

Public Health Disaster Preparedness for the Impact of Climate Change on Communities in Asia

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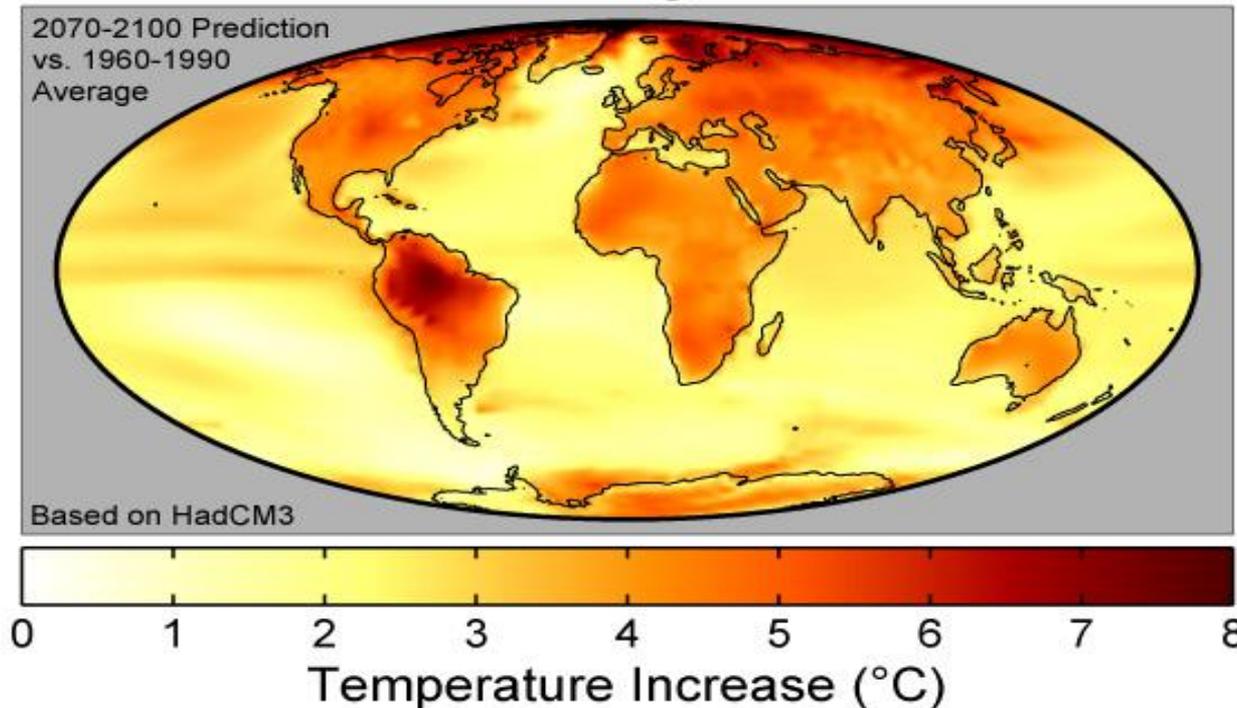




“Communities in Asia are victims of climate change; but the causes and solutions are global not local”

Climate change: a global or local issue?

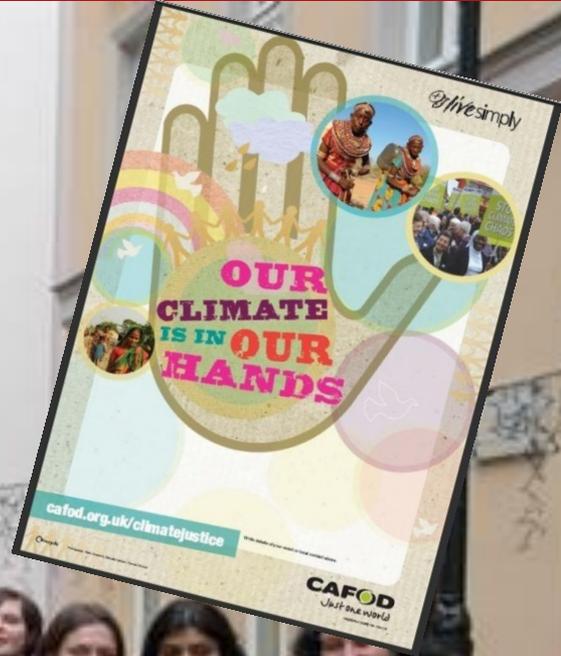
Global Warming Predictions



“.... A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.”

The geographic distribution of surface warming during the 21st century calculated by the [HadCM3](#) climate model if a business as usual scenario is assumed for economic growth and greenhouse gas emissions. In this figure, the globally averaged warming corresponds to 3.0 °C (5.4 °F).

OUR CLIMATE IS IN OUR HANDS



“Communities in Asia are victims of climate change; but the causes and solutions are global not local”

Perspectives on community health impacts...

- Climate change is magnifying public health challenges in communities in Asia, with potentially **disastrous consequences – requiring disaster management perspectives**
- Climate change should be addressed as inherent within other humanitarian development challenges; **poverty , inequality, vulnerability and particularly ecosystem damage.**
- There are complexities inherent in analyzing the causal relationship between global climate change and local effects, divergent debates and priorities in global platforms and community contexts, as well as confusion about what's meant by mitigation, adaptation **on global and local scales**
- Need to take an **ecosystem perspective** to understand effects on communities in Asia—**encompassing climate and environmental change**
- The threat varies with region, socio-economic and **public health context**, and the degree and nature of the climate risk, with **the poor affected first and worst.**
- Every threat posed by climate change has a public health aspect. Climate change has immediate, or primary effects – and also secondary effects on communities.
- *“Climate change will not introduce NEW causes of morbidity and mortality; but will change the distribution of factors which cause morbidity and mortality”* J. Samet, Climate Policy Program RFF Report 2008

Community public health multi-hazard risks :

- **Communities** are at the forefront of climate change effects;
 - This is where effects are observed and suffered
 - This is where adaptation and mitigation efforts need to take effect, and suffering reduced
- Climate change threatens public health in vulnerable communities through **increased numbers of disasters and emergencies**
- Climate change effects are increasing variability and **unpredictability in weather events as well as local habitats and ecologies**
- Climate change is causing changes to the patterns of transmittable diseases, especially **zoonotic and vector borne diseases with pandemic potential**

Projected disastrous consequences of climate change for community public health in Asia

- Can be difficult to project and assess and will vary widely spatially and temporally:
- Range from being quite specific e.g.. heat waves to more general e.g.. exposure to pollution
- Range from being acute e.g.. infectious disease outbreak, to longer term e.g.. chronic allergic diseases
- Exacerbate and strain underlying public health vulnerabilities and weaknesses
- This is a **disaster** at a local, national and global level – and needs to be managed as such

Mapping Disaster Risks - Global

Mapping Disaster Risks

A United Nations study released on Sunday compares data from several types of natural disasters against population and economic trends, highlighting areas with a high risk of death.

