

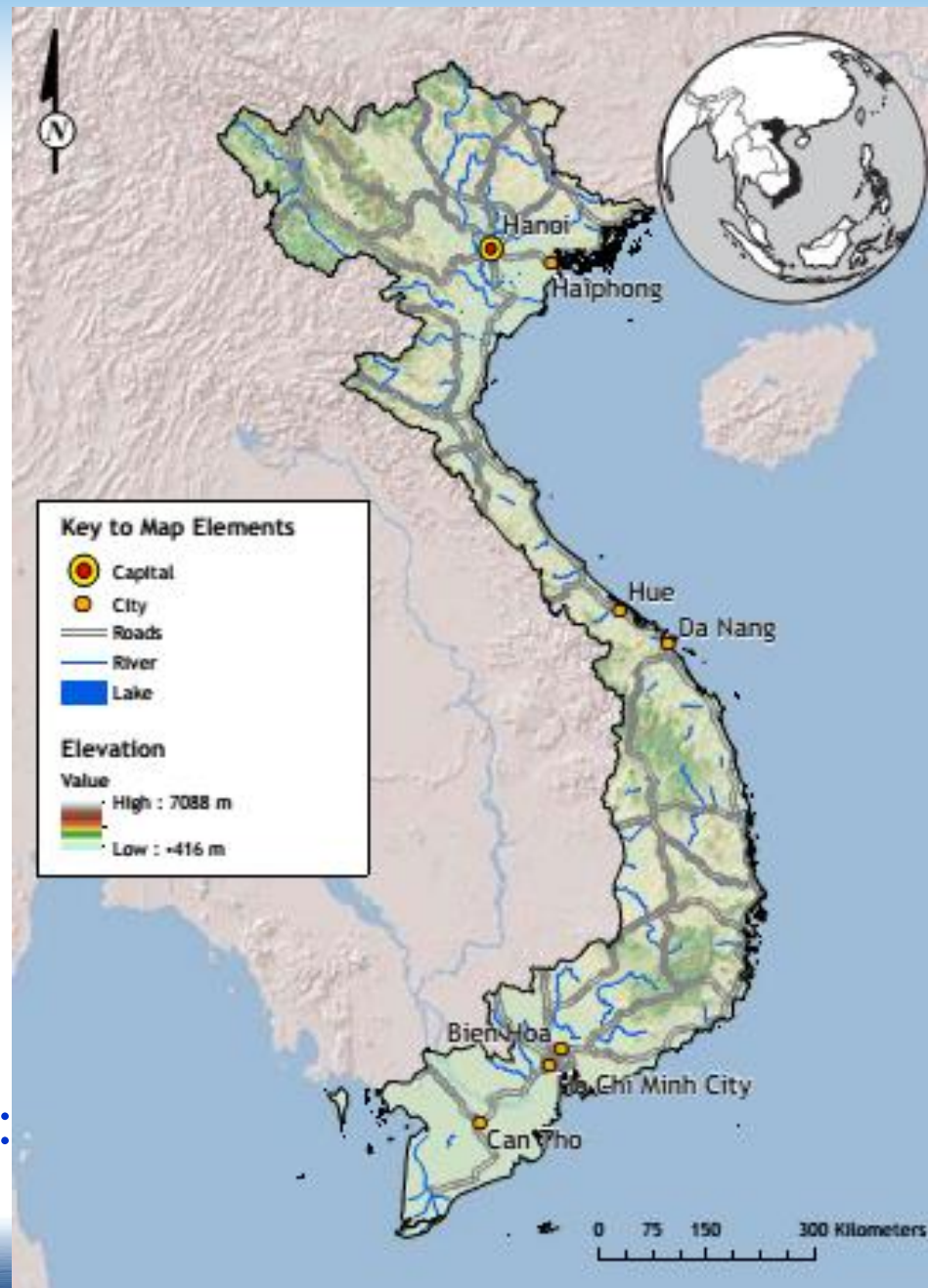
CLIMATE CHANGE IN VIETNAM



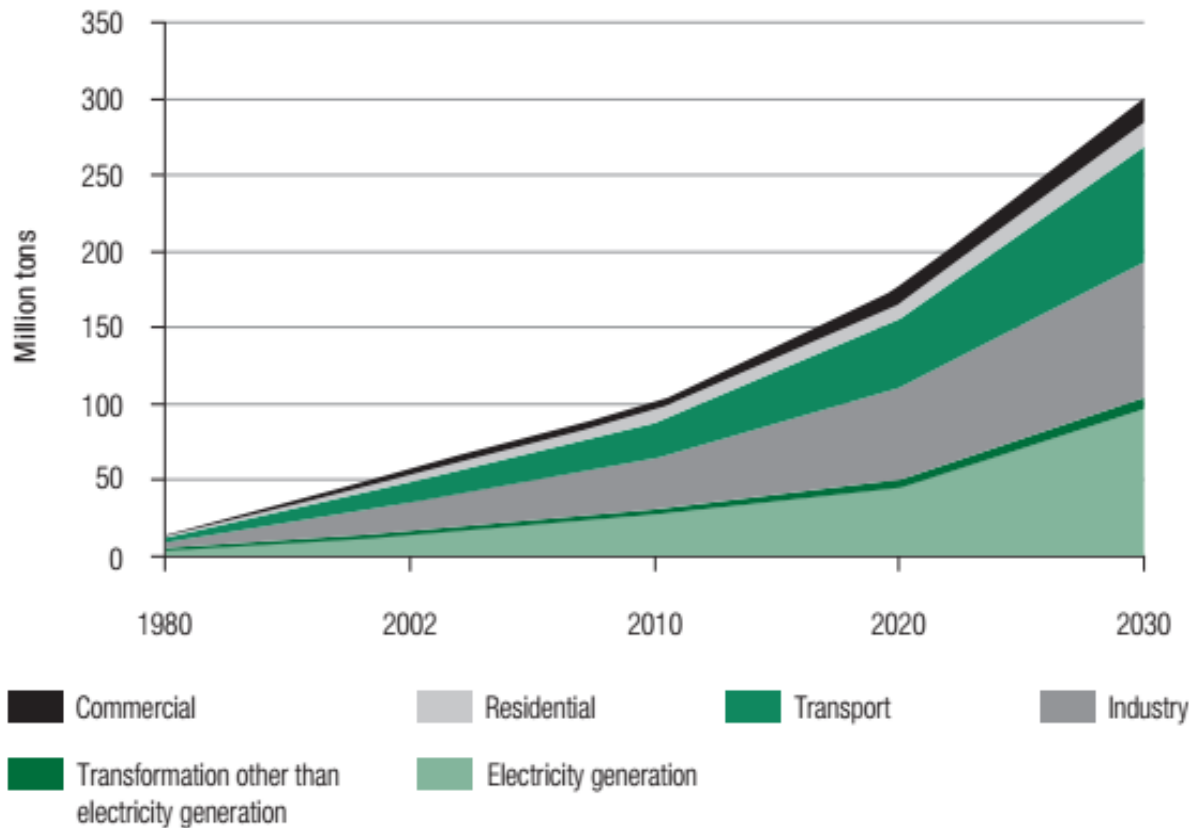
Nguyen Thi Tuyet Le
Tran Nguyen Van Nhi
Han Quang Hanh

