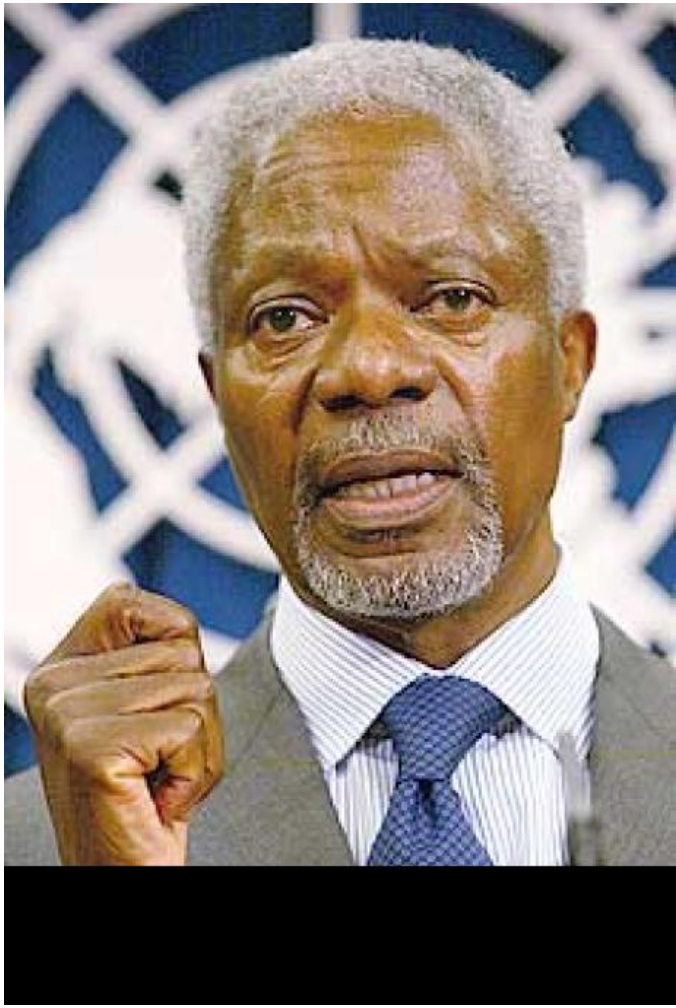
SECURITY IMPLICATIONS OF CLIMATE CHANGE

Major General Muniruzzaman (Retd)
President
Bangladesh Institute of Peace and Security Studies (BIPSS)

"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 Annan



Outline of Presentation

- Introduction
- Current Status of Climate Change
- Threat Landscape and Security Implications
- Human Security Implications
- Hard Security Implications
- Question and Comments

INTRODUCTION

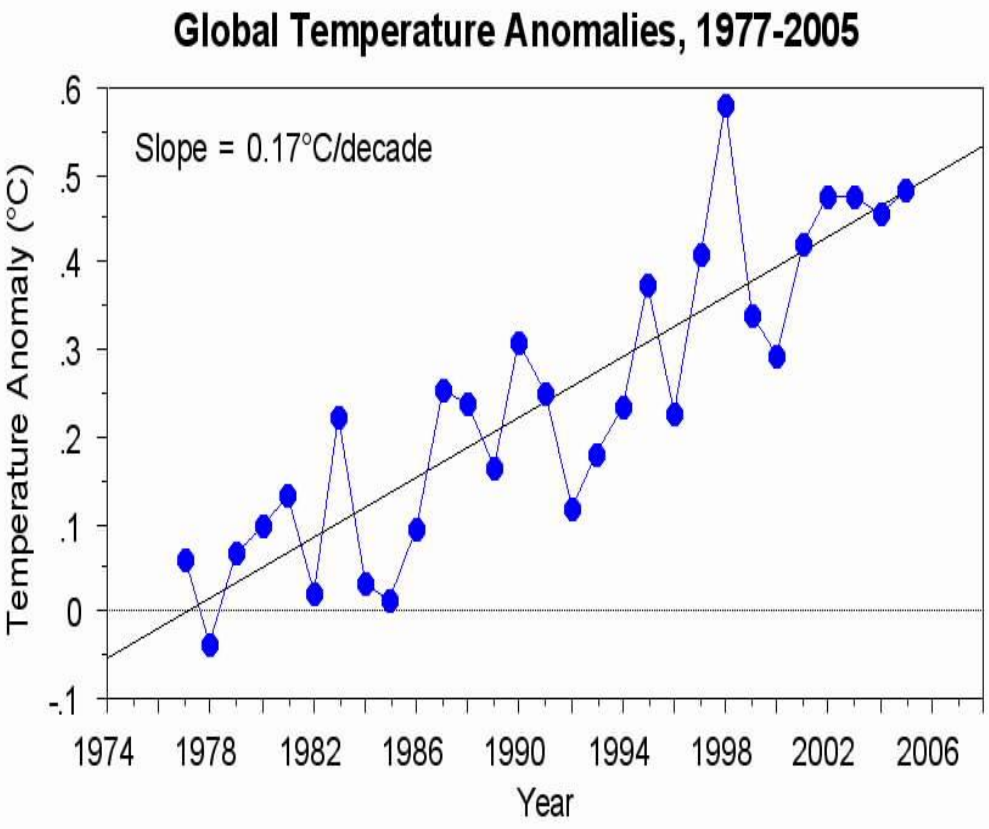
- Climate change is recognized as a major security issue that poses serious global threats.
- Climate change affects individuals and communities around the world.
- Climate change brings hunger, disease, poverty and poses a threat to social and, political stability.
- Climate change can heighten existing social and political tensions or can lead to new ones.
- If unchecked, climate change is likely to aggravate old and trigger new tensions.

Current Status of Climate Change

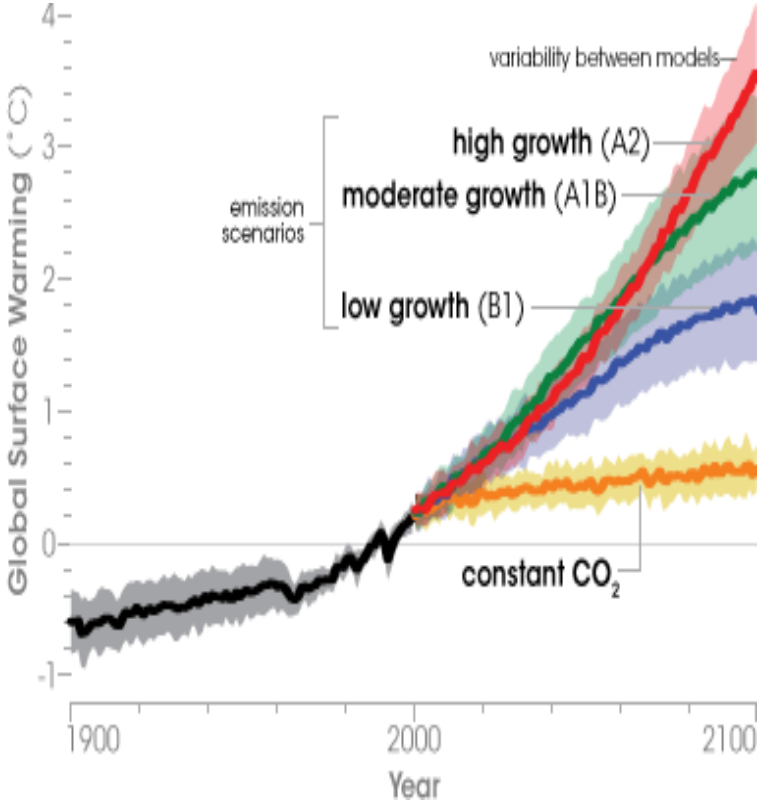
- Long-term changes in climate observed:
  - arctic temperatures and ice
  - precipitation amounts
  - ocean salinity
  - wind patterns and
  - aspects of extreme weather including droughts, heat waves and
  - the intensity of tropical cyclones

Current Status, (contd.)

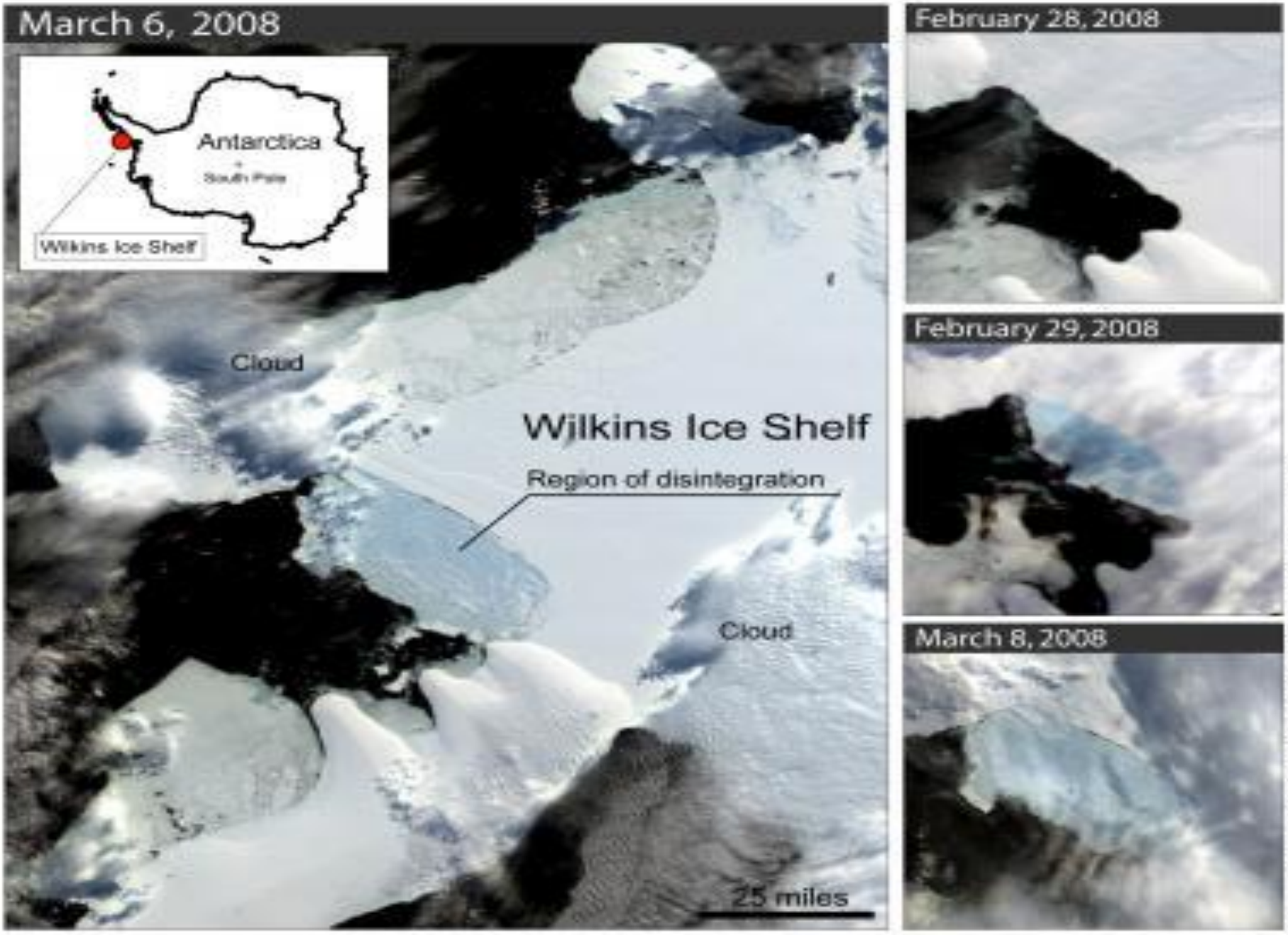
- The 2007 IPCC report predicts temperature rise of 1.1 - 6.4 °C (2 - 11.5 °F) by 2100.



