Security Implications of Climate Change: Role of the Military

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President
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"Climate change is an all encompassing threat, directly affecting the environment, the economy, health and safety. Many communities face multiple stresses with serious social, political and security implications, both domestically and abroad. Millions of people are uprooted or permanently on the move as a result. Many more millions will follow."

-Kofi A. Annan

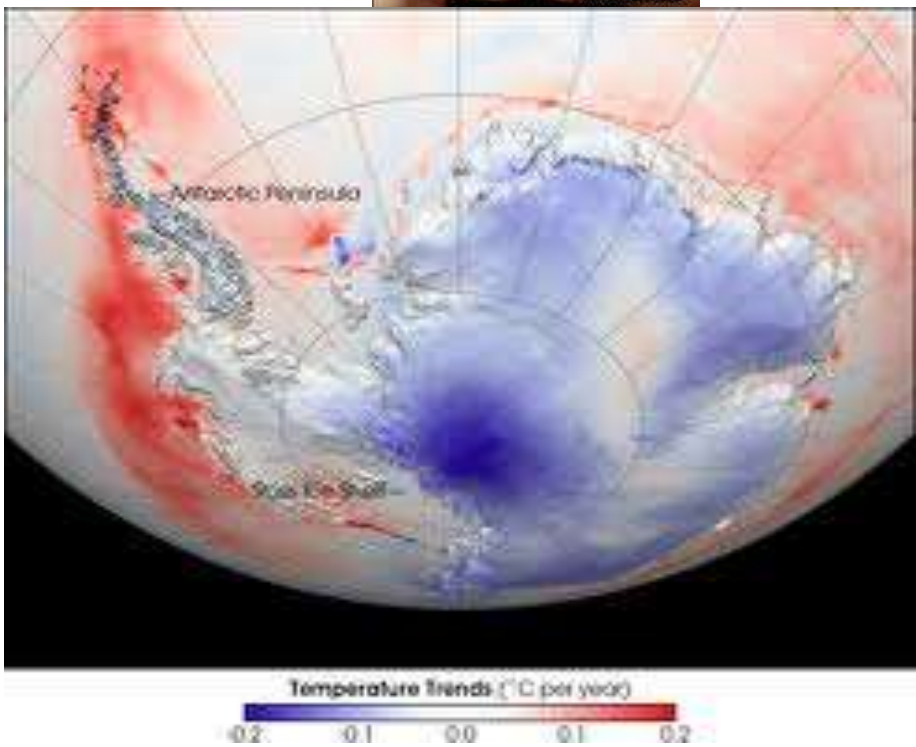
Flow of Presentation

- Introduction
- Climate change - facts.
- Threat Assessment

i. Human Security

ii. Hard Security

- Case Study: Bangladesh
- CCIS and roles of Military
- What needs to be done.



Introduction

- Climate change is increasingly recognised as a major security threat, both nationally and internationally, with serious consequences.
- It affects many aspects of international politics, economics, migration, human rights, development, trade, health and environmental systems.
- It can also act as a stressor making situations of instability, conflict and humanitarian crises more likely and severe.
- The interaction between these threats intensifies the challenges for international politics and could have a 'chain reaction' with unpredictable consequences.

Climate change as a fact

- The number of natural disasters in the world may double during the next 10 to 15 years, according to WWF.
- According to the figures released by CRED in Geneva, 3,852 disasters killed more than 780,000 people over the past ten years, affected more than two billion others and cost a minimum of 960 billion US$.

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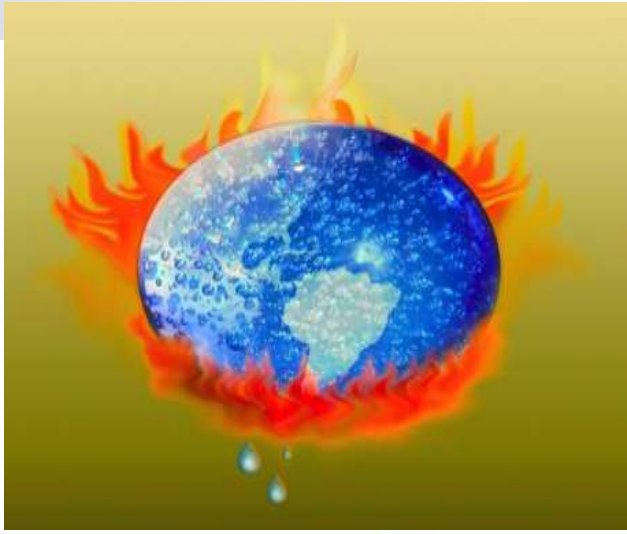
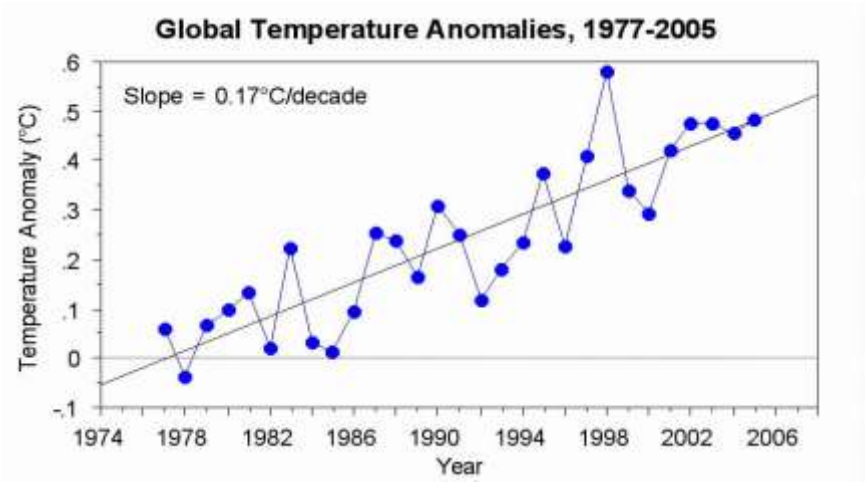
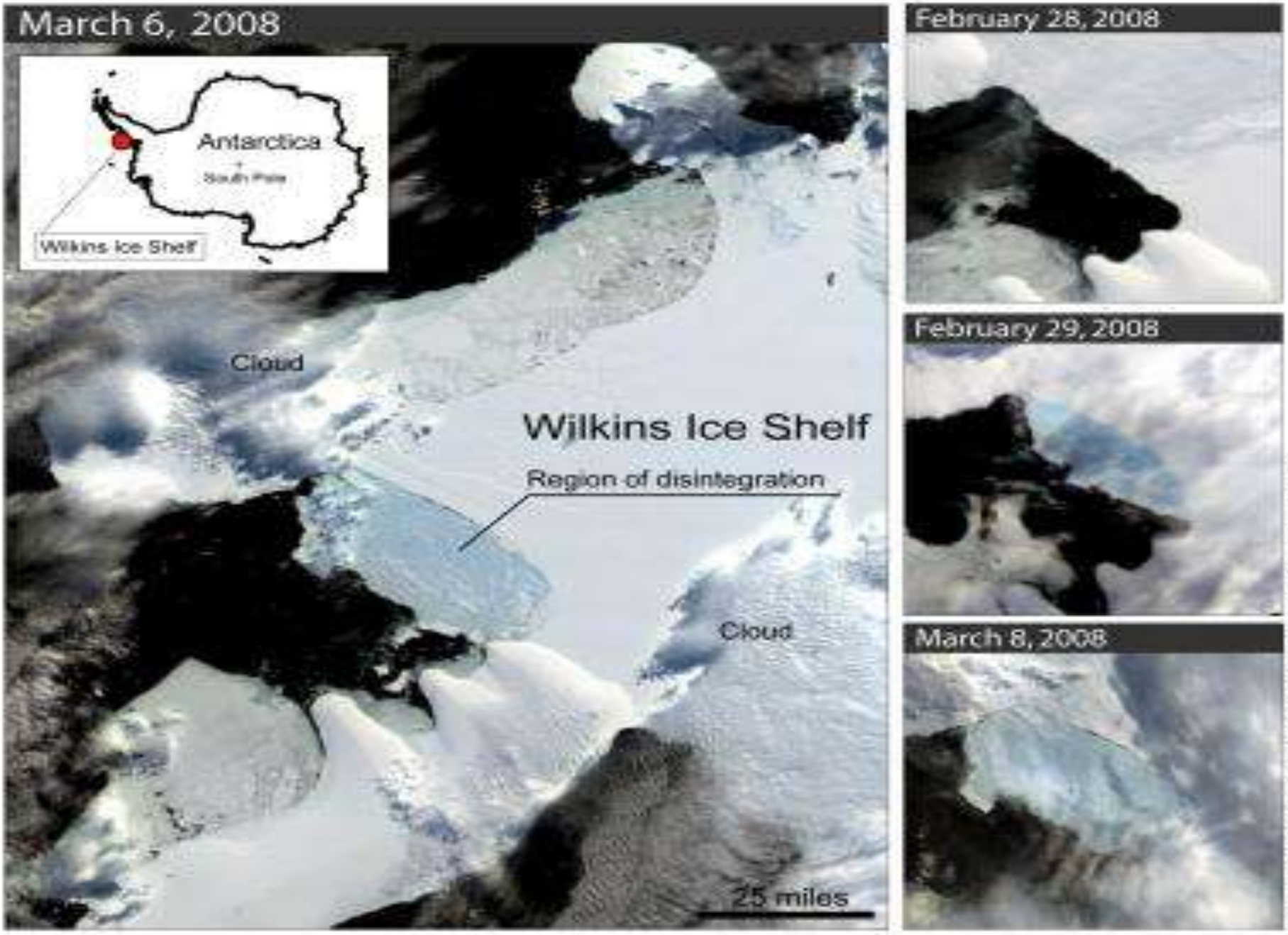


- The 2007 IPCC report predicts temperature rises of 1.1 - 6.4 °C (2 - 11.5 °F) by 2100.




