Typhoon Committee Technical Conference (TC50 TECO)

Managing Disaster Risk and Climate Extremes in Viet Nam to Advance Climate Change Adaptation

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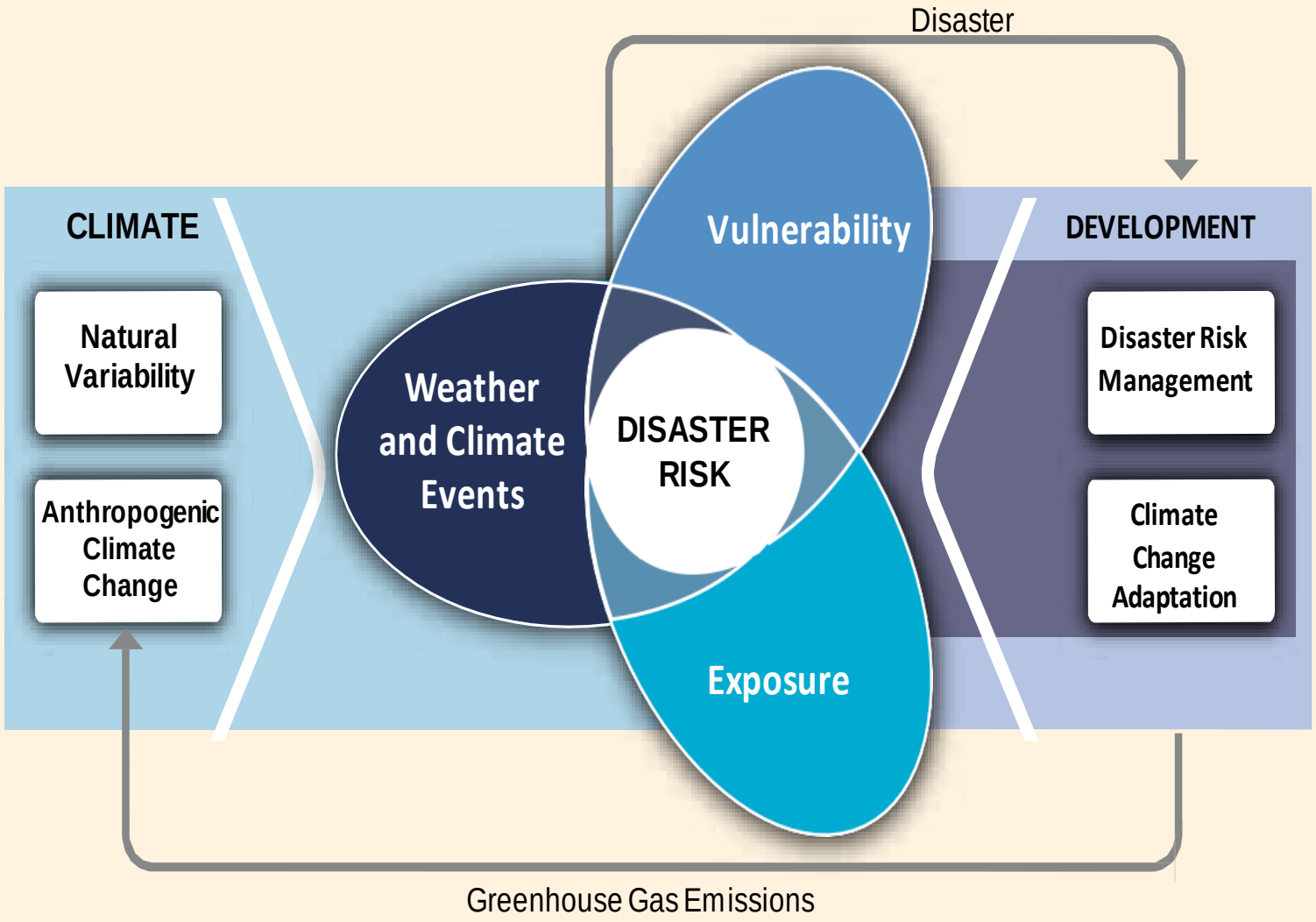
1) **Observations of Exposure, Vulnerability, Climate Extremes, Impacts, and Disaster Losses.**
2) **DRM & CCA: Past Experience with Climate Extremes.**
3) **Future Climate Extremes, Impacts, and Disaster Losses.**
4) **Managing the Changing Risks of Climate Extremes and Disasters.**
5) **Case study.**

Exposure and vulnerability are key determinants of disaster risk and of impacts when risk is realized

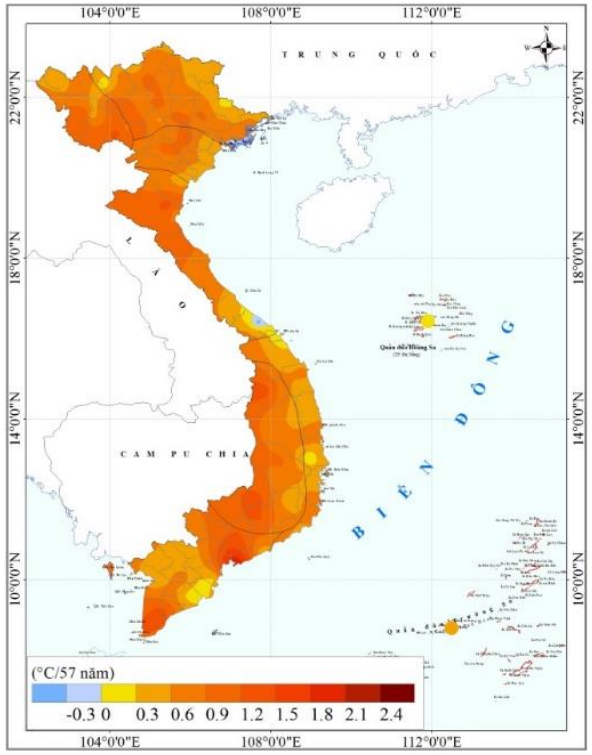


SREX Viet Nam - SPM

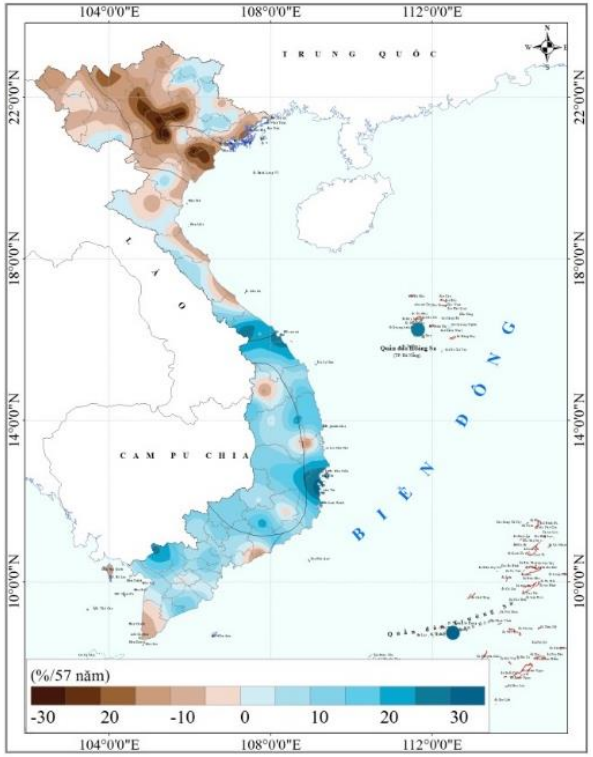
1. Observations of Exposure, Vulnerability, Climate Extremes, Impacts, and Disaster Losses