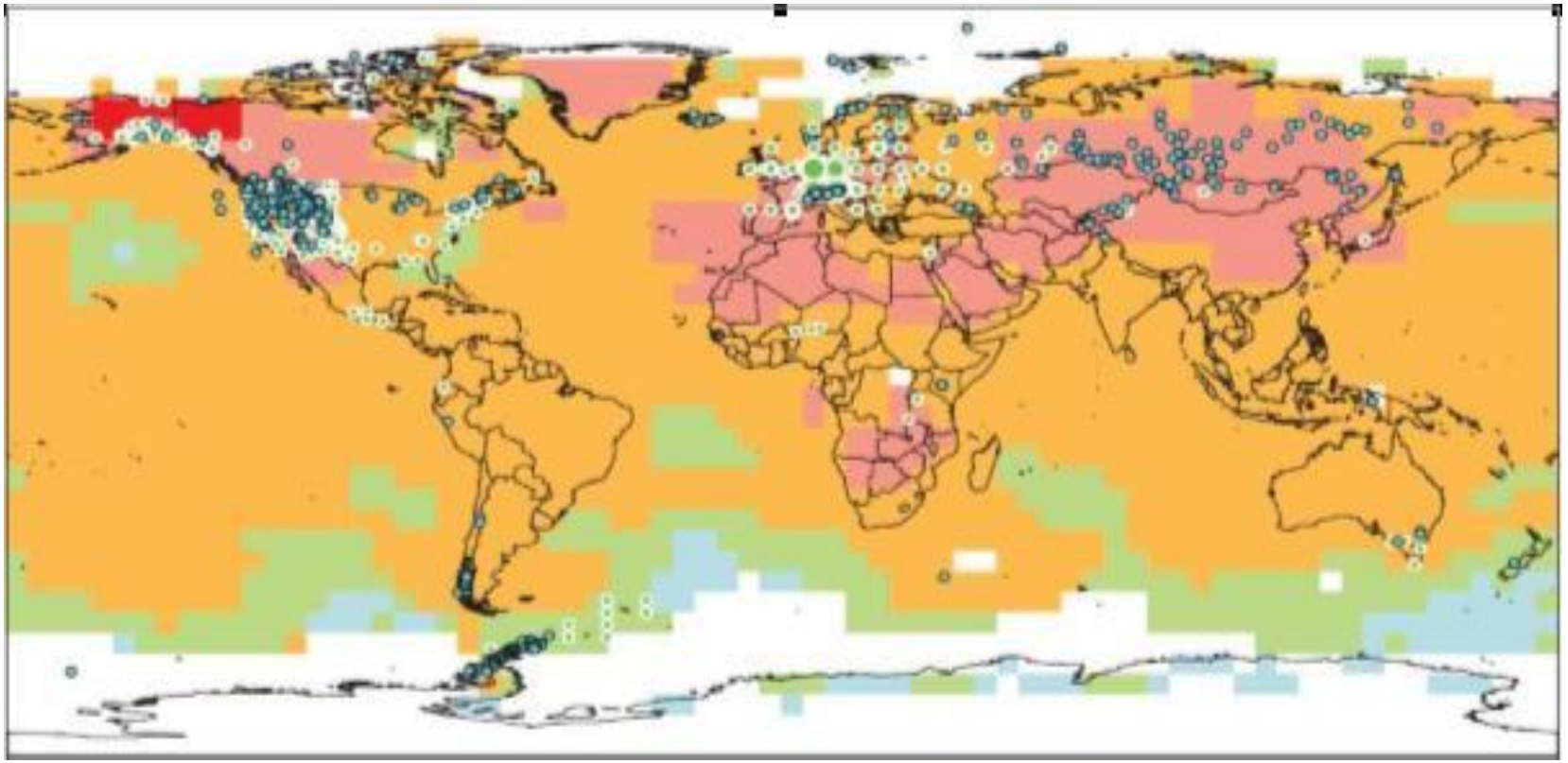
IPCC Warming Projections



Source:
Environmental Protection Agency


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

Changes in Temperature

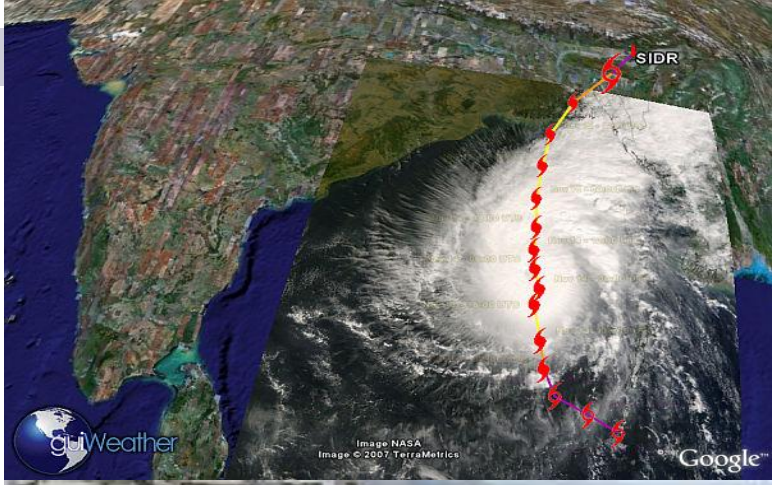


Current Status(contd.)

- **The number of natural disasters in the world may double during the next 10 to 15 years. (Source: WWF)**

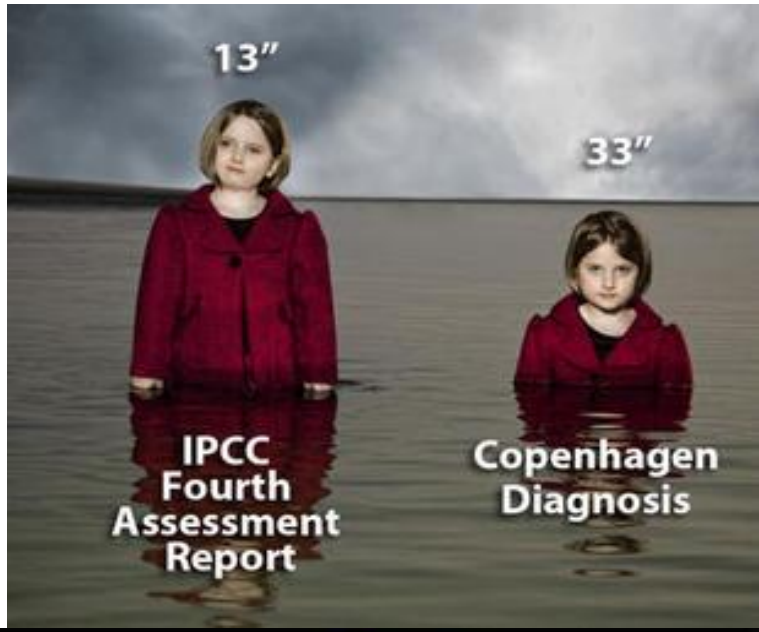
- **3,852 disasters killed more than 780,000 people over the past ten years, affected more than two billion others and cost a minimum of 960 billion US$.**

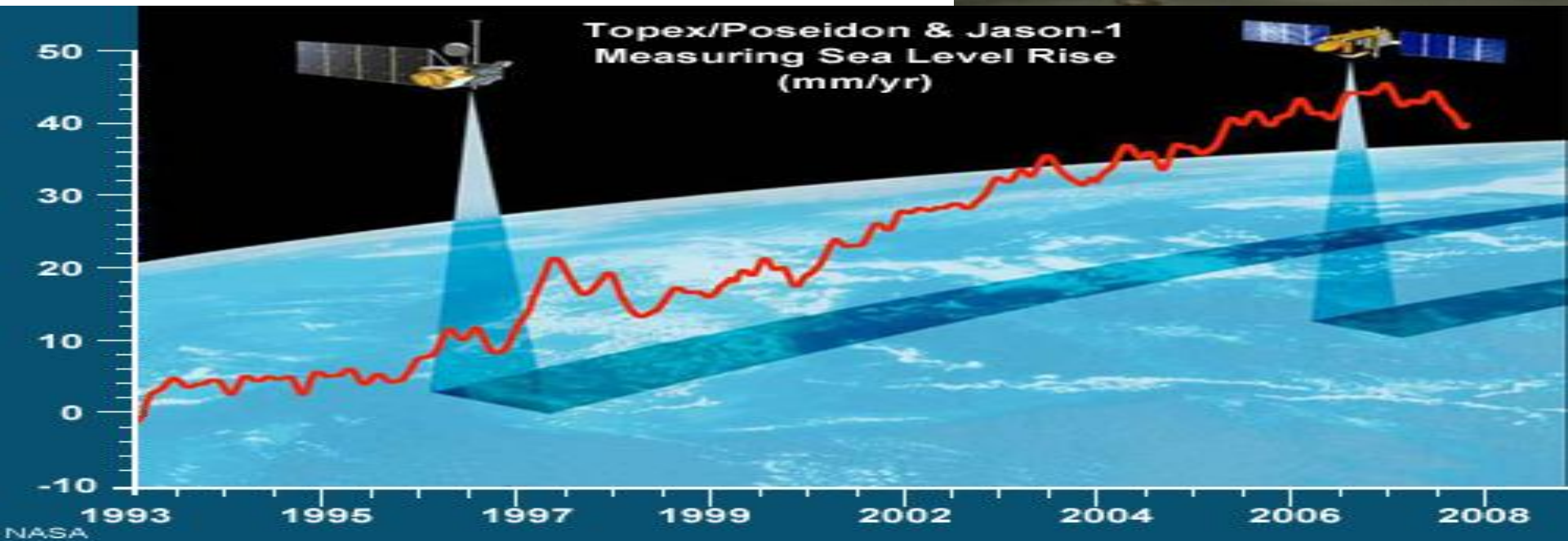
  (Source: figures released by CRED in Geneva)



Contd.

Significant Sea level rise by 2100 is predicted by IPCC.





Contd.

- The 2001 World Disasters Report of the Red Cross and Red Crescent Societies estimated of 25 million current “environmental refugees”.

- UN University’s Institute for Environment and Human Security estimates the rise of environmental refugees up to 50 million.

“ First, I worry about climate change. It's the only thing that I believe has the power to fundamentally end the march of civilization as we know it, and make a lot of the other efforts that we're making irrelevant and impossible.”

--Bill Clinton

THREAT MAPPING AND SECURITY IMPLICATIONS

- **Presents threat to the following two areas:**

1. Threat to Human Security

2. Hard Security Dimension

Dimensions of Human Security

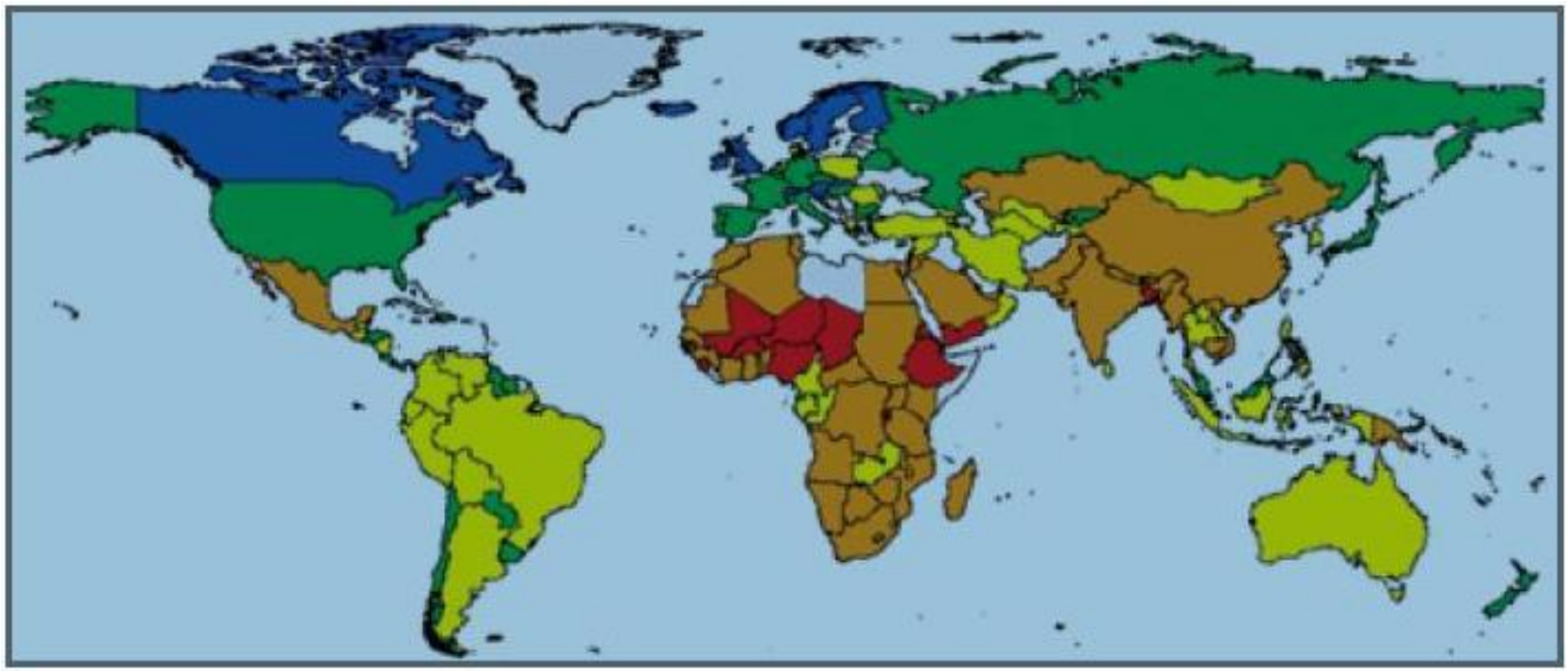
- Water Security
- Food Security
- Health Security
- Disaster security.
- Energy security
- Displacement and Migration
- Threat to Development

