Youth Think Tank on Climate Change and Health

"Protecting human health from climate change"

24 May, 2012 - Dhaka

Dr. Atiq Rahman

Executive Director: **Bangladesh Centre for Advanced Studies (BCAS)**

Chairman**: Climate Action Network – South Asia (CANSA)**

Visiting Professor: **Fletcher School of Law and Diplomacy , Tufts University and Harvard University, Boston, MA, USA**

BANGLADESH CENTRE FOR ADVANCED STUDIES
House # 10, Road # 16A, Gulshan- 1, Dhaka- 1212, Bangladesh
Phone:, 8818124-7 9851237, 9852904; Fax: (+880-2) 9851417
E-mail: info@bcas.net; Website: www.bcas.net

Outline of Presentation

- Introduction
- Case Study: Bangladesh Vulnerability
- Health Impacts of Climate Change
- Why Community Participation
- Challenges in Addressing Health Impacts of Climate Change
- Approaches in Addressing Health Impacts of Climate Change
- Recent Findings from Preliminary Researches through Community Participation in Bangladesh
- Bangladesh Government Response to Climate Change

Introduction

- Climate Change is the biggest global health threat of the 21st century
- The indirect effects of climate change on water, food security, and extreme climatic events are likely to have the biggest effect on global health
- Vector-borne diseases will expand their reach and death tolls will increase because of heat waves
- Climate change effects on health will exacerbate inequities between rich and poor

Introduction

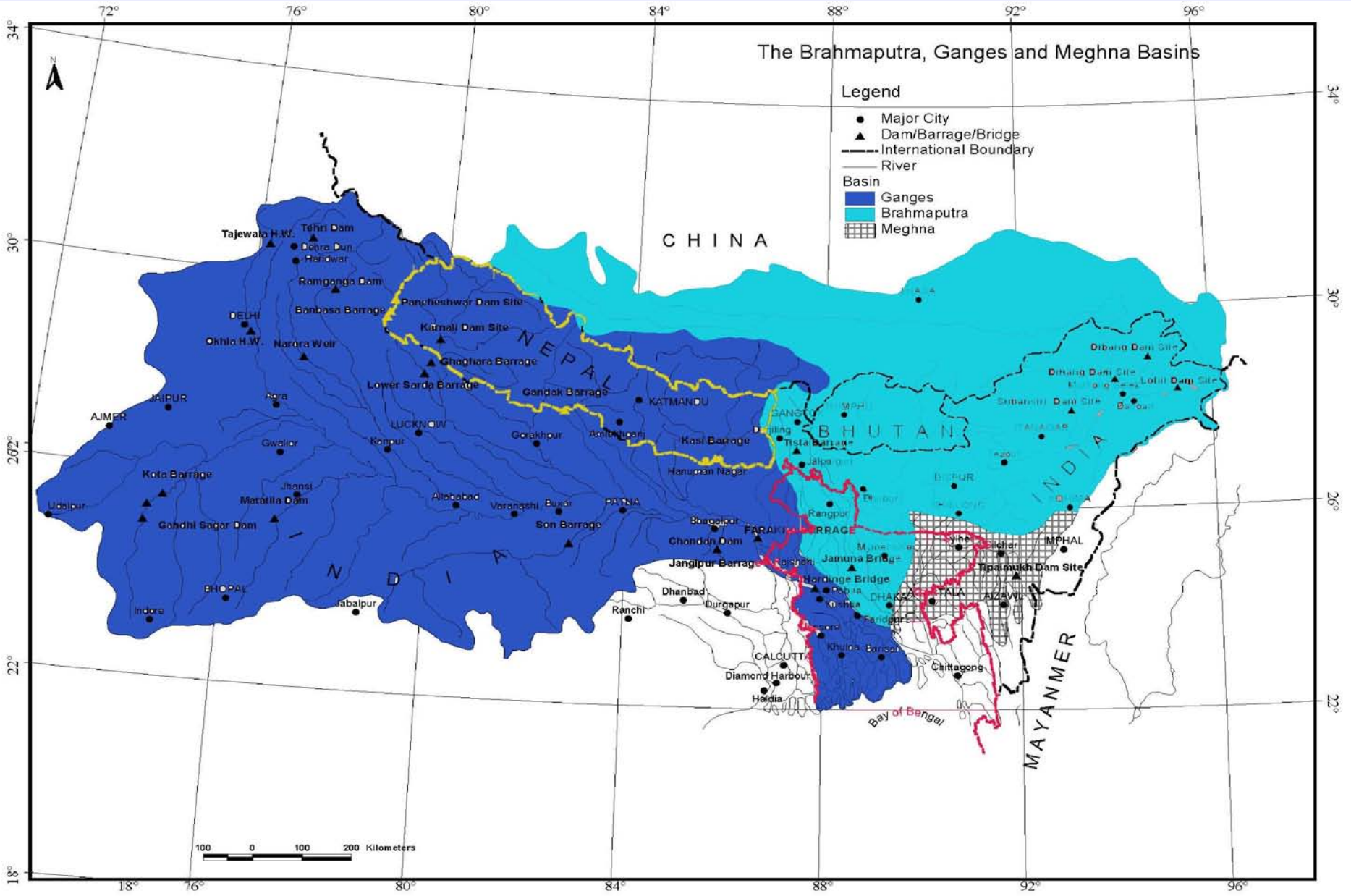
- A new advocacy and public health movement is needed urgently to bring together governments, international agencies, non-governmental organizations (NGOs), communities, and academics from all disciplines to adapt to the effects of climate change on health

- The recognition by governments and electorates that climate change has enormous health implications should assist the advocacy and political change needed to tackle both mitigation and adaptation

- Involvement of local communities in monitoring, discussing, advocating and assisting with the process of adaptation will be crucial

CASE STUDY: BANGLADESH VULNERABILITY

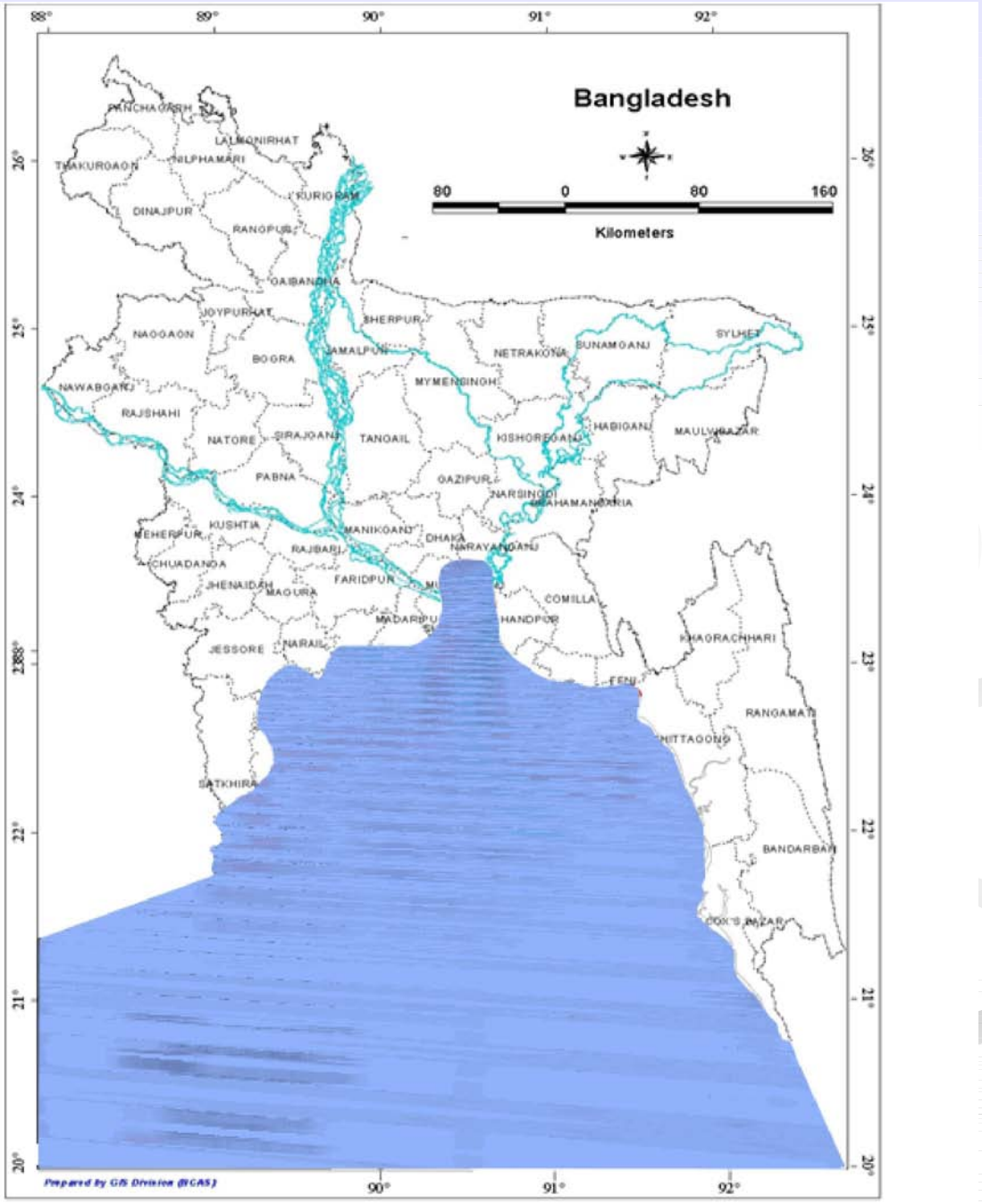
Bangladesh: Part of GBM -
Highly Vulnerable to Climate Change



CASE STUDY: BANGLADESH VULNERABILITY

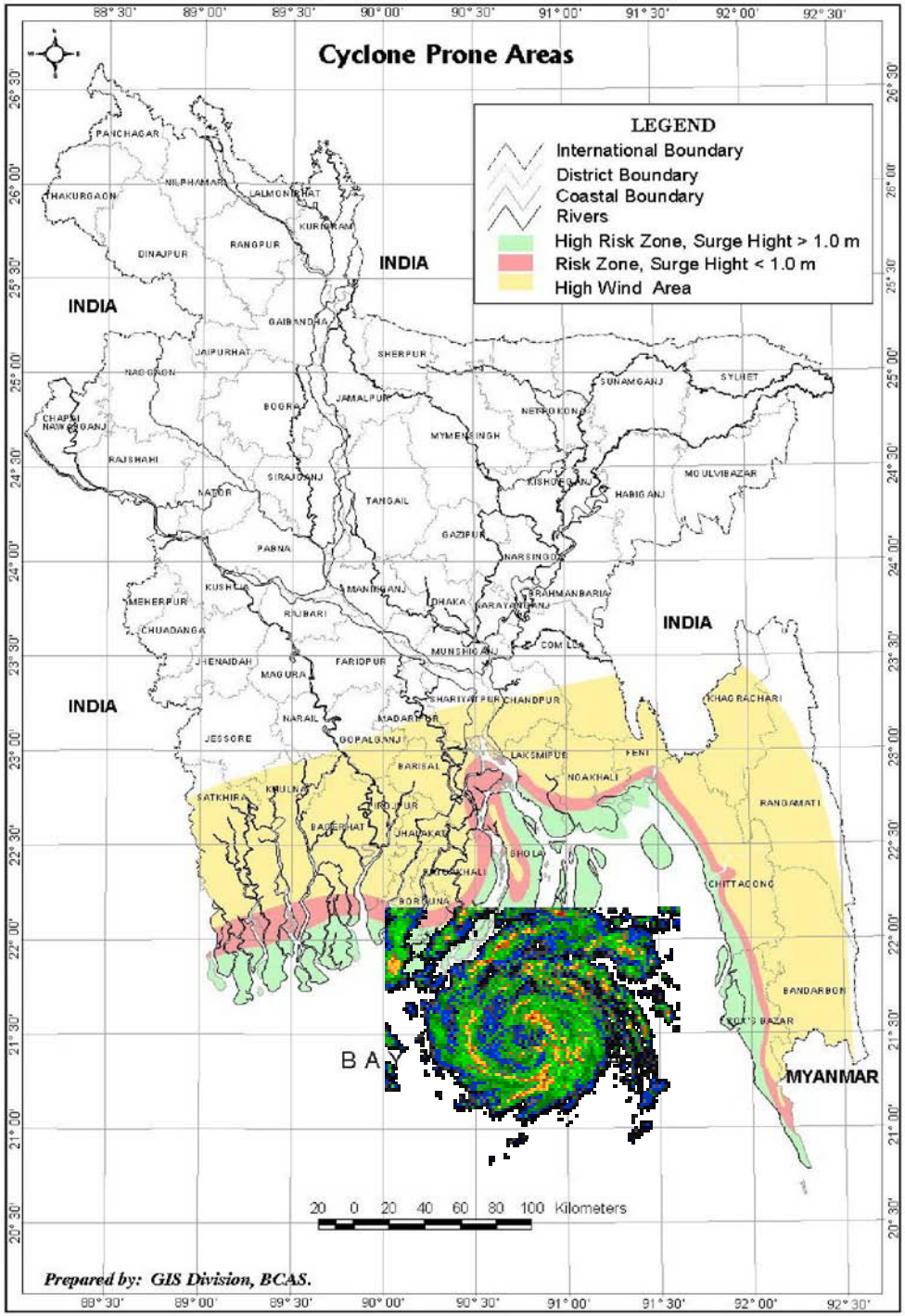
1. Sea Level Rise
2. Cyclone (Intensity & Frequency)
3. Deeper Penetration of Saline Water
4. Erratic Rainfall
5. Flood (Intensity & Frequency)
6. Drought
7. River Bank Erosion
8. Health
9. Food Security
10. Impacts in CHT