- **Exposure and vulnerability depend on many factors.**
- **Some extremes have changed, globally.**
- **Climate extremes changed in Viet Nam but extreme events are rare, so there are few data to assess changes:**
  - **No. of cold days and nights decrease nationwide.**
  - **No. of hot days increased especially in the North and Central Highlands.**
  - **No. of extreme rainfall events increased especially in the Central and South Central provinces.**
  - **No. of consecutive dry days increased and total precipitation decreased in Northern regions.**
  - **No evident variability in the frequency of tropical cyclones but those with very high intensity increased.**

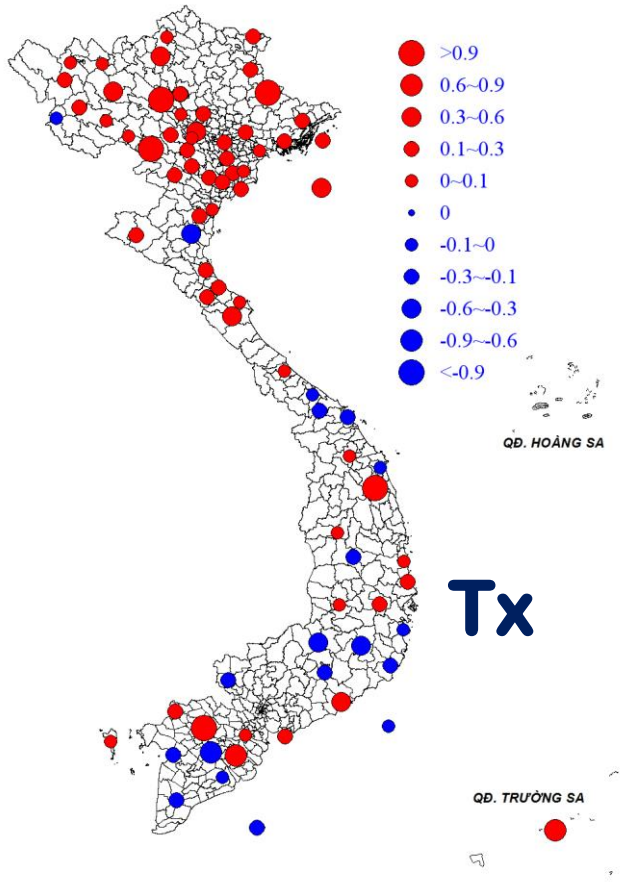
Observed Changes

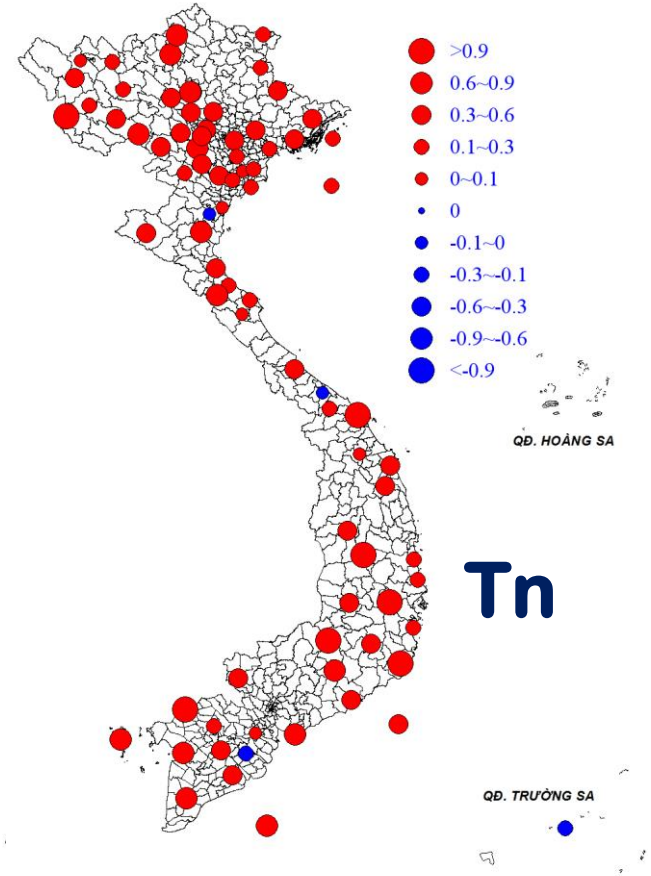


Changes in yearly average temperature (1958-2014)



Changes in annual rainfall (1958-2014)