BIPSS
Bangladesh Institute of Peace and Security Studies

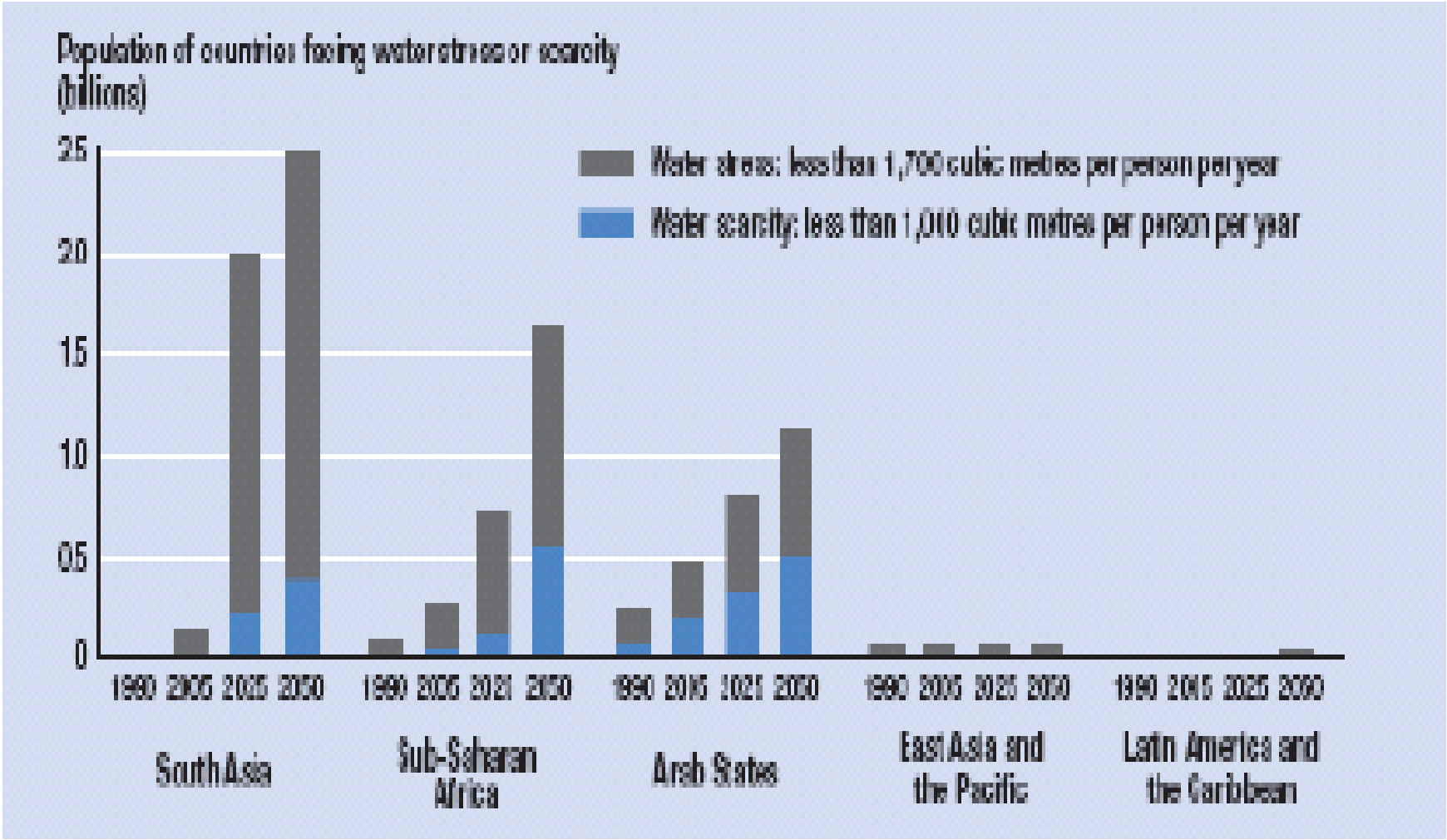
WATER SECURITY

- Climate change exacerbates water quality and availability in regions with water scarcity: Africa, South Asia, Southwest Asia, the Middle East and the Mediterranean.
- Currently 1.1 thousand million people are without access to safe drinking water.
- More than 3.5 million people die each year from water-related disease; 84 percent are children. Nearly all deaths, 98 percent, in the developing world. (Source: IPCC 4th Ass on climate change in Asia)
- Freshwater availability in Central, South, East and South-East Asia is likely to decrease that could adversely affect more than a billion people in Asia by the 2050. (Source: IPCC 4th Ass on climate change in Asia)

Areas Vulnerable to Climate Related Water Challenges

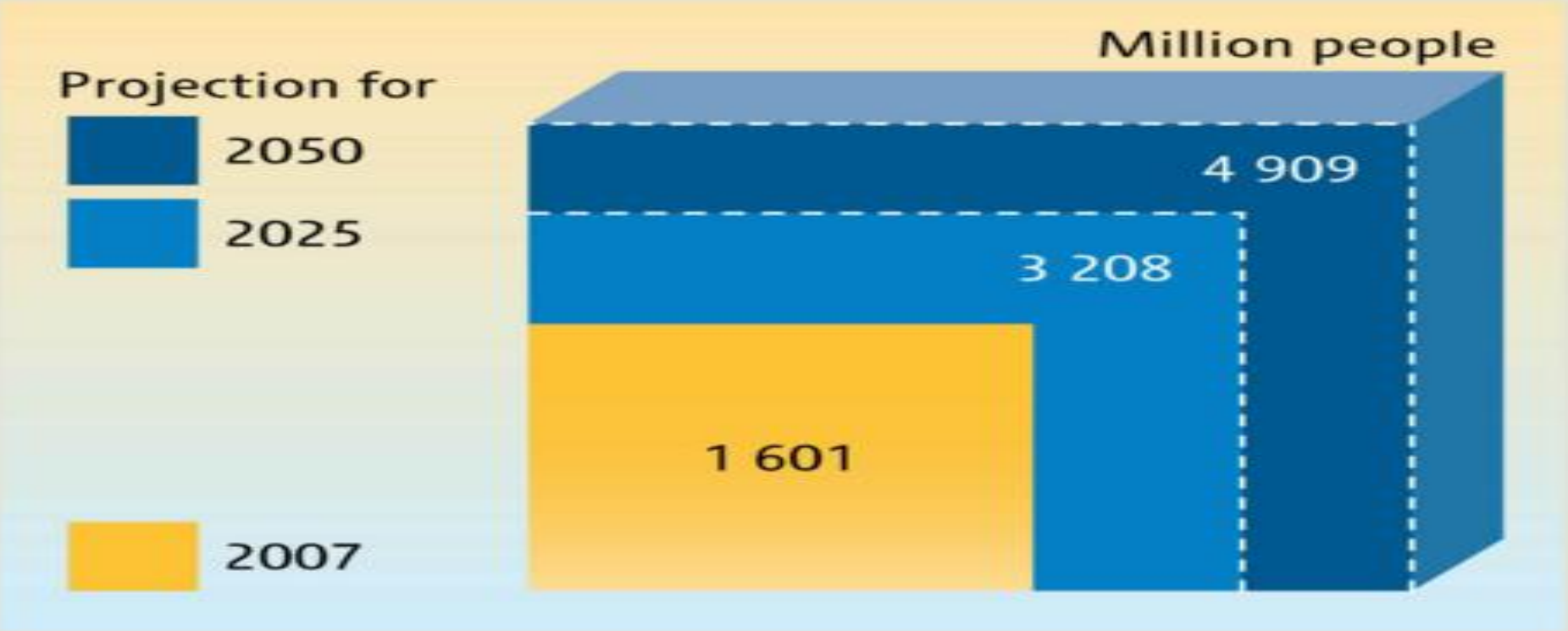


Projected Stress in Water Availability (2025-2050)



Source: HDR, 2006

World population living in river basins with severe water stress

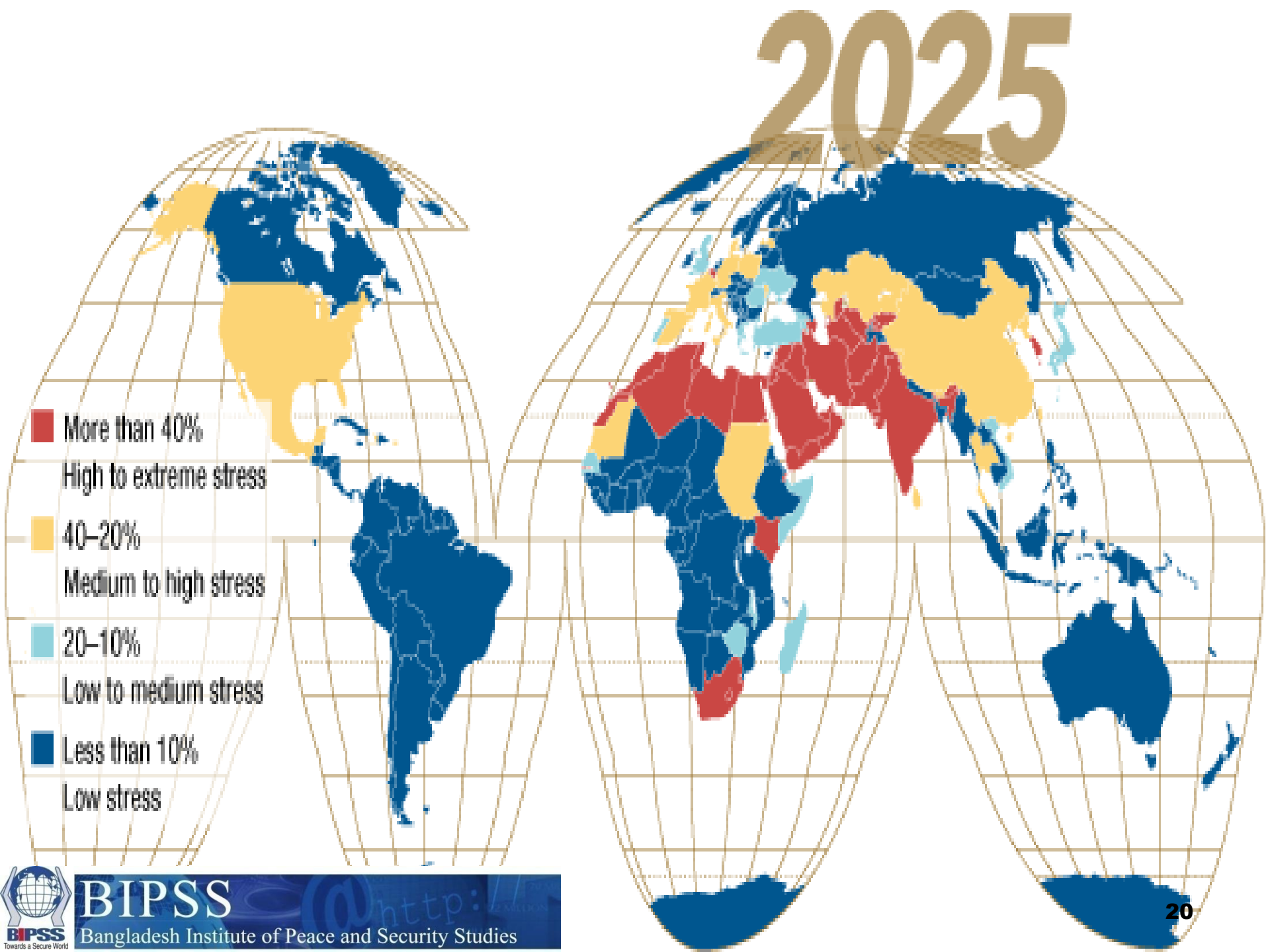


Water availability below 1 000 m3 per capita per year was regarded as an indicator of water stress.
Projections for 2025 and 2050 are computed considering socio-economic and climatic driving forces from the B2 scenario of the IPCC.