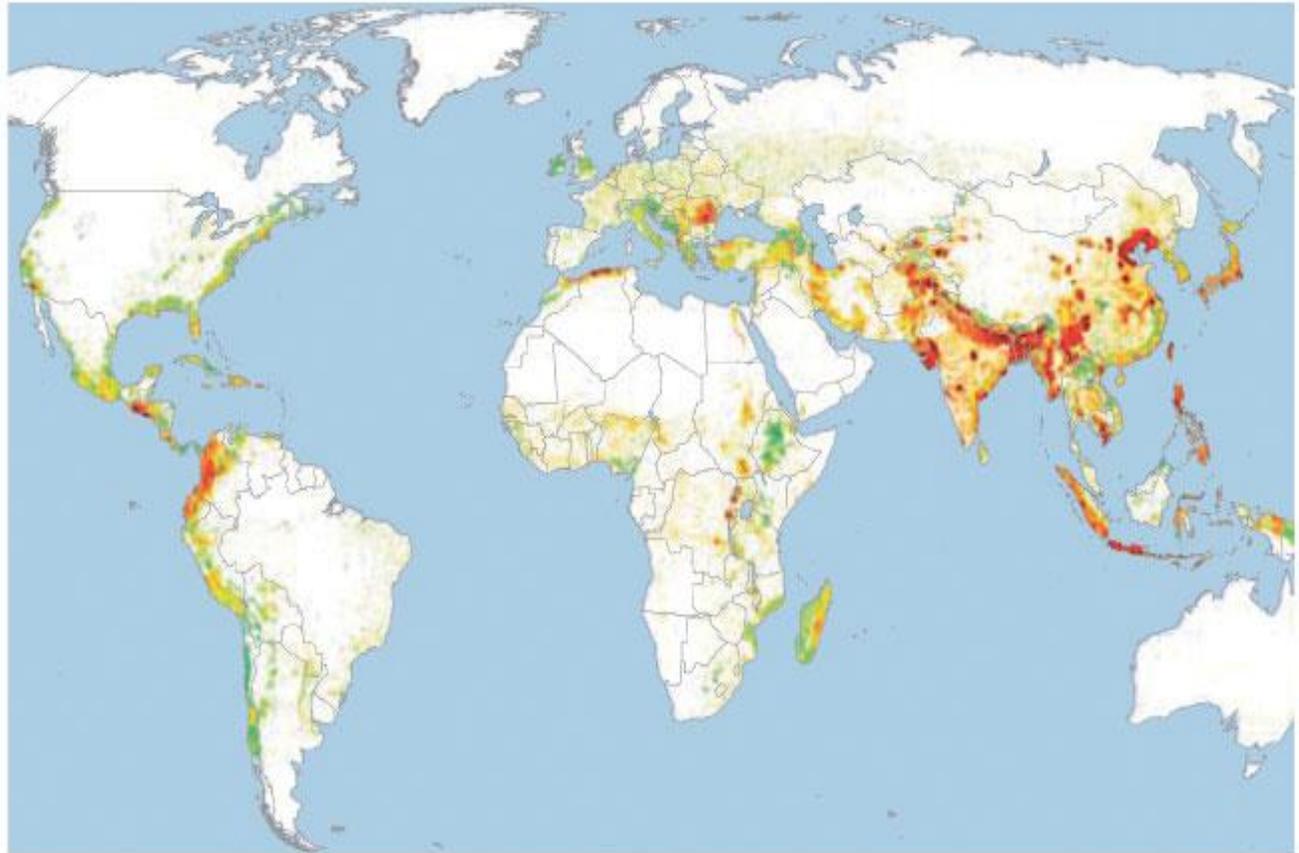
Combined risk of death

From cyclones, floods, earthquakes and landslides

Low High Unknown



Source: United Nations



THE NEW YORK TIMES

Disaster Risk Management: Context

Disaster risk = (hazards x vulnerability) / capacity

Disaster preparedness strategies: in place or required?

Disaster Risk is a function of:

- Hazard
- Exposure
- Vulnerability
- Capacity

Disaster Preparedness Processes and Management

 **Community level**

 **National level**

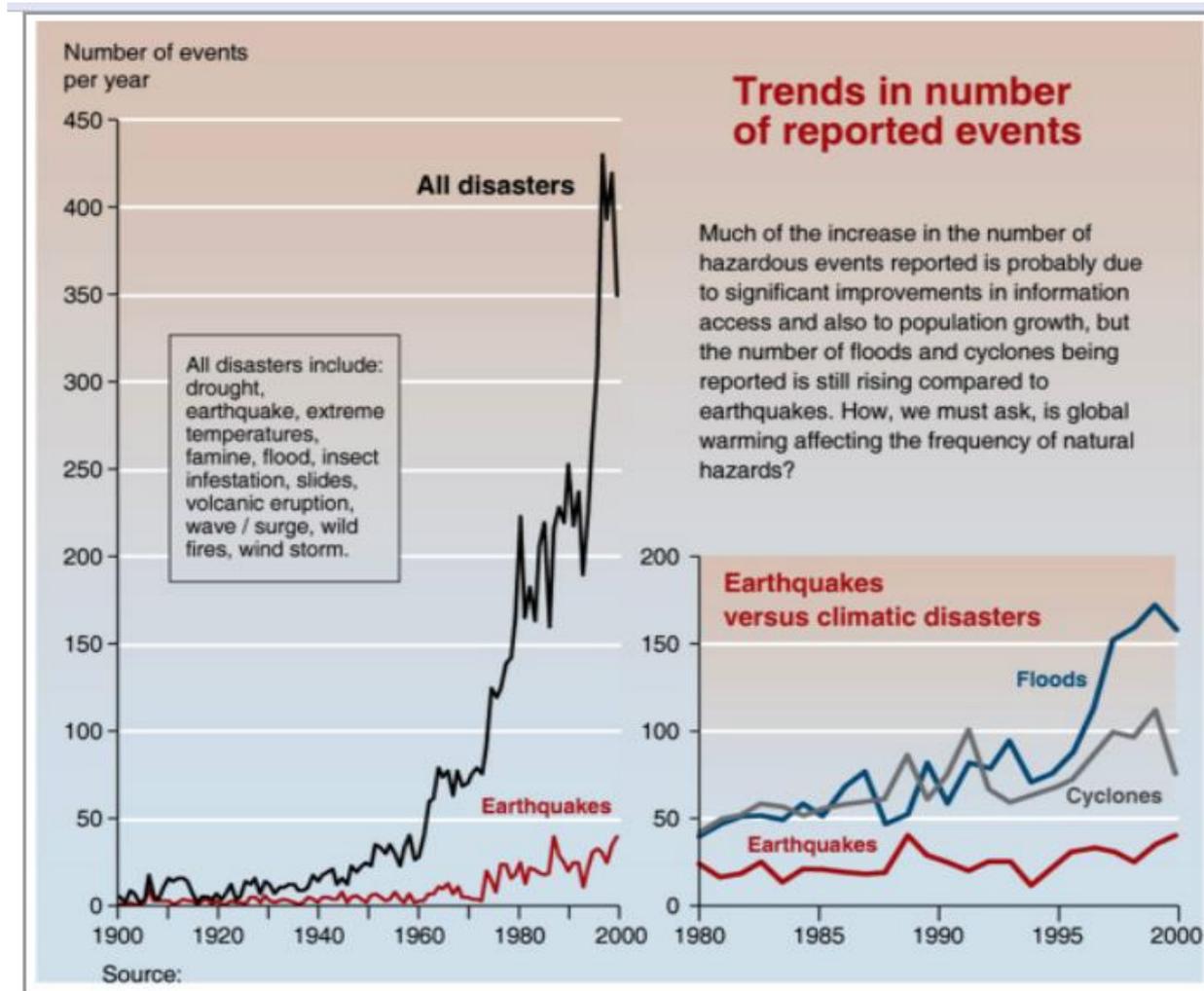
 **Regional level**

 **Global Preparedness**

Ecosystem change + intrinsic vulnerability = DISASTER

- **Access to food and nutrition**
- **Reduced access to safe water**
- **Population displacement**
- **Natural disasters increase**