Socialist Republic of Vietnam

- Location: Southeast Asia, next to China, Lao, Cambodia
- Long coastline: 3,260 km
- Areas: 331,210 km²
- Population (2016): 93 million
- Two major deltas:
 - Red River in the North
 - Mekong in the South
- Agriculture-forestry-fisheries: 21% GDP, 47% labor force



Drivers of Environmental Degradation and Climate Change



Source: Asia Pacific Energy Research Centre. 2006. *APEC Energy Demand and Supply Outlook 2006*. Tokyo.

Carbon Dioxide Emissions in Viet Nam by sector, 1980–2030



Climate Change Situation in Vietnam

According to monitoring data, climate change in Vietnam displayed the following features

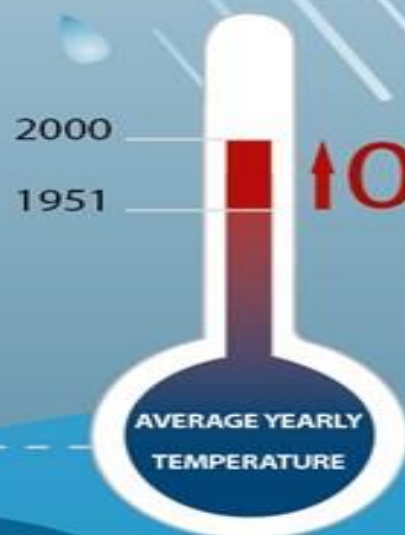
Changes in average rainfall were not obvious on a yearly basis from 1911-2000 with the figure rising in some periods and dropping in others.

In 1994 and 2007, there were about 15-16 cold spells, equivalent to 56 percent of the average figure in many previous years.

Extreme cold lasting 38 days in January and February 2008 caused heavy agricultural losses.

In recent years, the number of severe typhoons has tended to increase, with their orbit moving southward.

Stormy season tends to last longer, with many storms having extraordinary orbits.



↑0.7 Celsius degrees

20centimetres

2015
SEA LEVEL
1965

Source: Ministry of Natural Resources and Environment;
the National Target Programme on Climate Change Response;
the Intergovernmental Panel on Climate Change

<http://infographics.vn>

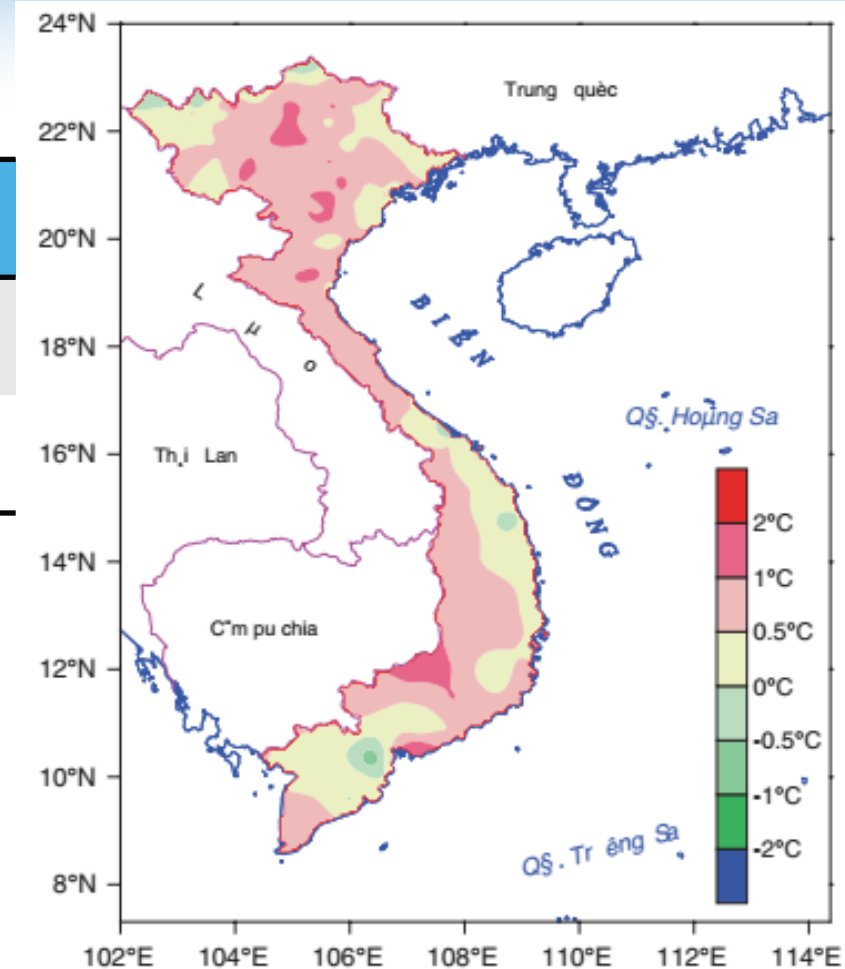
Map of Viet Nam showing likely impacts of climate change this century



Recent Climate Change Observations in Vietnam

	North	South
Summer	22-27.5°C	28-29°C
Winter	15-20°C	26-27°C

- Annual average temperature has increased by 0.5 °C.
- Both maximum and minimum temperatures have tended to increase, with minimum temperature increasing faster than maximum temperature, reflecting the trend of global climate warming.