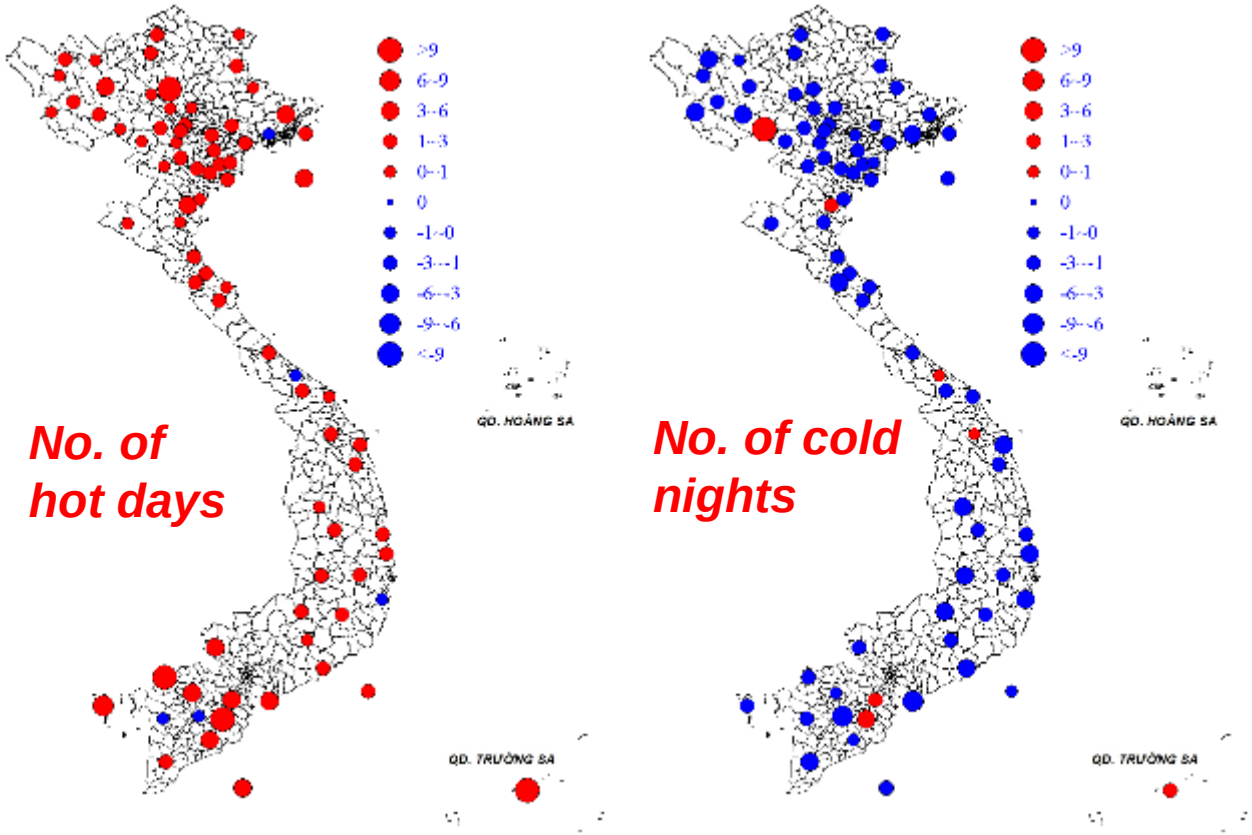


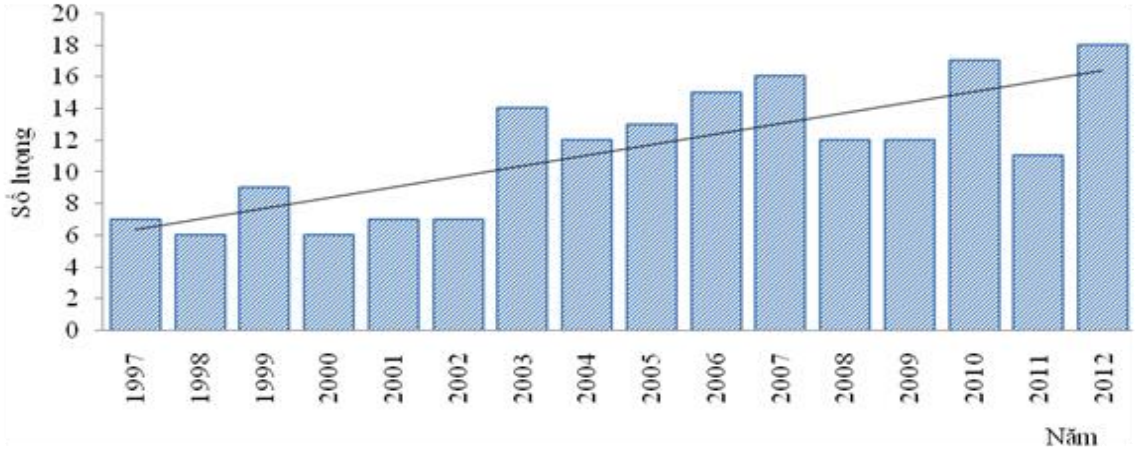
Period 1958 – 2014: Mean temperature increases **0,62°C**

Extreme temperature increase in most areas

IMHEN, 2016

Changes in No. of Hot Days and Cold Nights





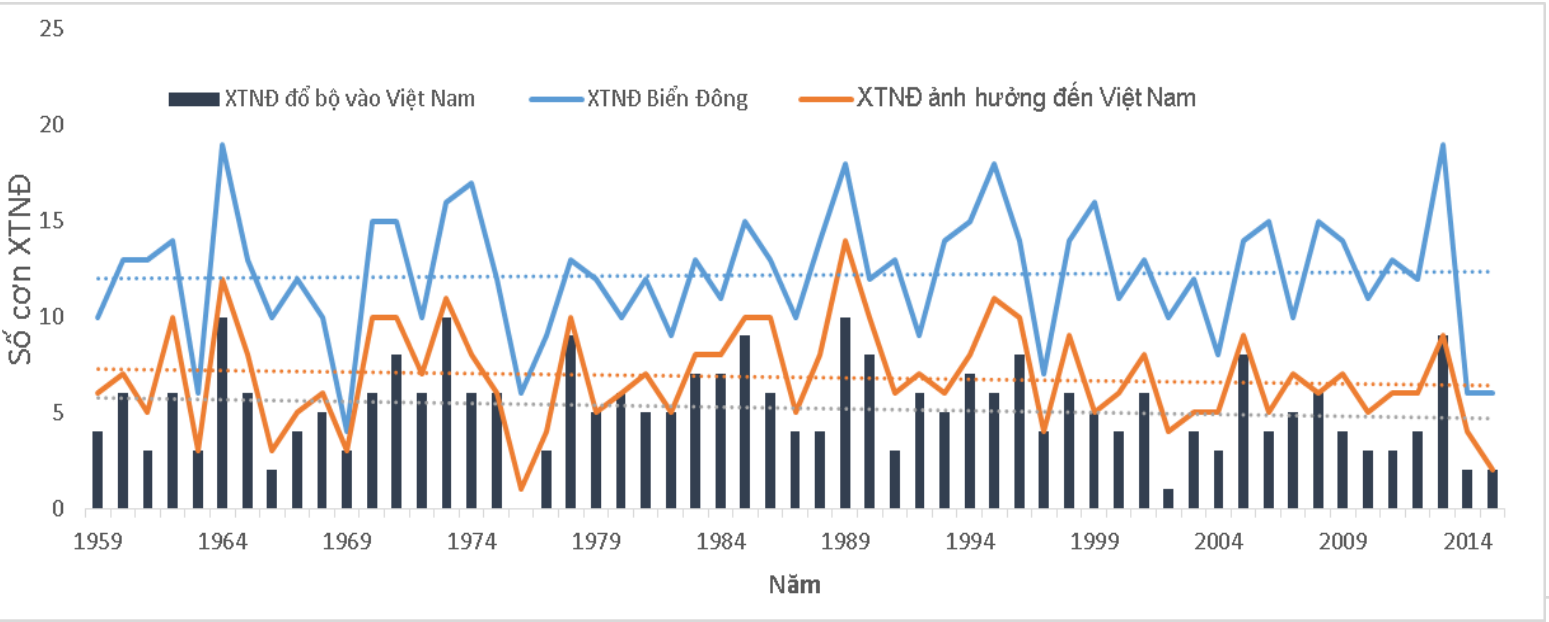
No. of annual heat waves
(*TTKTTVQG, 1998-2013)*

***Hot day**: Day with Max temp. higher than temp. of 90%*
***Cold night**: Night with Min. temp. lower temp. of 10%*

- No. of hot days increases significantly, up to 34 days/decade
- No. of cold night decreases, about 11 nights/decade (in the South)