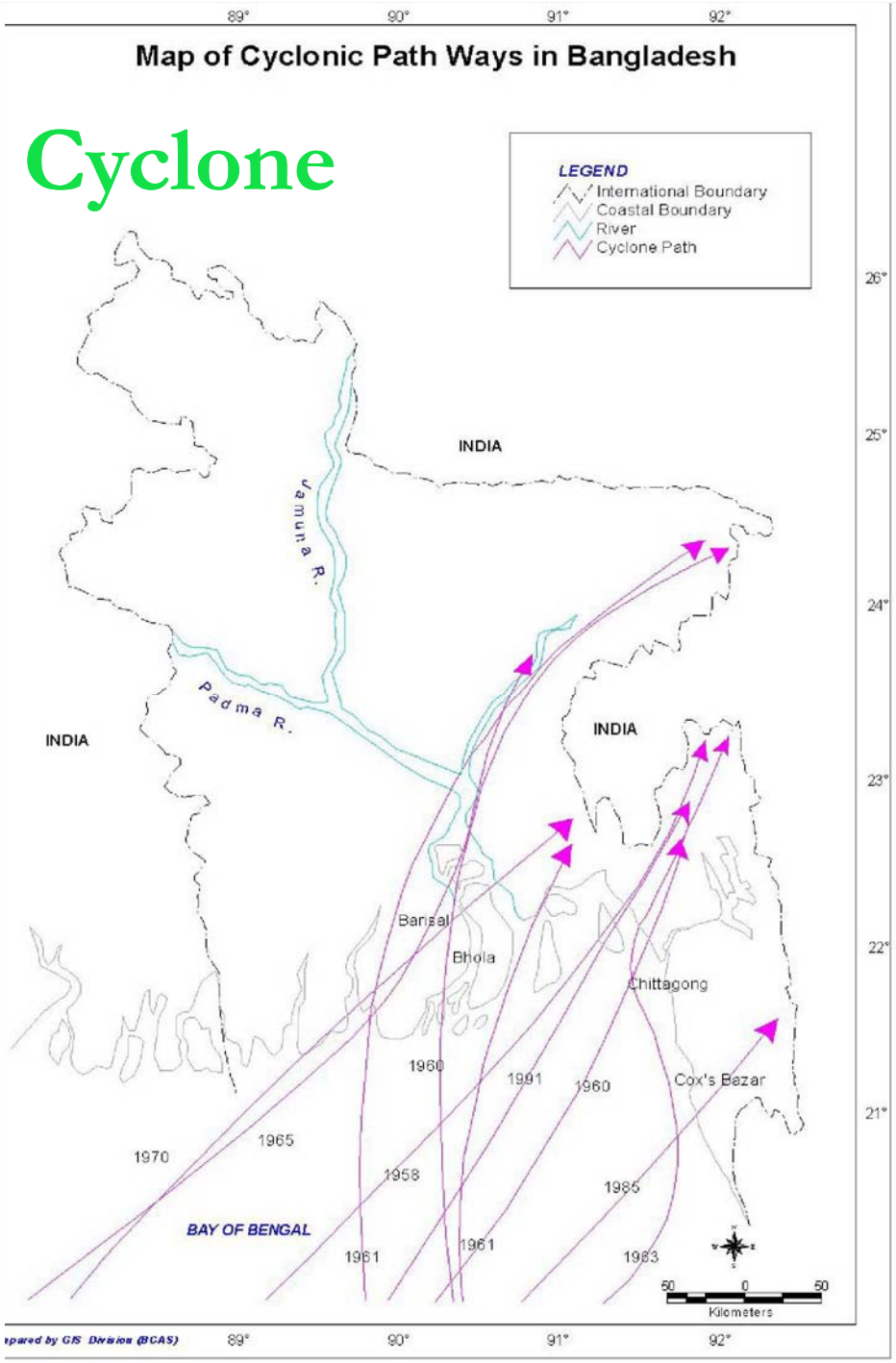
1 Meter Sea Level Rise



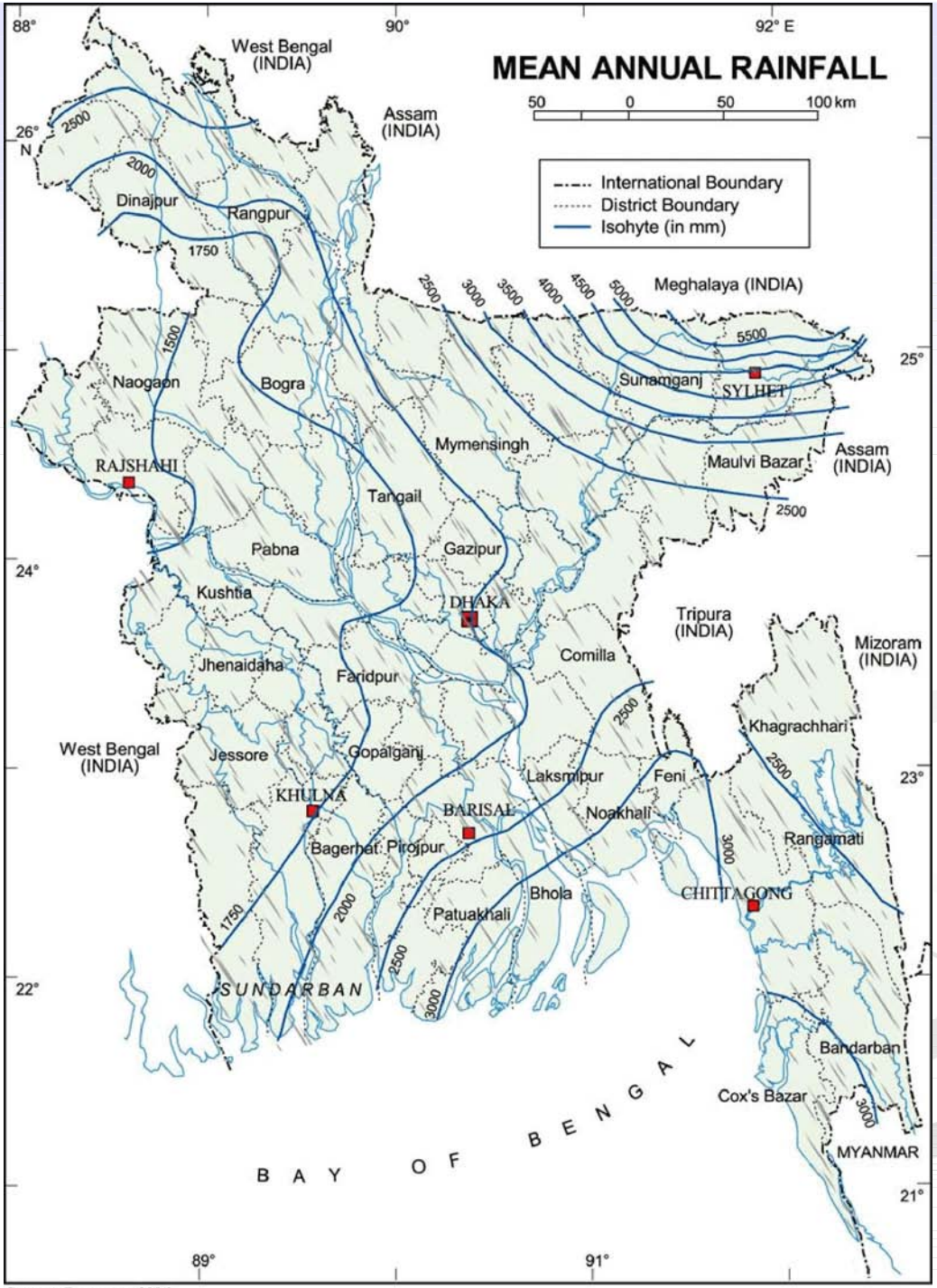
Sea Level Rise

BCAS
Bangladesh Centre for Advanced Studies


Cyclone Prone Areas
LEGEND
International Boundary
District Boundary
Coastal Boundary
Rivers
High Risk Zone, Surge Hight > 1.0 m
Risk Zone, Surge Hight < 1.0 m
High Wind Area
INDIA
INDIA
INDIA
INDIA
MYANMAR
BAY
20 0 20 40 60 80 100 Kilometers
Prepared by: GIS Division, BCAS.


Map of Cyclonic Path Ways in Bangladesh
Cyclone
LEGEND
International Boundary
Coastal Boundary
River
Cyclone Path
INDIA
INDIA
INDIA
Jamuna R.
Padma R.
Barisal
Bhola
Chittagong
Cox's Bazar
1960
1991
1960
1970
1965
1958
1985
1961
1961
1983
BAY OF BENGAL
50 0 50
Kilometers