Source: Joseph Alcamo, *et al*, Future Long-term changes in global water resources driven by socio-economic and climatic changes, Hydrological Sciences Journal, 52(2), April 2007.

Access to water

*Source: www.unicef.org/...**pdf**/03_SafeDrinking**Water**_D7341Insert_English.**pdf***

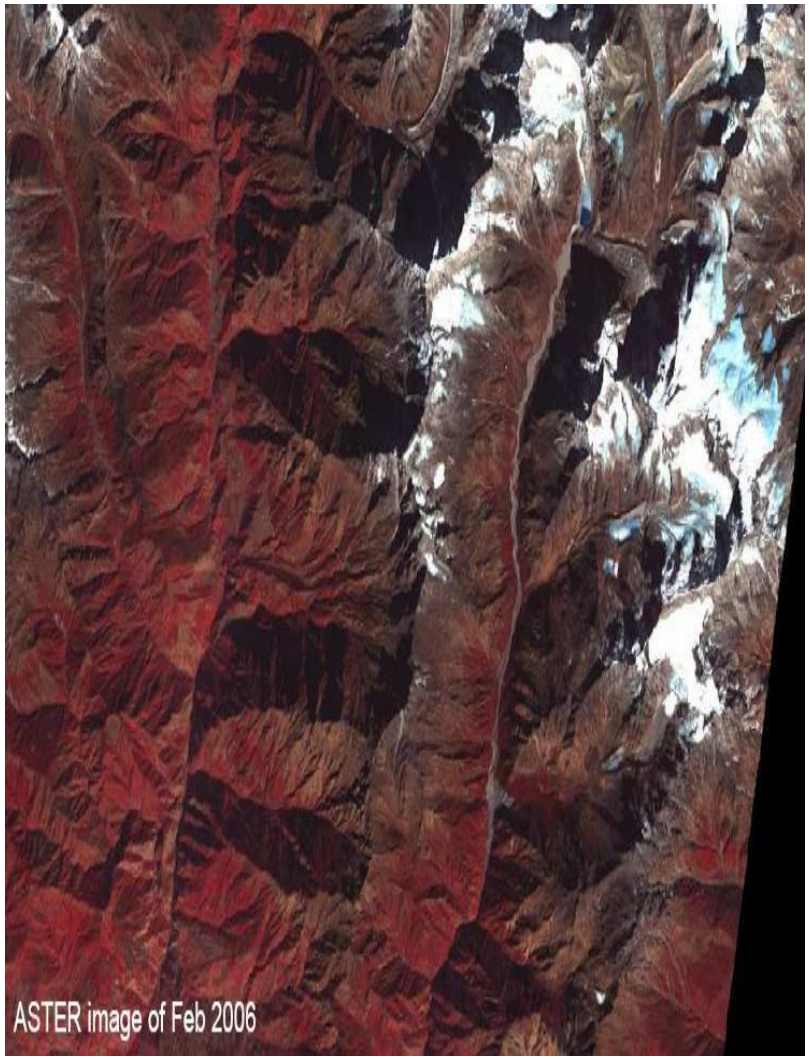

2025
More than 40%
High to extreme stress
40–20%
Medium to high stress
20–10%
Low to medium stress
Less than 10%
Low stress

Melting Glaciers in the Himalayas

- Glaciers in the Himalayas are receding faster than in any other parts of the world.
- In Northwest China, 27% of the glacier area will decline by 2050 (equivalent to an ice volume of 16,184 km3), as will 10 to 15% of the frozen soil area.
- The temperature increase in the Himalayan region has been greater than the global average of 0.74 °C over the last 100 years (IPCC 2007).
- This ongoing rapid warming has a profound effect on the Himalayan environment.
- Retreat of glacier tongues has led to the formation of glacial lakes.

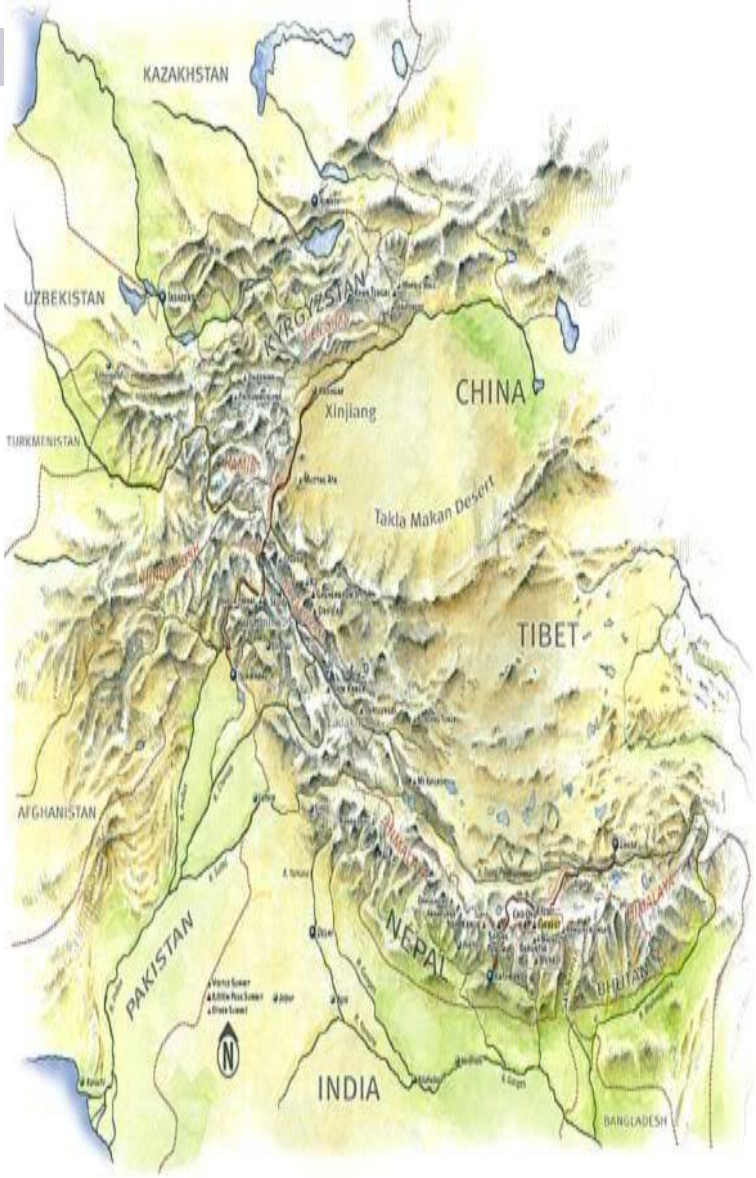
A map of the outline of the glaciers clearly identifies the new outcrops and the separation of the glaciers.

Snow-cover Changes in the Himalayas



Contd.

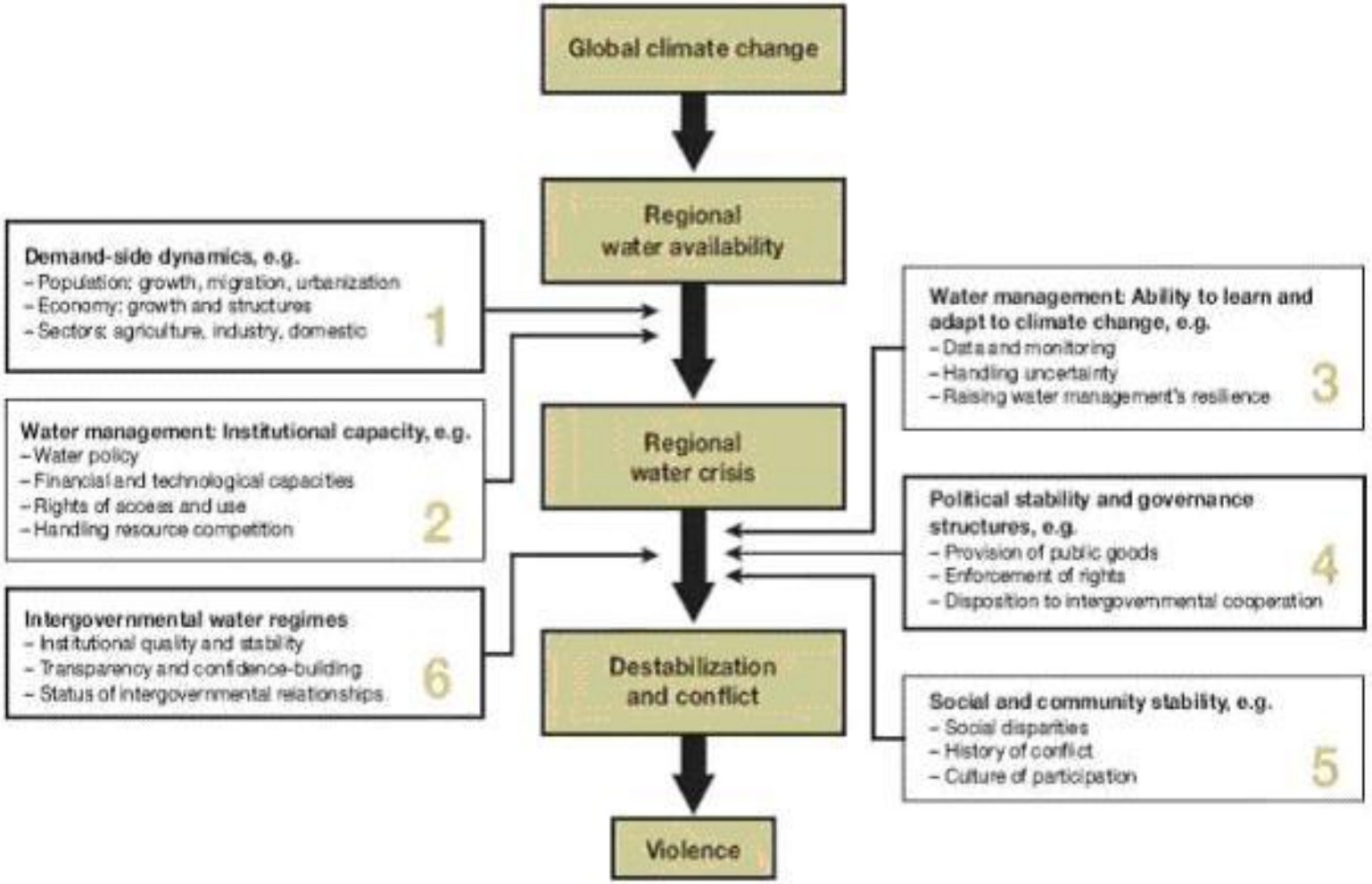
- The current trends of glacial melt suggest that the Ganges, Indus, Brahmaputra and other rivers across the northern Indian plain could likely become seasonal rivers in the near future.
- This poses a challenge for reducing the vulnerability of the more than 1.3 billion people living in the major river basins downstream from the Hindu Kush-Himalayan region.