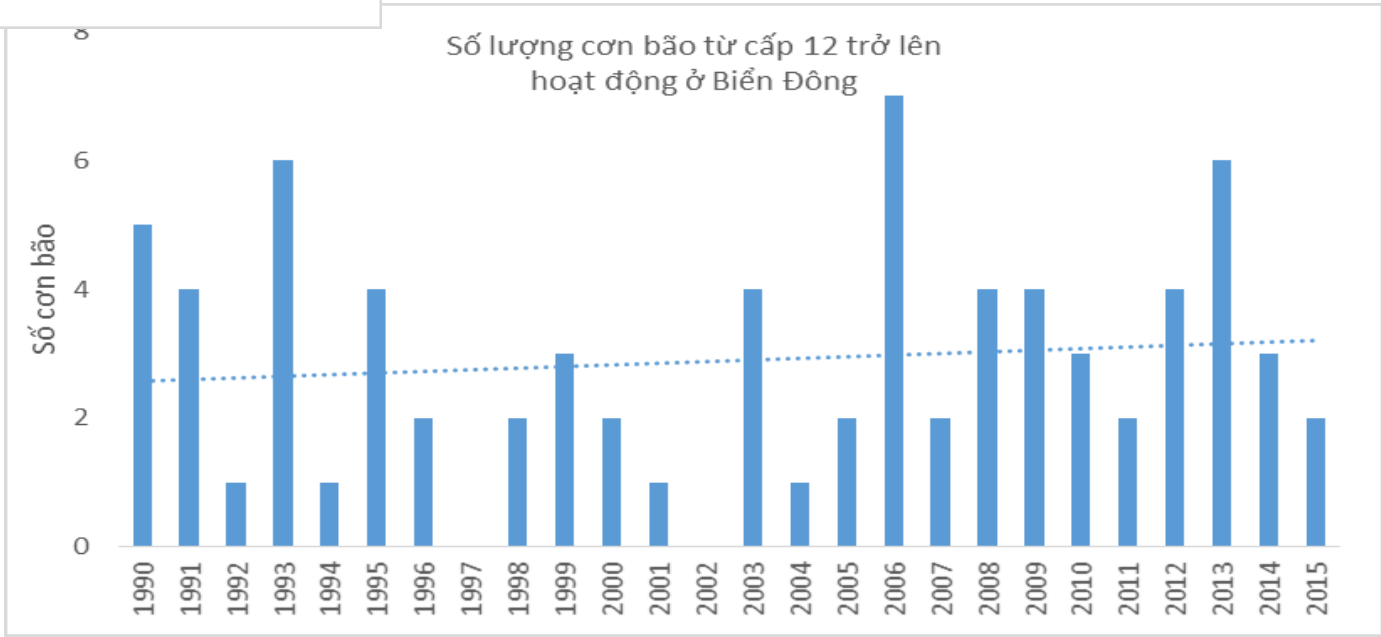
IMHEN, 2016

Changes in Typhoon



- **No. of high intensity typhoon increases**

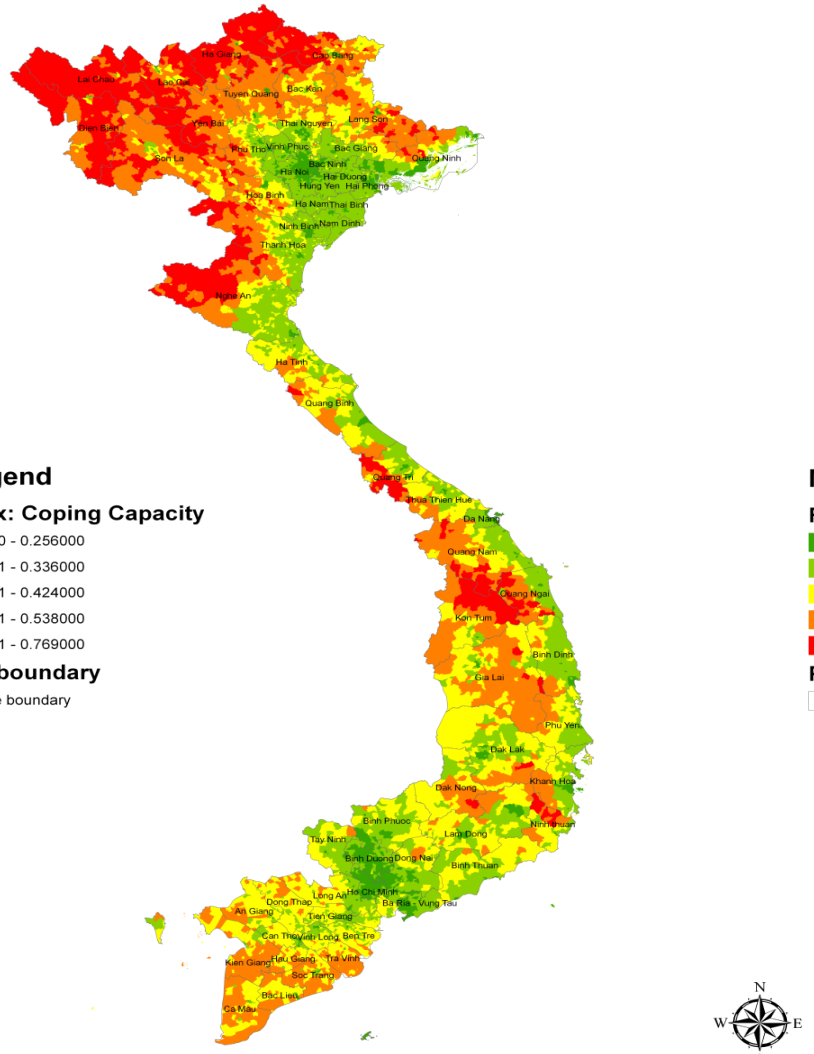
Strong typhoon (12th level) in the East Sea (1990-2015)