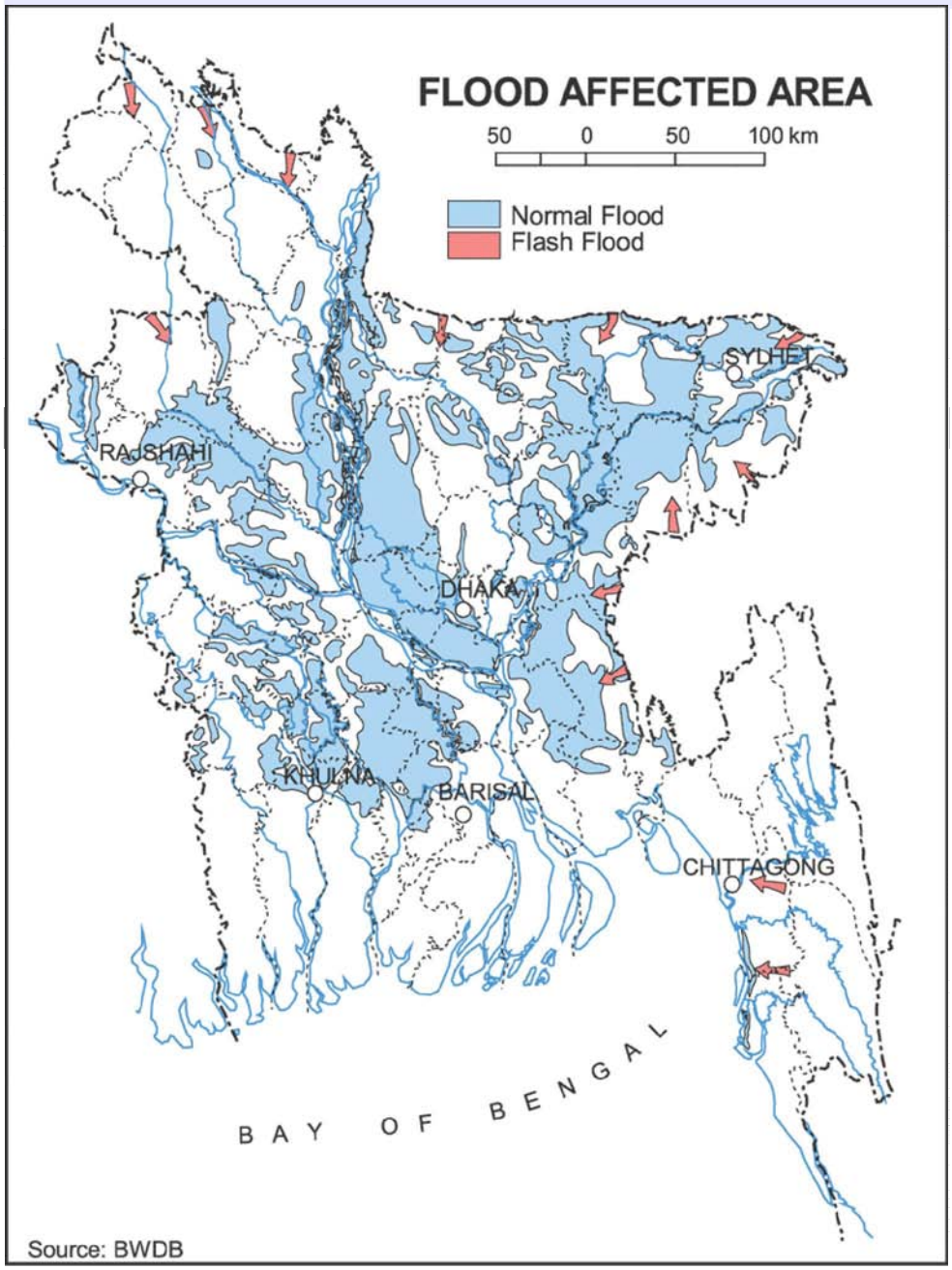
Erratic Rainfall

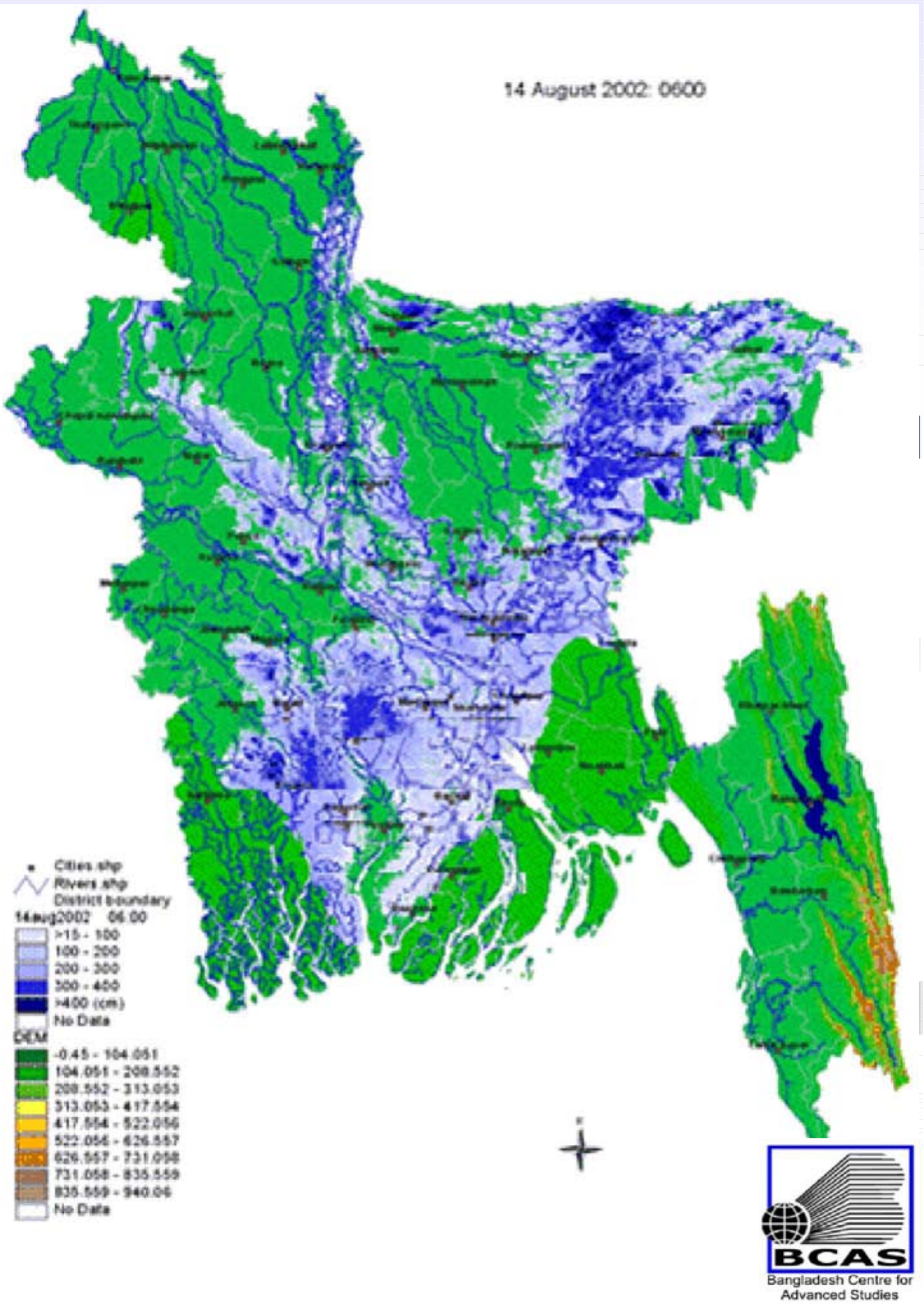


Source: *Brammer, 1996*

BCAS
Bangladesh Centre for Advanced Studies

Flood


FLOOD AFFECTED AREA
50 0 50 100 km
Normal Flood
Flash Flood
SYLHET
RAJSHAHI
DHAKA
KHULNA
BARISAL
CHITTAGONG
BAY OF BENGAL
Source: BWDB


14 August 2002: 0600
Cities.shp
Rivers.shp
District boundary
14aug2002 06:00
>15 - 100
100 - 200
200 - 300
300 - 400
>400 (cm)
No Data
DEM
-0.45 - 104.051
104.051 - 208.552
208.552 - 313.053
313.053 - 417.554
417.554 - 522.056
522.056 - 626.557
626.557 - 731.058
731.058 - 835.559
835.559 - 940.06
No Data
BCAS
Bangladesh Centre for Advanced Studies

Flood

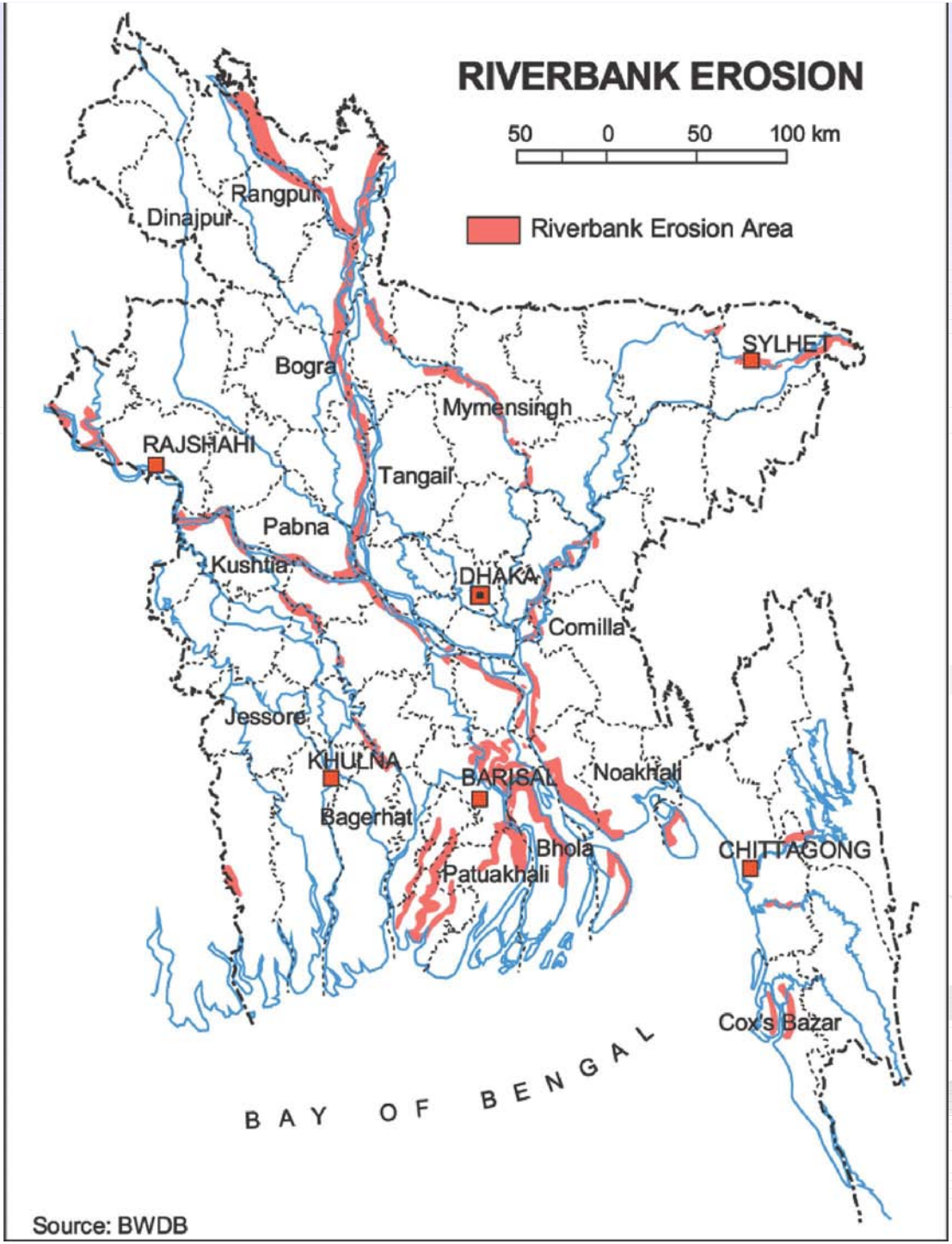
Inundated Area during Different Floods and Number of Occurrences in Last 30 Years

Flooded Area	Return period (Years)						
	2	**5**	**10**	**20**	**25**	**50**	**100**
Area affected %	20	30	37	43	52	60	70
Last 30 years			5	3	2	2	
Last 10 years			3	2	1	1	

For Example: A flood event with return period of 20 years has already occurred twice during the last 10 years.

BCAS
Bangladesh Centre for Advanced Studies

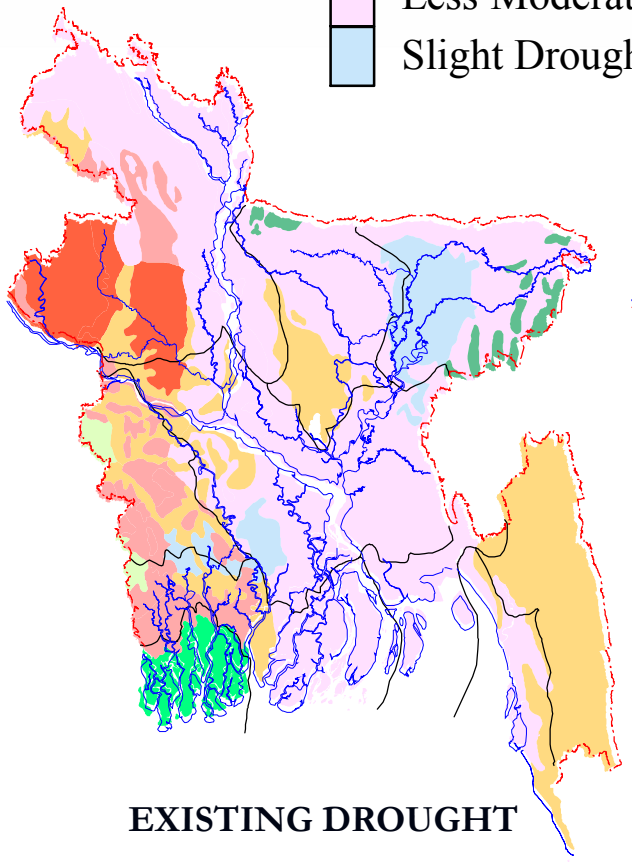
River Bank Erosion



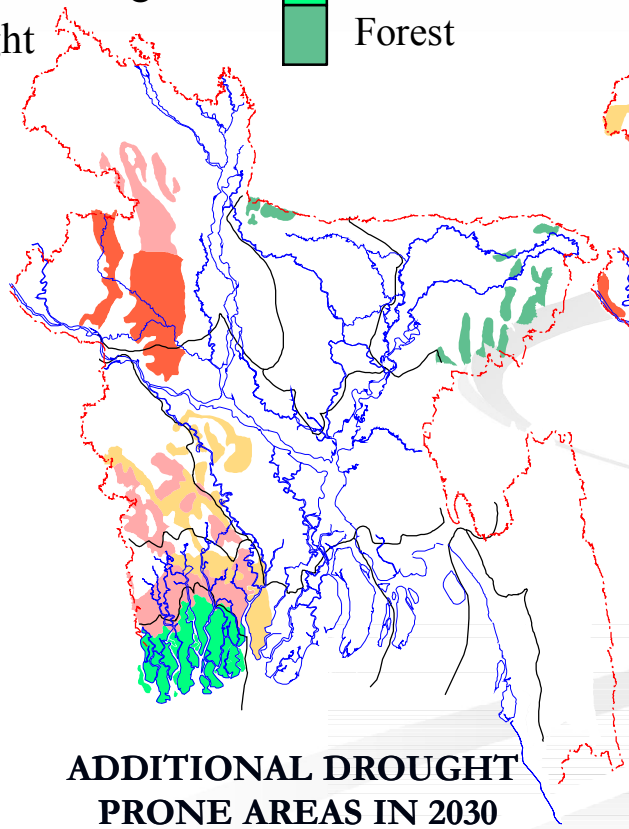
EXISTING DROUGHT SITUATION, AND DROUGHT SITUATION IN THE YEARS 2030 & 2075

DROUGHT CLASSES (RABI SEASON)