March 6, 2008
Antarctica
South Pole
Wilkins Ice Shelf
Cloud
Wilkins Ice Shelf
Region of disintegration
Cloud
25 miles
February 28, 2008
February 29, 2008
March 8, 2008
National Snow and Ice Data Center, Boulder, CO

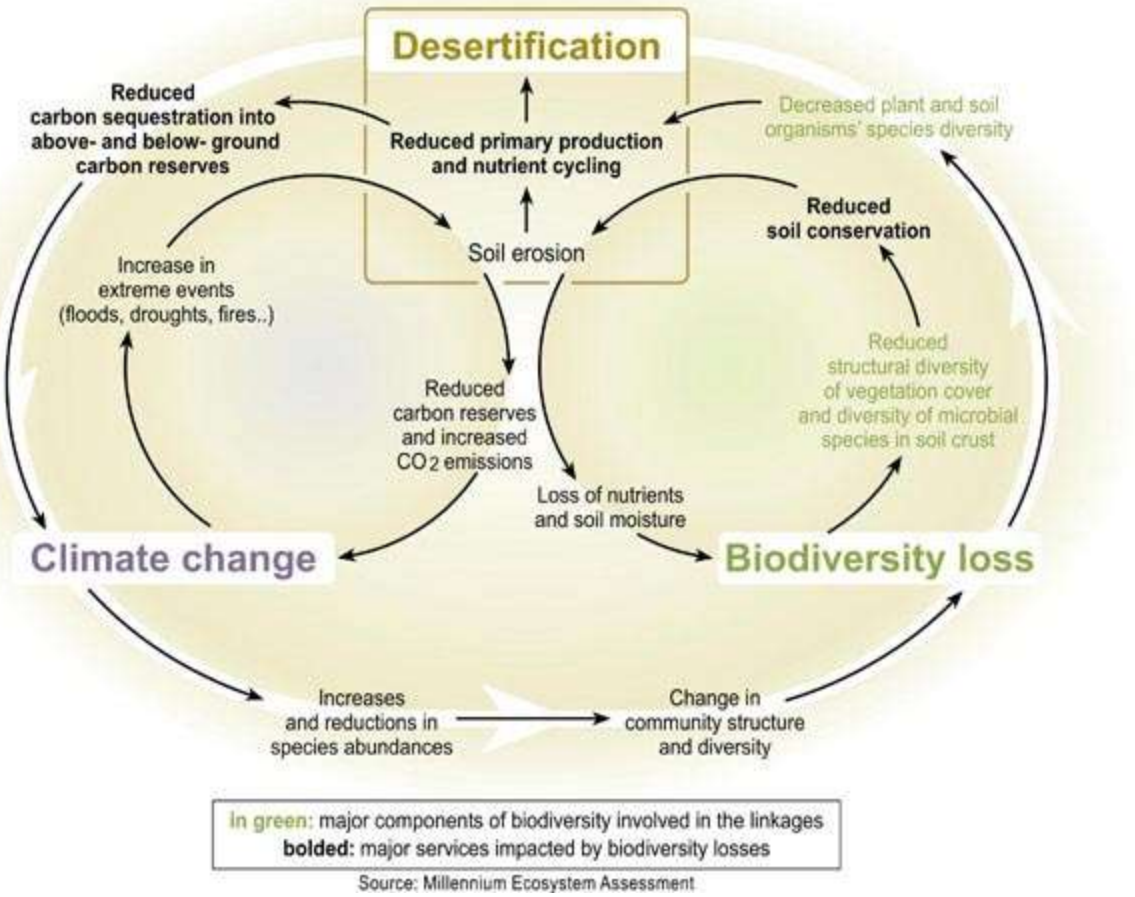
Contd.

- Sea level rise by 2100 predicted by IPCC will be .6 - 1.9 feet (18 - 58 cm). An additional 3.9 to 7.8 inches (10 to 20 cm) are possible if the recent surprising melting of polar ice sheets continues.

- The 2001 World Disasters Report of the Red Cross and Red Crescent Societies estimated of 25 million current "environmental refugees". And in October 2005 the UN University's Institute for Environment and Human Security warned that the international community should prepare for 50 million environmental refugees by 2010.

- The annual desertification/sand encroachment rate in certain districts of Kalmykia, north-west of the Caspian Sea, was recently estimated at a level as high as 10%, while in other localities it was 1.5-5.4%. The desert growth around the drying-out Aral Sea was estimated at about 100,000 ha per year during the past 25 years, which gives an annual average desertification rate of 4%.
- The Colorado River, the Yellow River in northern China, the Ganges in India and the Niger in West Africa are losing water, in some cases because of the effects of climate change, a study conducted by National Center for Atmospheric Research in Boulder, Colorado finds.

Desertification-Climate Change-Biodiversity Loss Nexus



A study by

বাংলাদেশ প্রকৌশল বিশ্ববিদ্যালয়
Bangladesh University of Engineering and Technology

- A study on Bangladesh, conducted by Bangladesh University of Engineering and Technology (BUET) has been found that due to the climate change overall access to the natural capital for the farmer group will be reduced from 75% to 54%. On the other hand, access to the physical capital and financial capital will be reduced to 63% and 30% from the present condition respectively. Access to the financial capital for the labour group will be reduced from 58% to 44%. Annual work days of farm laborers will be 40% less than their present situation.

- Climate change and desertification are two sides of the same coin and must be tackled together. “These two issues are very intimately related in the way you can describe them as two halfs of a coin," according to Yvo de Boer, executive secretary of the UN Framework Convention on Climate Change (UNFCCC). "Desertification, the loss of biodiversity and climate change are three inextricably linked aspects" he added.
- In 2009, The International Centre for Integrated Mountain Development (ICIMOD) studied 1,466 glacial lakes in Nepal, It identified six of them as candidates for glacial lake outburst floods (GLOFS).