Increase in disasters globally 1900s-2000s



Public Health Disaster Preparedness for the Impact of Climate Change on Communities in Asia:

Natural Disasters and Climate Change

- Rapid onset extreme **hydro-meteorological events**
- Slow onset changes in **ecosystems**
- **Secondary and further impacts** associated with socio-economic and ecological factors driven by both rapid and slow onset climate change events

= requirement for better disaster management



Disastrous Hydro-Meteorological Events

Increases in extreme hydro-meteorological events or Extreme Climate Events (ECEs) due to climate change increases the hazard from:

- Cyclones
- Flooding
- Storm surge
- Heat waves/cold spells
- Landslides

Increase in ECE's projected to increase, so we need:

- Vulnerability studies in consultation at local level – rural and urban
- Understanding of disaster risk through research, participatory resource gathering
- Disaster preparedness understanding, capacity building, training
- Disaster management policies, programs, practices



Extreme Flood Effects in Urban Communities in Asia:

“Under the fossil fuel intensive scenario (A1FI) downscaled forecasts show temperature increases of about 1.8°C by 2050 for the Asian Coastal Cities of Kolkata, Bangkok, HCMC and Manila.

Similarly, 24-hr extreme precipitation rates could increase by 14 to 16 percent for those regions.”



Source: “Study on Climate Impact Adaptation and Mitigation in Asian coastal mega cities: Interim Report”; July 8, 2008; Dr. Masahiro Sugiyama; Integrated Research System for Sustainability Science; University of Tokyo

3-7 August 2009: Typhoon Marakot



- ❑ Taiwan: 2777 mm precipitation in few days, mudslides, >300 deaths
- ❑ China, 1.5 mill evacuated, severe floodings



(wikipedia and news agencies)

Sep 23-30, 2009: Typhoon Ketsana



- ❑ Philippines, record precipitation
- ❑ Manila, 341 mm / 24 hours, flooding, >300 deaths
- ❑ Vietnam, >150 deaths



(wikipedia and news agencies)

Sep 28-Oct10, 2009: Typhoon Parma



- Hits northern Philippines
- New flooding
- New land slides, >500 deaths
- Irregular path



(wikipedia and news agencies)

Public Health Disaster Preparedness for the Impact of Climate Change on Communities in Asia:

Slower Onset Impacts of Climate Change

- More frequent droughts
- Crops failures driving poverty and malnutrition
- Access to safe water reduced leading to increases in water-borne diseases
- Famine and malnutrition due to crop failures / fishery resources or collapse of ecosystems
- Accelerated rural to urban migration into more exposed and vulnerable locations
- Dislocation due to sea level rise and flood basin inundation
- Effects on livelihoods, increasing poverty
- Conflicts over scarce resources
- Other socioeconomic effects

Ecosystem Change and Infectious Diseases

- Changes in the density or presence of disaster related organisms
- Changes in exposure pathways
- Changes in the genetics of pathogens
- Changes in the life cycle of pathogens and vectors
- Changes in species composition

Endemic, Epidemic, Pandemic Diseases

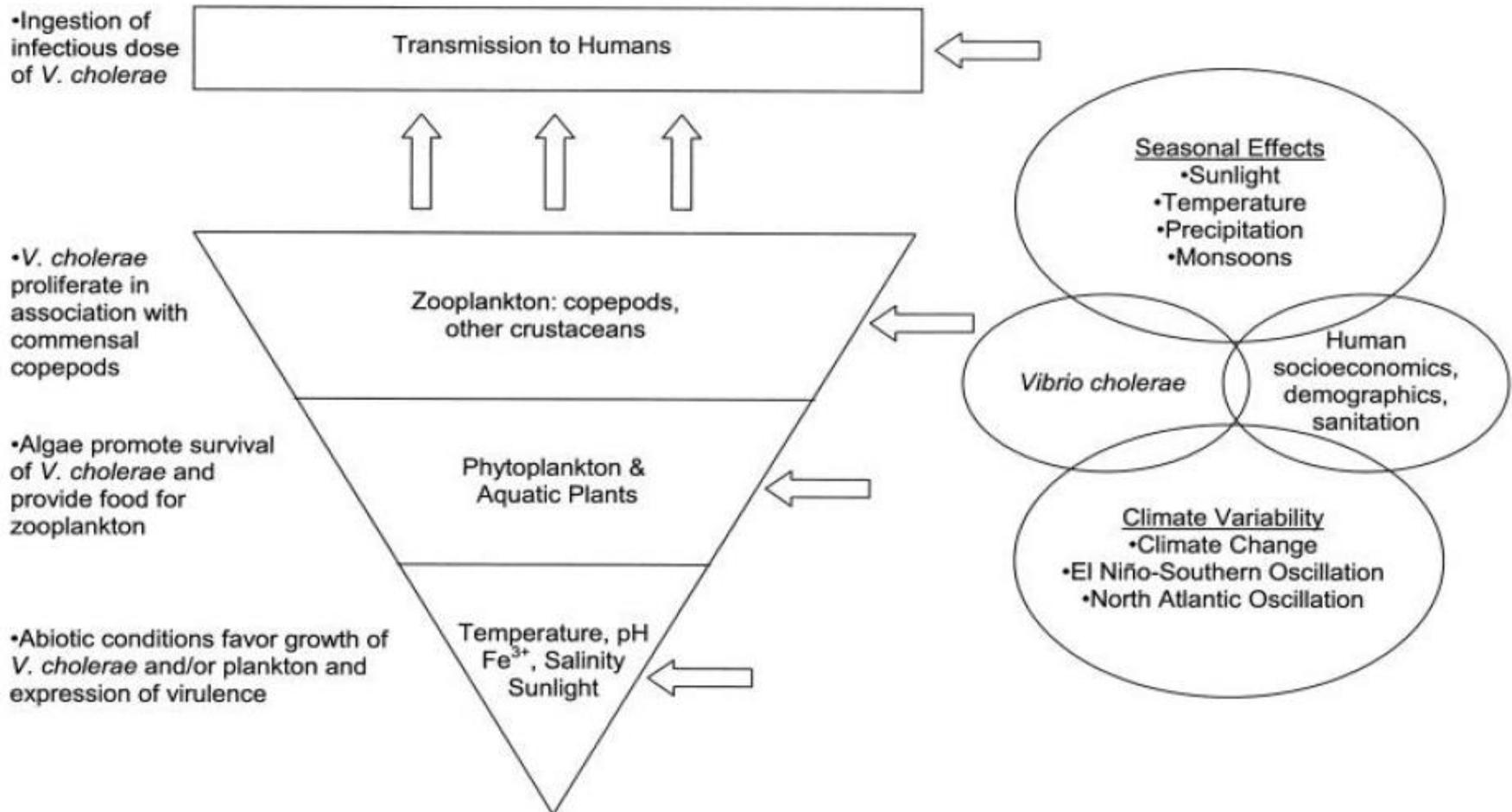
Hypothesis: Climate change is anticipated to cause changes in disease transmission, spread and effects. Endemic diseases may become more widespread, epidemic disease may become more extreme and unpredictable. Pandemics will occur across borders:

The following effects will increase:

- Waterborne and airborne diseases
- Infectious diseases
- Diseases mutation
- Cross-border transmission (forced migration and displacement)
- Zoonotics disease risk increases with human/animal populations sharing scarcer resources

Endemic Disease Spread with Climate Change

Figure 4. Hierarchical Model for Environmental Cholera Transmission

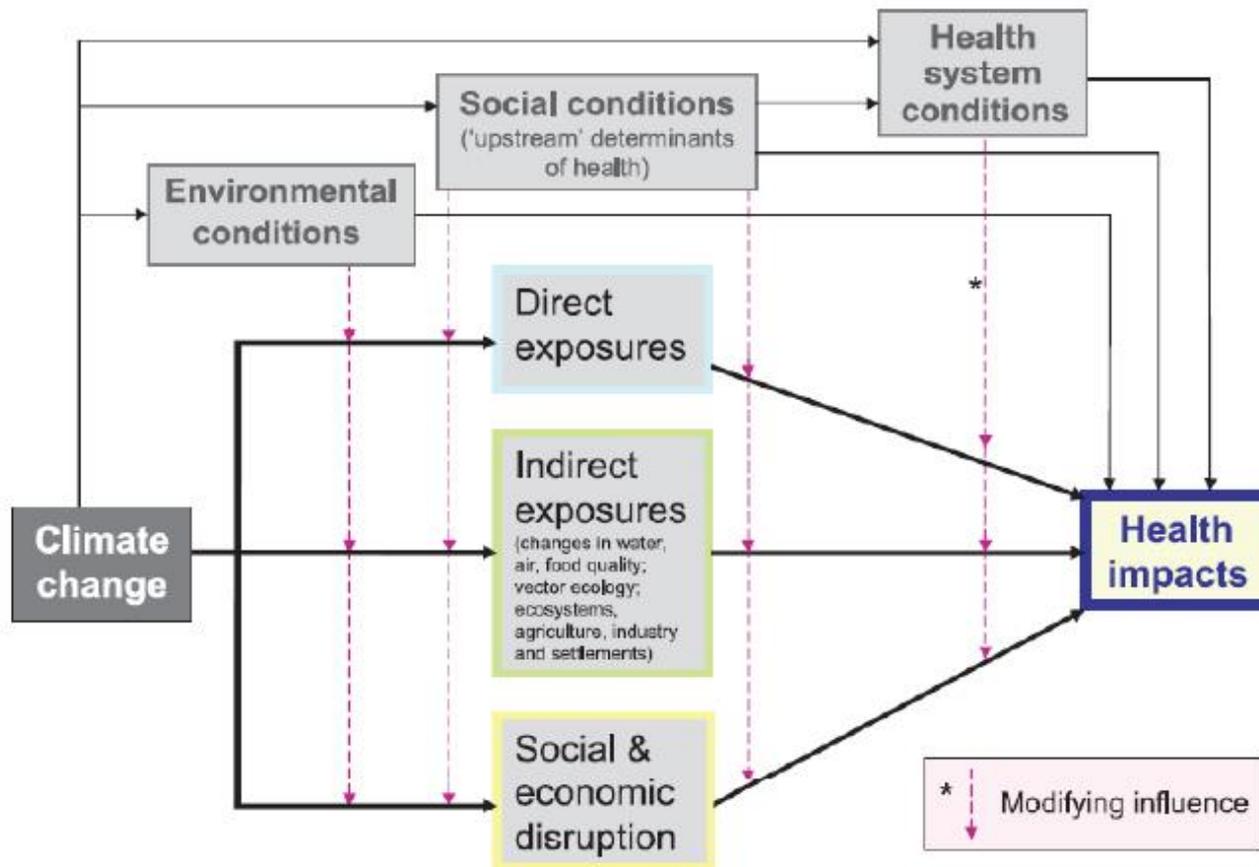


Secondary Effects of Extreme Events Increase Public Health Vulnerabilities

- Displaced persons from extreme events may congregate in camps or move to new locations increasing their exposure to contagious disease and may bring new disease to their resettlement areas
- Post flood epidemics (e.g.. cholera)
- Loss of livelihood by persons affected from the extreme event can lead to poverty and malnutrition.
- Malnutrition increases the vulnerability of a population to disease and is strongly linked to maternal and infant mortality rates.
- Post disaster psychosocial trauma can diminish ability to learn and productivity at work, which are both drivers of poverty.

Modelling the relationship of climate change and public health:

Figure 6. Schematic Diagram of Pathways by Which Climate Change Affects Health, and Concurrent Direct-Acting and Modifying (Conditioning) Influences of Environmental, Social, and Health System Factors



Source: IPCC 2007.

Cumulative Impact on Mortality

Table 3. Estimated Mortality (000s) Attributable to Climate Change in the Year 2000, by Cause and Subregion

Subregion	Malnutrition	Diarrhea	Malaria	Floods	CVD	All causes	Total deaths/million population
AFR-D	8	5	5	0	1	19	66.83
AFR-E	9	8	18	0	1	36	109.40
AMR-A	0	0	0	0	0	0	0.15
AMR-B	0	0	0	1	1	2	3.74
AMR-D	0	1	0	0	0	1	10.28
EMR-B	0	0	0	0	0	1	5.65
EMR-D	9	8	3	1	1	21	61.30
EUR-A	0	0	0	0	0	0	0.07
EUR-B	0	0	0	0	0	0	1.04
EUR-C	0	0	0	0	0	0	0.29
SEAR-B	0	1	0	0	1	2	7.91
SEAR-D	52	22	0	0	7	80	65.79
WPR-A	0	0	0	0	0	0	0.09
WPR-B	0	2	1	0	0	3	2.16
World	77	47	27	2	12	166	27.82

Notes: CVD, cardiovascular disease; AFR, African region; AMR, Region of the Americas; EMR, Eastern Mediterranean region; EUR, European region; SEAR, South-East Asian region; WPR, Western Pacific region.
Source: McMichael et al. 2004.

Disaster Prepared Communities:

Building a strong and resilient public health system now is a “no regrets” policy to reducing future climate change induced public health risks.

Building health systems which can cope with day-to-day emergencies, mean they are better able to cope with extreme events.