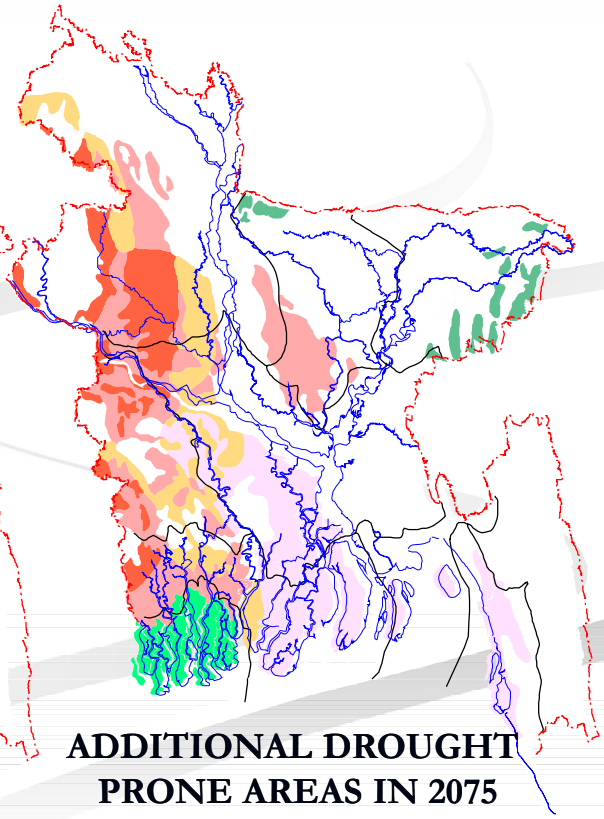
- Very Severe Drought
- Severe Drought
- Moderate Drought
- Less Moderate Drought
- Slight Drought
- Very Slight to Nil
- Severe & Moderate
- Moderate & Less Moderate
- Sunderbans
- Forest



EXISTING DROUGHT



ADDITIONAL DROUGHT PRONE AREAS IN 2030

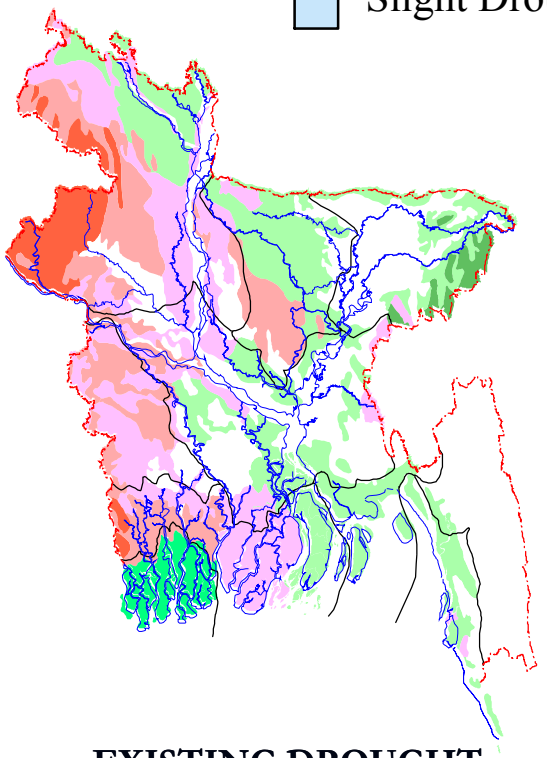


ADDITIONAL DROUGHT PRONE AREAS IN 2075

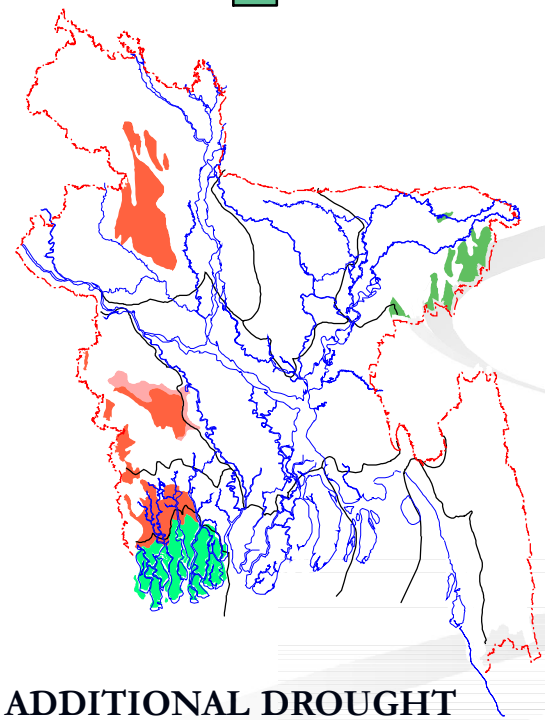
EXISTING DROUGHTB SITUATION, AND DROUGHT SITUATION IN THE YEARS 2030 & 2075

DROUGHT CLASSES (KHARIF SEASON)

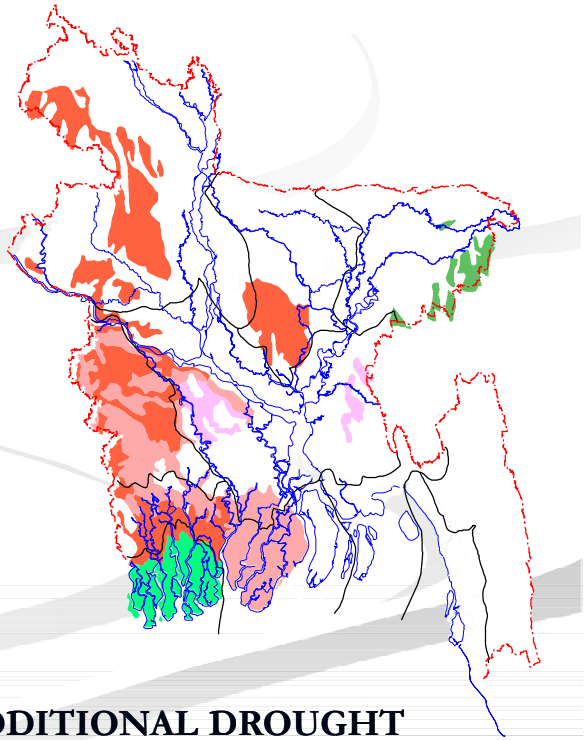
- Very Severe Drought
- Severe Drought
- Moderate Drought
- Less Moderate Drought
- Slight Drought
- Very Slight to Nil
- Severe & Moderate
- Moderate & Less Moderate
- Sunderbans
- Forest



