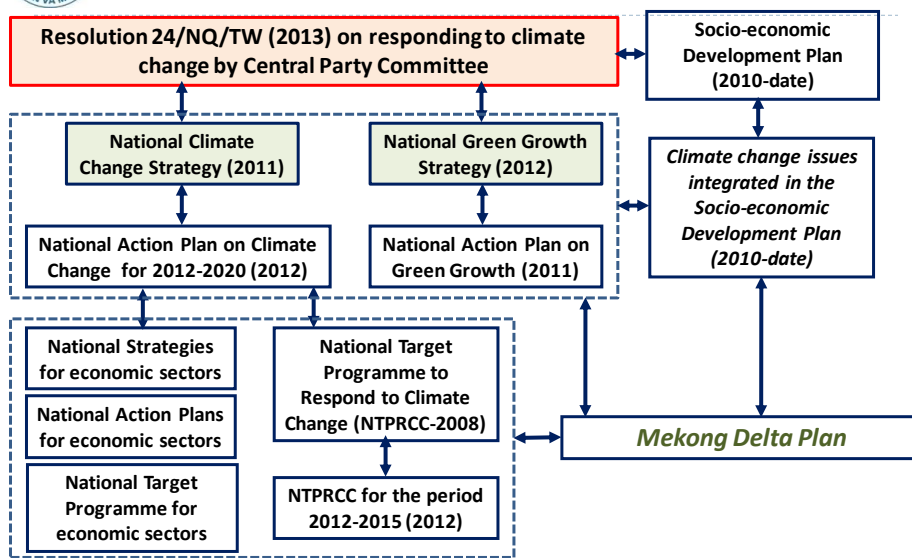
- ▶ Water pressures drop by 2-5 m in the dry season,
- ▶ Groundwater use is depleting a limited aquifer and further intensification of groundwater use is unsustainable.



## Climate Change Policies



### Evolution of climate change policies in Viet Nam





## Response to Climate Change in Mekong Delta



### Notable activities

1. Raising awareness from the central to the local level and the private sector;
2. Strengthening of research, development and application of science and technology in response to climate change.



**Energy saving Eco-house Model**  
*A Product of National Scientific Program to Respond to Climate Change*

The salinity water treatment system using solar energy





## Notable activities



First Mekong Delta Climate Change Forum - 2009



Project design for Climate Change Adaptation in Mekong Delta

1. Participate in international forums, negotiations on climate change;
2. International cooperation in order to strengthen climate change activities in Mekong Delta.



Viet Nam Negotiation Delegation at COP18



## Adaptation

### Natural Disaster Risk Prevention and Reduction

1. The government has submitted to the Congress the Law on Natural Disaster Risk Prevention and Reduction.
2. Investing in prevention and mitigation of natural disasters, reforestation; upgrading dykes; prevent erosion; Living with floods; safety boats etc.

### Monitoring climate change

1. Modernizing hydro-meteorological observation system,
2. modernizing forecast technology and hydro-meteorological observation network, increase the forecasting capacity

### Food Security

1. Apply Good Agricultural Practices (VietGAP) in agriculture, forestry and fisheries; using biotechnology and advanced manufacturing processes in: select the resistant varieties alum, salinity and pests;
2. complete cultivation process-specific crop varieties in each ecological conditions; restructuring and crop varieties appropriate to avoid disaster etc.





## Adaptation



Can Gio Mangrove Biosphere Reserve



Smart and climate friendly agriculture

### Water resources Security

- Improving standards in exploitation and economical use of water resources; Reviewing the overall planning of irrigation in the Mekong Delta.

### Protection and sustainable development of forests

- Implement some pilot projects to study mechanisms to conserve biodiversity through REDD+ high in Vietnam; Integrated protection Program mangrove forests to adapt to climate change in Mekong Delta etc.



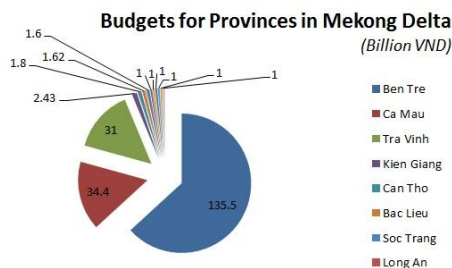
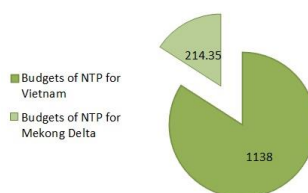
## Investment

- NTPRCC provided VND 214.35 billion (US\$100 millions) to Mekong Delta 2010-2014.
- Provincial Action Plans to Respond to Climate Change are all under implementation.



Ms. Rachel Kyte - Vice President of World Bank learn about the impact and response to climate change in Ben Tre Province

Budgets for implementation of NTP  
(Billion VND)





## Investment

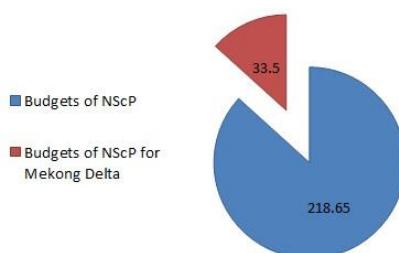
### National Scientific Program to respond to climate change

#### Objectives

1. Gaining better knowledge and understanding of climate change;
2. Establishing a scientific basis for monitoring and early warning of climate change
3. Improving capability of science and technology.
4. Proposing guidelines, policies and climate change adaptation and mitigation measures.
5. Integrating climate change into strategies, master plans, development strategies, ...