Disaster Resilient Communities require-

Locally Adopted Strategies and Disaster Mitigation Plans at all levels to address vulnerabilities

- Integration of disaster mitigation, preparedness, prevention and vulnerability in a sustainable development framework;
- Empowering local capacities and abilities to cope with adverse effects of unnatural situations; and
- Incorporating risk reduction strategies into the design and implementation of emergency programs in affected localities as well as communities
 - NO standard model of Disaster Mitigation in Communities in Asia
 - Strategies and Mechanisms vary country to country, region to region, local to local and even from individual to individual
 - Dependency on richer countries to support Programs, and Governments to carry our short term policies – often not institutionalised

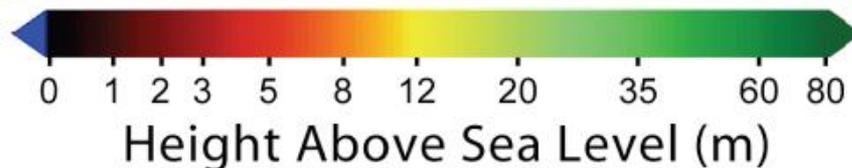
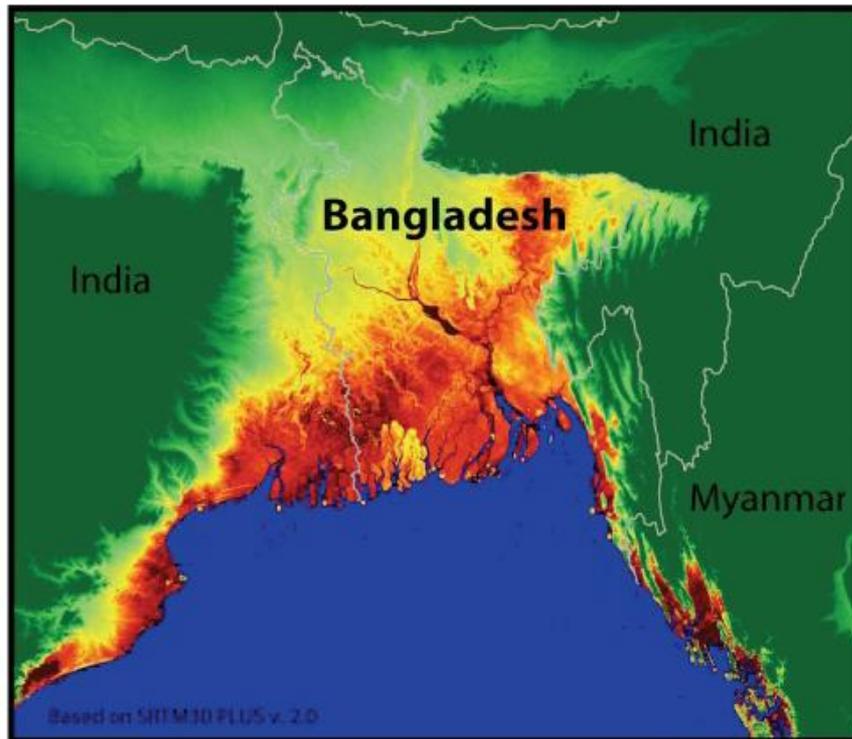
Ecosystems and community disaster risk:

Ecosystems change is a result of many aspects:

- demographic increase and dispersal / concentration
- water use and water cycle run-off changes
- economic development opportunities
- increased urbanization
- habitat reduction
- deforestation
- monocultures, cash crops, animal husbandry,
- poverty, impoverished infrastructure
- lack of education about community protection
- inadequate and unsustainable livelihoods

Cyclone Nargis: Extreme climate event + environmental degradation

2. May 2008:



- Storm surge from Nargis hits Irrawaddy delta in Myanmar
- Between 150 000 and 200 000 lost their lives



Ecological change: Combination of climate effects and environment degradation = **community vulnerability:**

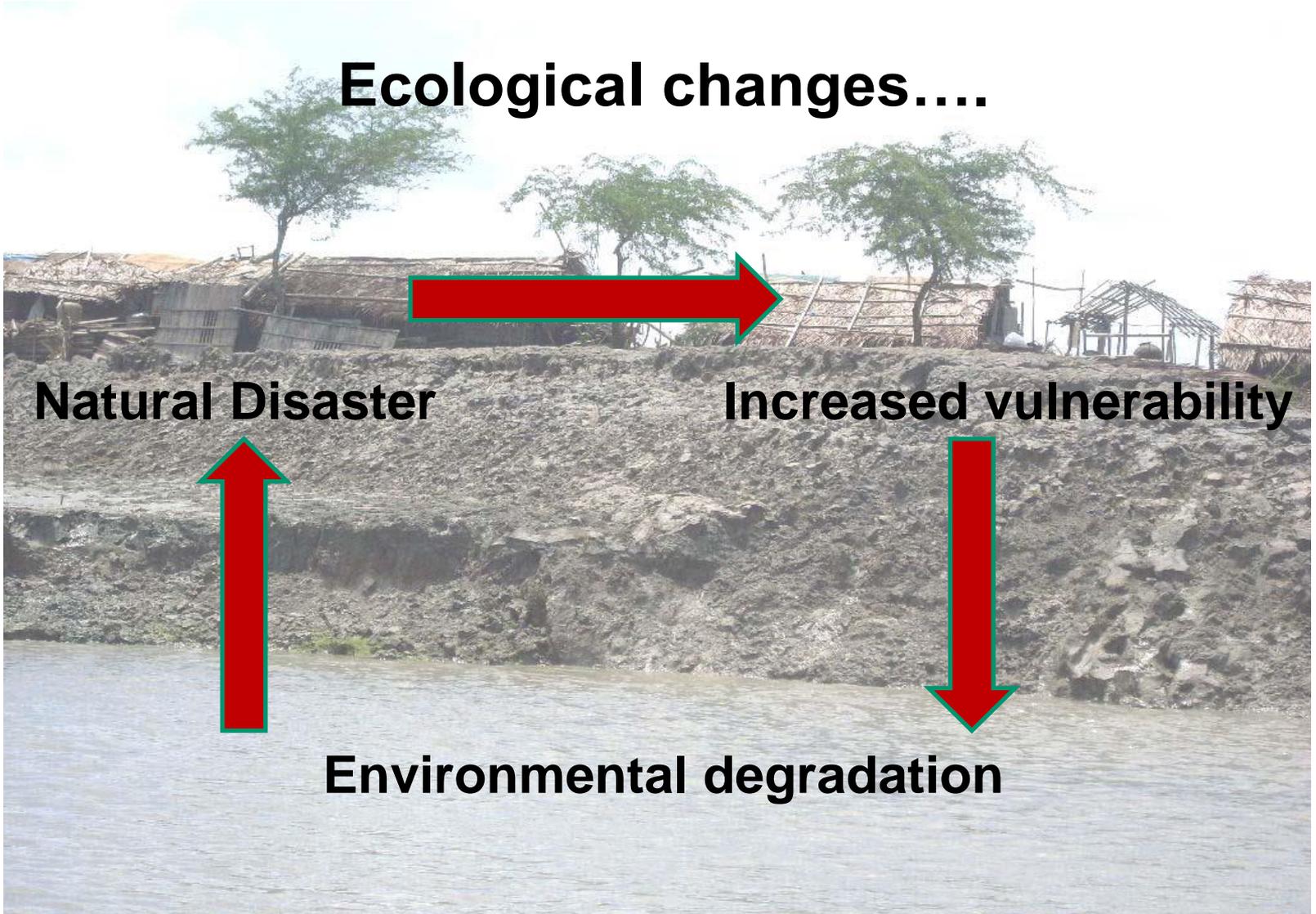
The example of Cyclone Nargis:

- In the delta, 75 percent of mangroves have been lost in the last 80 years
- Over exploitation of forest resources such Napa leaves
- Extensive farming led to more sowing areas for more yield
- Loss of mangroves for cropping put further stress on fishing,
- Sea level rise led to increased salinity in ground water sources such as ponds, wells – reduced any margin of protection – therefore increased vulnerability

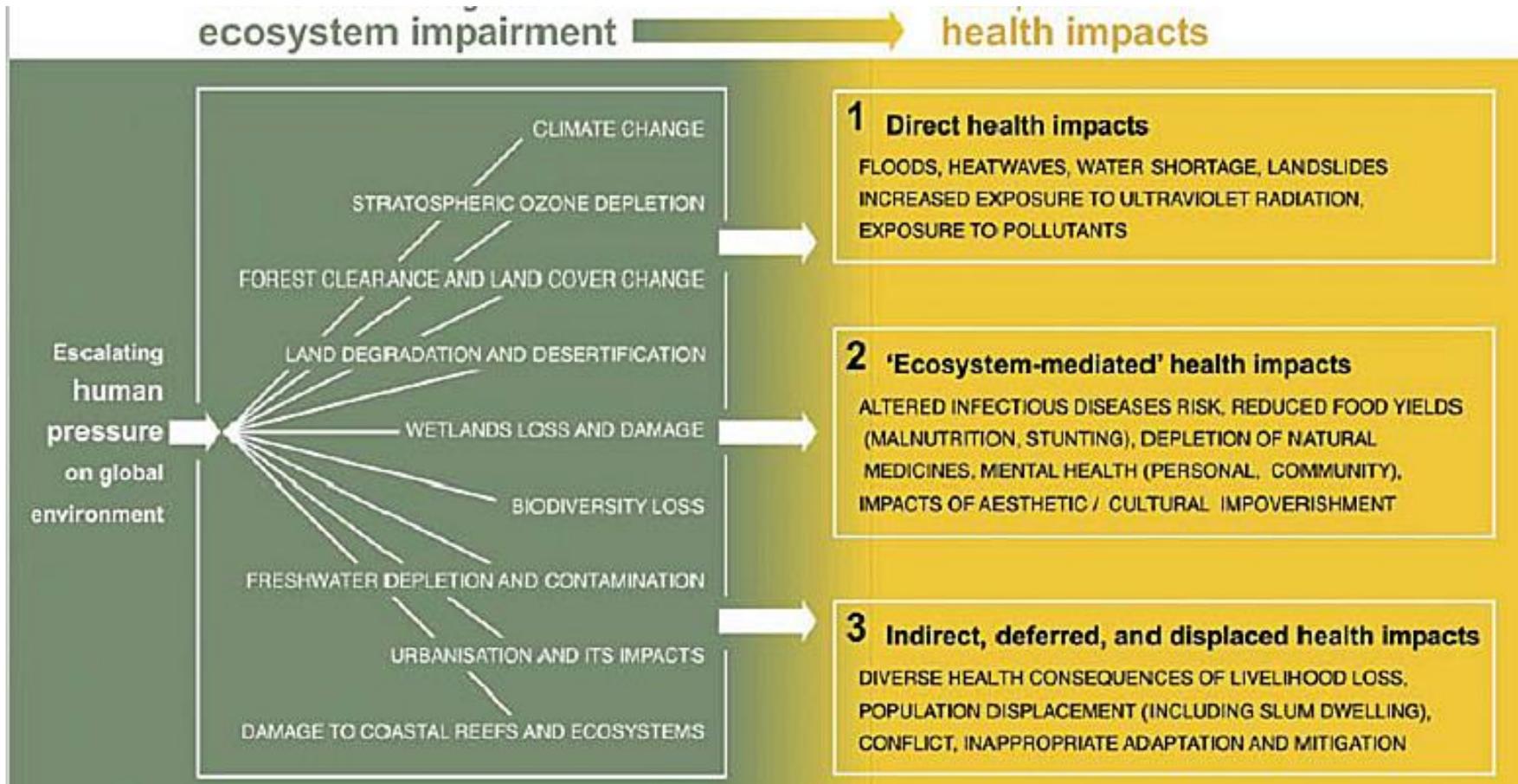


Cyclone Nargis becomes a major disaster

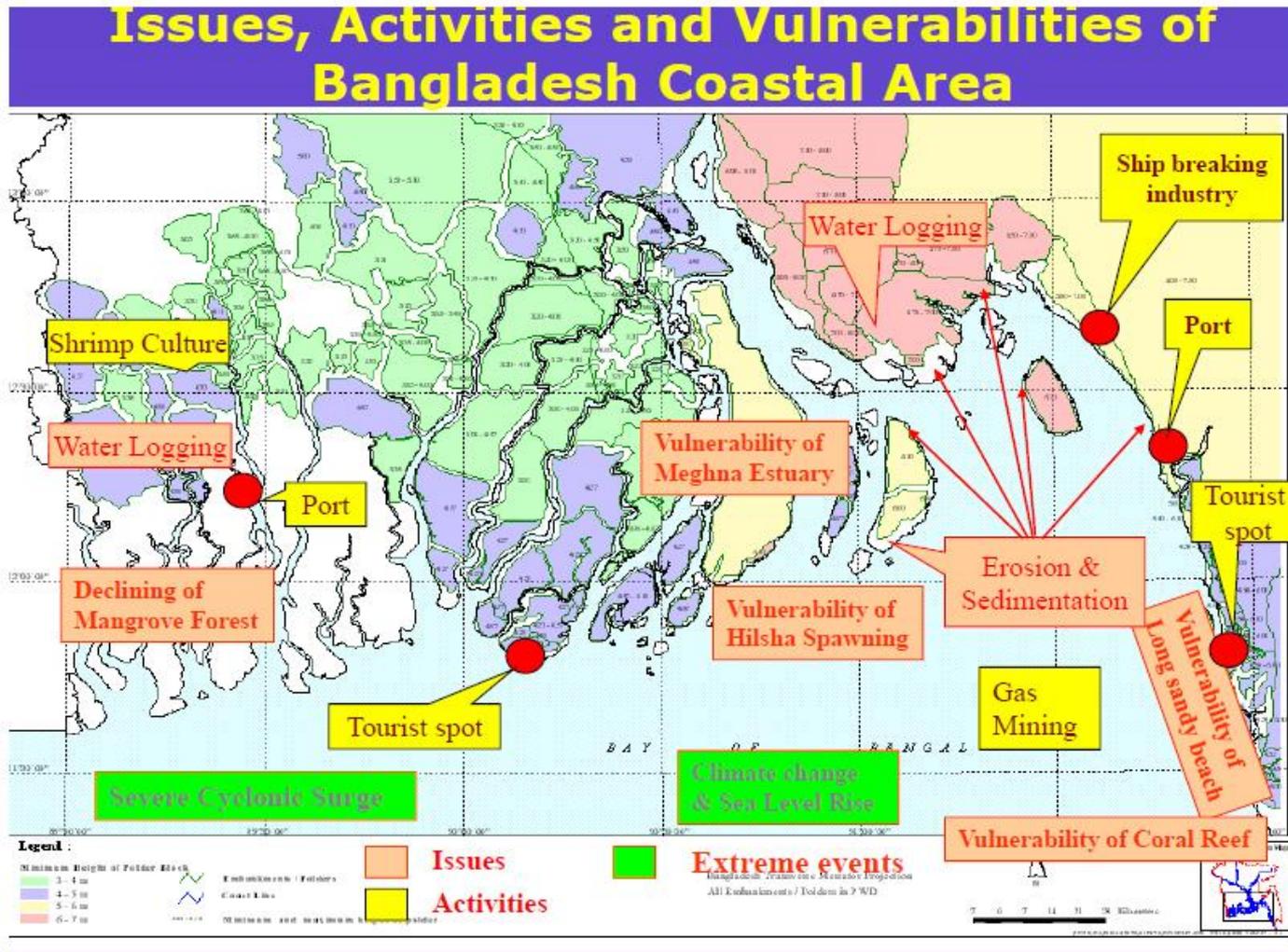
Ecological changes....