EXISTING DROUGHT

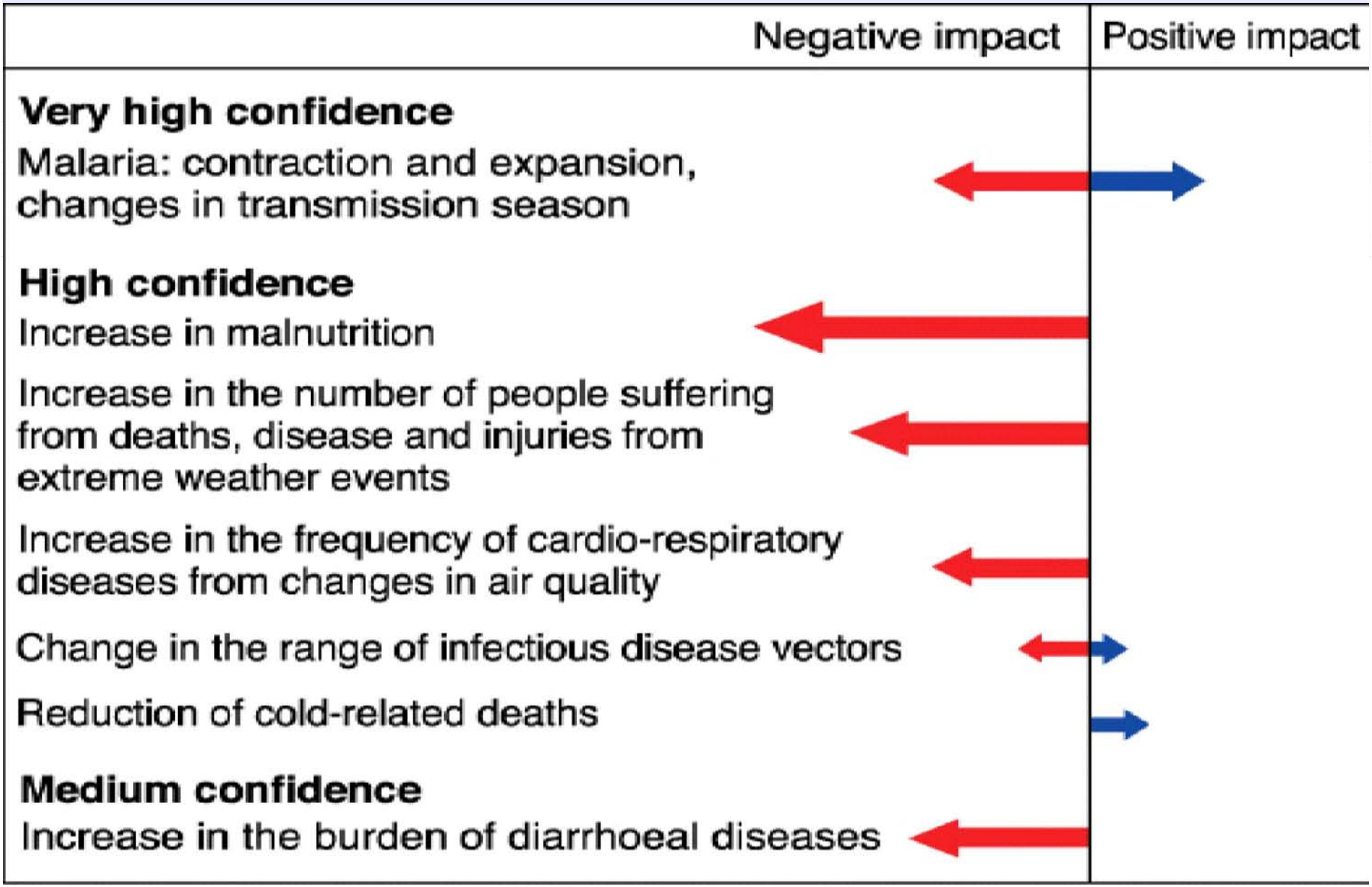


ADDITIONAL DROUGHT PRONE AREAS IN 2030



ADDITIONAL DROUGHT PRONE AREAS IN 2075

CC Impacts on Health



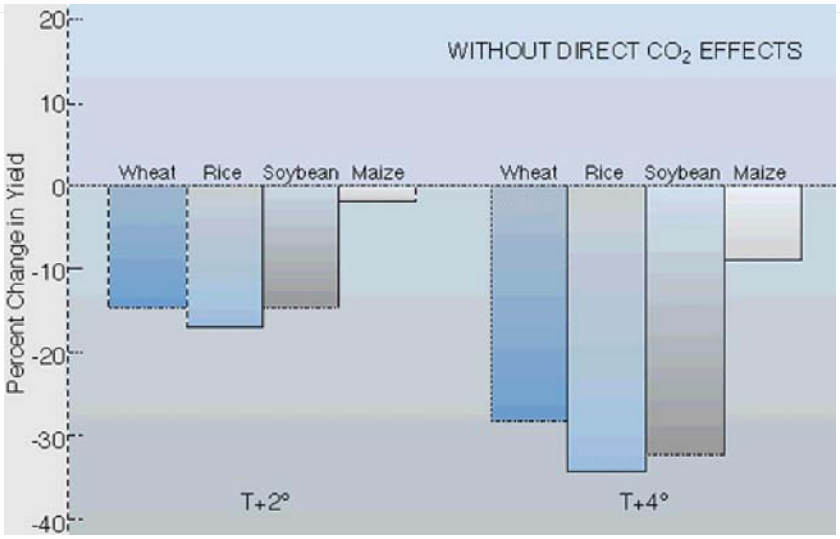
Source: IPCC AR4, 2007

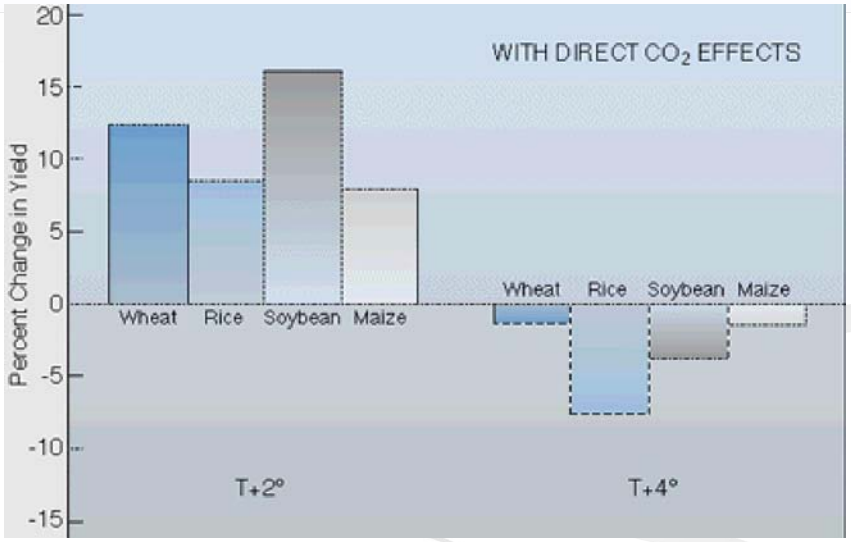
Key Climate Change Stresses and Impacts in CHT

- Hills support sub-ecosystems which are rich in species and biodiversity
- These give livelihood supports to the hilly people
- **Key stresses in CHT**
  - **Temperature rise**
  - **Erratic rainfall**
  - **Extreme events -**Flood and Landslide

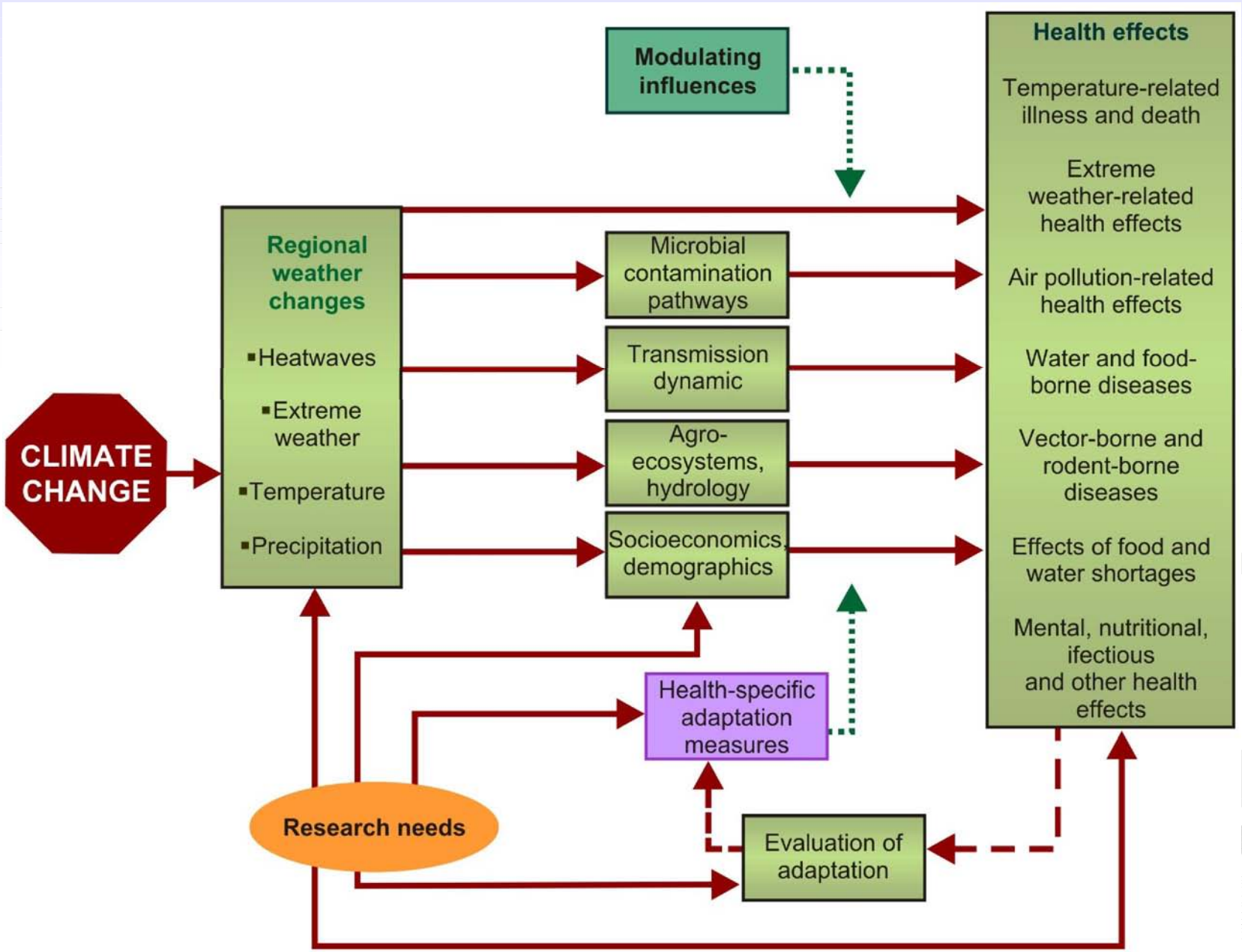
CC Impacts on Food Security

- IPCC estimates that, by 2050, rice production in Bangladesh could decline by 8 percent and wheat by 32 percent





- Decrease production of livestock,
- Increase of pest attack
- Decrease production of fisheries



Source: WHO, 2003

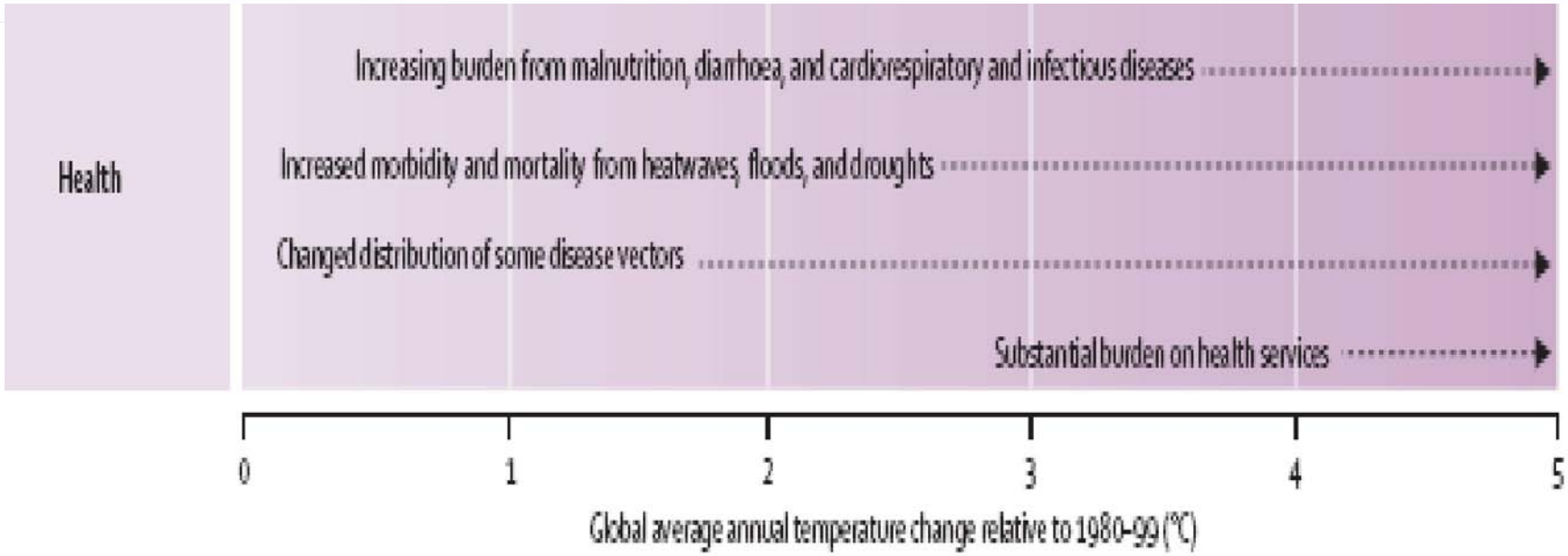
Health Impacts of Climate Change

- **Many risk factors and illnesses that are currently among the most important contributors to the global burden of disease are sensitive to climate, notably to temperature changes. These include:**

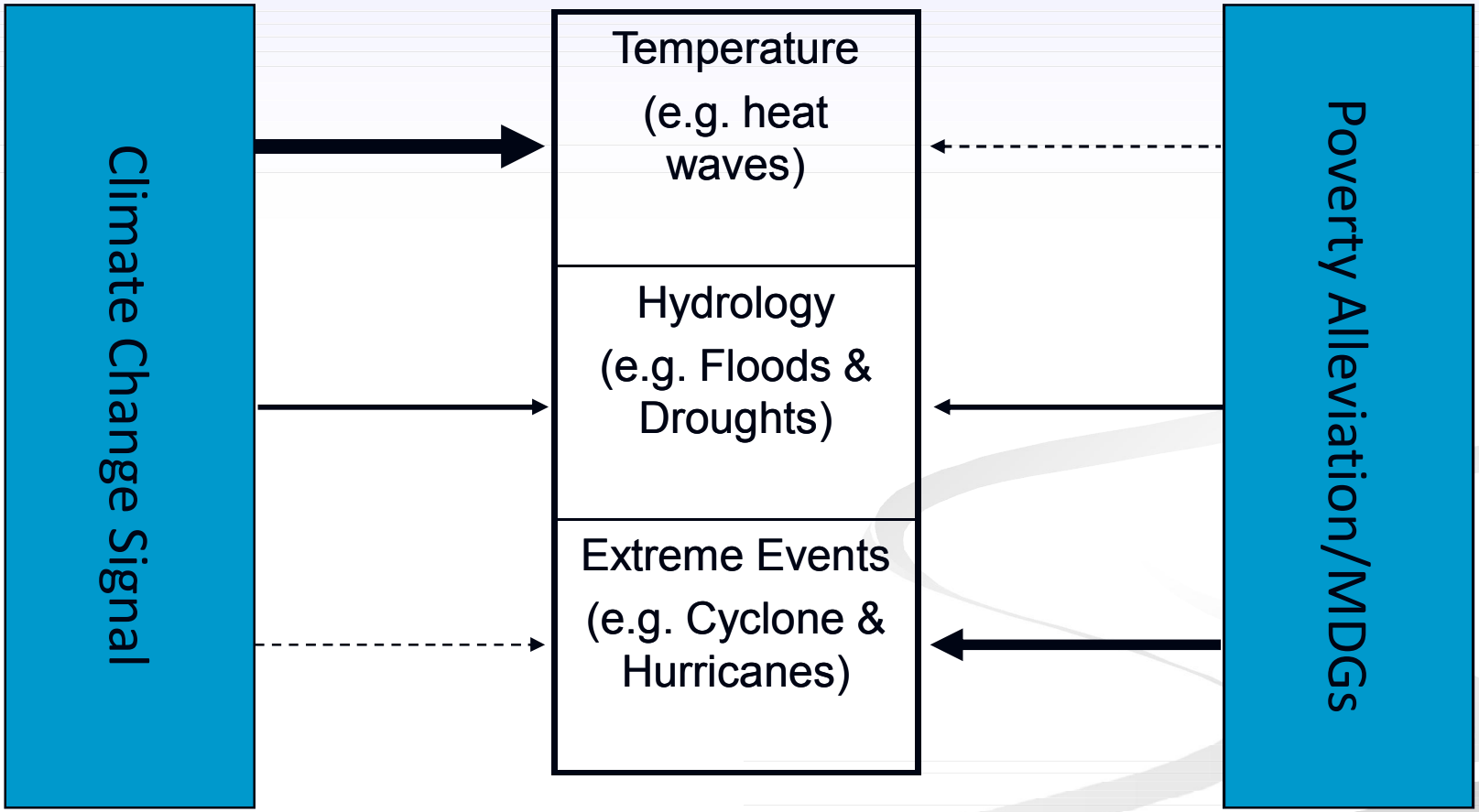
- **Malnutrition** (estimated 3.7 million deaths per year globally)
- **Diarrhoea** (estimated 1.9 million deaths per year globally)
- **Malaria** (estimated 0.9 million deaths per year globally)