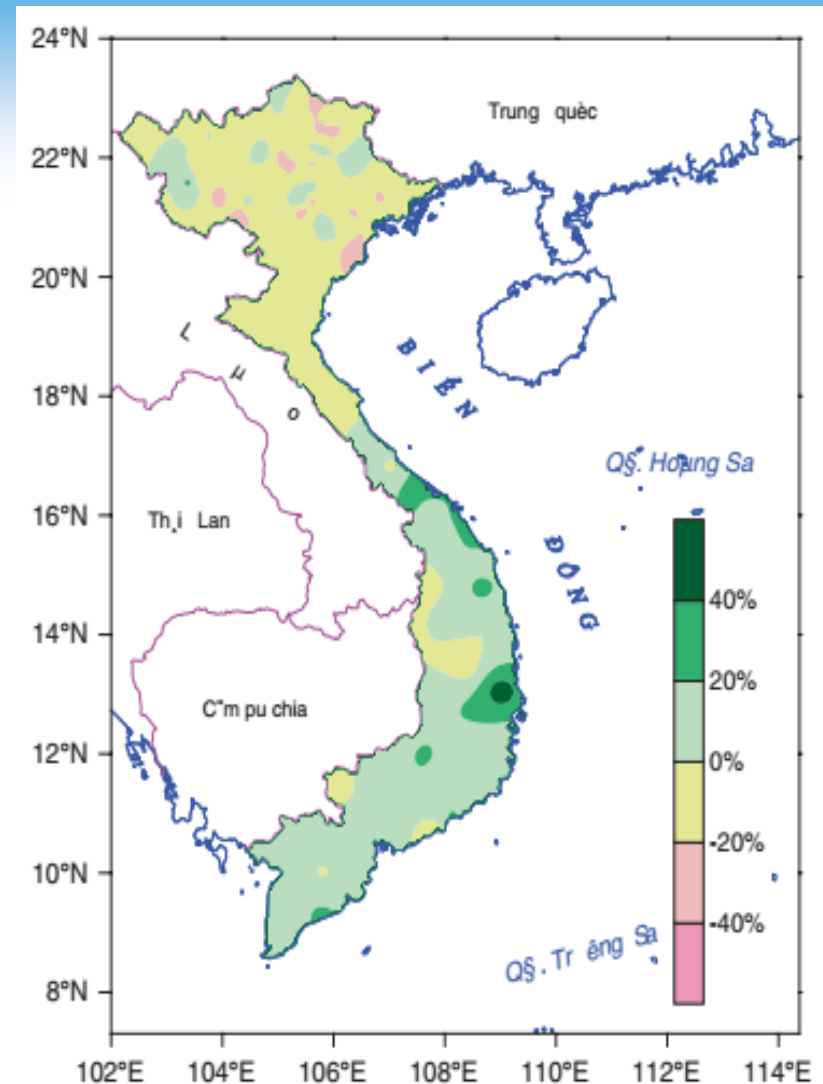


Change in annual average temperature (°C) during the last 50 years in Vietnam [source MONRE (2012)]



Recent Climate Change Observations in Vietnam

- Annual rainfall: 700-5,000 mm
- Rainy days per year: 60-200
- Precipitation during the rainy season (May–October) has decreased by 5 to over 10 % in most of Vietnam's northern area and increased by 5–20 % in the southern regions.
- Annual precipitation in the South Central Region has increased most dramatically compared with other regions during the last 50 years, even by 20 % in some places.

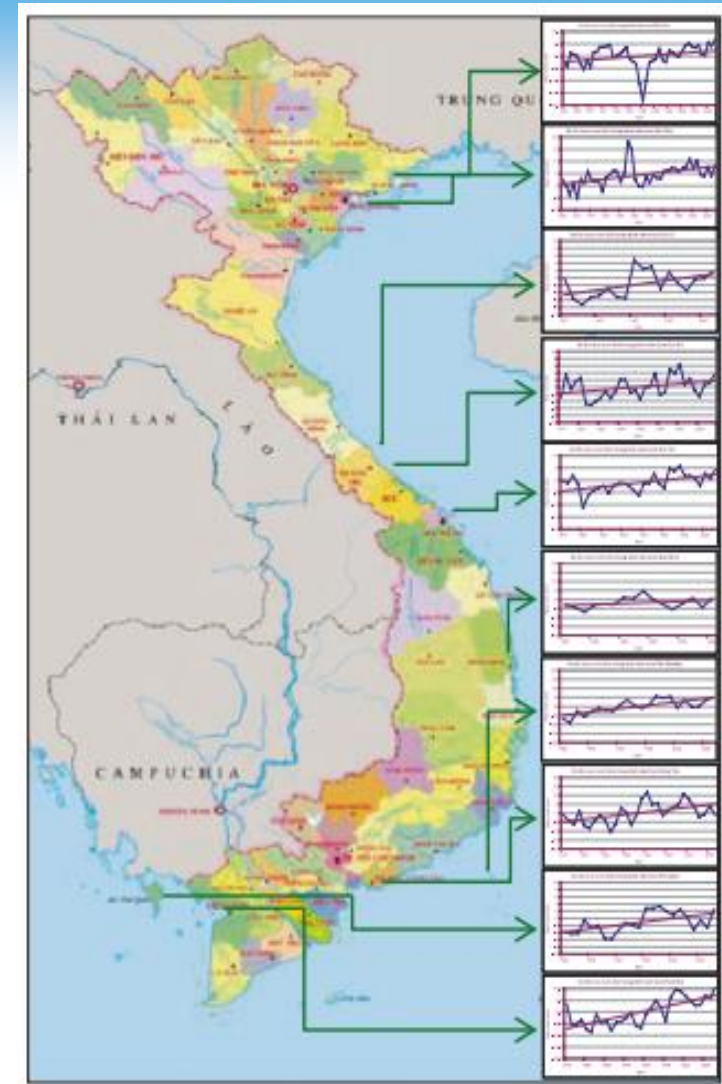


Change in precipitation (%) during the last 50 years in Vietnam
[source MONRE (2012)]