Ecological approach: the global and the local:



Mapping disaster risk: all community factors



“No regrets” approach – for community wellbeing and disaster management

- Communities need to be empowered to protect themselves
- Communities need subtle and effective strategies dealing with their own specific context
- Communities need to look at local level conditions which are effecting their vulnerability
- Resources need to be brought to bear at the local level
- There needs to be seamless local / national policies and practices on disaster management
- Research needs to be increased for adaptation and mitigation strategies at the local or micro level

ADPC Projects on Public Health in Emergencies:

- **Helps preparedness in Public Health Systems for climate change. Prepares medical facilities and communities for unpredictable, multi-hazard effects - 'no-regrets' strategies in action:**

- Public Health Education Awareness, surveillance, disaster management
- Surge capacity, hospital and medical systems preparedness plans, Incident command systems, cross border regional health disaster initiatives,
- Community preparedness, Psychosocial Response to Disasters, Nutrition in Emergencies...

A holistic 'National Health Systems and Community' approach in Asia to Disaster Management

-

•Program for Enhancement of Emergency Response (PEER):

CADRE: Community Action for Disaster Response Course – To establish systems for enhancing community-level first responder capacity

HOPE : Hospital Preparedness for Emergencies Course – To improve the capacity of hospitals and medical facilities to be prepared to manage emergencies and mass casualty events



www.adpc.net/peer

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Headline

Disaster response in Pakistan

[3 Aug 2010 | No Comment |]



Northern Pakistan has been hit by destructive monsoon floods, which have killed more than 1,600 people. Up to 20 million more people are affected or displaced by the extreme flooding

PEER has been working in Pakistan since 2006, to strengthen the disaster preparedness and response capacity here. There are many challenges of poverty and weakened infrastructure, as well as insecurity and a history of devastating natural and man-made disasters.

[Read the full story »](#)

Featured



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[PEER Instructors Development Workshop in Bangkok](#)

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Public Health Disaster Preparedness for the Impact of Climate Change on Communities in Asia:

PHEMAP: Stronger Public Health Systems

Public Health Emergency Managers in Asia Pacific: Training emergency managers in broad-spectrum disaster management, central systems and coordination and community/facility preparedness

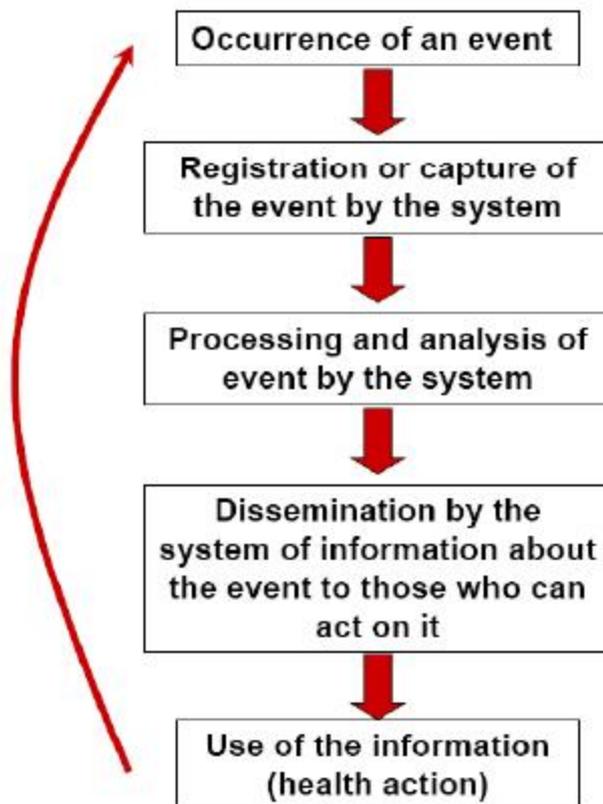
Effects of climate change on populations will depend on the public health system in place e.g.. some public health systems will be resilient and some will be overburdened

- What is the role of public health?
 - Protect and improve the health of communities
 - Prevention is fundamental to public health
- What are the general strategies for identifying /managing threats to public health?
 - Monitoring and surveillance of health threat assessment
 - Building adaptation to climate change and community resilience = ACTION

Public health systems will need to adapt and change to changing climate by identifying vulnerability, increasing monitoring of the health of vulnerable populations, and investigating changing health problems

Model of Public Health ECE Surveillance

Figure 1. Modeling a Surveillance System



Source: Teutsch and Churchill 2000.

Management of Zoonotic Disease:

- **ADPC -PHE team** is managing and innovative new project on Zoonotics funded by Rockefeller.

- **How will climate change affect Zoonotic Disease?**

Projected onset of endemic, epidemic and pandemic disease.

This can be brought about as an effect of population movement, debilitating health conditions such as malnutrition and increasing poverty and poverty housing, which in turn increases animal / human interaction and incubates disease.