#### Budgets for implementation of NScP

(Billion VND)



*10 projects being implemented in Mekong Delta with VND 33,500 billion (US\$1.5 billion). Six of them were accepted by MONRE in 2014.*



## Investment

### Support Programme to Respond to Climate Change (SPRCC)

1. In 2009, the SP-RCC program has 02 sponsors, JICA and AfD,
2. More donors are participated in the program, including the World Bank (WB), Canada International Development Agency (CIDA), the Australian Agency for International Development (AusAID), Korea Eximbank.
3. **Total funds mobilized for the program in 2010, 2011 and 2012 were US\$ 138 million, US\$ 142.5 million and US\$ 248 million respectively**

**From 2009 to date, the SP-RCC program continues to receive committed fund of about \$ 221 million, of which:**

1. The French Development Agency (AfD): 26.8 million
2. World Bank (WB): \$ 70 million.
3. The Australian Agency International Development (AusAID): US\$ 7.4 million (non-refundable).
4. Japan International Cooperation Agency (JICA): US\$ 97.2 million
5. Korea Eximbank: \$ 20 million (estimated).

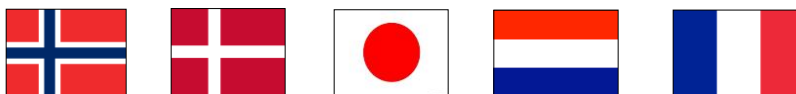


## What have been done ...

### Policies and Legislations on Climate Change



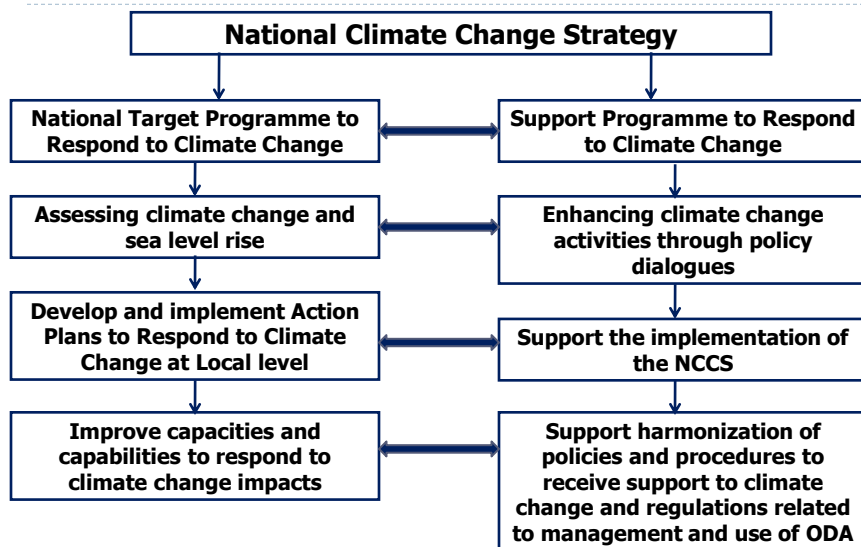
### International Cooperation



### Science and Technology for Climate Change



### The links between NCCS, NTPRCC and SPRCC





## Lesson learn ...

1. The importance of Capacity building and Social Awareness for Climate Change.
2. The role of Governmental Organizations in Climate Change Responses
3. Implementation of Strategies, Programs and Plans to respond to Climate Change
4. The role of Viet Nam in global response to Climate Change



## Pitfalls, Challenges for future!

- ❖ Lack of knowledge and updated information on Climate Change and Climate Change responses.
- ❖ Delayed Climate Change Policy and Legislation Implementation
- ❖ The implementation of Climate Change responses.

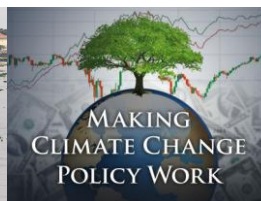
- The operation of Provincial Climate Changes Taskforce is still dependently and un-linked.
- There is no Regional Climate Change Response Organization for Mekong Delta

- Multi-Stakeholder participation in Climate Change responses: stil no rule of the game!!!
- Investment in Climate Change Response is still overlapped and un-appropriately.
- Slow transformation from scientific results to policy and from policy to actions



## Conclusions and ways forwards

1. Climate change is increasingly being considered as development issues in Mekong Delta;
2. Responding to climate change is important for Mekong Delta and associated with socio-economic development;
3. Many laws and legal documents relating to the response to climate change
4. Adaptation and mitigation associated with the development and being given equal attention and priority;
5. High potential of mitigation in all economic sectors;
6. Feasible to learn and apply international experiences and technologies;
7. Sustainable development in Mekong Delta can be achieved with smart and effective response to climate change.
8. Urgent need for a change in climate change policy approach for not only the Mekong but all of Viet Nam.



***Thank you for your attention!***

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