Recent Climate Change Observations in Vietnam

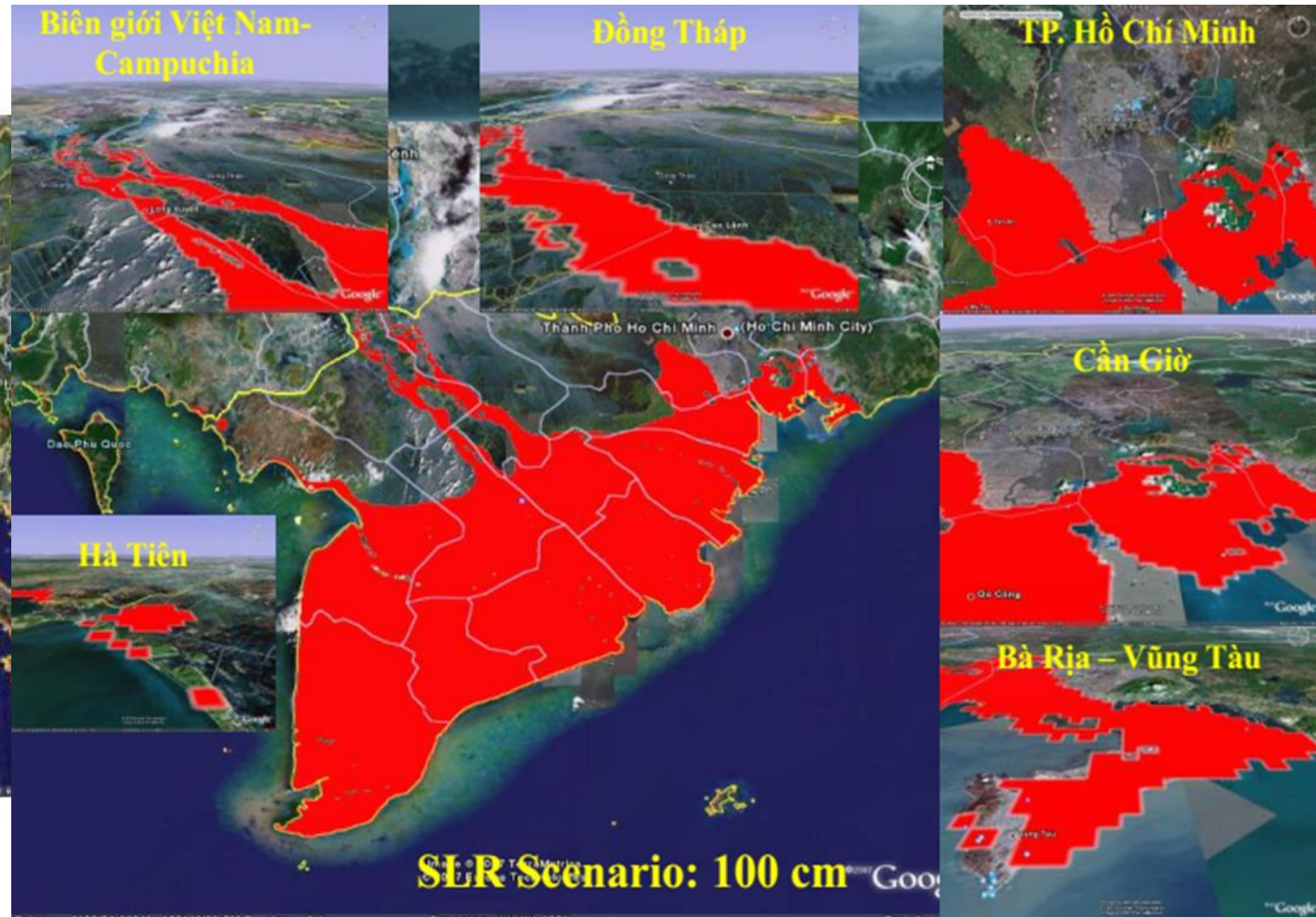
- Sea level rise along Vietnam coasts was at the rate of about 2.8mm/year.
- Coastal zones in the Central and South West regions: sea level rose strongest, about 2.9mm/year



Change in sea level based on data from measuring stations (1960–2010) [source MONRE (2009)]



SLR Scenario: 100 cm



Vietnam and the Impacts of Climate Change

Temperature 3°C



0.7m Sea level

IF SEA LEVEL RISES BY
1METER

39%

Mekong Delta

10%

Red River Delta

20%

Ho Chi Minh City

will be under water



**Soil
resources**

**Water
resources**

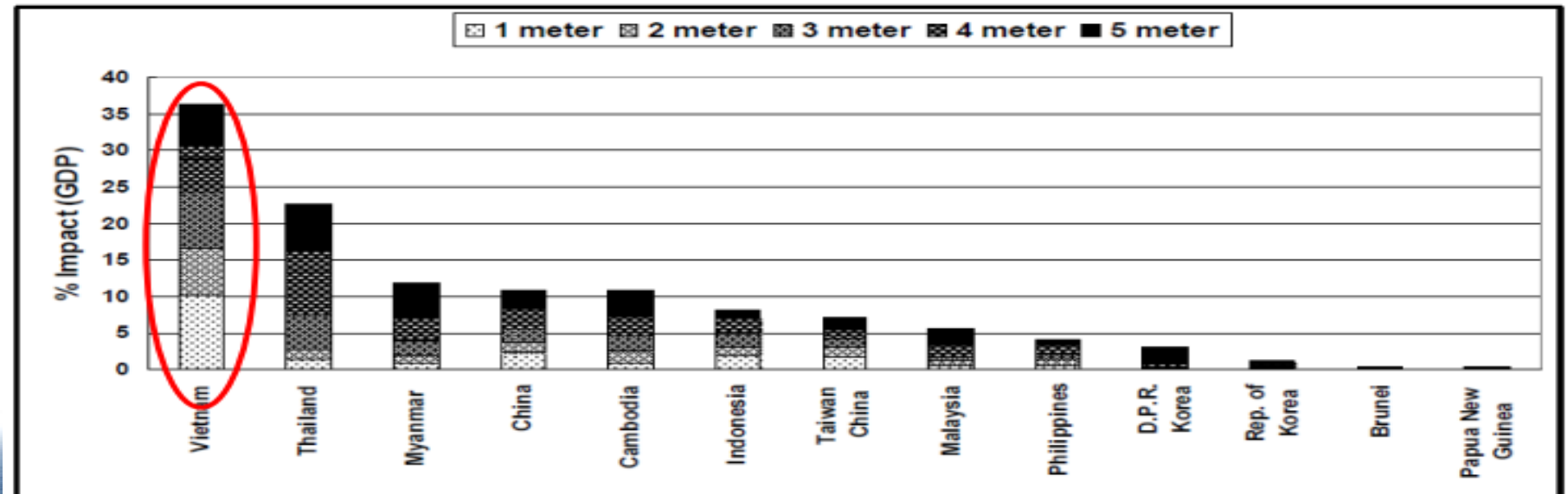
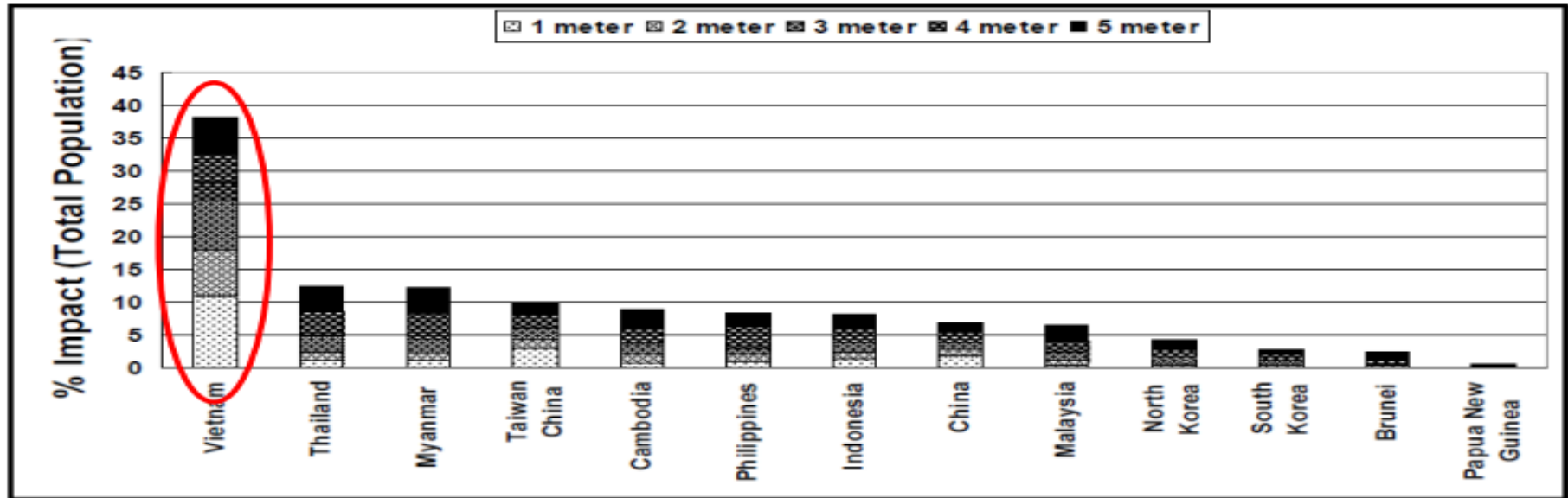
Crops