ADPC Project Goal: To strengthen capacities to manage the risks of Zoonotic Disease Emergencies, including those with pandemic potential



Public Health Disaster Preparedness for the Impact of Climate Change on Communities in Asia:

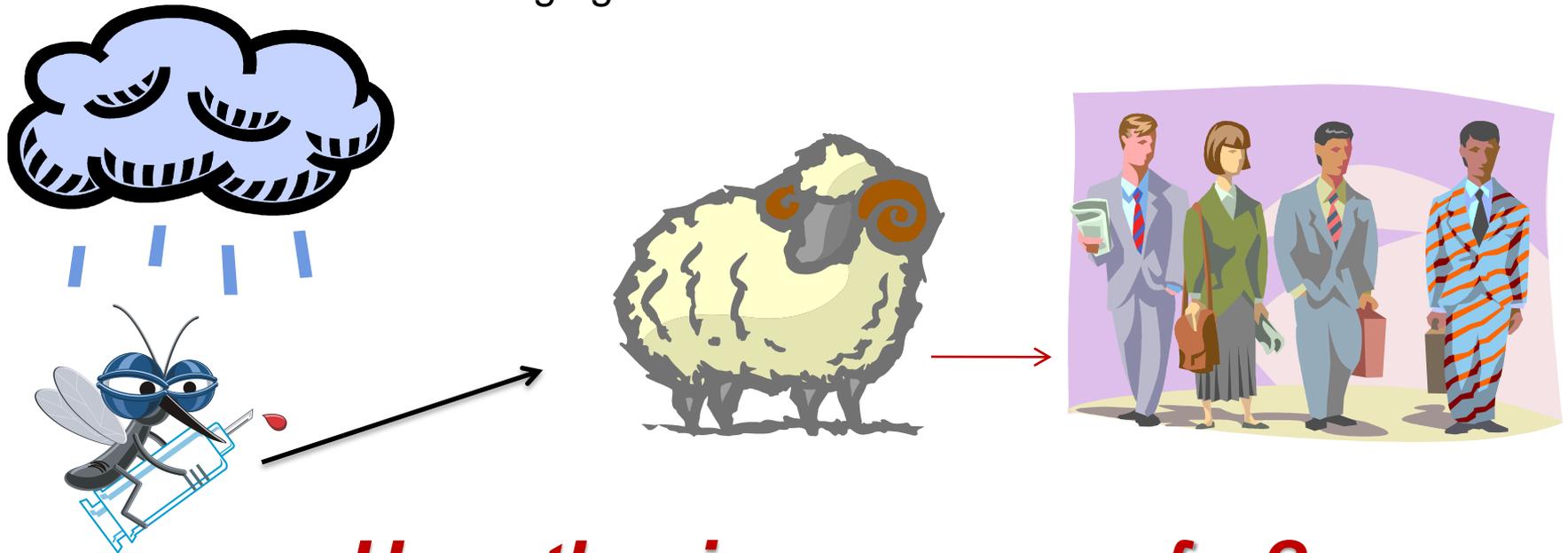
Zoonotic Diseases

- Infectious diseases that can be transmitted (in some instances, by a vector) from non-human animals, both wild and domestic, to humans or from humans to non-human animals



Hypothesis

- With climate change, temperature goes up and rainfall increases, especially in temperate zone
- Arthropod vector, and reservoir vertebrate host become active
- = Increase of emerging diseases



Hypothesis proven so far?

Climate Change and Anthropod / Zoonotic Disease = a complex relationship

- Newly emerged infectious diseases in humans are indeed **zoonotic**, but are **not arthropod-borne**. This infers they may only have a secondary causal relationship with climate change.
 - Ebola virus in 1976
 - HIV in 1981
 - (HPAIV in 1997)
 - Nipah virus in 1999
 - SARS coronavirus in 2003 etc.
- Dispersal and frequency of infectious diseases appears to be sensitive to climate change
 - Sin Nombre (Hanta) virus in Four Corners in USA
 - Bluetongue virus in Central Europe (Not a human disease)
- Zell et al,
in Current opinion in Biotechnology 2008,19:652

Zoonotic Diseases Training Package: One Health Initiative

“Strengthening capacities for communities in South East Asia to anticipate, prepare for and manage the risks of zoonotic diseases in emergencies”

The ***comprehensive package*** which is based on the “One Health Initiative” was undertaken by ADPC with funding support from the Rockefeller Foundation

The overall course objective was to provide a comprehensive training package in Zoonotic Diseases that is flexible and adaptable to multiple audiences

While many courses have dealt with individual components of this training package, this was the first to combine several elements into a complete ‘One Health’ programme

Modules were developed by ADPC, Murdoch University, Chiang Mai University and ICF Macro



‘Zoonotic Diseases Training Package ‘One Health Initiative’

Modules

- 1. Global Health**
- 2. Zoonotic Diseases**
- 3. Epidemiology**
- 4. One Medicine**
- 5. Ecology and Health**
- 6. Socio-economic Issues**
- 7. Disaster Risk Reduction**
- 8. Management Tools**

Using The 'Zoonotic Diseases Training Package

- The package is designed to be flexible, allowing it to be modified for a variety of audiences or training purposes – e.g. Youth or community groups, vulnerable groups, villagers in key areas such as cross-border vicinities
- Users of the package can choose to use certain modules only, to simplify or expand the module content, to use different teaching methods, or to translate it into local languages or dialects
- Suggestions for usage included: train-the-trainers; combined medical and university student groups; local veterinary and health officials; Wide roll-out though International NGOs (e.g. IFRC), civil society groups etc
- Continued dialogue between academic and research organisations, with organisations working at the grassroots and in practical applications in Asian Communities
- Training methodologies use participatory techniques, and should be flexible and continue to adapt to local needs and learning methods

Public Health Disaster Preparedness for the Impact of Climate Change on Communities in Asia:

Psychosocial Responses to Disasters:

- The management of psychosocial responses to disasters and emergencies in children. The aim of the event is to identify challenges and gaps in capacity to deal with child psychosocial issues after disasters and emergencies in Asia.
- ADPC's initiative on Psychosocial Response to Disasters, with funding support from the Royal Government of Norway. The project will strengthen national capacity throughout Asia, to manage the psychosocial aspects of disasters and emergencies
- Psychosocial experiences from the Asian Tsunami and Cyclone Nargis
- Disasters – psychological perspectives and challenges – Europe / Asia
- Where are the gaps in Asia's capacity to deal with child psychosocial issues following disasters and emergencies?"

In conclusion....

“Communities in Asia are victims of climate change; but the causes and solutions are global not local”

The reality is that causes and solutions are often local and regional – this is a challenge and opportunity for disaster preparedness

- International conference such as this is the best opportunity to increase global understanding of this multi-faceted issue and find opportunities to work together
- Develop knowledge about the ecological nature of climate change effects on public health in urban as well as rural communities in Asia – incorporating local level ecological damage and change
- Understand that acting to mitigate climate change effects means working at the micro level, within the support network of national, regional and global health systems
- Adaptation strategies have to include disaster management plans and preparedness for health systems and communities

Further reading:

- Good overview of some climate change and public health impacts:
<http://www.rff.org/RFF/Documents/RFF-Rpt-Adaptation-Samet.pdf>

It covers various climate change risks and the role of public health; the surveillance measures used, and the preparedness measures needed. It does not really cover public health risks of more disastrous events e.g. flood - but focuses instead on atmospheric changes.

- New report from IRG shows highly impacted zones, and the vulnerability of refugees and IDPs - doesn't reference too many health effects specifically, but shows the broader picture of land loss, conflict, migration and related hazards.

http://www.preventionweb.net/files/12548_img.pdf

More on ADPC Projects on Public Health Emergency Preparedness

www.adpc.net/peer
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Thank you