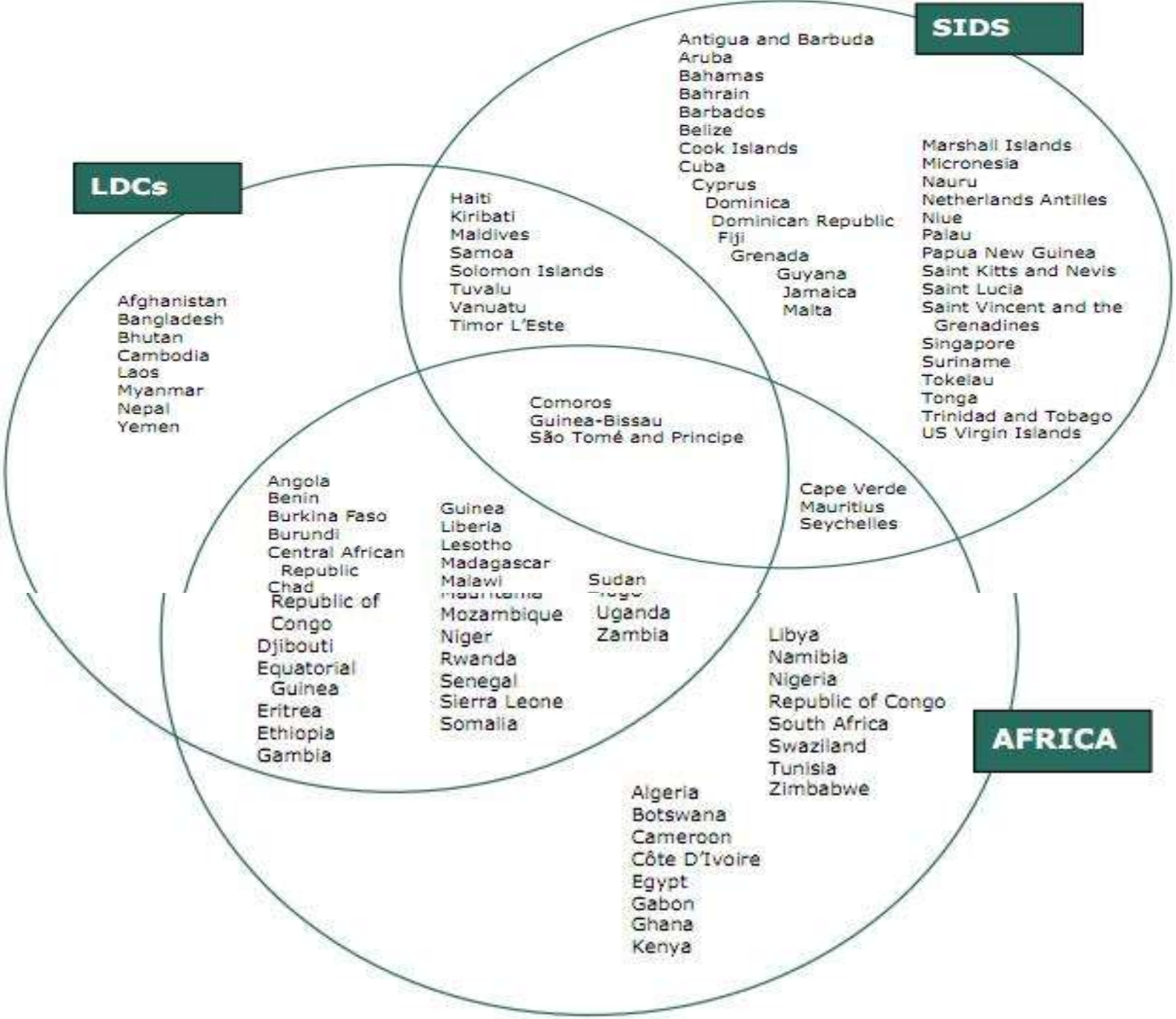
Threat Assessment

- Mainly two dimension;
  - Human/Non-Traditional Security
  - Hard Security
- Dimensions of human/Non-Traditional security:
  - Water Crisis
  - Food Security
  - Health Security
  - Disaster security.
  - Energy security
  - Climate Shock
  - Cultural threat
- Hard Security:
  - Socio-political and economic unrest.
  - Radicalisation and terrorism
  - Resource conflict
  - Inter and/ or Intra-state conflict potentials.
  - State collapse.
  - Regional conflicts.

Most vulnerable countries

IPCC states that the impacts of human-induced climate change are likely to be felt in poor countries and poor communities first. The IPCC highlights the following as being particularly vulnerable:

- **Small Island Developing States (SIDS)**
- **Africa**
- **Mega-deltas (particularly in Asia)**
- **The polar regions.**


SIDS
Antigua and Barbuda
Aruba
Bahamas
Bahrain
Barbados
Belize
Cook Islands
Cuba
Cyprus
Dominica
Dominican Republic
Fiji
Grenada
Guyana
Jamaica
Malta
Marshall Islands
Micronesia
Nauru
Netherlands Antilles
Niue
Palau
Papua New Guinea
Saint Kitts and Nevis
Saint Lucia
Saint Vincent and the Grenadines
Singapore
Suriname
Tokelau
Tonga
Trinidad and Tobago
US Virgin Islands
LDCs
Haiti
Kiribati
Maldives
Samoa
Solomon Islands
Tuvalu
Vanuatu
Timor L'Este
Afghanistan
Bangladesh
Bhutan
Cambodia
Laos
Myanmar
Nepal
Yemen
Comoros
Guinea-Bissau
São Tomé and Principe
Cape Verde
Mauritius
Seychelles
Angola
Benin
Burkina Faso
Burundi
Central African Republic
Chad
Republic of Congo
Djibouti
Equatorial Guinea
Eritrea
Ethiopia
Gambia
Guinea
Liberia
Lesotho
Madagascar
Malawi
Mozambique
Niger
Rwanda
Senegal
Sierra Leone
Somalia
Sudan
Uganda
Zambia
Libya
Namibia
Nigeria
Republic of Congo
South Africa
Swaziland
Tunisia
Zimbabwe
AFRICA
Algeria
Botswana
Cameroon
Côte D'Ivoire
Egypt
Gabon
Ghana
Kenya

Human/Non-Traditional Security Dimensions

- Water Crisis
- Food Security
- Health Security
- Disaster Security
- Energy Security
- Climate Shock
- Cultural threat

Water Crisis:

- Climate change makes water scarce and unfit for human consumption today and exacerbates unsustainable water use by farming sector in many water scarce regions.

- Warming of climate changes the nature of global rainfall, evaporation, snow, stream flow and other factors that affect water supply and quality.

- Climate change exacerbates water quality and availability in regions that are already struggling hardest with water scarcity: Africa, Southwest Asia, the Middle East and the Mediterranean.

FLOOD VICTIMS IN BANGLADESH

- **In South Asia, climate change increases the variability of water supply, leading to floods during some parts of the year and droughts in others.**

- **Currently 1.1 thousand million people are without access to safe drinking water.**

- **Demand for water is increasing due to world's growing population and countries which suffer the greatest water stress are generally those which lack the political and institutional framework necessary for the adaptation of water and crisis management systems ultimately leading to destabilization and violence.**

Food Security

- Reduced agricultural productivity is potentially the most worrisome consequence of climate change
- If global warming rises to 3^0 C it is likely that the number of people suffering from hunger will increase by 250 million to 550 million (Stern 2006:72)
- The combination of various climate change impacts will overstretch adaptive capacities in agricultural production (IPCC, 2007)

Food Security (contd)

- Desertification and soil erosion will lead to a decrease in available farmland and a reduction in potential yields (IPCC, 2007)
- Food production in river deltas may be substantially constrained due to sea level rise and coastal erosion.
- According to German Advisory Council on Global Change agricultural production from rainfed agriculture could fall by about 50% in some regions by 2020 (WBGU 2007)

Health Security

- A changing climate affects the essential ingredients of maintaining good health: clean air and water, sufficient food and adequate shelter.

- Every year the health of 235 million people is likely to be seriously affected by gradual environmental degradation due to climate change.

http://www.eird.org/publications/humanimpactreport.pdf

Health Security (contd)

- Climate change is projected to cause over 150,000 deaths annually and almost 45 million people are estimated to be malnourished because of climate change.

- Climate change-related diarrhoea incidences are projected to amount to over 180 million cases annually, resulting in almost 95,000 fatalities.

Source:http://www.eird.org/publications/humanimpactreport.pdf

Disaster Security

- In 2007, former UN Secretary-General Kofi Annan warned: “The humanitarian impact of climate change is likely to be among the biggest humanitarian challenges in years and decades to come. Action so far has been slow and inadequate compared with needs.”
- Direct economic losses of global disasters have increased in recent decades with particularly large increases since the 1980s.
- Climate change and variability are factors which influence trends in disasters.

(Cont)

- **2007 has been a year of climatic crises, especially floods, often of an unprecedented nature. They included Africa's worst floods in three decades, unprecedented flooding in Mexico, massive floods in South Asia and heat waves and forest fires in Europe, Australia, and California.**

(Cont)

- **According to Oxfam estimate developing countries will require at least US$50bn annually to adapt to unavoidable climate change.**

Energy Security

- Climate induced consequences negatively affect the key infrastructures and make it more vulnerable which has wide ranging security implications.
- The impacts of climate change may damage key infrastructures, such as energy supply, and consequently destabilise public order.
- The decline in hydroelectric power generation may additionally reinforce competition/conflicts over fossil energy sources.

Climate Shock

- **Climate change is expected to increase the intensity and frequency of climatic shocks.**
- **In recent years, abrupt climatic disasters are increasing in frequency and touching the lives of more people.**
- **Such abrupt disaster which is also termed as *'Climate Pearl Harbour'* is reinforcing wider risks and vulnerabilities, leading to short and long-term setbacks to human security.**

Cultural Threat

- Climate change can jeopardise the cultural heritage of people and society. As people are losing their places and livelihoods, increasing number of people are becoming climate refugees leaving their history and tradition behind.
- It is predicted that some of the endangered groups in Africa which are coming under further stress due to climate impacts will disappear in future, thereby posing a threat to the cultural security of the society and the state.

Hard Security Dimensions

- Social fragmentation
- Radicalisation and terrorism
- Resource competition
- Inter-state conflict
- Intra-state conflict
- State collapse
- Regional destabilization

Radicalisation and terrorism

- Radicalisation and terrorism may increase in many developing societies due to the climate induced social and economic deprivation.
- Many developing countries do not have the government and social infrastructures in place to cope with the types of stresses that could be brought on by global climate change.
- When a government can no longer deliver services to its people, conditions are ripe for the extremists and terrorists to fill the vacuum.