- **Systematic reviews of empirical studies indicate that climate plays an important role in the seasonal pattern or temporal distribution of malaria, dengue, tick-borne diseases and cholera**

Effects of Global Average Temperature Change on Health



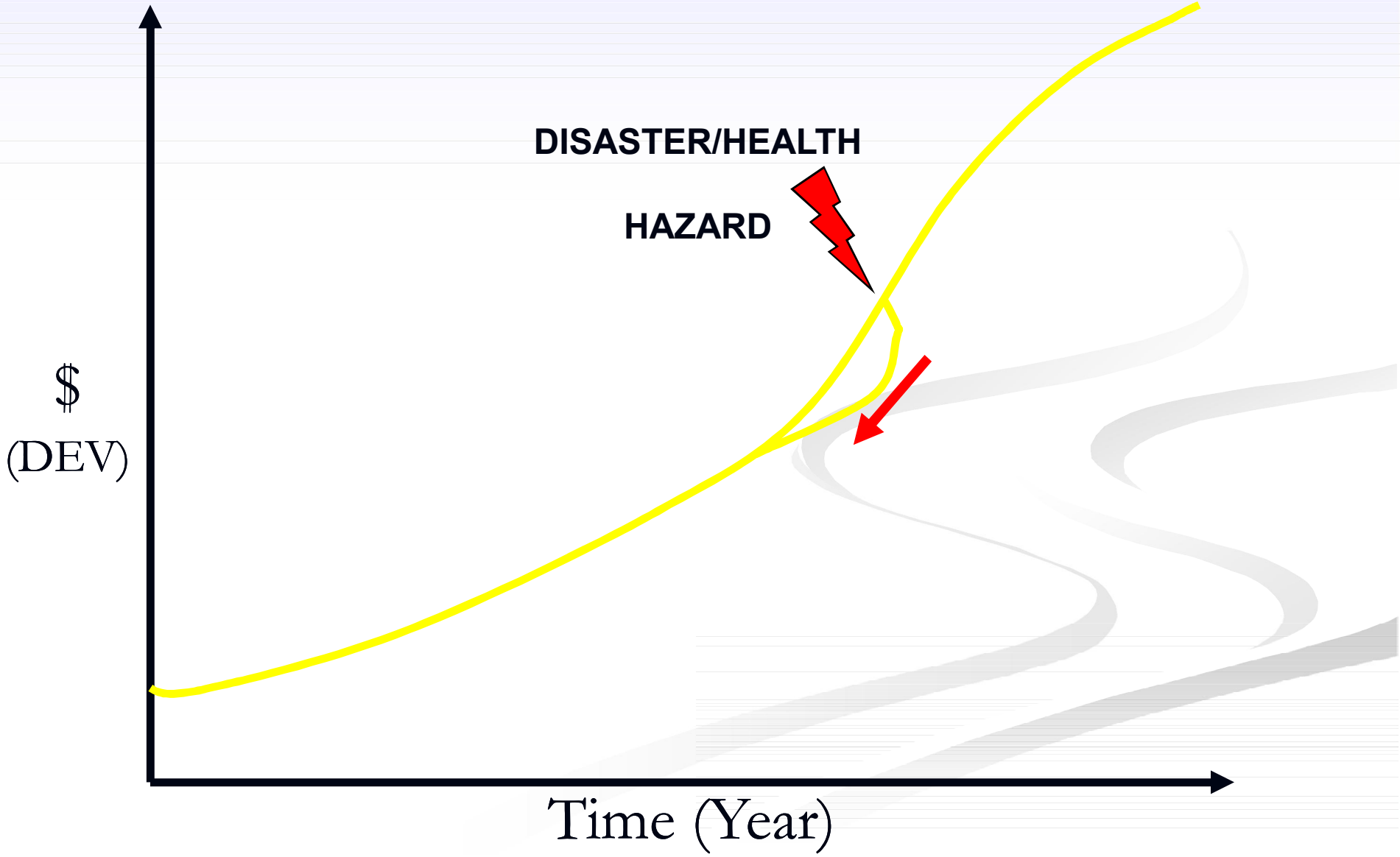
Climate Change, MDGs and Poverty Alleviation



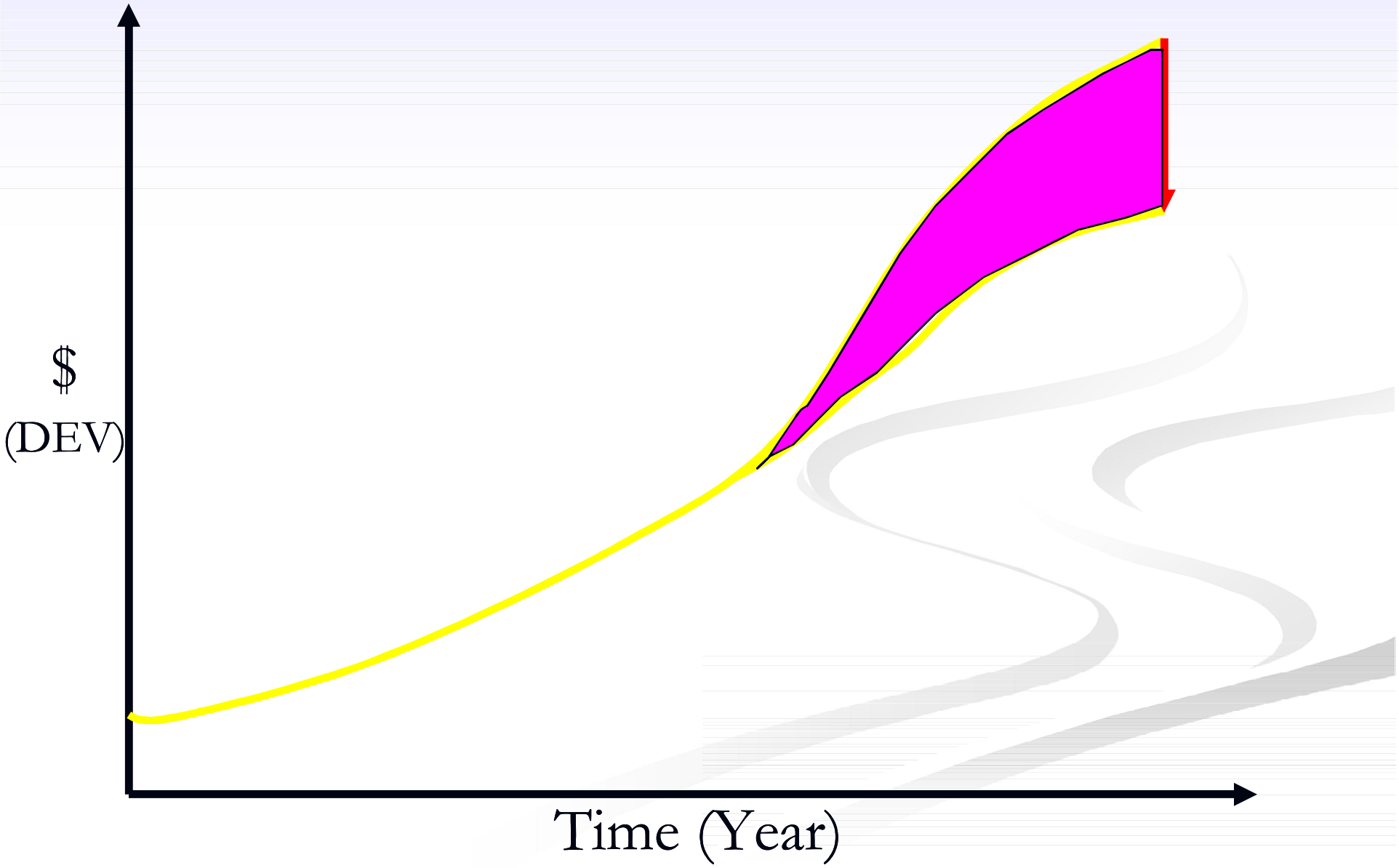
Source: Saleem et al.., 2006

BCAS
Bangladesh Centre for Advanced Studies

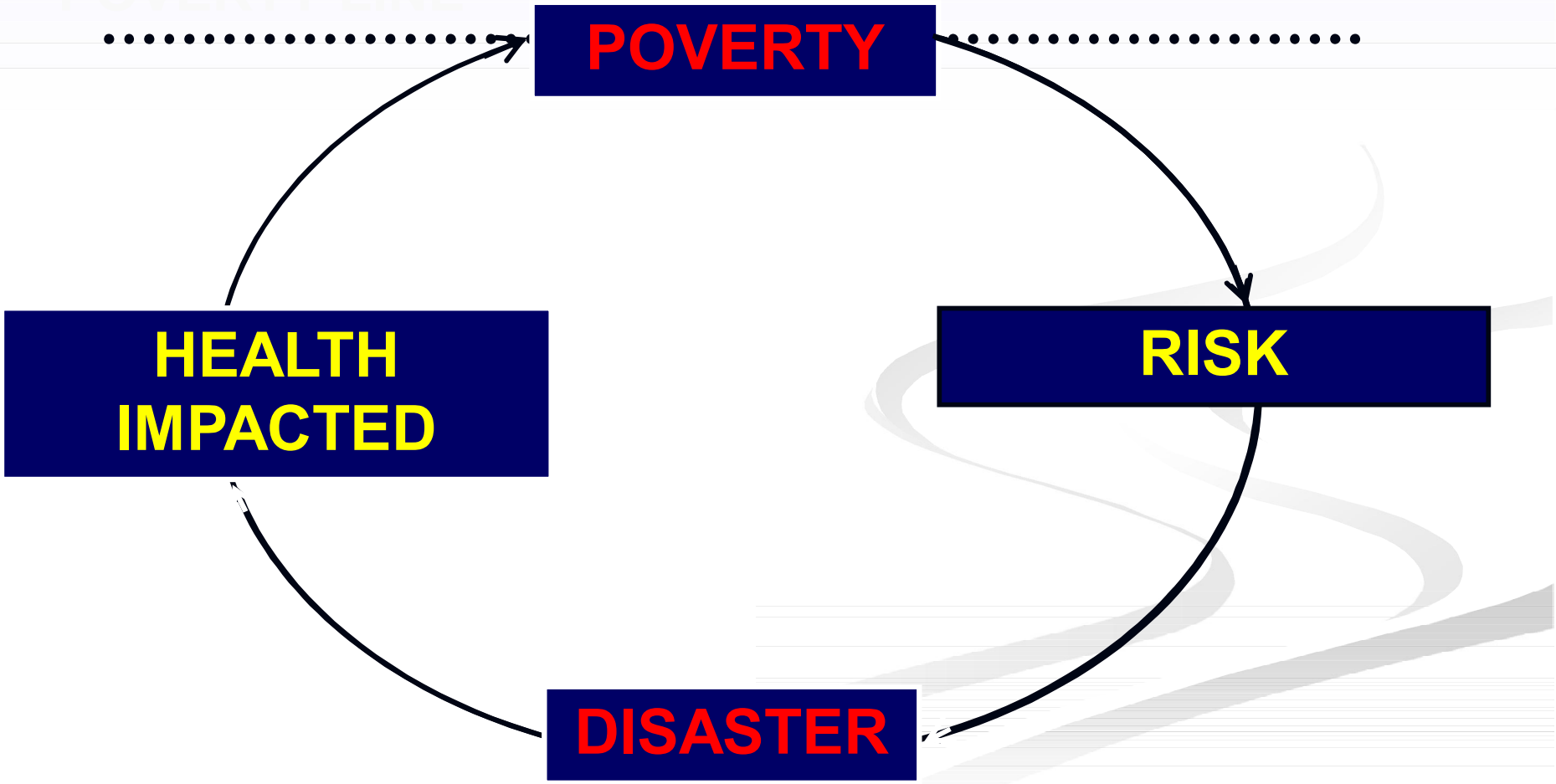
Schematic Diagram Showing Severe Impact of Disaster and Health Hazards on Poverty and SD