Map of countries depending on Himalayan river basin

River Management and Violent Hydro-Conflict

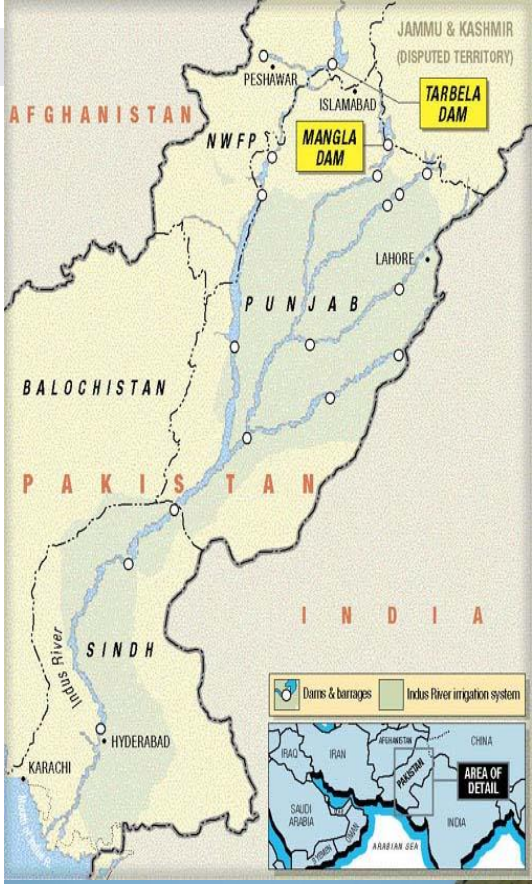
- Water- related issues led to interstate tensions and significantly hampered development, such as along the Nile, Euphrates, Indus and Ganges rivers.
- The United Nations estimates 300 potential conflicts over water exist around the world today.
- Water flow ignores political and community boundaries, decisions in one place affect water use elsewhere.
- In the case of shared river basins, water use upstream can affect downstream quality and quantity, thus creating the potential for conflicts of interest.



Climate Change, water stress and violence

Indo-Pak Water Disputes

- Indian is hurtling water by building expensive hydroelectric dams in a remote valleys of India controlled Kashmir.
- India plans, being rapidly growing but power-starved economy, to build many more dams over the next decade.
- Concerns over the Indus Waters Treaty that was concluded in 1960 that sets out the legal framework for the sharing of the waters of six rivers: Indus, Chenab, Jhelum, Sutlej, Beas, and Ravi - flow through northern India into Pakistan.
- Concern is growing in Pakistan that India is controlling the water flow of the Indus, Chenab and Jhelum rivers that pass through India's Jammu & Kashmir state.

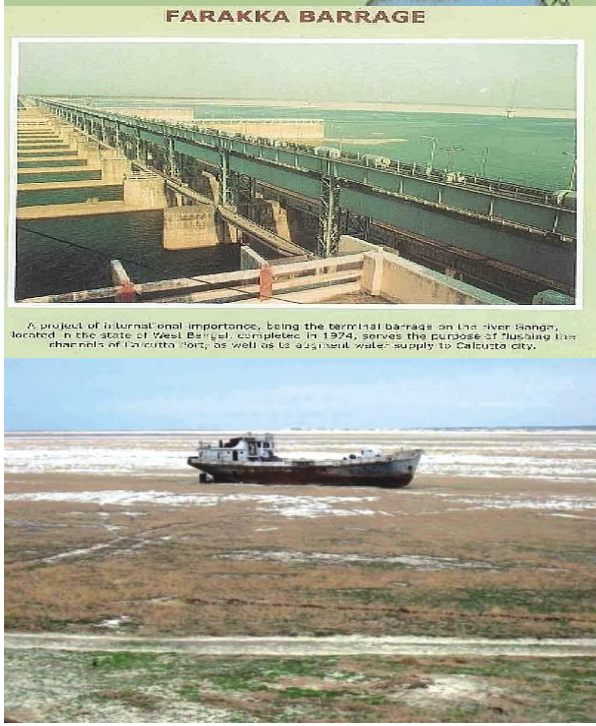


Indo-Pak Water Disputes

- Since Indus provides water to over 80 percent of Pakistan's 54 million acres of irrigated land, dam and water withdrawal by India will cause desertification and have devastating impact on Pakistan agricultural productivity leading to wide scale food insecurity in Pakistan.
- Water withdrawal and dam construction by India is potential source of bilateral tension and conflict
- Pakistan fears that India can make the country solely dependent on India in terms of war and can create draught or famine during the crucial time like war
- The level of securitization went to the stage of nuclear redline with the warning from Pakistan
- Afghanistan plans to build 12 dams on the Kabul river with a combined storage capacity of 4.7 million acre-feet, which Pakistan frets will further diminish the Indus water supply.

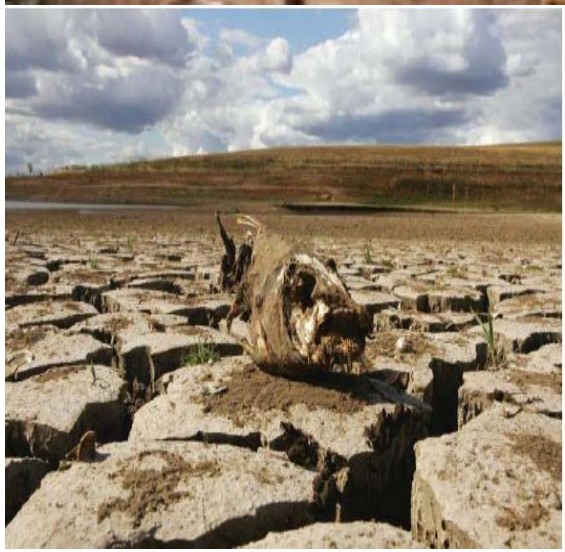
Indo-BD Water Disputes

- Bangladesh shares 54 rivers with India, but has agreement for only one river.
- From1974, India started unilateral diversions of water from Ganges River after the construction of Baraka Barrage.
- The Ganges Water Treaty which was concluded for 30 years in 1996 is not also implemented rightly because of Indian unilateral withdrawal.
- Supply more during the season that cause flood and less supply in dry season resulting in draughts.
- Saltwater intrusion, vegetation damage, erosion, reduced conveyance capacity, disrupted fishing
- Construction of Dam: Tipai Mukh
- Water sharing agreement for Teesta river have failed recently

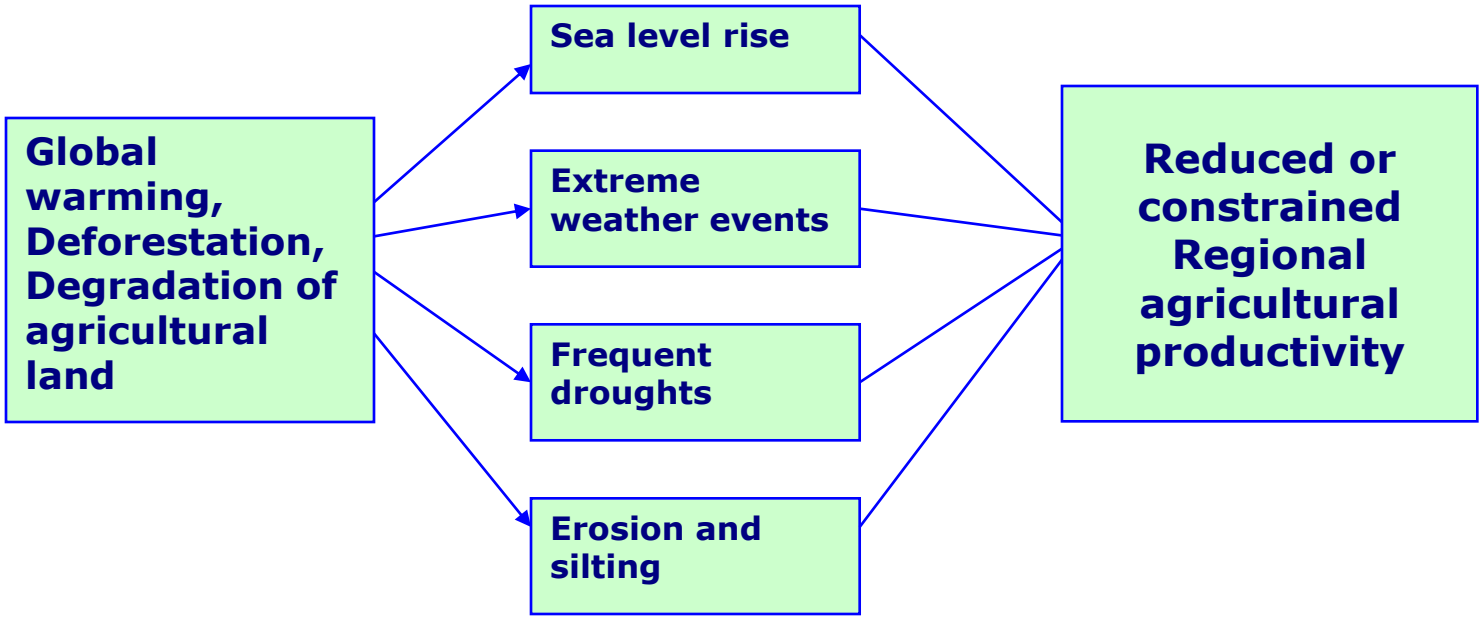


FOOD SECURITY

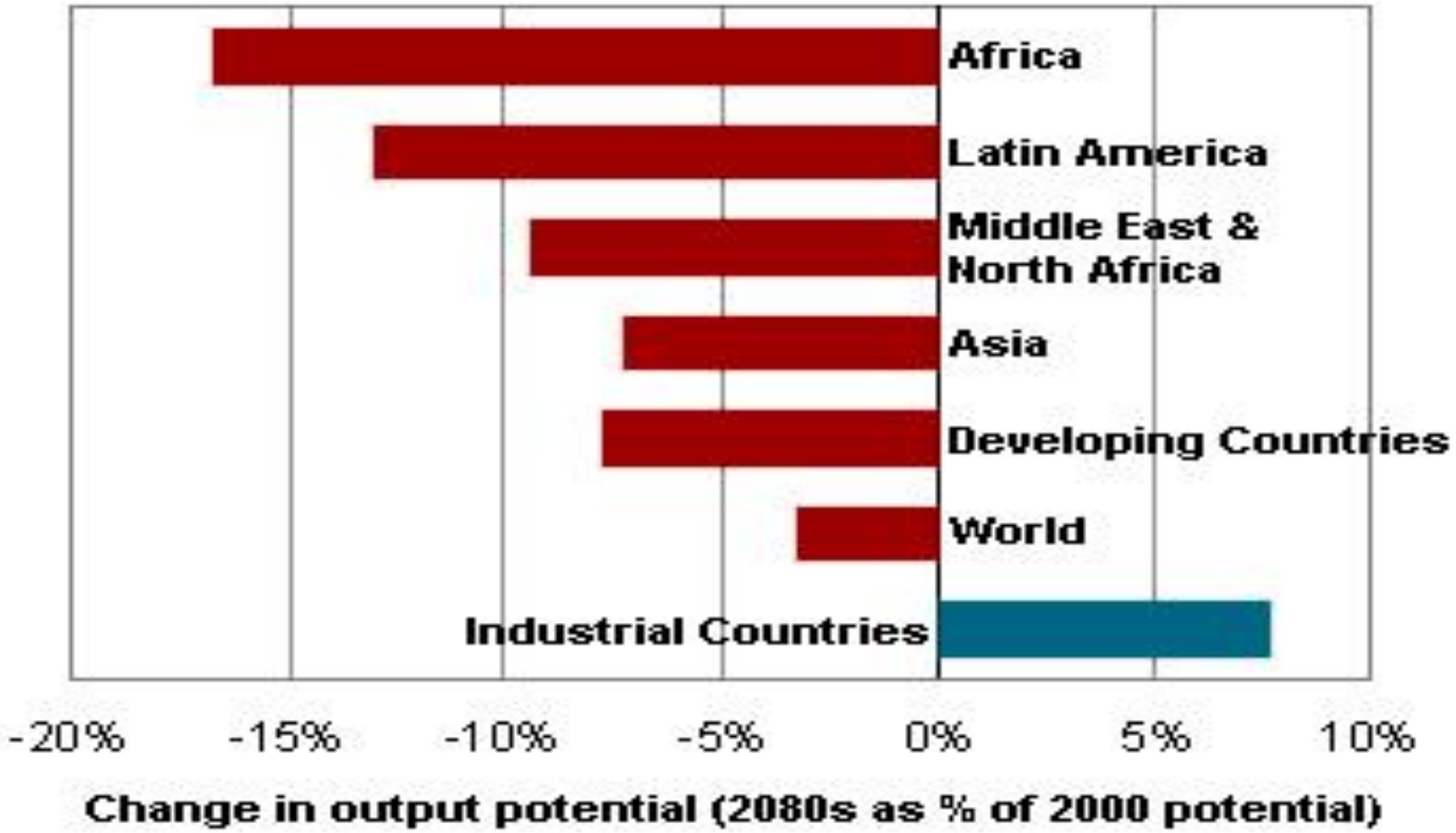
- Reduced agricultural productivity is potentially the most worrisome consequence of climate change.
- If global warming rises to 3 ^{0} C it is likely that the number of people suffering from hunger will increase by 250 million to 550 million. (Stern 2006:72)
- The combination of various climate change impacts will overstretch adaptive capacities in agricultural production. (IPCC, 2007)
- According to German Advisory Council on Global Change, agricultural production from rain-fed agriculture could fall by about 50% in some regions by 2020 (WBGU 2007)