- The radicals and terrorists exploit these conditions as a recruiting ground by offering various social services to the people.
- Lebanon's experience with the terrorist group Hezbollah is a glaring example of how central governments' inability to provide basic services has led to the strengthening of a terrorist organization.
- The Rohingyas of Myanmar is also a very relevant example of how marginalized people get involved in radicalisation and subsequently to terrorism.

Inter-state conflict

- Rising tension
- Localised war
- Inter-state conflict/war

Inter-state conflict (contd)

"For centuries, wars have been fought for territorial expansion, ideological or religious dominance, and national pride. In the future, as climate change progresses and its effects become more pronounced, conflicts between states over natural resources could increasingly take centre-stage."

Byers & Dragojlovic,

Human Security Bulletin, October 2004

Intra-state conflict

- Ethnic conflict
- Civil strife
- Terrorism
- Social Fragmentation

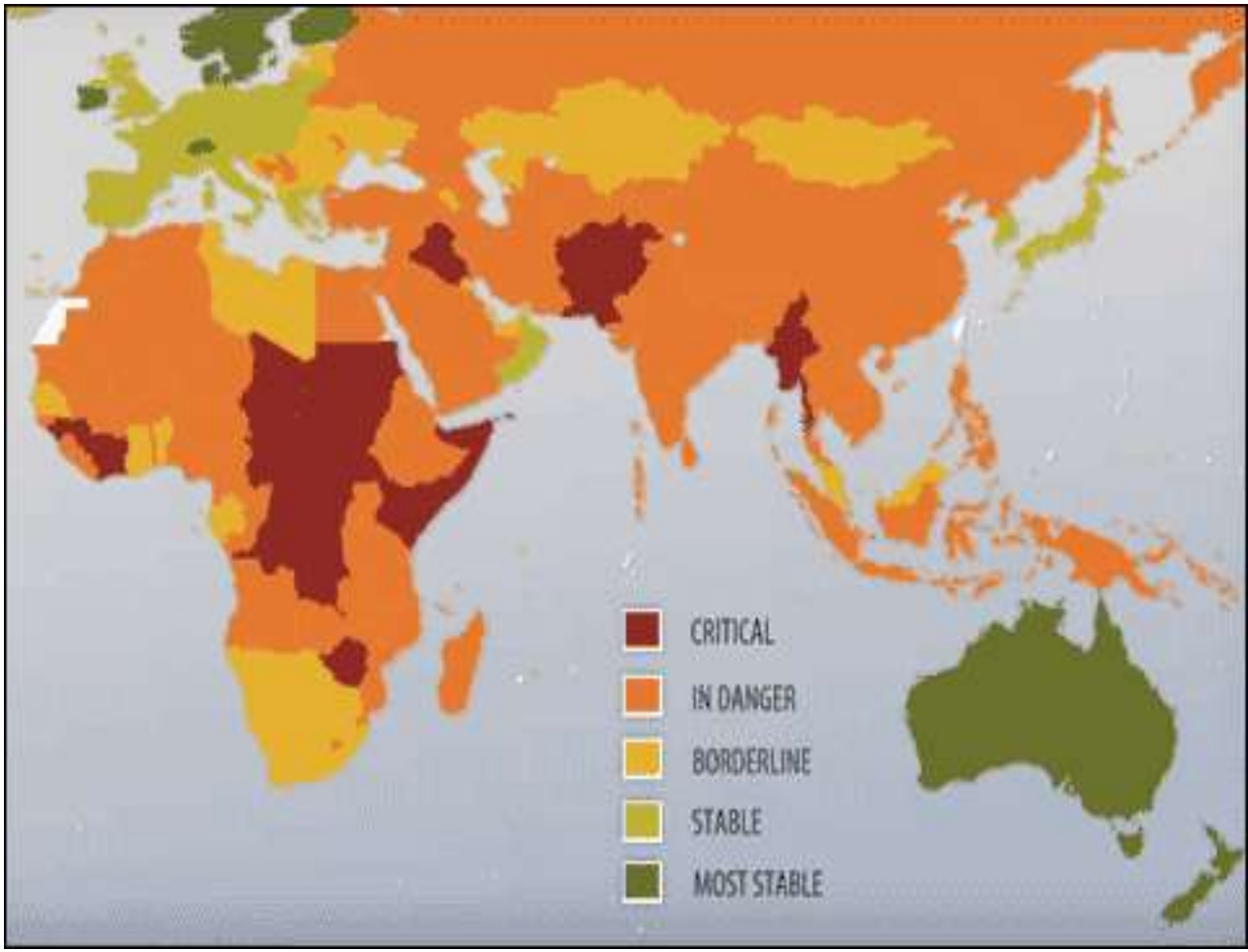
Conflict over resources

- Resource scarcity has the potential to be a contributing factor to conflict and instability.
- The 1994 genocide in Rwanda was furthered by violence over agricultural resources.
- The 1974 Nigerian coup that resulted largely from an insufficient response to famine.
- Situation in Darfur, Sudan, which had land resources at its root and which is increasingly spilling over into neighboring Chad.
- In the late 1990s conflict took place over timber resources in Liberia.

(Source: CNA Report, 2009)

State Collapse

- Vulnerable state
- Weak state
- Fragile state
- Failed state
- Non-state



Regional Destabilisation

- **Climate change acts as a threat multiplier for instability in some of the most volatile regions of the world.**

- **Projected climate change will seriously exacerbate already marginal living standards in many Asian, African, and Middle Eastern nations, causing widespread political instability and the likelihood of failed state.**

State Collapse

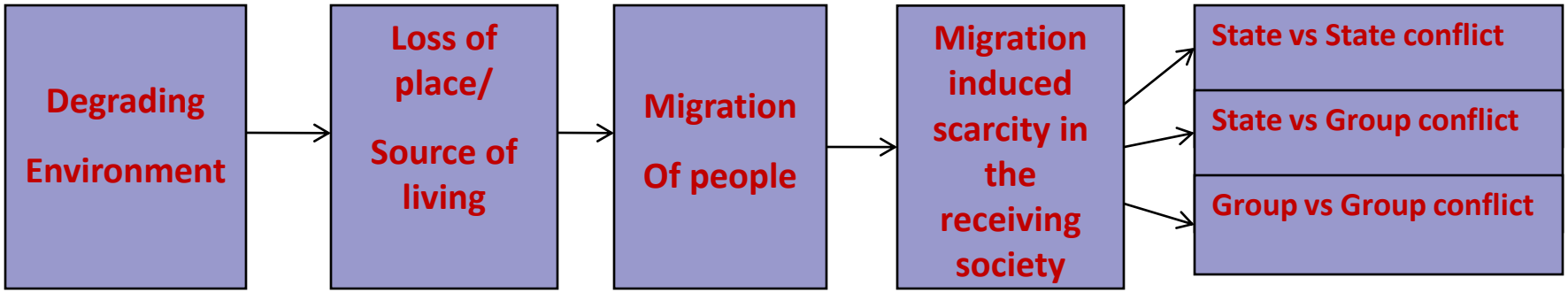
"When climate change significantly or environmental conditions deteriorate to the point that necessary resources are not available, societies can become stressed sometimes to the point of collapse"