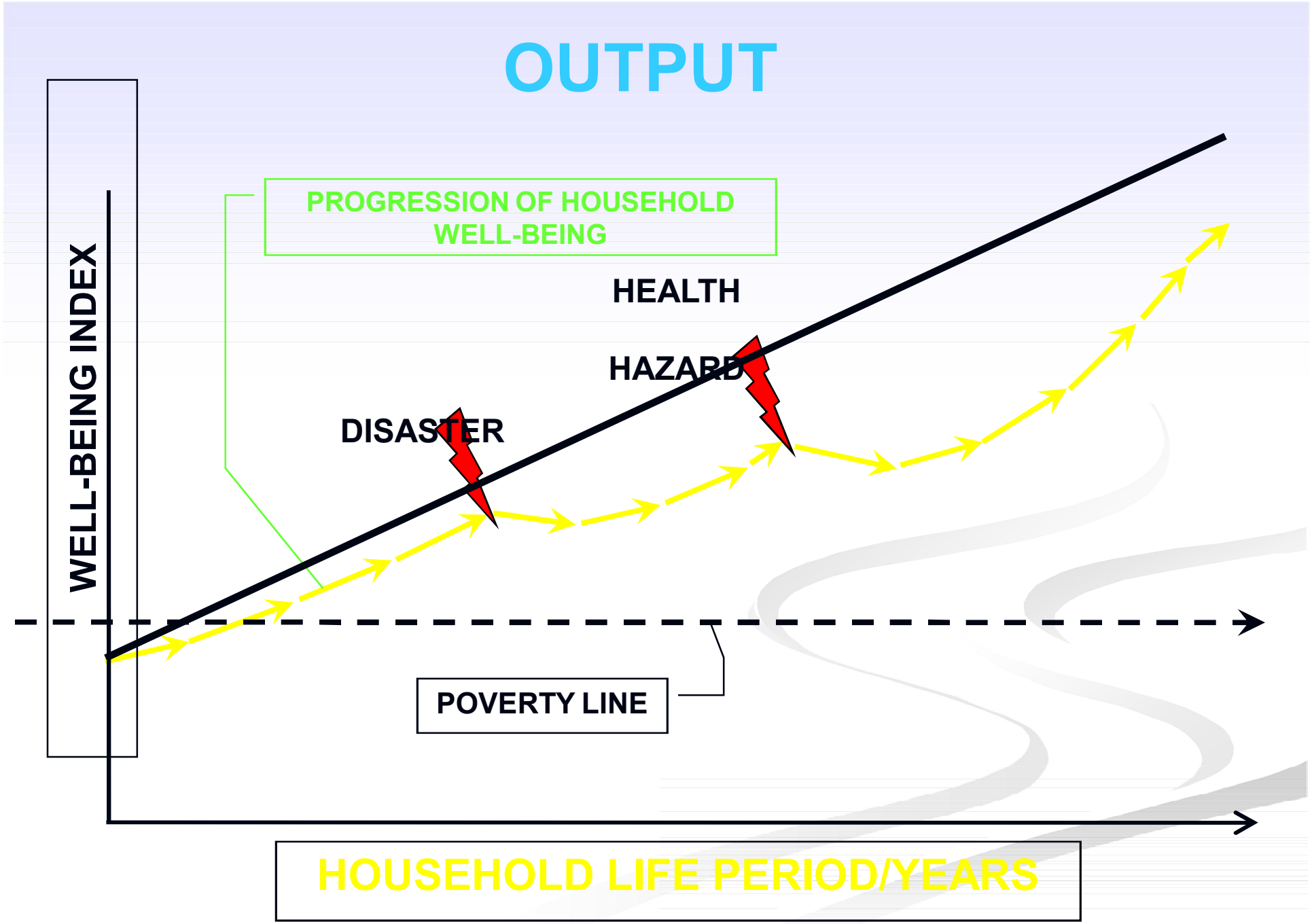


Schematic Diagram Showing Severe Impact of Disaster and Health Hazards on Poverty and SD



VICIOUS CYCLE OF DISASTER AND POVERTY



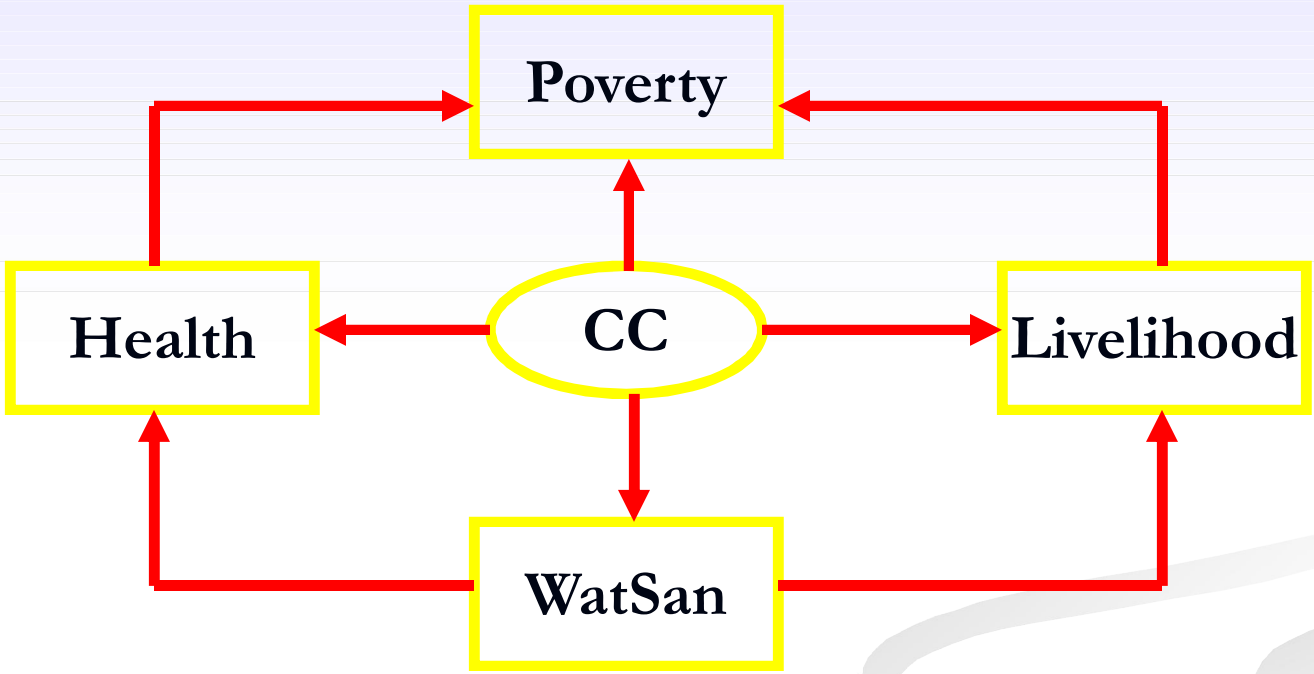

OUTPUT
WELL-BEING INDEX
PROGRESSION OF HOUSEHOLD WELL-BEING
HEALTH
HAZARD
DISASTER
POVERTY LINE
HOUSEHOLD LIFE PERIOD/YEARS

MAJOR CONCERNS

- Water Security
- Food Security
- Livelihood Security
- Health Security

- **ALL ARE LINKED WITH POVERTY**
- **EACH AFFECTED BY CLIMATE CHANGE**

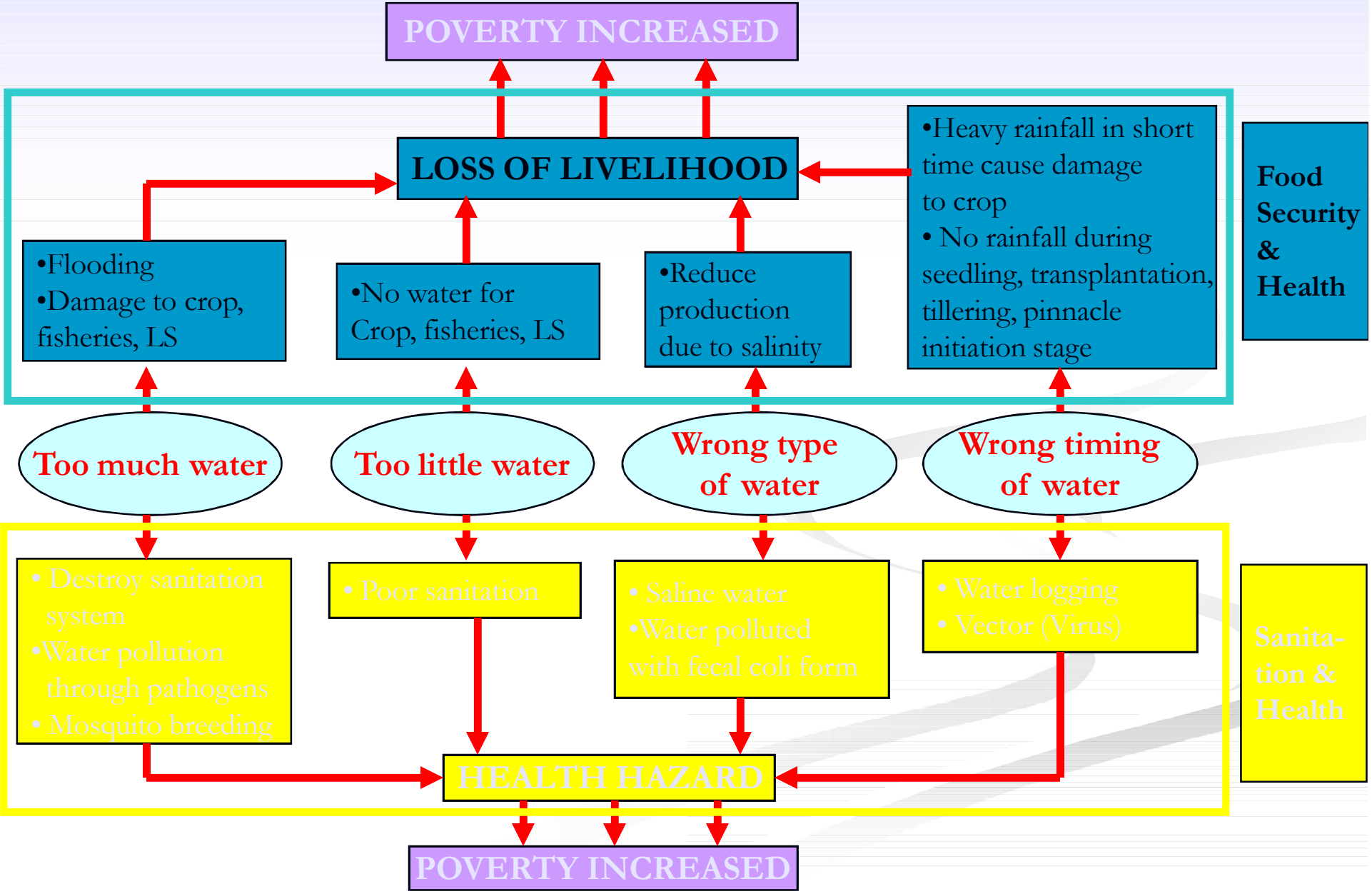
CC-WatSan-Health-Livelihood-Poverty



60-70% global impacts of climate change can be reflected in water. This is:

a. Too much water
b. Too little water
c. Wrong type of water
d. Wrong timing of water