Possible Effects of Environmental Change on Agricultural Productivity



Impact on Agriculture Output Potential



Source: Earth Trends, 2008

Climate Change Impacts on South Asian Agriculture

(percentage of 2100 agricultural GDP)

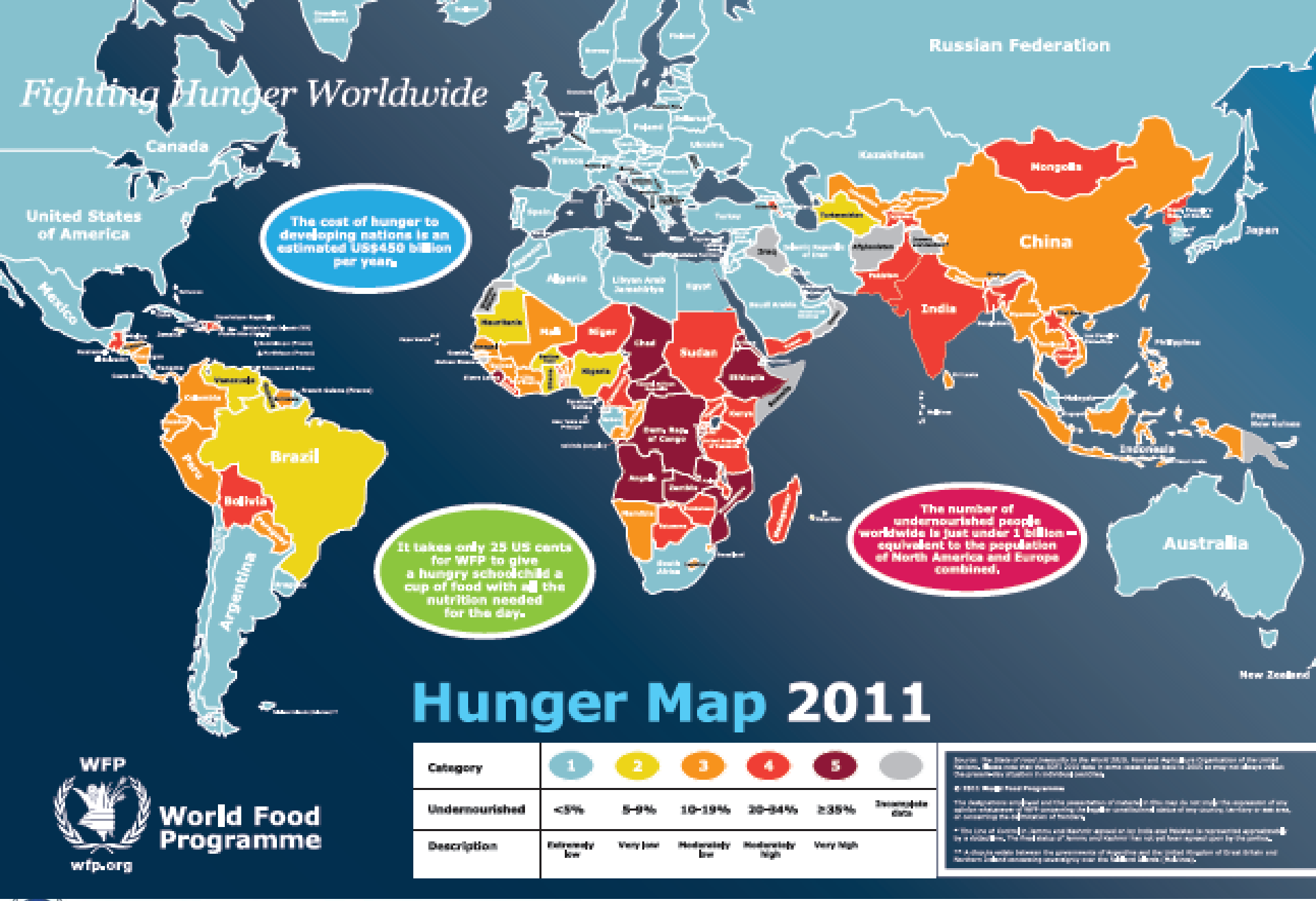
Country	CCC	CCSR	PCM
Bangladesh	-0.6 to -59	-0.6 to -23	-0.6 to -3
India	-0.6 to -52	-0.9 to -29	+0.3 to -3
Nepal	0 to -15	0 to -15	0 to +9
Pakistan	-1.1 to -82	-1.1 to -3	+2.6 to +9
Sri Lanka	0 to -53	0 to -18	0 to +12

Source: Mendelsohn, 2005)

Rising Food Price

It has been estimated that rising food prices could potentially push 100 million people back into poverty
(Source: SA Forum on Food Insecurity, 2008)

Source : FAO



WFP
World Food Programme
wfp.org

BIPSS
Towards a Secure World
Bangladesh Institute of Peace and Security Studies

Source : WFO 35

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.
- 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.

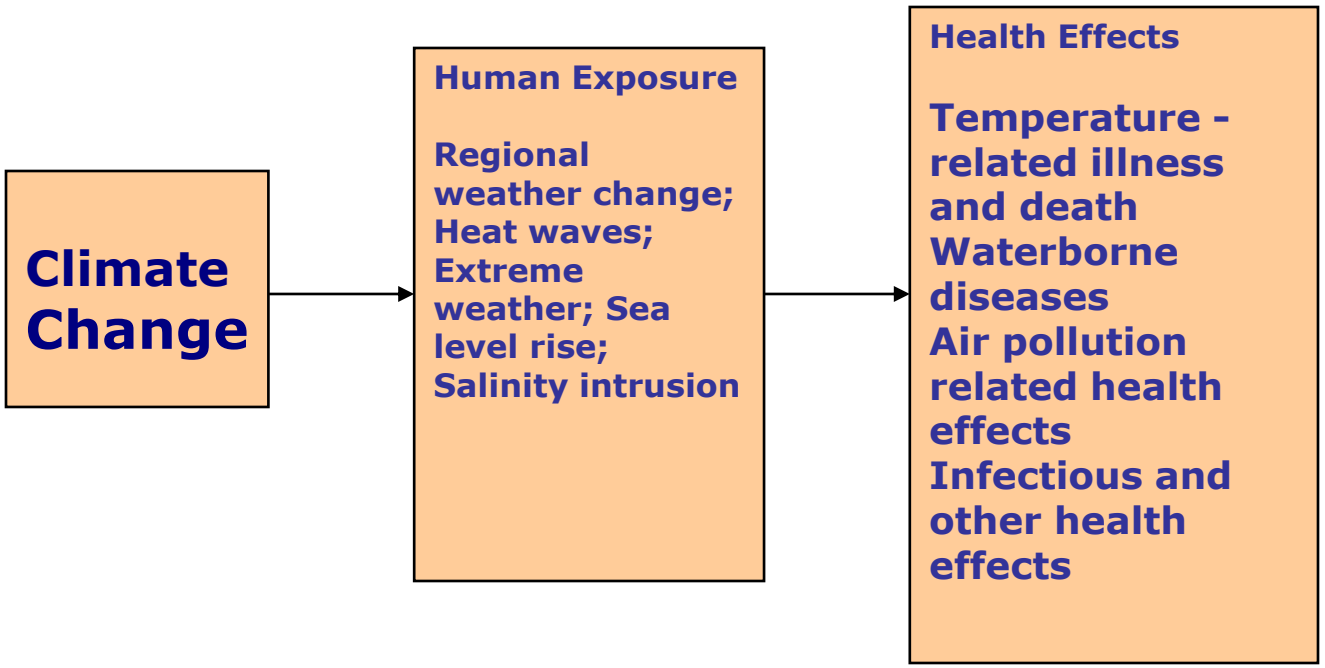
Health Security (contd.)

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

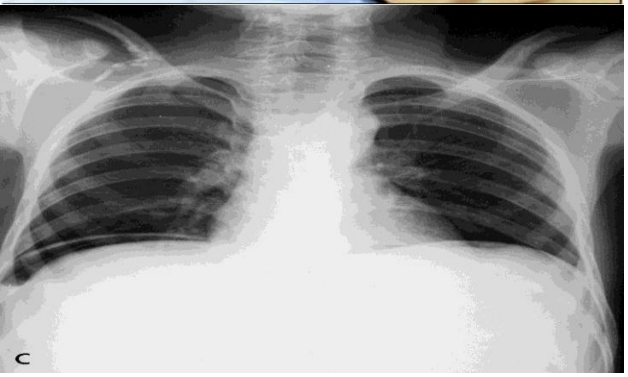
  Source: http://www.eird.org/publications/humanimpactreport.pdf

- **In South Asia merely 37 per cent people have access to improved hygiene. (New Age, 31 March, 2011)**

Impact of Climate Change on Human Health



Water Borne Diseases in South Asia

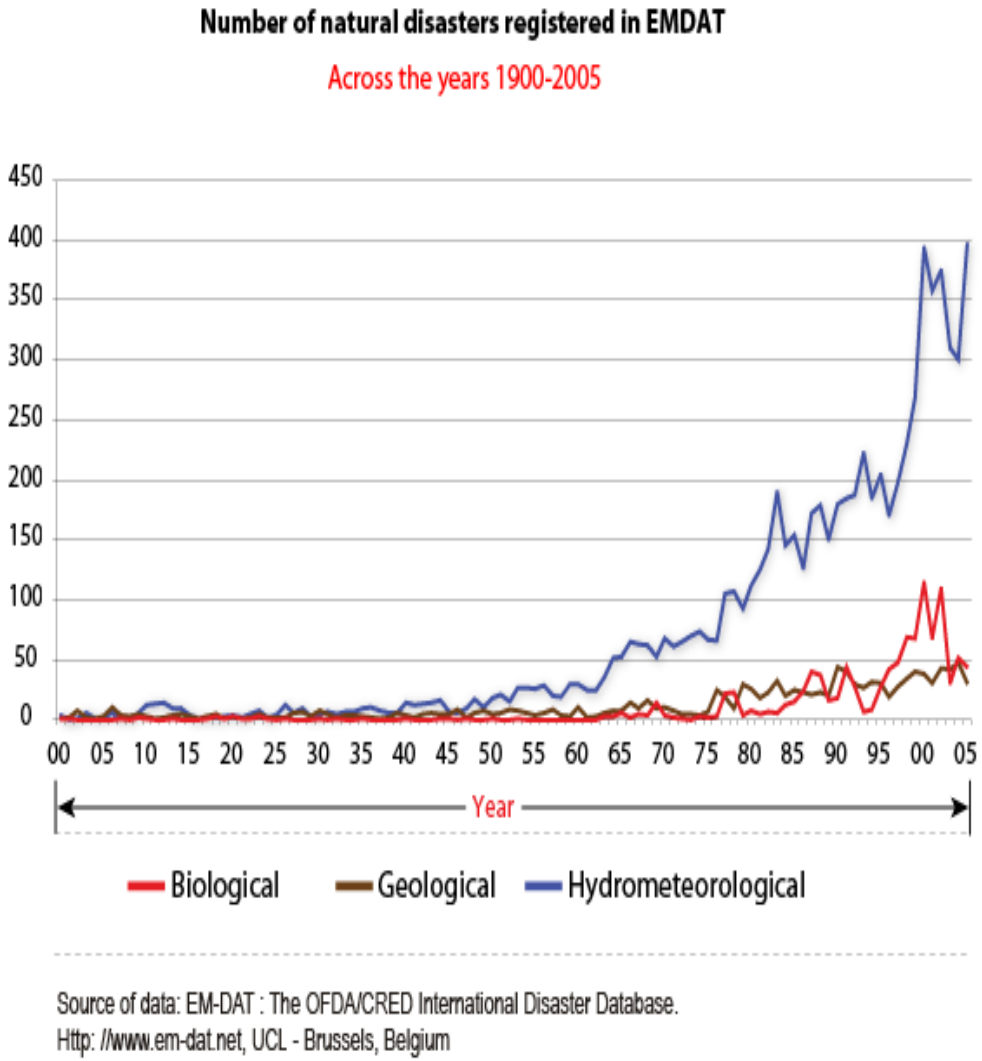


- Almost one in five people in South Asia still lack improved water resources making them susceptible to water borne diseases like Anaemia, Arsenicosis, Cholera, Diarrhoea, Hepatitis, Malaria, schistosomes, Typhoid and so on.
- In South Asia, over two million people die due to water-borne diseases like typhoid and cholera annually.
- 37.7 million Indians are affected by waterborne diseases annually, 1.5 million children are estimated to die of diarrhoea alone.
- In Bangladesh alone, 35 million people are exposed to elevated levels of arsenic in their drinking water, which will ultimately threaten their health and shorten their life expectancy. (Lancet)