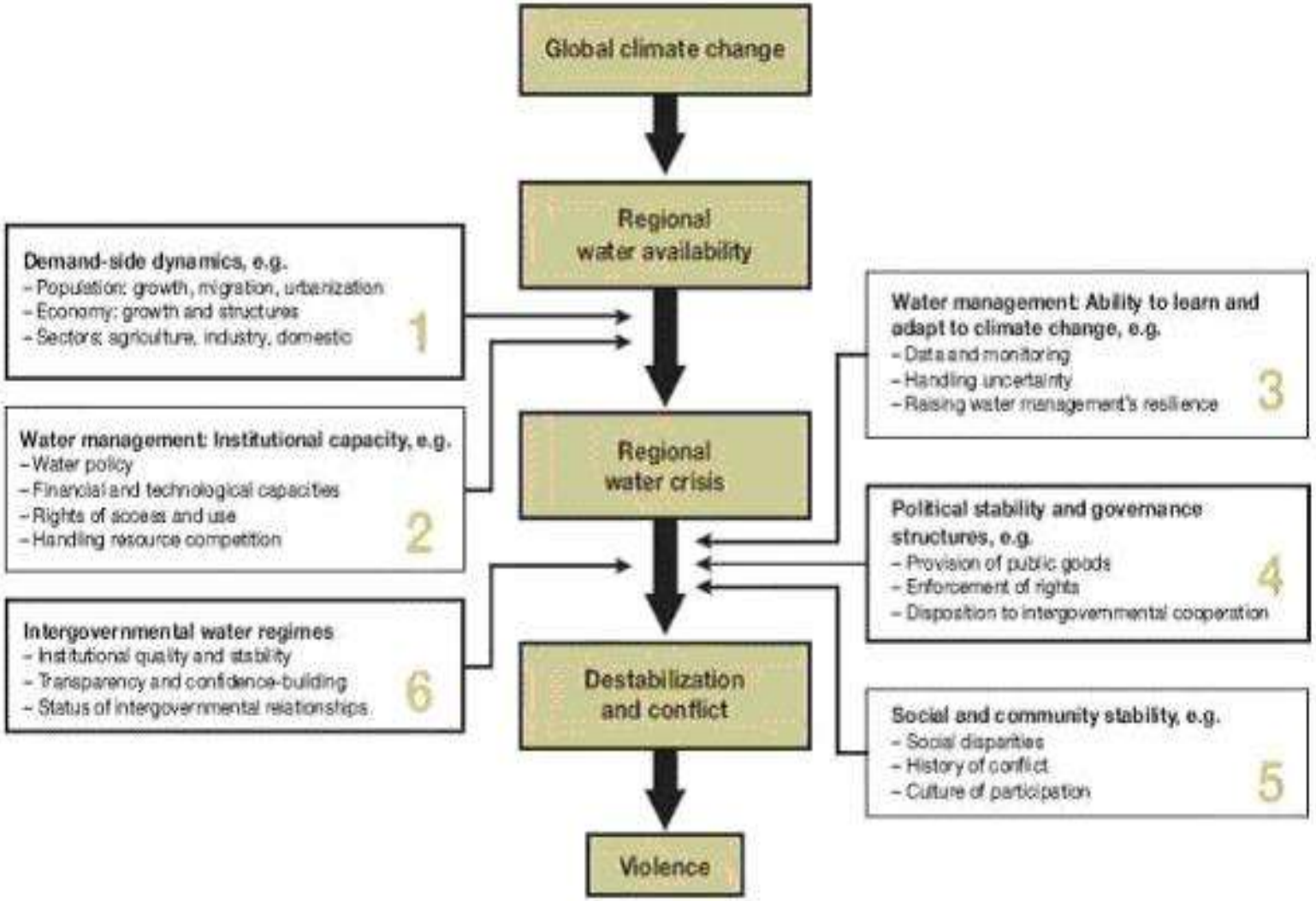
CNA Report on the National Security and the Threat of Climate Change

Threat Multiplier

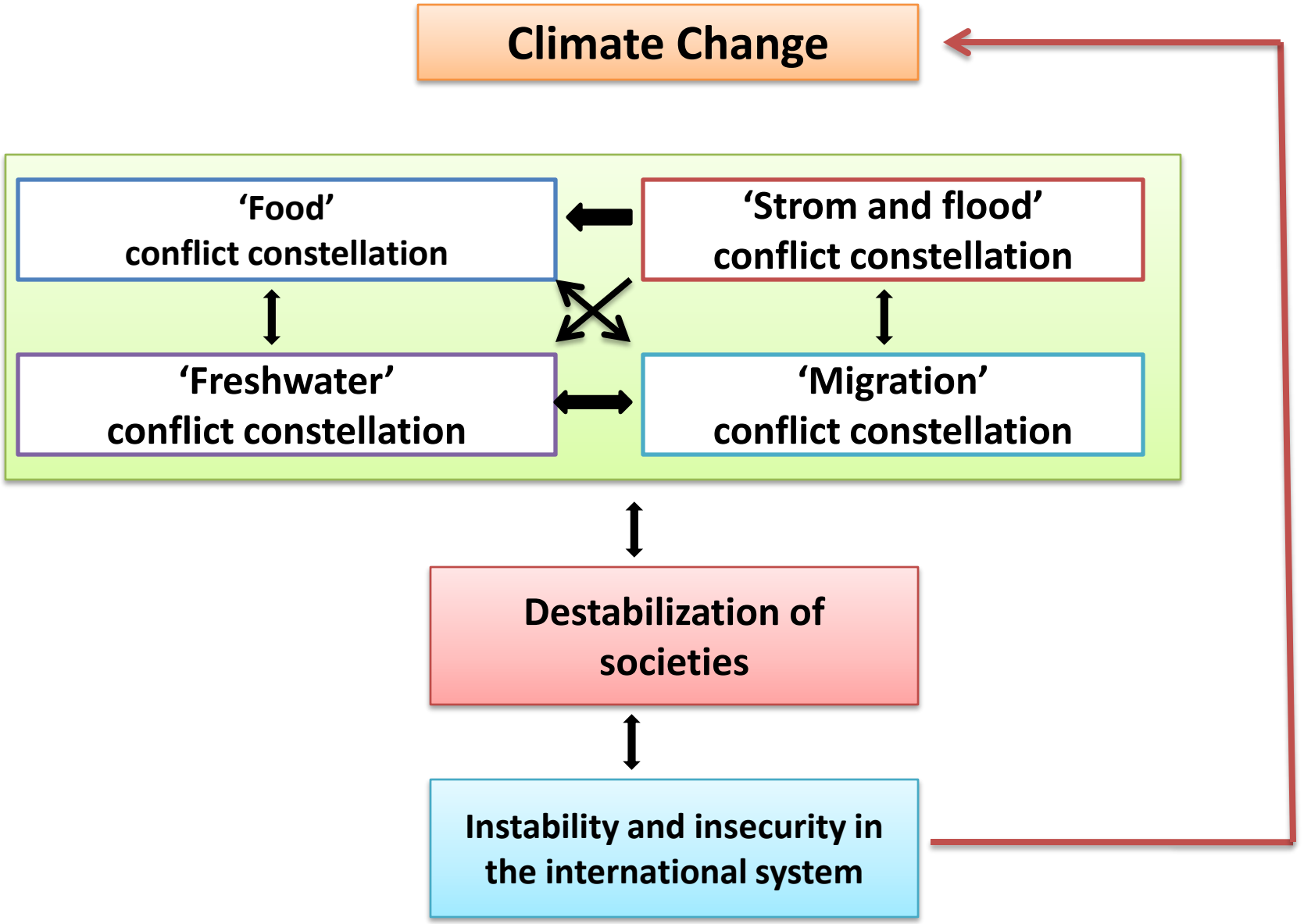
- The impacts of climate change will add significantly to existing tensions.
- It leads to economic collapses, massive human migration and escalation of existing conflicts between states.

The Environmental Trap: Environment and Conflict



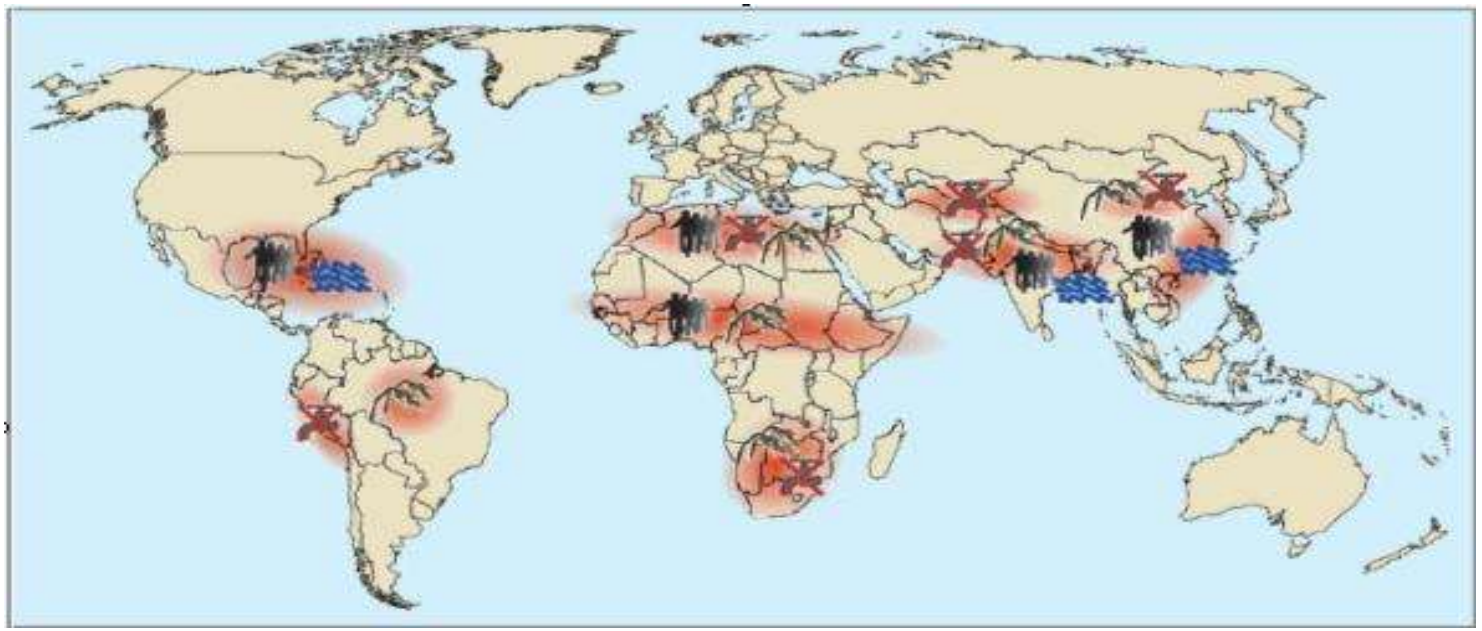


Climate Change, water and violence



Climate Change as drivers of international destabilization

Security risks associated with climate change: Selected hotspots



Climate-induced degradation of freshwater resources

Climate-induced decline in food production

Hotspot

Climate-induced increase in storm and flood disasters

Environmentally-induced migration

Case Study: Bangladesh

- The land area of the country divided broadly into three categories i.e. floodplain (80 %), Pleistocene terrace (8 %), and tertiary hills (12 %)