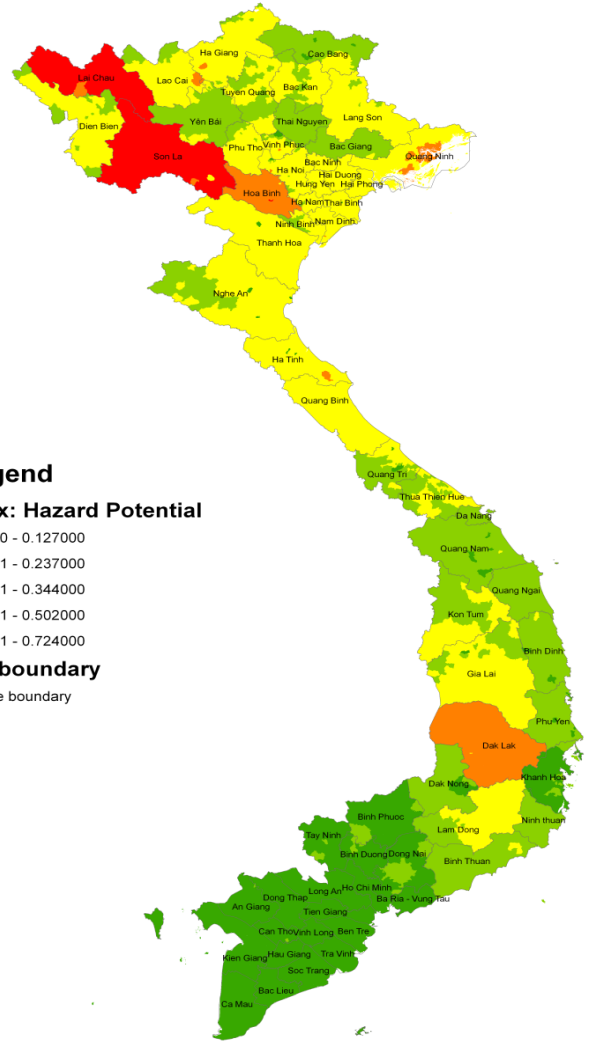


IMHEN, 2016

Coping capacity is **limited** in: mountainous areas

Hazard potential is **high** in Mekong Delta, Central & mountainous provinces



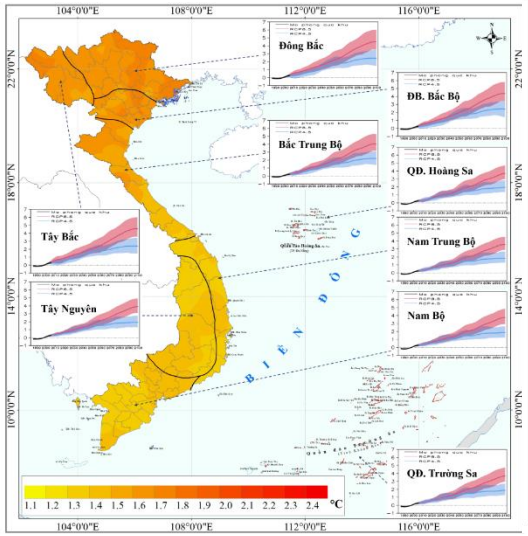


2. DRM & Adaptation to CC: Past Experience with Climate Extremes

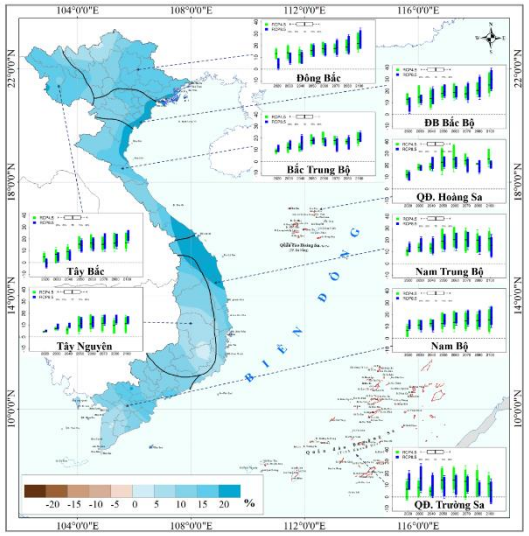
- **Development practice and policy shape disaster risk.**
- **Management of disasters & climate extremes at local level is critical for enhancing resilience, adaptation and recovery.**
- **Inequalities influence local coping and adaptive capacity.**
- **Post-disaster recovery & reconstruction can reduce risk.**
- **Risk sharing mechanisms can increase resilience.**
- **DRM and CCA need 2-way approach.**
- **Need integration of DRM and CCA, and integration of both into policies and programs.**
- **Coordination of DRM between sectors and localities limited.**

3. Future Climate Extremes, Impacts, and Disaster Losses

- **No. of heat waves increase, esp. in the Central.**
- **Frequency of heavy rainfall increase, esp. in the South.**
- **Drought is likely to increase.**
- **No. of typhoons is uncertain but strong typhoons likely increase.**
- **Extreme impacts mainly on sectors linked to climate.**
- **Increased exposure causes higher economic losses (typhoons), in the absence of additional protection measures.**
- **Disasters / climate extremes influence population mobility.**

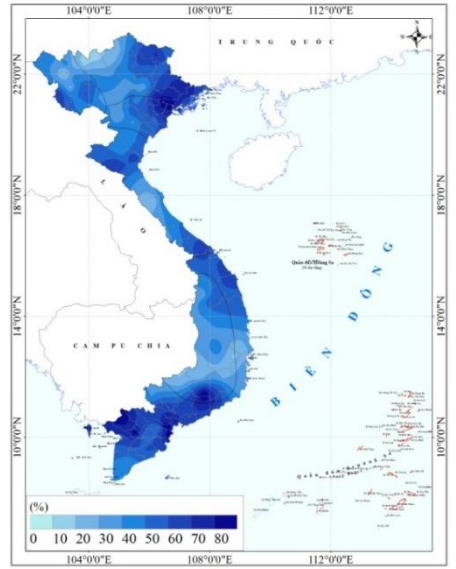


Mean Temperature



Annual Rainfall

Extremes Rainfall



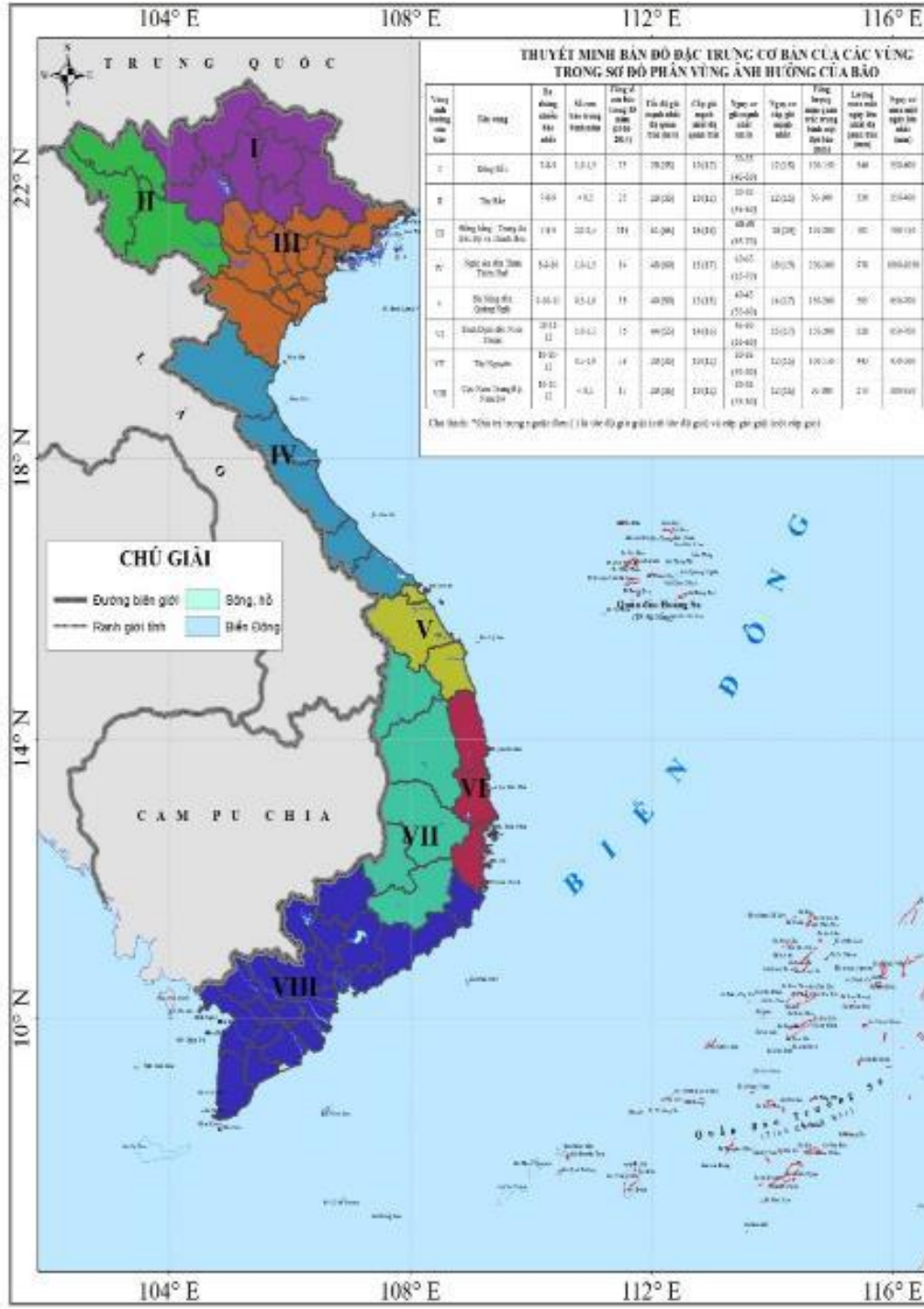
Natural disasters increase the uncertainty of development