Livestock

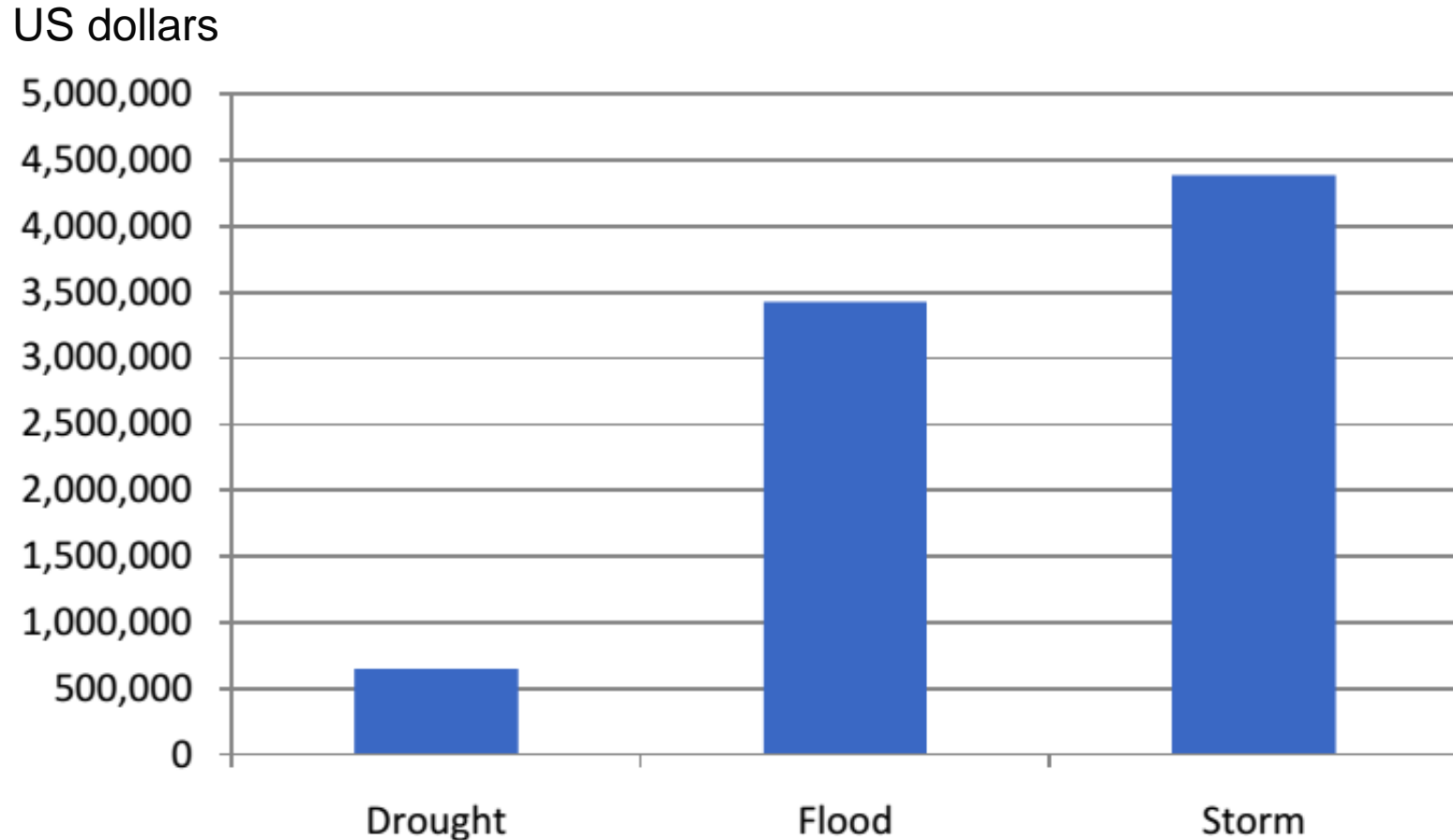
The Impacts of Climate Change



Impacts of climate change on Viet Nam by sea level rise scenarios, WB, 2007



Damages of some disasters



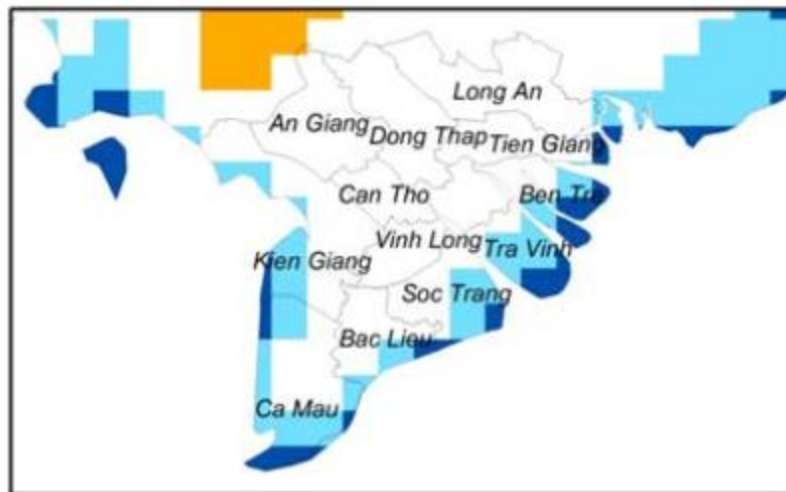
Total damages from select disaster types in Vietnam
(1900-2011)