- Differences in the elevation between adjoining ridge tops and depressions range from less than 1 meter on tidal floodplains, 1 meter to 3 meters on the main rivers and estuarine floodplains, and up to 5 to 6 meters in the Sylhet Basin in the north-east.

- Floodplains located in the north-western, central, south-central and north-eastern regions are subject to regular flooding at different frequency and intensity.

- The coastal plain is subject to cyclones and storm surges, salinity intrusion and coastal inundation.

Key Environmental Stresses facing BD

- **Water:**
  - River flows have very large seasonal variations.
  - Water scarcity is a dry season.
  - Salinity in the estuarine areas, and water pollution in the marine zone.
  - Drawing down of ground water.
  - Arsenic poisoning.
  - Alarming Sea level rise.
- **Biodiversity:**
  - Over-exploitation of some very common species in an unwise manner has led to their being reduced to a vulnerable status.
  - The case of Sundarbans mangrove forest.
- **Disasters:**
  - Flood in Bangladesh is a normal phenomenon.
  - 1970-98: cyclonic storms and floods killed more than 4.6 hundred thousand and 41 thousand peoples respectively.
- **Land and Soil:**
  - Agricultural land is decreasing rapidly.
  - Riverbank erosion is rampant.
  - Physical, chemical and biological properties of soil are deteriorating.

Event	Impact
1954 floods	Affected 55% of country
1974 flood	Moderately severe, over 2,000 deaths, affected 58% of country, followed by famine with over 30,000 deaths
1984 flood	Inundated 52,520 sq-km, cost estimated at US$378 million
1987 floods	inundated over 50,000 sq-km, estimated damage US$ 1.0 billion, 2055 deaths
1988 floods	Inundated 61% of country, estimated damage US$ 1.2 billion, more than 45 million homeless, between 2,000-6,500 deaths
1998 floods	1,100 deaths, inundated nearly 100,000 sq-km, rendered 30 million people homeless, damaged 500,000 homes, heavy loss to infrastructure, estimated damage US$ 2.8 billion
2004 floods	Inundation 38%, damage US$ 6.6 billion, deaths 700, affected people nearly 3.8 million

Impacts of major floods in Bangladesh

The potential impact of a destructive flood in Bangladesh that sent hundreds of thousands of refugees streaming into neighboring India, touching off religious conflict, the spread of contagious diseases and vast damage to infrastructure. Indicating the severity of the problem, the deputy assistant secretary of defense for strategy Amanda J. Dory commented that: "It gets real complicated real quickly."

-New York Times

August 8, 2009

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Is Bangladesh sinking?

Bangladesh: Impacts of Climate Change

- Increasingly frequent and severe tropical cyclones.
- Heavier and more erratic rainfall.
- Increasing droughts, especially in drier northern and western regions of the country.
- Sea level rise leads to submergence of lowlying coastal areas and saline water intrusion.
- Warmer and more humid weather
- For Bangladesh, Climate Change is no longer a theory, but it is something already happening.

Photo: SIDR Devastation

Salinity affected areas in the coastal and offshore regions of Bangladesh

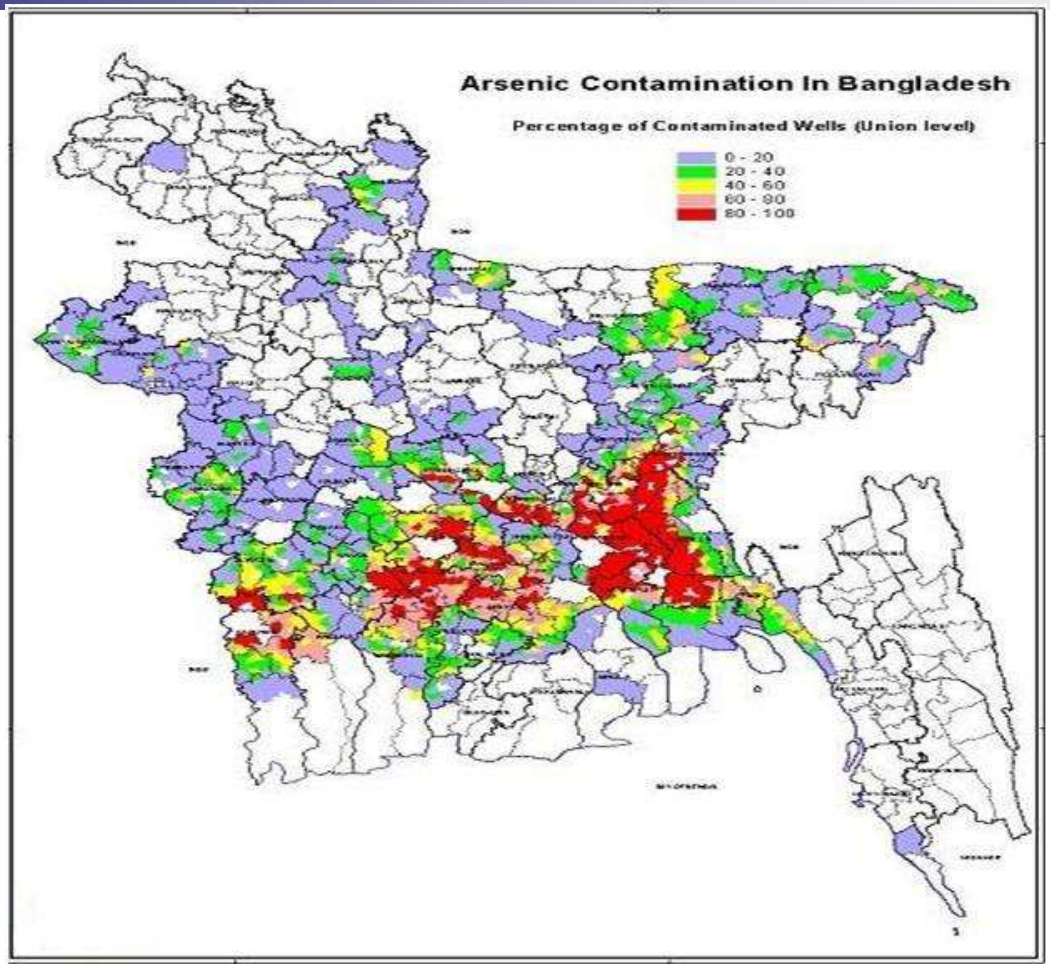
Description	Total cultivated area(ha)	Saline Area(ha)
Non-saline with very slightly saline	4,25,490	1,15,370 (27%)
Very slightly saline with slightly saline	4,20,420	3,09,190 (73%)
Slightly saline with moderately saline	2,57,270	2,40,220 (93%)
Moderately saline with strongly saline	1,98,890	1,98,890 (100%)

Source:http://www.pakbs.org/pjbot/PDFs/38(5)/PJB38(5)1359.pdf

- The coastal region covers almost 29,000 sq. km or about 20% of the country. Again, the coastal areas of Bangladesh cover more than 30% of the cultivable lands of the country. About 53% of the coastal areas are affected by salinity.
- The IPCC statistics shows that rising sea levels will wipe out more cultivable land in Bangladesh than anywhere in the world. By 2050, rice production is expected to drop 10 percent and wheat production by 30 percent.
- About 20 to 30 million people in Bangladesh alone could be on the move by 2050 because of climate change, causing the worst migration in human history.