IMHEN, 2016

Typhoon and Storm Surge

Zone	Total No. (1961-2014)	Freq. (event/yr)	Max wind scale (Observed)	Max wind scale (Projected)
I	70	1,0-1,5	10	11-12
II	26	< 0,5	9	10-11
III	116	2,0-2,5	14	15-16
IV	93	1,5-2,0	14	15-16
V	66	1,0-1,5	13	14-15
VI	48	0,5-1,0	13	14-15
VII	58	1,0-1,5	9	10-11
VIII	23	< 0,5	10	11-12

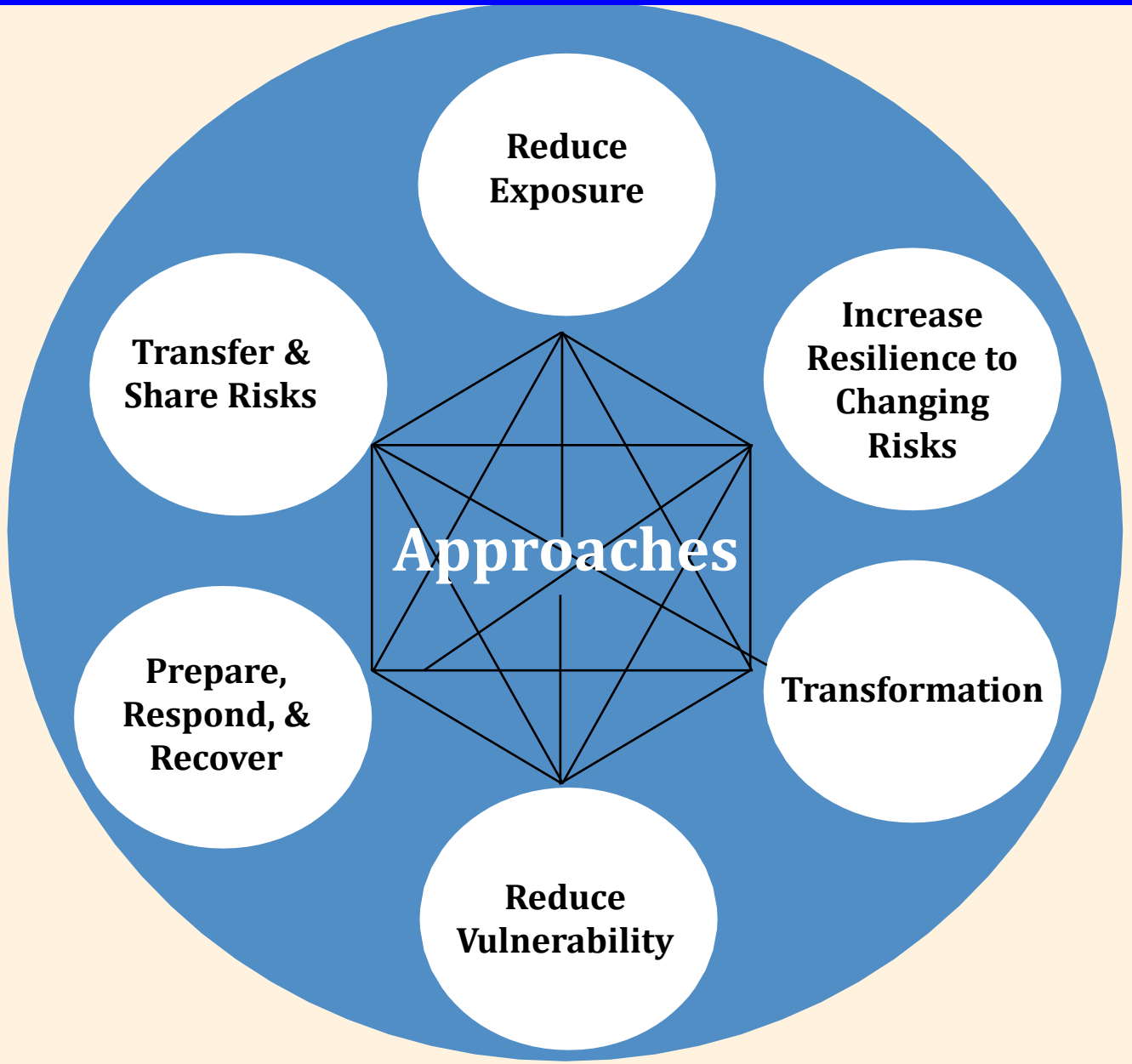
Max tidal amplitude (m)	Max SLR (Observed, m)	Max SLR (Projected, m)	Total WL (Projected (m)
Region V-1: From Bình Thuận to Bà Rịa – Vũng Tàu			
1.4 – 1.8	**1.2**	**2.0**	3.4 – 3.8
Region V-2: From TP. Hồ Chí Minh to Mũi Cà Mau			
1.8 – 2.0	**2.0**	**2.7**	4.4 – 4.7
Region V-3: From Mũi Cà Mau to Kiên Giang			
0.8 – 1.1	**1.2**	**2.1**	2.9 – 3.2



4. Managing the Changing Risks of Climate Extremes and Disasters

- **Social, economic, environmental sustainability can be enhanced by DRM and CCA.**
- **Measures with benefits in the short as well longer term are most effective for DRR and CCA.**
- **Cooperation and coordination among DRM and CCA agencies is critical.**
- **Opportunities exist for synergies from international finance for DRM and CCA.**
- **Iterative process of evaluation, learning, and innovation reduces risk and promotes CCA.**
- **Raise awareness and mobilize communities in DRR and CCA.**

DRM and adaptation to CC focus on reducing exposure and vulnerability, and increasing resilience to the potential adverse impacts of climate extremes



DRM and CCA Options

Mainly low regret options to reduce the level of exposure and vulnerability to climate extremes

1) Mapping climate risks.
2) Mapping exposure, vulnerabilities and adaptation measures.
3) Improving forecasting capacities and early warning systems.
4) Poverty reduction programs.
5) Strengthen social protection and social care networks to reach vulnerable groups.
6) Integrate DRR and CCA in urban & land use planning.
7) Develop integrated plans for water resource management in river basins and key areas.
8) Raise community awareness, building capacities, local plans (CBDRM).