The Linkage


POVERTY INCREASED
LOSS OF LIVELIHOOD
•Heavy rainfall in short time cause damage to crop
• No rainfall during seedling, transplantation, tillering, pinnacle initiation stage
Food Security & Health
•Flooding
•Damage to crop, fisheries, LS
•No water for Crop, fisheries, LS
•Reduce production due to salinity
Too much water
Too little water
Wrong type of water
Wrong timing of water
• Destroy sanitation system
•Water pollution through pathogens
• Mosquito breeding
• Poor sanitation
• Saline water
•Water polluted with fecal coli form
• Water logging
• Vector (Virus)
Sanita-tion & Health
HEALTH HAZARD
POVERTY INCREASED

Why Community Participation

- Cost Effective
- Higher Acceptability
- Early Warning
- Rapid Feedback
- Direct Communication
- Reality Check for both service recipients and service providers
- Community Empowered
- Community Choice Reflected

Challenges in Addressing Health Impacts of Climate Change

- **Health-Poverty:**

  Raising health status and reducing health inequity will only be reached by lifting billions out of poverty

- **Policy Response:**

  Policy responses to the public health implications of climate change will have to be formulated in conditions of uncertainty, which will exist about the scale and timing of the effects, as well as their nature, location, and intensity

- **Primary Health Care:**

  Improve surveillance and primary health information systems in the poorest countries, and to share the knowledge and adaptation strategies of local communities on a wide scale

- **Improve Research Component:**

  Weak capacity for research to do informed adaptation in poor countries is likely to deepen the social inequality in relation to health

Challenges in Addressing Health Impacts of Climate Change

- **Effective Response Capacity:**

  Ability of health systems to respond effectively to direct and indirect health effects of climate change is a key challenge worldwide, especially in many low-income and middle-income countries that suffer from disorganized, inefficient and under-resourced health systems

- **Demography and Transition:**

  Population growth associated with social and economic transition will initially increase carbon emissions in the poorest countries, in turn exacerbating climate change unless rich countries, the major contributors to global carbon production, massively reduce their output

- **Power and Politics:**

  Power and politics will enter all discussions about food security, water supply, disaster risk reduction and management, urban planning, and health and population expenditure

- **Late Comer:**

  Apart from a dedicated few, health professionals have come late to the climate change debate

Approaches in Addressing Health Impacts of Climate Change

- **INTEGRATION AND MAINSTREAMING:**

  An integrated and multidisciplinary approach to reduce the adverse health effects of climate change requires at least three levels of action:

- **MITIGATION:**

  Policies must be adopted to reduce carbon emissions and to increase carbon biosequestration (say, through reforestation and improved agricultural practices), and thereby slow down global warming and eventually stabilize temperatures

- **CC-HEALTH LINKAGE:**

  Action should be taken on the events linking climate change to disease

- **PUBLIC HALTH:**

  Appropriate public health systems should be put into place to deal with adverse outcomes

Approaches in Addressing Health Impacts of Climate Change

- **Therefore, we require:**

- Full documentation of the risks to health and differences in vulnerability within and between populations
- Development of health protection strategies
- Identification of health co-benefits of actions to reduce greenhouse gas emissions
- Development of ways to support decisions and systems to predict the effects of climate change
- More investment and resources for strengthening health systems
- Estimation of the financial costs of action and inaction

Approaches in Addressing Health Impacts of Climate Change

- **Public Health Movement:**
  Strengthening informational, technological, and scientific capacity within developing countries is crucial for the success of a new public health movement. Public funding for investment in developing green technologies for poor markets will be essential. Local and community voices are crucial in informing this process.

- **Luxury vs. Survival Emissions:**
  Luxury emissions are different from survival emissions, which emphasizes the need for a strategy of contraction and convergence, whereby rich countries rapidly reduce emissions and poor countries can increase emissions to achieve health and development gain, both having the same sustainable emissions per person

- **Population Planning:**
  Improved population-based planning (high-quality family planning services where there is unmet need, and the effective and efficient management of scarce resources.

- **MDGs:**
  Investment to achieve the Millennium Development Goals will release public expenditure for climate change currently consumed by basic prevention strategies (e.g. malaria control)

- **Investment:**
  Health-oriented and climate-orientated investments in food security, safe water supply, improved buildings, reforestation, disaster risk assessments, community mobilization, and essential maternal and child health and family planning services, will all produce dividends in adaptation to climate change

Recent Findings from Preliminary Researches through Community Participation in Bangladesh

- **ICDDR, B: Role of Climate in Transmission Dynamics of Cholera in Bangladesh**
  - Temperature plays a vital role to increase the reservoir of cholera pathogen.
  - Sunshine also plays a role for algal growth
  - Combined effect of sunshine and temperature greatly influence the cholera epidemic in Bangladesh

- **BCAS – NIPSOM: Climate Change and Health Impacts in Bangladesh**
  - Indications that Heat stress, salinity-flooding and deterioration in water quality are associated with incidences of diarrhea, skin diseases, malnutrition and kalazar

Recent Findings from Preliminary Researches through Community Participation in Bangladesh

- **University of East Anglia, UK – BCAS: Health Care Provision in the 2004 Floods in Bangladesh**

- Comparison of flood intensity with disease prevalence showed significant rise in diarrhea cases during flood
- Loss of health was found to be the third major loss after housing and crops
-
- According to the reports of physicians frequency of disease prevalence overall had increased about 80 percent compared to the pre-flooding situation with viral fever, diarrhea, RTI and hepatitis and skin disease, and also there had been cases of snake bites, drowning, and accidental and/or emotional trauma
- Children and women were the most disease affected population
- One of the major reasons for the spread of diseases was unhygienic sanitation
- Majority of the health service providers (84%) informed that there were no precautionary planning, instructions given and steps taken before the onset of flood
- According to several flood affected people, village physicians contributed the most during the flood and that government and even non-government health services was not received in time and in many cases the service was of poor quality and not always free of cost, due may be to mismanagement, lack of communication, and sometimes even lack of willingness and political influence

Recent Findings from Preliminary Researches through Community Participation in Bangladesh

- **BCAS – IIED and London School of Tropical Hygiene: "Incidence of Malaria" versus "Variations in Temperature and Rainfall affecting Prevalence of Mosquitoes"**

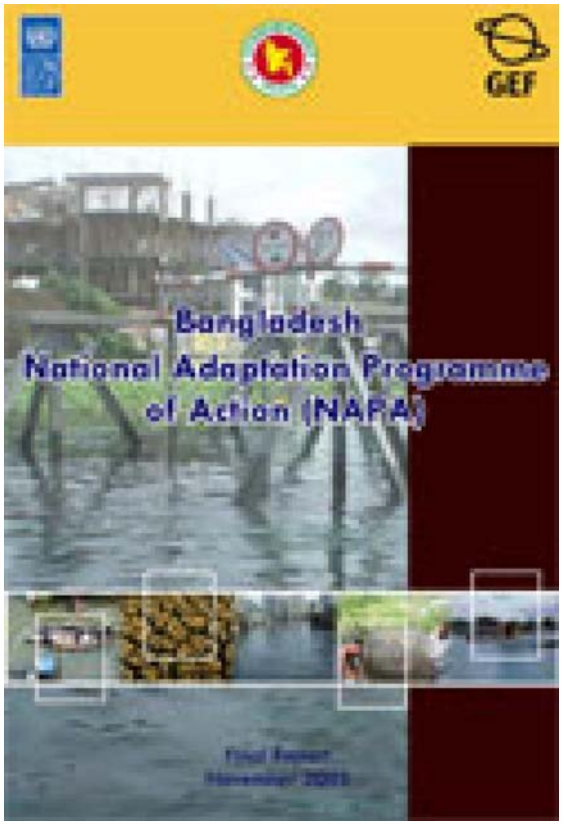
- **'Spearman' correlation analyses conducted relating monthly incidence rate of malaria to various monthly climatic measures. The monthly mean maximum and minimum temperatures, monthly amount of rainfall and relative humidity were positively correlated with monthly incidence rate of malaria in the Chittagong Hill Tracts. The correlation coefficient was ≥ 0.6**

- **Temperature rise likely to increase transmission and prevalence of malaria by producing new vector generations, and by shortening the incubation period of the parasite in mosquitoes. Temperatures of20°C to 30°C and humidity greater than 60% are optimal for *Anopheles* to survive long enough to acquire and transmit the parasite**

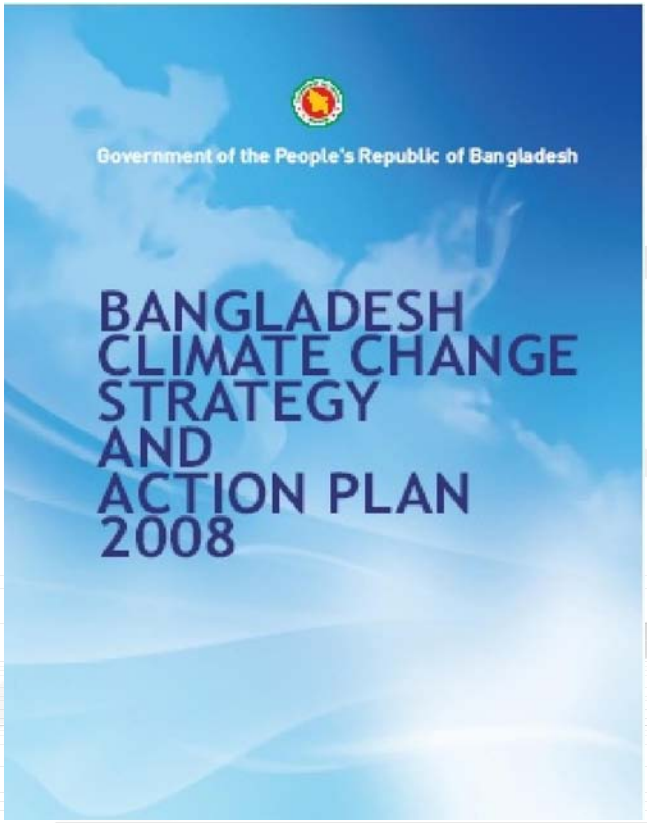
- **The extrinsic incubation period of the parasite shortens dramatically at temperatures in the range of 20°C to 27°C. Temperatures lower than 16°C or higher than 30°C have a negative impact on the growth of the mosquitoes; also, at these temperatures the propagation rate of *Plasmodium* is reduced in the body of the mosquitoes**

Bangladesh Government Response to Climate Change

NAPA



BCCSAP



BCAS
Bangladesh Centre for Advanced Studies

Types of Adaptation Projects and Interventions Proposed in National Adaptation Programme of Action (NAPA) in terms of Health, Water Resources, Food Security & Agriculture

- **Health**
  - Monitoring the incidence of and expanding control of vector-borne diseases at and beyond current boundaries

- **Water Resources**
  - Rainwater harvesting and storage for domestic and irrigation water supplies
  - Protection of water supply sources
  - Improved water resource planning to accounting for heightened variability and vulnerability

- **Food Security and Agriculture**
  - No-till agriculture techniques
  - Improvements of seasonal weather forecasting for crops
  - Increased use of traditional crops to reduce crop-production variability
  - Development of drought and salt tolerant varieties

Types of Adaptation Projects and Interventions Proposed in NAPA in terms of Disaster Preparedness and Natural Resource Management

- Disaster Preparedness and Risk Management
  - Awareness raising
  - Information dissemination
  - Disaster resistant settlement and shelter

- Natural Resources Management
  - Community-based adaptation
  - Mangrove restoration
  - Sustainable fisheries

SIX PILLARS of Bangladesh Climate Change Strategy and Action Plan (BCCSAP)

(1) Food Security, Social Protection and Health;
(2) Comprehensive Disaster Management;
(3) Infrastructure Development;
(4) Research and Knowledge Management;
(5) Mitigation and low-carbon development; and
(6) Capacity Building and Institutional Development

The Action Plan consists of 37 programmes and 128 projects for implementation within the time period of 2009-2018. BCCSAP will be an integral part of national development policies, plans and programmes.

THANK YOU