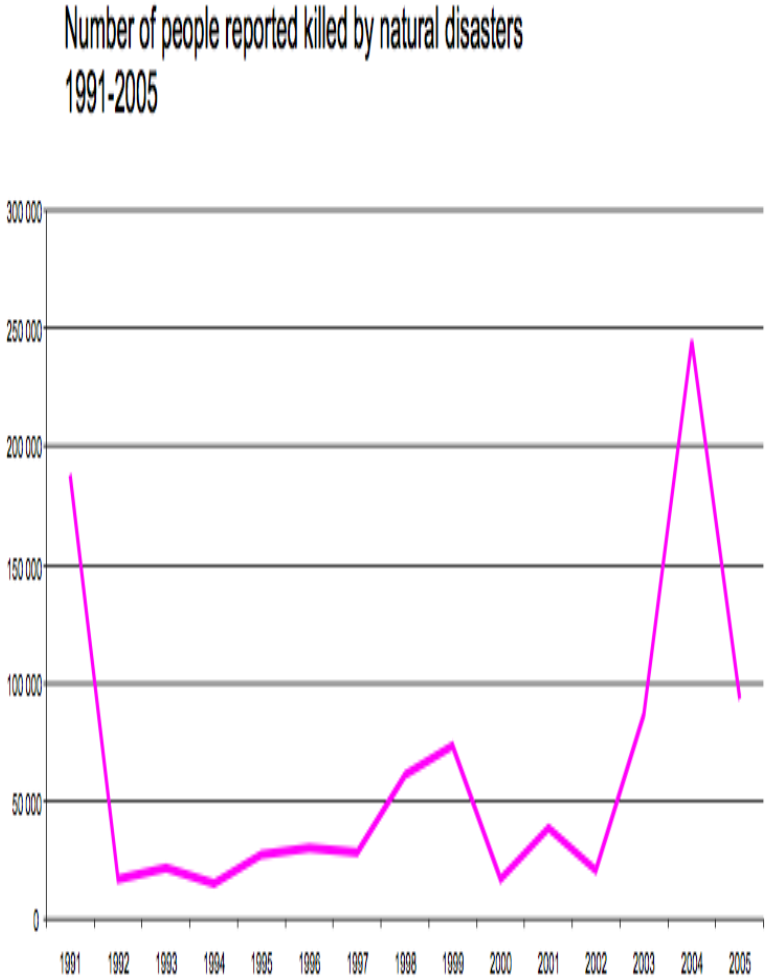
DISASTER SECURITY

- Climate change and variability are factors which influence trends- frequency and intensity of disasters.
- In recent years, unprecedented floods: 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.
- According to Oxfam estimate developing countries will require at least US$50bn annually to adapt to unavoidable climate change.

Contd.



Source of data: EM-DAT : The OFDA/CRED International Disaster Database.
Http: //www.em-dat.net, UCL - Brussels, Belgium



Natural Disasters in South Asia

- South Asia is extremely vulnerable to natural disasters, with more than 900 events reported since 1970 alone.
- Between 1990 and 2008, more than 750 million people—50 percent of the population in the region—were affected by at least one natural disaster, leaving almost 230,000 deaths and about US$45 billion in damages. (Source: World Bank Report, South Asia: Shared Views on Development and Climate Change)
- The toll of natural disasters is high and rising. Since 1970, the number of reported natural disasters in the region has been rising steadily.



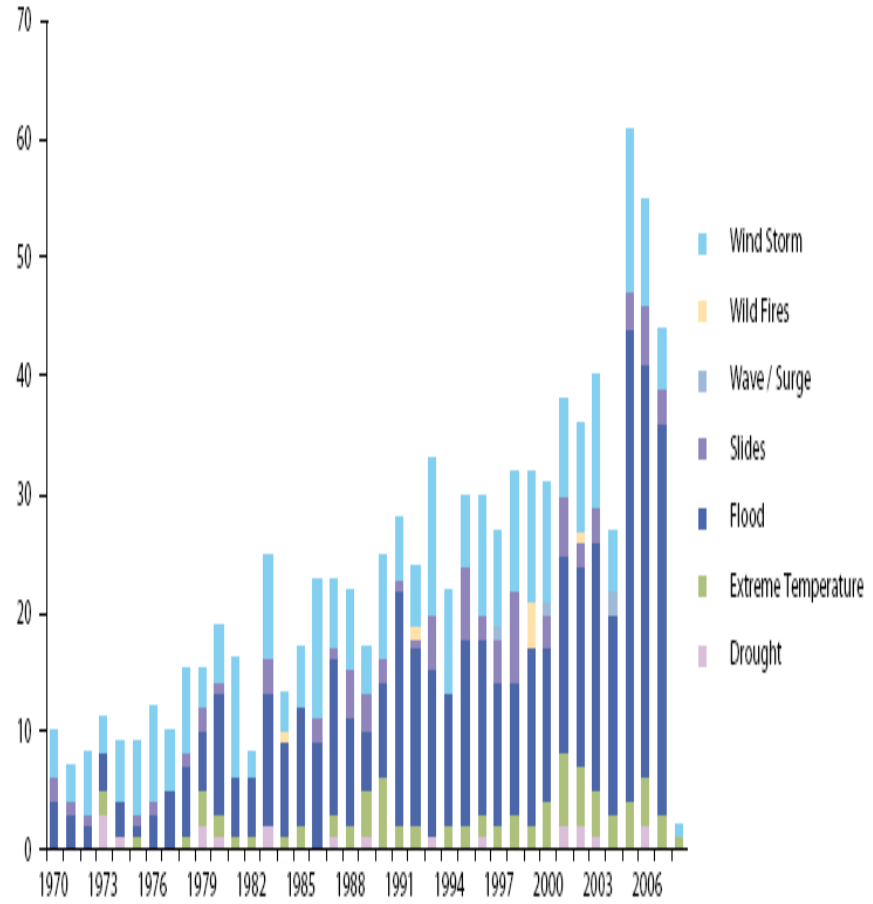


Frequency of Natural Disasters in South Asia, 2000-09

Year	Type Of Disaster	Country	Frequency
2000	Floods	India	6
2001	Earthquake	India	1
2002	Extreme Temperature, Earthquake	India, Afghanistan	2, 3
2003	Extreme Temperature	India	2
2004	Earthquake, Earthquake, Floods, Floods	Sri Lanka, India, India, Bangladesh	1, 1, 6, 3
2005	Earthquake, Earthquake, Floods	Pakistan, India, India	1, 1, 17
2006	Floods	India	17
2007	Storm, Floods, Floods	Bangladesh, Bangladesh, India	2, 2, 16
2008	Storm	Afghanistan	1
2009	Floods	India	2

Source: EM-DAT

Numbers of Reported Disasters in South Asia by Disaster Type (1970–2008)



Source: Emergency Events Database (EM-DAT: The OFDA/CRED International Disaster Database) (http//www.em-dat.net).

Natural Disasters- Impact on South Asia

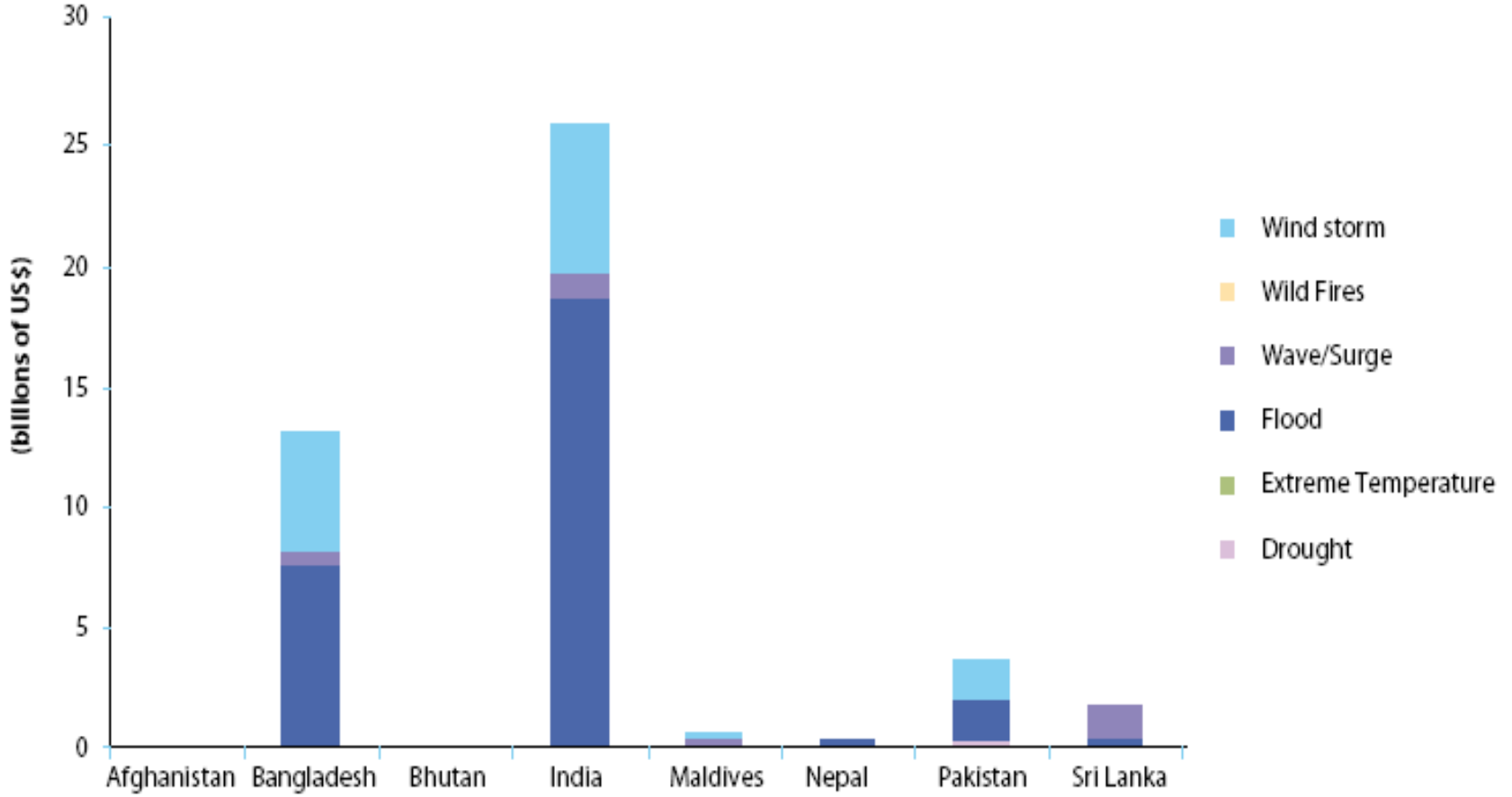
- Human casualties and damages of properties from extreme weather events
- Loss of shelter, large-scale displacement outbound migration
- Water-logging and human sufferings from large-scale flooding
- Loss of agricultural production due to flood and drought
- Adverse impacts on fisheries
- Increased incidence of diseases such as malaria, dengue, and cholera
- Pressure on scarce resources, resource competition and from social instability to violent conflicts
- Trans-boundary migration and interstate tension and conflicts
- Damage of critical infrastructure- nuclear plants, energy pipelines and so on

Reported Natural Disaster Impacts in South Asia (1990–2008)

Country	Population[56] ('000)	Deaths ('000)	People Affected ('000)	Population Affected (%)[57]	Damage (US$millions)
Afghanistan	22,615	6.1	5,410	23.9	69,060
Bangladesh	143,990	155.3	145,713	101.2	12,984,000
Bhutan	602	0.2	66	11.0	3,500
India	1,071,608	53.4	885,244	82.6	25,743,100
Maldives	279	0.0	2	0.7	500,100
Nepal	25,278	4.6	2,796	11.1	245,100
Pakistan	162,662	9.4	27,943	17.2	3,573,054
Sri Lanka	19,258	0.5	6,331	32.9	1,670,070
Total	**1,368,327**	**229.5**	**1,073,504**	**78.5**	**44,787,984**

Source: Emergency Events Database (EM-DAT: The OFDA/CRED International Disaster Database) (http://www.em-dat.net) and United Nations World Population Prospects (http://esa.un.org)

Reported Costs of Damage in South Asia by Country and Disaster Type(1990–2008)



Source: Emergency Events Database (EM-DAT: The OFDA/CRED International Disaster Database) (http://www.em-dat.net).