DRM and CCA Options

9) Strengthen resettlement programs, to reduce exposure vulnerabilities.
10) Strengthen infrastructure construction standards (climate proofing).
11) Strengthen building codes, designs of houses, buildings.
12) Develop local, national and international scale risk-pooling.
13) Strengthen forest, including mangrove conservation, restoration, and replanting.
14) Support conservation agriculture, e.g. new crop rotations, drought and flood tolerant crop varieties.
15) Improve practices for water saving, water demand management, and rainwater and groundwater harvesting and storage systems.
16) Upgrade irrigation and drinking water systems, also drainage.
17) Develop policies and management mechanisms associated multi-purpose reservoirs, especially hydroelectric works.

Case Study and Lessons Learnt

Case Studies

Lessons Learnt

Objective: To analyze climate extremes to provide information, enhance understanding and lessons learned.

Scope: Typical cases are grouped include: Typhoon; flood; flash floods; urban flooding; drought; Hot and cold waves; Salinity intrusion.

Contents: Basic information about the phenomenon, extent of influence, damage and the response measures, eventually giving the lessons learnt.

Case Study

1) Effective prevention of Typhoon.
2) Flood Risk Management.
3) Flash floods - threats of the mountainous areas.
4) Urban flooding: threats and challenges of urban planning.
5) Drought: a silent threat.
6) Temperature extremes: Cold and heat.
7) Saltwater intrusion in the Mekong Delta.
8) Early warning system - Disaster risk reduction.
9) The motto "Four-on-the-spot" - a basic principle.
10) Sharing disaster risks: Disaster risk insurance in agriculture.
11) Community awareness raising.

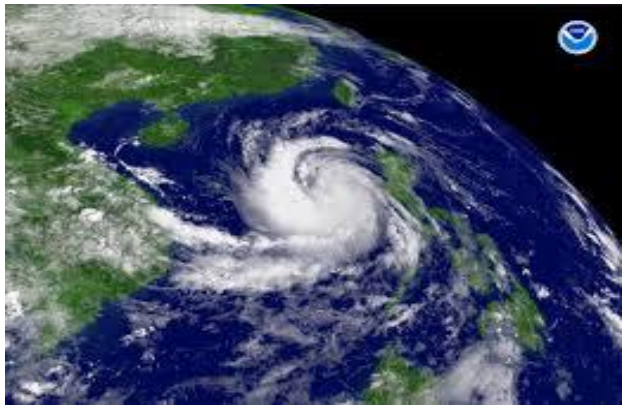
Effective Prevention of Typhoon

Event	Year	Description	Human	Total damage
Linda	**1997**	Scale 10, landed in coastal area of Ca Mau and Bac Lieu (Nov. 2)	Dead: 778 Missing: 2,123	7,200 Bill. VND
Xangsane	**2006**	Scale 13, fast moving, landed in the Central coastal area (Oct. 1)	Dead: 72 Missing: 4	10,000 Bill. VND
Ketsana	**2009**	Scale 13, fast moving, landed in Quang Nam and Quang Ngai (Sep. 29)	Dead: 179 Missing: 8	14,000 Bill. VND
Son Tinh	**2012**	Scales 12, 13, fast moving, unpredictable, landed in the Northern area (Oct. 28)	Dead: 8 Missing: 3	11,000 Bill. VND
Mirinae	**2016**	Scales 10, the intensity when landed was stronger than expected, causing severe damage to coastal provinces (Jul. 27)	Dead: 5 Missing: 2	7,230 Bill. VND
Damrey	**2017**	Scales 11, 12, landed in the area that rarely has typhoon for decades (Nov. 4)	Dead: 107 Missing: 16	22,680 Bill. VND

Effective Prevention of Typhoon

Lessons learnt

- **Storm prevention should concentrate in:**
  1) **Raising community awareness about the harzard.**
  2) **Promoting the effectiveness of the early warning systems in that forecasting is important; improving the early warning system, alert, alarming systems.**
  3) **Minimizing the vulnerability for the high risk areas (migration from coastal areas, mangroves forest planting, storm shelters…).**
- **Government's attention plays important role.**
- **Social contributions: Authorities, social organization, peoples, international agencies, Non-Governmental Organizations (NGOs).**



Flood Risk Management

Year	Impacted area	Description	Damage
1945	Northern Plain	Biggest flood on Da river meeting with medium flood in Lo and Thao rivers	2 million died…
1971	Northern Plain	Historic flood on Red river over the last 100 years	594 died, 400 km dykes broken.
1996	Northern Plain	Big flood on Lo river caused 3rd ranking floods on Red River over the last 100 years	60 died, primary dyke of Gua river broken…
1999	From Thua Thien Hue to Khanh Hoa	Biggest ever historic flood	718 died, losing 300 million USD…
2000	Mekong river delta	Historic flood, biggest over the last 100 years with two consecutive peaks.	448 died, losing 285 million USD…
2001	Mekong river delta	Flooding in a month, caused deep inundation	539 died, 219 injured…

Flood Risk Management

Lessons learnt

1. **Strengthening the infrastructure, improve the disaster prevention capacity.**
2. **Model of community based disaster risk management.**
3. **Response to flooding concentrated in relief, remedies after flooding, pre-flooding prevention remain less attended.**
4. **Used effective measures: Construction of river/sea dikes, river protection forest protection and development etc to cope with climate change and sea level rise in the region in the future.**

Flash Floods

Timing	Location	Description	Damage
8/8/2008	Lao Cai	Extended heavy rains caused flash floods, land slides, inundation in many location led to biggest ever historic flash flood.	88 died, traffic jam, losses of houses and crops.
31/8/2012	Lao Cai	Rains caused watershed slide led to flash flood over two villages of Nam Du and Nam Cham, Nam Luc commune, Bac Ha district, Lao Cai province.	11 died, 9 injured Clearance of 10 ha of field…
26/4/2010	Ha Giang	In Xin Man district, Ha Giang province due to lengthened heavy rain causing serious flash floods.	5 died, 3 injured, estimated losses of 35 billion VND.
14/8/2010	Yen Bai	90 minute big rain caused flash flood in Lien Son village, Lang Thip commune, Van Yen district, Yen Bai province.	7 died; transportation works; houses destroyed…

Flash Floods

Lessons learnt

1. **Resettlement in the flash flood prone areas –that significantly reduce human damage.**
2. **Limited resource is one of the biggest obstacles, causing difficulties for flash flood prevention and response in the mountains.**
3. **Prevention and mitigation of flash flood need people' participation.**
4. **Drills of flash flood avoidance and damage mitigation are necessary to get some experience and react properly with unexpected flash floods.**

Urban Flooding

11/2008: Record heavy rain over the last 100 years happened and lasted for days in the North, especially in Hanoi, caused a historic flood, 3,000 billion VND loosed.

End of 2013: High tide in Ho Chi Minh city exceeded alarming level 3 caused serious flooding in the riverside, canal and low-lying areas. On 20/10/2013, peak of tide 1.68m – historic level over the last 61 years.