The Impacts on Air Temperature

Extreme fluctuation:

- Increase evaporation
- Reduce the water balance
- Exacerbate drought conditions



Average maximum temperature (°C)



1980s



Average maximum temperature (°C)



2030s

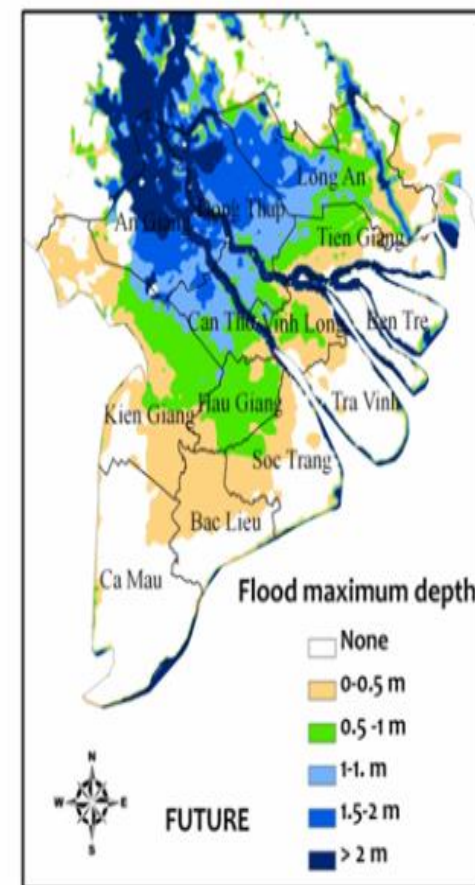
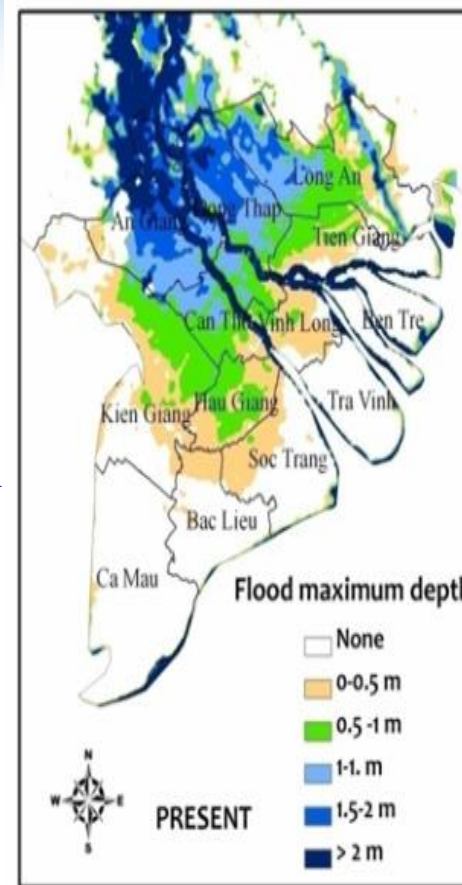
The Impacts on Water Resources

Changes in precipitation

- Rain season is increased
- Dry season is reduced

Escalate:

- Flood flows and inundation
- Risk of erosion and landslides
- Droughts and saltwater intrusion in the dry season
- Intensity and frequency of storms
- Risk of destruction of coastal ecosystems



Sea level rise may cause:

-



The Impacts on Land Resources

- Saline intrusion
- Flooding
- Drought
- Desertification
- Landslide



Flood due to dike break at Thinh Long, Hai Hau, Nam Dinh, 2005



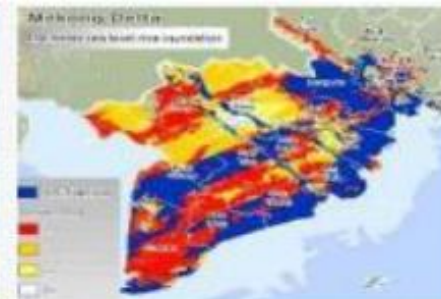
Sea dike erosion at Nam Dinh coast during typhoon



Hai Trieu church after dike break



Erosion at Doi Duong Beach, Phan Thiet



Adaptation Measures

Water resources

- Formulate and integrate sustainable water resource development planning
- Reinforce, upgrade, complete existing and add new water resource infrastructure
- Upgrade and modernize hydro - meteorological observation, hydrological long-range and seasonal forecasting, and natural disasters forecasting
- Awareness raising



Adaptation Measures

Land resources

- Prevent soil erosion,
- Implement soil protection,
- Provide proactive crop irrigation,
- Select crops suited to climate change.



Impacts of CC on crops

- ❖ Failure or Reduce grain yield and quality
- ❖ Increase incidence and distribution of pests and pathogens
- ❖ Change seasonal structure and distribution of crops
- ❖ Decrease of total agricultural land
- ❖ Raising alarm over desertification status in some provines: Ninh Thuan, Binh thuan



Impacts of CC on livestock production

- ❖ **Lacking of feed resources**
- ❖ **Reduce livestock productivity: heat stress, nutritional stress; water access**
- ❖ **Increase livestock diseases**
- ❖ **Reduce number of animals (flood, drought, diseases...)**
- ❖ **Increase production costs**



(1) Effect on availability of feed resources

- ❖ Change in different crops and grassland species
- ➔ Changes in feeding ingredients and grazing management
- ❖ Reduction of quantity and quality of forage and crop-feed
- ➔ Lack of feed for ruminants
- ➔ Increase in feed prices
- ➔ impact on livestock productivity



(2) Increase livestock diseases

- ❖ Ruminants: Parasitosis, FMD...
- ❖ Poultry: heat stress, coccidiosis, Newcastle, avian flu....
- ❖ Pigs: Pasteurellosis, PRRS...
- ❖ Mycotoxins (aflatoxins) due to wetter conditions and poor storage of grains, particularly maize.