Arsenic poisoning

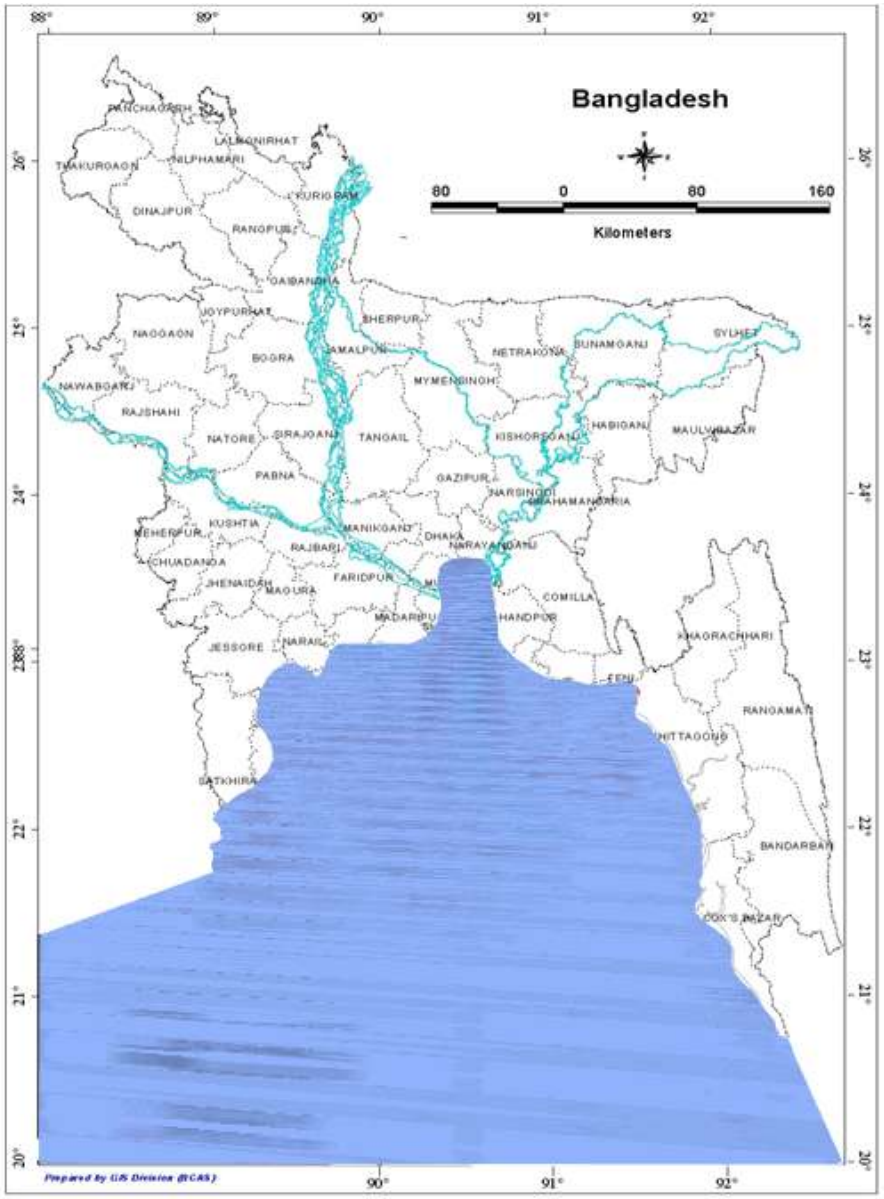
- **World Health Organization described the arsenic conatamination in Bangladesh as *"the largest mass poisoning of a population in history".***
- **The results of a ten year, large population study by Lancet (2010) showed the link between arsenic contamination and deaths in Bangladesh.**



- **Half of Bangladeshis, up to 77 million people, have been exposed to the toxic arsenic, says the Lancet.**

(Source: The Lancet, Volume 376, Issue 9737, Pages 252 - 258, 24 July 2010)

Sea Level Rise: Worst Case Scenario



Human Exposure and Tracks of Cyclones in Bangladesh

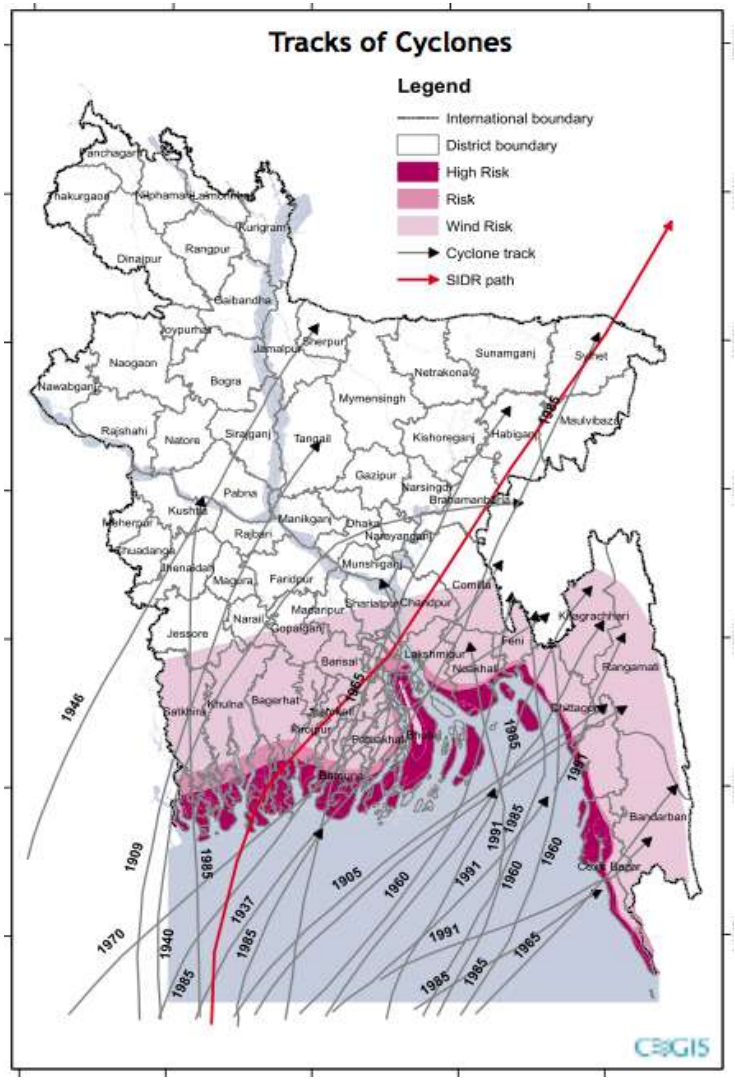
Human Exposure

Modelled number of people present in hazard zones that are thereby subject to potential losses.

Absolute human exposure

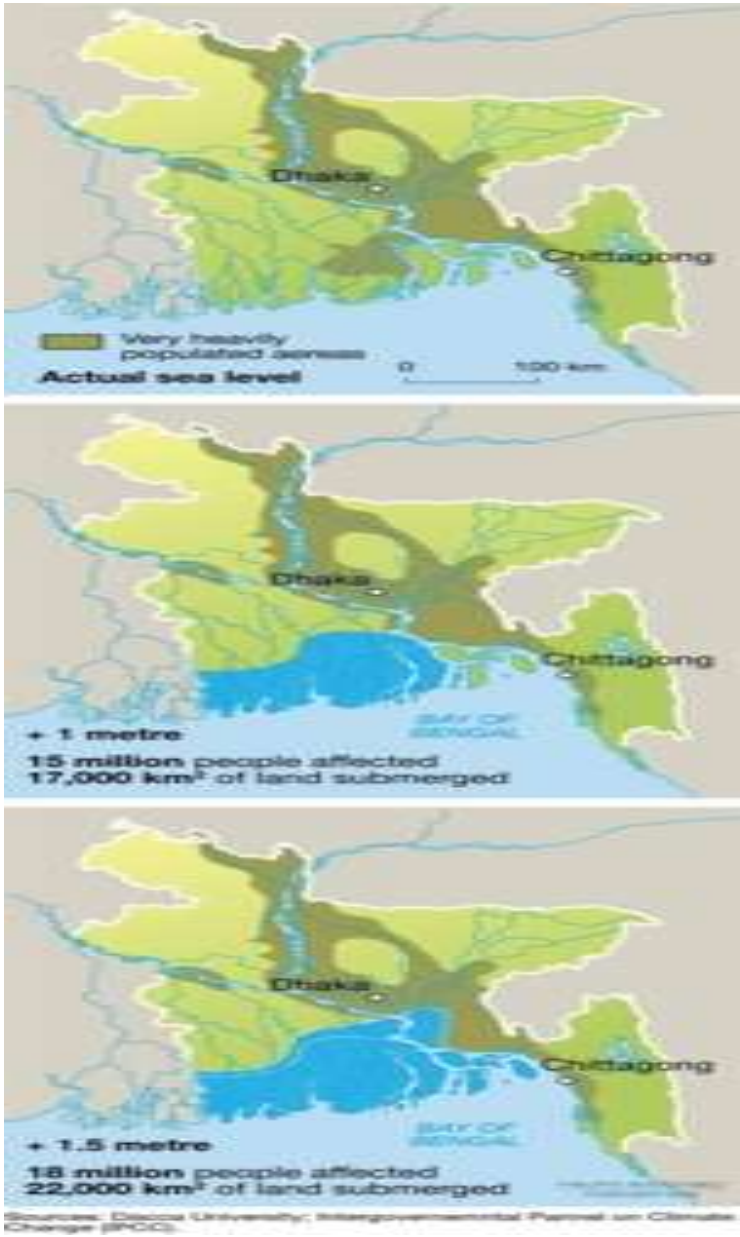
	Average people exposed per year	Country
1	22,548,120	Japan
2	16,267,090	Philippines
3	9,933,174	China
4	7,607,821	India
5	6,507,695	Taiwan, prov. of China
6	4,641,060	Bangladesh
7	3,573,351	United States of America
8	2,083,071	Korea (Rep. of)
9	1,885,541	Madagascar
10	872,234	Viet Nam
11	867,976	Myanmar
12	629,325	Mexico
13	602,264	Dominican Republic
14	488,556	Cuba
15	423,511	Hong Kong