Urban Flooding

Lessons learnt

1. **Urban planning not good, failed to integrate CC into the planning yet they are vulnerable to disasters, especially flooding due to extreme rains and sea level rise.**
2. **Government and central and local agencies take timely action and responses, however, due to insufficient facilities on the spot, reckless of people caused damages.**
3. **To effectively prevent urban flooding, master plan should be synchronized, integrating CC should be prioritized. The fact is individual solutions are not effective.**

Drought

1997 – 1998 (country).

- First 6 months of 1998, rainfall reached 30-70 % semi-annual average.
- Crop failure of 120,000ha, estimated losses of 5,000 billion VND.

2004 – 2005 (the North, Central Highlands, Central North…).

- Rain shortage, rainy season ended 1-1.5 months earlier than semi-annual average.
- Crop failure of 142,300 ha, estimated losses of 2,420 billion VND.

2010 (Most serious in the Central).

- First 6 months of 2010, rain shortage in the whole country, 20-30% at places.
- Hundreds of thousand of ha loss, estimated losses of 2,500 billion VND.

Drought

Lessons learnt

1. **To solve the problems of drought, water shortages and for prevention of harmful effects due to water shortages in the long terms, sustainably, multiple measures are needed in which the rational water resource utilization is important:**
   - **Building integrated planning of water resources of river basins, key areas.**
   - **Water resource development planning, including structure and non-structure measures; protection and prevention of forest and water regeneration.**
   - **Water regulation and distribution planning for each river basin.**
   - **Developing policies to define priorities for water resources by users to ensure mutual benefits.**
2. **Monitoring and forecasting should be regular and continuous.**

Temperature Extremes

Event	Location	Description	Temperature extreme	Damage
Cold spells in Jan. and Feb. 2008.	North and Central North.	From 14/I to 20/II Year 2008, keenly cold spell (<15°C), historic spoiled cold spell (<13°C) in 38 days.	Lowest temperature at places in the North: Sa Pa -1.0°C, Mau Son -2.0°C	52,000 cattle died, 200 billion VND loosed. More than 100,000 ha of spring rice failed.
Serious heat wave in Jun. and Jul. 2010.	North and Central.	2 blade heats (>35°C) lengthened for 1 month at places.	Highest temperatures in Hoa Binh: 41,8°C, Hanoi: 40,4°C Thanh Hoa: 42,0°C, Nghe An: 42.2°C	Water shortage for hundreds of thousands of ha, saltwater intrusion.

Temperature Extremes

Lessons learnt

1. **The government and the people have not been very active in the prevention of heat and damaging cold.**
2. **Measures should be carried out in the localities are to promote communication to instruct people how to prevent cold and heat.**
3. **In the long term, production methods, livestock adapted to climate change should be studied.**
4. **Raising the awareness of the local governments and citizens.**
5. **Use local experiences.**
6. **Further enhancing the delivery and application of science and technology in production.**

Salinity Intrusion

- Mekong Delta salinization session in February and March, 2010: Ca Mau Province has nearly 6,000ha of rice damaged; over 21,000 ha of forest were in short of water, more than 8,000 ha of forests in the Biosphere Reserve of U Minh Ha at alarming scales of 4-5 at the highest Scale Ladder.

- Mekong Delta salinization session in March and April, 2011: with 3/8 Mekong coastal provinces with rice production affected due to the drought and saltwater intrusion Soc Trang, Ben Tre and Tra Vinh. 100 ha of rice in Soc Trang, 2,615 ha in Bac Lieu, and 11,827 ha in Tra Vinh were damaged by drought and salinization.

Salinity Intrusion

Lessons learnt

1. **Orientation on appropriate measures, in-depth studies on varieties, seedlings, replacing livelihoods in the local area should be in place.**
2. **Combining experience and local knowledge.**
3. **Mounting adaptation measures with saline to transfer knowledge and skills to farmers.**
4. **Promote community involvement.**
5. **Measures to build dykes to prevent salt water are often very expensive, the solutions should take into account the costs and benefits.**

Early Warning System

- **The early warning systems should be “people focused", the warning message must be timely and understandable. The system should take into account the characteristics of the regions, social aspects, gender and livelihoods.**
- **The effective alarm system consists of 4 components.**
  1) **Detection, monitoring and forecasting of hazards.**
  2) **Related risk analysis.**
  3) **Disseminate timely warning messages.**
  4) **Emergency plans for preparation and response in place.**

Early Warning System

Lessons learnt

1. **Disaster warning should be accurate, timely and with complete information on the appropriate content and instructions and community preparedness should be ready to help minimize the damage caused by natural disasters.**
2. **There should be a coordination of all the stages: delivering reports, communication, preparation, response and post-disaster recovery tasks.**

Four on-the-spot Motto

Four on-the-spot motto is about:

1) On-the-spot direction.
2) On-the-spot forces.
3) On-the-spot facilities and materials.
4) On-the-spot logistics

Has been applied successfully in Viet Nam.

Four on-the-spot motto can be effective for the natural disasters, i.e. typhoons, floods; before, during and after the events.

Four on-the-spot Motto

Lessons learnt:

1. Four on-the-spot motto successful in Viet Nam because:

- **Documented in legal documents consistently.**
- **Suitable with Vietnamese's tradition/experience "Help the tattered"; "Distant water can not save close fire".**

2. To be successful with four on-the-spot motto, we should:

- **Provide regular training for the CFSC at all level on planning, preparing plans to actively respond to various types of natural disasters.**
- **Training for local forces to rescue within the area.**
- **Developing a transparent and clear mechanism on mobilization and use of resources, financing for disaster prevention, migration. etc..**

Sharing Disaster Risks - Insurance in Agriculture

Agricultural insurance is a form of disaster risk sharing applied in Viet Nam.

MOF and MARD are piloting the agricultural insurance (2011-2013), however this insurance has not succeeded yet in Viet Nam.

Agricultural insurance is a suitable approach for Viet Nam because:

- Viet Nam is an agricultural country, agriculture is heavily dependent on natural conditions; which are frequently affected by disasters.

Agricultural insurance has not succeeded yet in Viet Nam because:

- The inadequate awareness of people about the agricultural insurance.
- Complex procedures to receive compensation.
- Agricultural production is potentially risky.
- Production practices of our farmers are small scaled.
- The mechanism of agricultural insurance policy is not completed resulting in confusion in implementation.

Community Awareness Raising

Roles

- Education, training and community initiatives in prevention and mitigation of natural disasters are essential to minimize risks posed by natural disasters.

Activities

- The teachers and students and people are provided with basic knowledge about natural disasters, hazards and safeguards as well as what to do before, during and after disasters.

Lesson learnt

- Enhance the links between CCFSC Steering Committee, the Village Red Cross, local authorities to help respond more quickly.

All Lessons Learnt

1) Coping with extreme events and CCA can be proper if the information about risks is available before a disaster occur.
2) Should invest properly for long-term measures, planning for disaster prevention and CCA.
3) Develop appropriate policy framework.
4) Integrating DRR and CCA into the planning process of local Socio-Economic Development Plans…
5) Bringing DRR and CCA into the official educational program.
6) Should encourage the participation of people in DRM, CCA.
7) There should be harmony between the measures in the prevention of natural disasters which adapt to CC.