(3) Reduction in Livestock productivity

- ❖ Increase in temperature leads to heat stress → reduce body weight, feed intake, FCR; Milk production, egg production**
- ❖ Drought and flooding leads to lack of livestock feed → reduce body condition scoring**
- ❖ Increasing diseases → reduced production and economical losses**

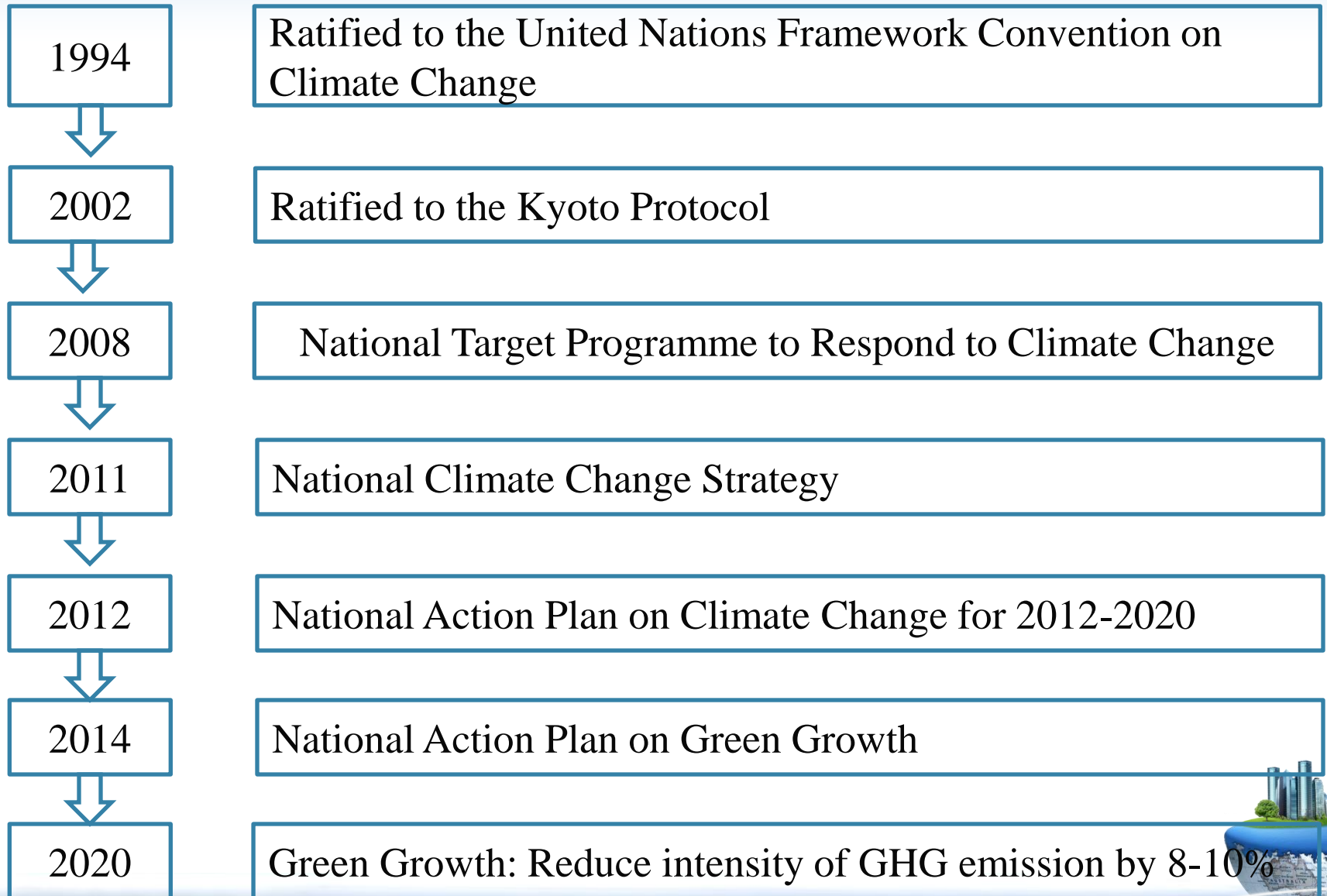


(4) Reduce number of animals

- ❖ April 2015: >1000 cattle have died due to drought in Ninh Thuan province, Vietnam
- ❖ August 2016: Floods in Vietnam's central, central highland and southern provinces 40,000 cattles and poultry were dead or washed away
- ❖ January 2016: 8900 buffalos and cow killed by cold in Northern Vietnam
- ❖ Diseases: 64,000 birds killed due to avian flu in 21 province in 2014



Policy context



Adaptation Measures: Lessons from Vietnamese Agriculture

1. Development of integrated crop-livestock-aquaculture farming system

Crop-Livestock-fish system in Red river delta



Rice-fish/shrimp system in Mekong delta



Agro-forest system in mountainous region (sloping land)



- Highly waste recycled, environmental protection
- High economic benefits
- Employment generation for farmers

Sustainable farming systems

Adaptation Measures: Lessons from Vietnamese Agriculture

2. Crop:

❑ Conservation of indigenous varieties:

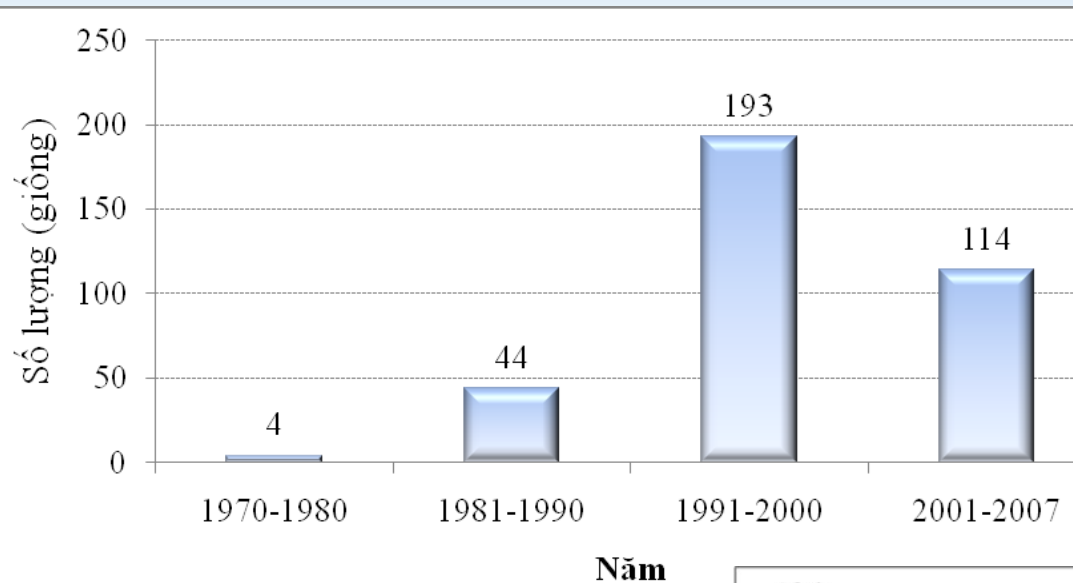
❑ Development of new crop varieties:

- Shorter production cycle varieties (Ex: New rice varieties (85-110 days) instead of old varieties (170-190 days))
- Pest and disease resistant varieties
- Acid and alkaline soil tolerant varieties (New rice varieties: tolerant 4-6 ‰ salinity)
- Drought or flood-tolerant varieties
- High yield varieties

❑ **Diversity of crop cultivation:** Change in crop calendar, crop rotation and crop association



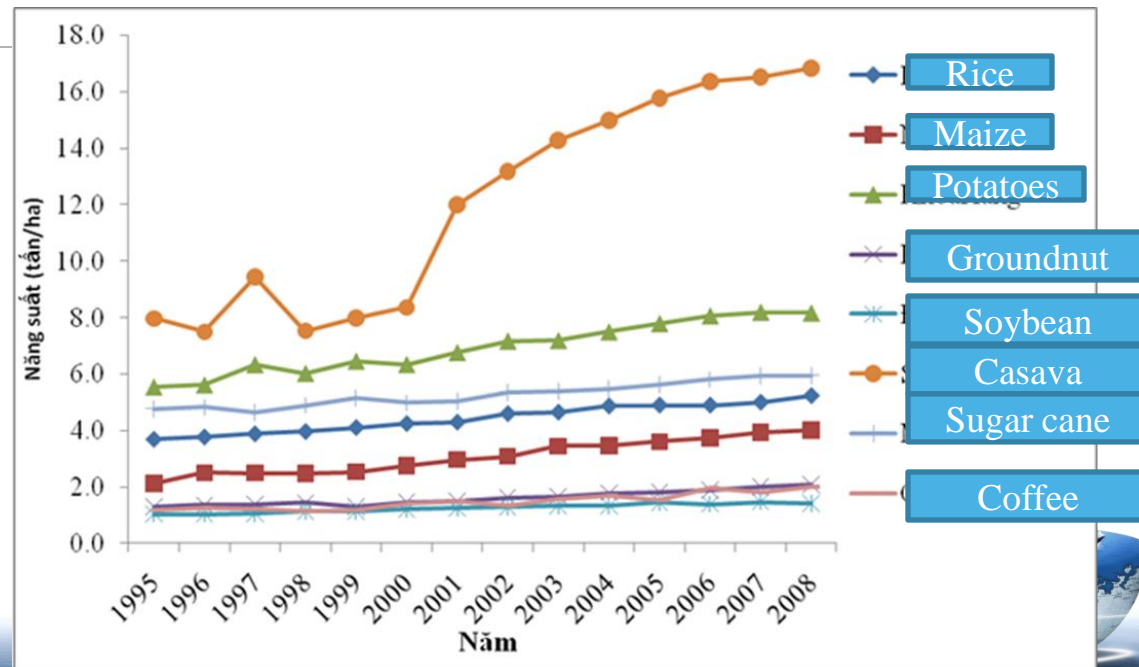
Adaptation Measures: Lessons from Vietnamese Agriculture



New crop varieties



Increase the yields of main crops



Adaptation Measures: Lessons from Vietnamese Agriculture

3. Livestock s:

☐ Conservation of indigenous breeds: Highly adapt with climate change

- Swine: 13 breeds
- Chickens: 15 breeds
- Ducks: 7 breeds
- Cattle: 4 breeds
- Buffalo: 1 breed
- Goat: 2 breeds
- Sheep: 1 breed
- Horse: 1 breed



Duck breed adapt with salty water

☐ Importation of exotic breeds for crossbreeding:

Increase the reproductivity and performance

☐ Biotechnology: Molecular or gene breeding selection



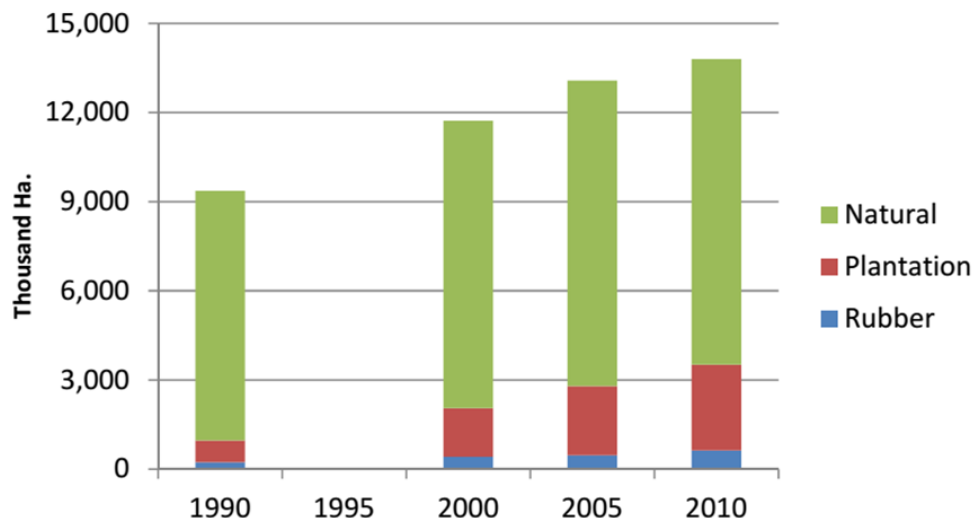
Mitigation Measures: Lessons from Vietnamese Agriculture

1. Mitigation of greenhouse gas emission:

- Expansion of biodigesters at livestock farms (500,000 plants nationwide)
- Reduce methane emission from cattle production: Supplement tanin (from green tea), oil (from cotton)



2. Reforestation of degraded land areas



Forest area trends in Vietnam



Conclusions

1. Vietnam is considered as one of the countries affected by climate changes in three ways: change in temperature, precipitation and sea level rise.
2. Climate change has negatively impacted on land, water resources as well as agriculture. These adverse impacts can affect economic growth, poverty and food security.
3. Strategies to strengthen capacity to cope with current climate variability and to adapt to expected future climatic conditions are mutually supportive and will have immediate benefits.



**THANK YOU
FOR YOUR ATTENTION!**