Legend:
Tropical Cyclones (Saffir-Simpson categories)
Cat1 Cat2 Cat3 Cat4 Cat5



Source:
http://www.preventionweb.net/english/hazards/statistics/risk.php?hid=58

- If sea levels were to rise by the predicted amount of 88 to 89 cm (2-3 ft) then the effect on Bangladesh would be disastrous. An 89cm increase in the sea level would eat up roughly one fifth (20%) of Bangladesh's landmass, displacing nearly 20 to 30 million people who will become environmental refugees (IPCC 2007).

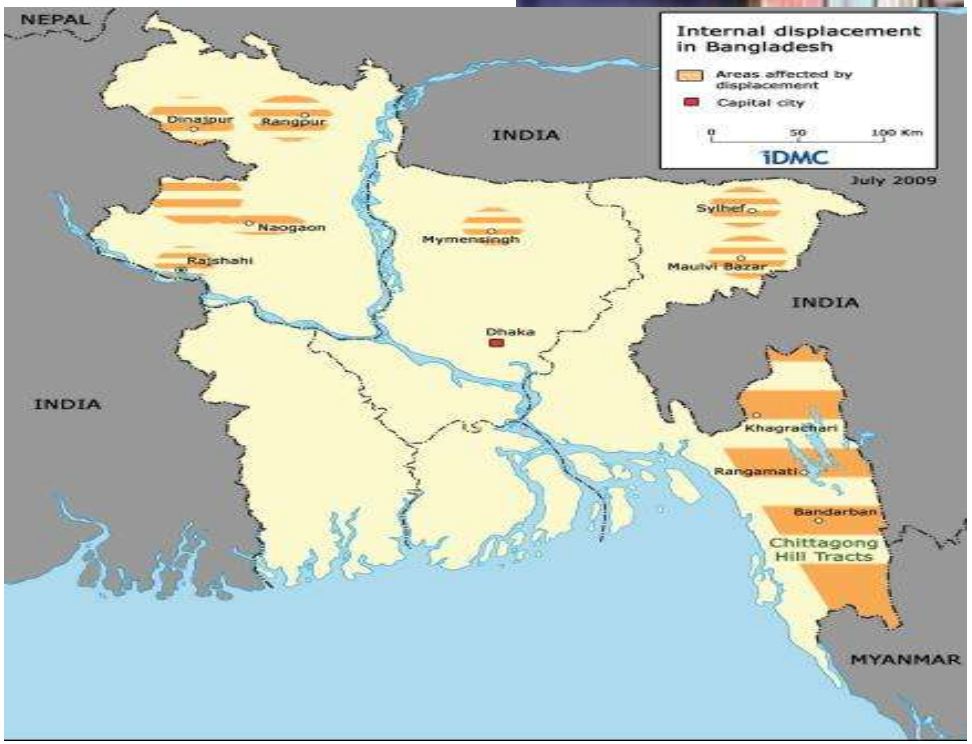


(Source: UNEP, Vital Water Graphics, 2nd Edition, 2008)

- Researcher James Pender wrote in a recent sweeping report in Forced Migration Review on Bangladesh that by 2080, almost all the 51 million to 97 million people currently living in coastal zones might have to leave.

(Source: www.fmreview.org/textOnlyContent/FMR/31/Pender.doc)

- Number of IDPs in Bangladesh amounts 60,000-500,000 (upto 0.3% of total population). Trickle down effects of IDPs are affecting Bangladesh.



(Source: Internal Displacement Monitoring Centre at www.internal-displacement.org)

Role of the Military

- General Mobilization
- Crisis management /Control
- Threat minimization
- Refugee / Migration Management
- Evacuation and lift
- Educate and train for adaptation

(Contd)

- Providing early warning/forecast
- Work for environmental sustainability project.
- Environmental damage repair.
- Awareness program

Contd.

- **Civil-Military Cooperation: whole of Govt. Approach**
- **Health and Sanitation**
- **Human Shelter**
- **Preventive Measures against destabilization.**
- **Social and national resilience**

(Contd.)

- **Prevent ‘Melt Down’**
- **Maintain social order, prevent anarchy**
- **Conflict prevention**
- **Regional Cooperation**

Military-NGO Cooperation

Role of the Military: What needs to be done

- **Rethinking security**
- **Include CCIS role of Military in the National Security Strategy**
- **Adaptation strategy**
- **Assign Mission to the military**
- **National level training**
- **Regional level training**

- Equip the military for this role
- Contingency / scenario planning
- Combined civil-military operation
- Simulated exercise

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- **Ground Exercise**
- **Material Storage**
- **Strategic Communication**

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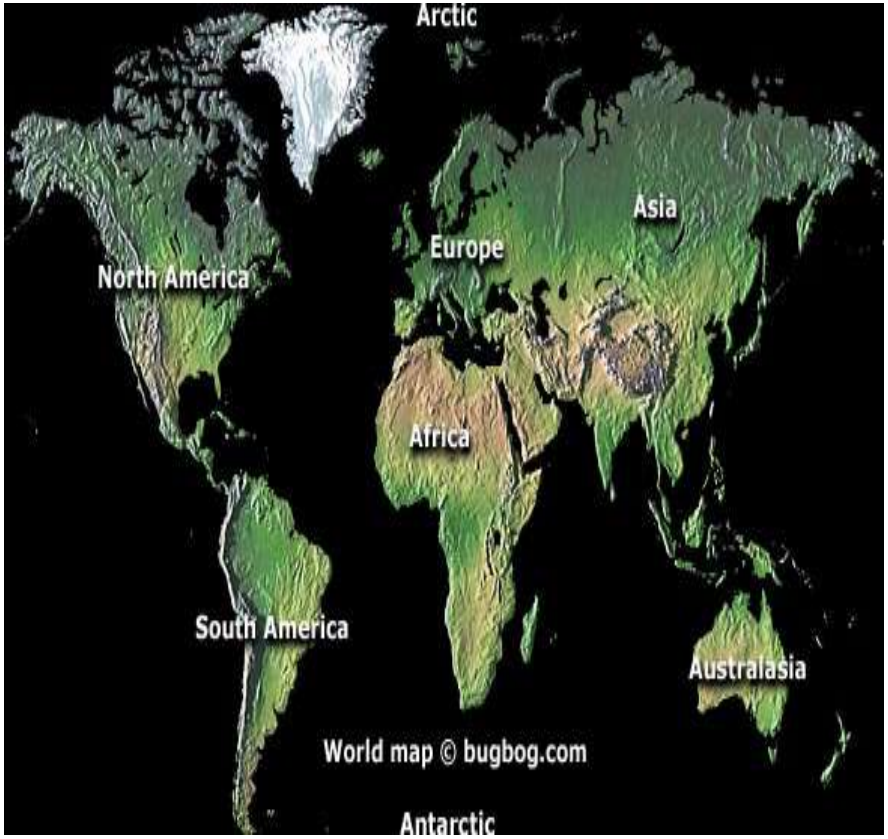
MEASURES TO TAKE

- Capacity building of the states and military.
- Knowledge, information, technology and expertise sharing and exchange.
- International/ Regional policy framework.
- Public Awareness.
- Political will and co-operation.
- Strengthening the roles of international organizations.
- Legal regimes.
- Global consensus.



"It is undoubtedly true that development rarely takes root without security; it is also true that security does not exist where human beings do not have access to enough food, or clean water, or the medicine they need to survive...This is why the world must come together to confront climate change. There is little scientific dispute that if we do nothing, we will face more drought, famine and mass displacement that will fuel more conflict for decades."

-Barack Obama, US President

US President Barack Obama's Nobel Award Acceptance Speech

Questions and Comments

Thank You

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