ENERGY SECURITY

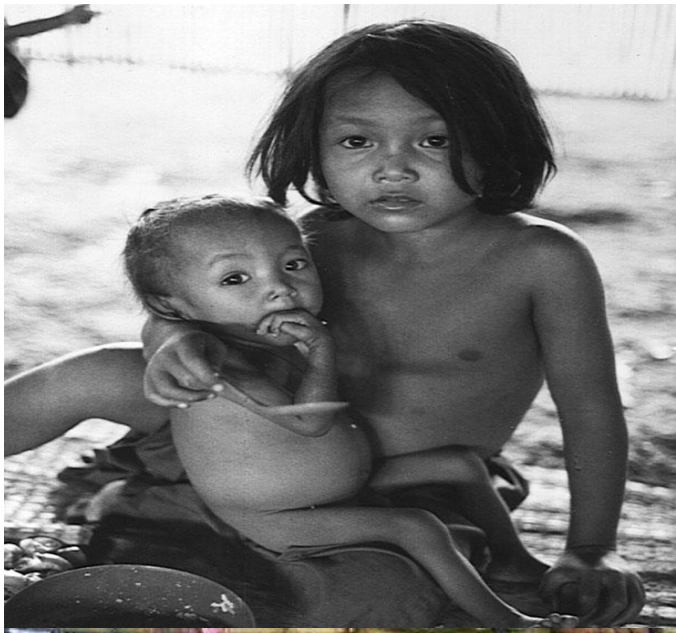
- The impacts of climate change may damage key infrastructures, such as energy, plants, supply pipelines, and consequently destabilize public order.
- Recent earthquake in Japan caused explosion in the Fukushima nuclear plant, for instance, causing human casualties and disruption to energy production.
- The decline in hydroelectric power generation may additionally reinforce competition/conflicts over fossil energy sources.




Vulnerability of Critical Energy Infrastructure

CLIMATE CHANGE AND MIGRATION

- Climate change could potentially trigger large-scale displacement and migration from one region to other in search of new avenues for employment and/or settlement.
- It is estimated that by 2050, 150 million people could be displaced by climate change related phenomenon like desertification, increasing water scarcity, floods and storm etc. (IPCC Ass. Report).
- Loss of livelihoods will trigger IDPs in vulnerable regions.



Transboundary Migration

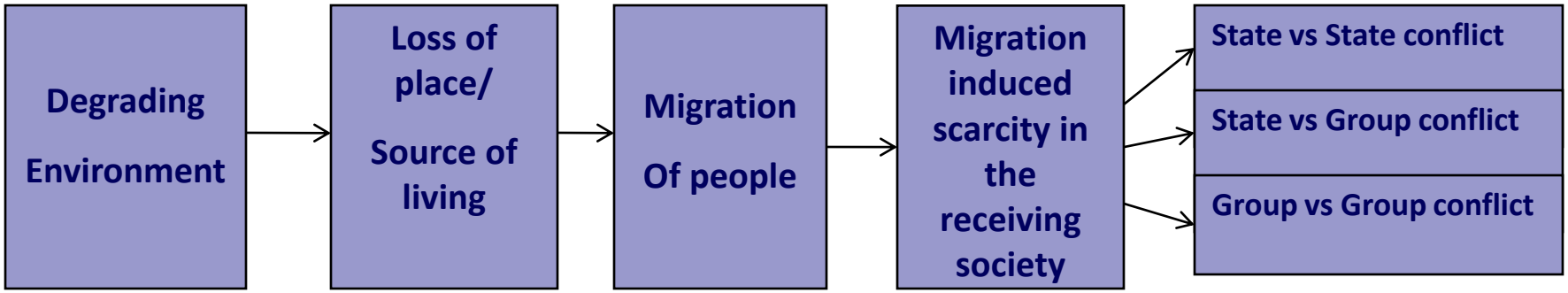
- Climate change induced migration is going to be in acute condition in South Asia.
- One third of the population live under poverty line and climate induced vulnerabilities may cause large scale impoverishment, loss of livelihood, shelter and food availability.
- Major disasters-flood, earthquake or cyclone may induce massive transboundaty migration.
- One of the riskiest places to live is in low-elevation coastal zones. Worldwide, the largest populations living on low-lying coasts are in Asia-Pacific, in countries like China, India, Bangladesh, Vietnam, Indonesia and the Philippines.




Contd.

- A recent report has indicated that the major deltas of the world such as the Ganges may be adversely affected due to climate change.
- The delta has 8.5 million hector of agricultural lands, of which 486 thousand hector would be inundated by a 2 meter sea level rise leading large scale migration both internal and transboundary.
- Glacier melting could profoundly induce migration by affecting the livelihoods of people who are directly dependent on irrigated water, small scale fishing and aquaculture.

Migration and Conflict



- Large-scale migration will add extra pressure on the scare resources in the society and thereby heighten competition and conflict over resources.

- Intra-regional forced migration, such as those from Bangladesh to India is subject to stimulate bilateral tensions.

THREAT TO DEVELOPMENT

"The drops in growth and prosperity are likely to be very substantial if climate change continues unabated and causes greatly intensified climate impacts."

-- German Advisory Council on Global Change

MDGs	Threat to MDGs
Goal 1: Eradicate extreme hunger and poverty	Regional food security is undermined and vulnerability of poor people increases
Goal 2: Achieve universal primary education	Displacement and migration of families makes education a low priority
Goal 3: Promote gender equality	Women make up two-thirds of worlds poor and are more adversely impacted by disasters
Goal 7: Ensure environmental sustainability	Climate change causes fundamental alterations in ecosystems
Goal 8: Develop a global partnership for development	The lack of adequate investment for adaptation acts as a significant drag on humanitarian assistance and development.

Climate change is an "unholy brew" that could create dangerous security vacuums …we must make no mistake to address a clear danger that not only exacerbates threats to international peace and security rather itself is a threat to international peace and security–

-- Ban Ki-moon,
UN Secretary General

HARD SECURITY DIMENSION:
Conflict Potentials of Climate Change

- Socio-political and economic unrest.
- Radicalisation and terrorism
- Resource conflict
- Inter and/or Intra-state conflict potentials.
- State collapse.
- Regional conflicts.

RADICALISATION AND TERRORISM

- Radicalisation and terrorism may increase in many developing societies particularly in South Asia due to the climate induced social and economic deprivation.
- When a government can no longer deliver services to its people, conditions are ripe for the extremists and terrorists to fill the vacuum.
- The Rohingyas of Myanmar is a very relevant example of how marginalized people get involved in radicalisation and subsequently to terrorism.

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)

Challenges of Environmental Scarcity

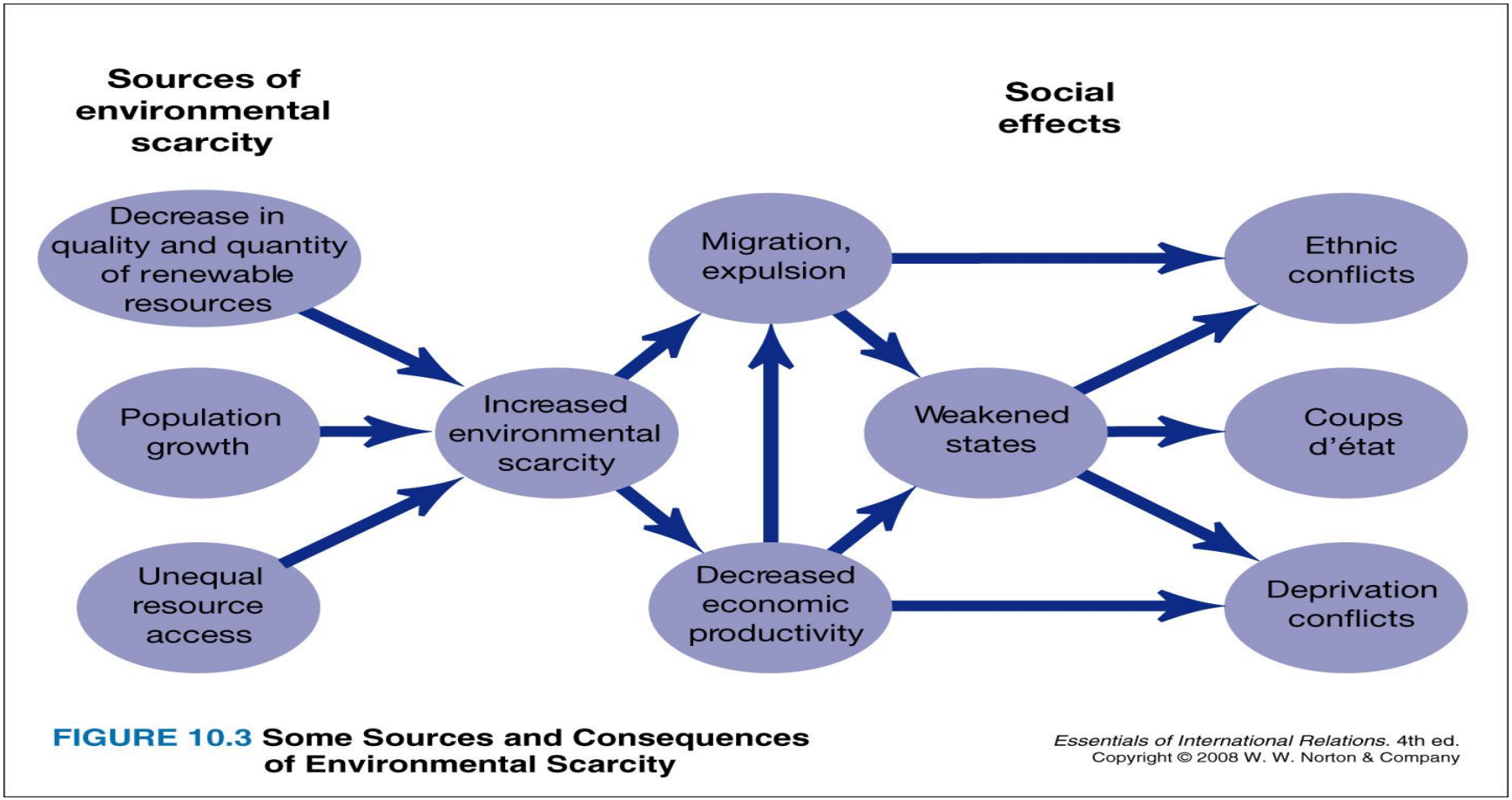


FIGURE 10.3 Some Sources and Consequences of Environmental Scarcity

SOCIAL FRAGMENTATION

- Competition over scarce resources
- Breakdown of traditional established order.
- Group versus group conflict

INTER-STATE CONFLICT

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

"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."

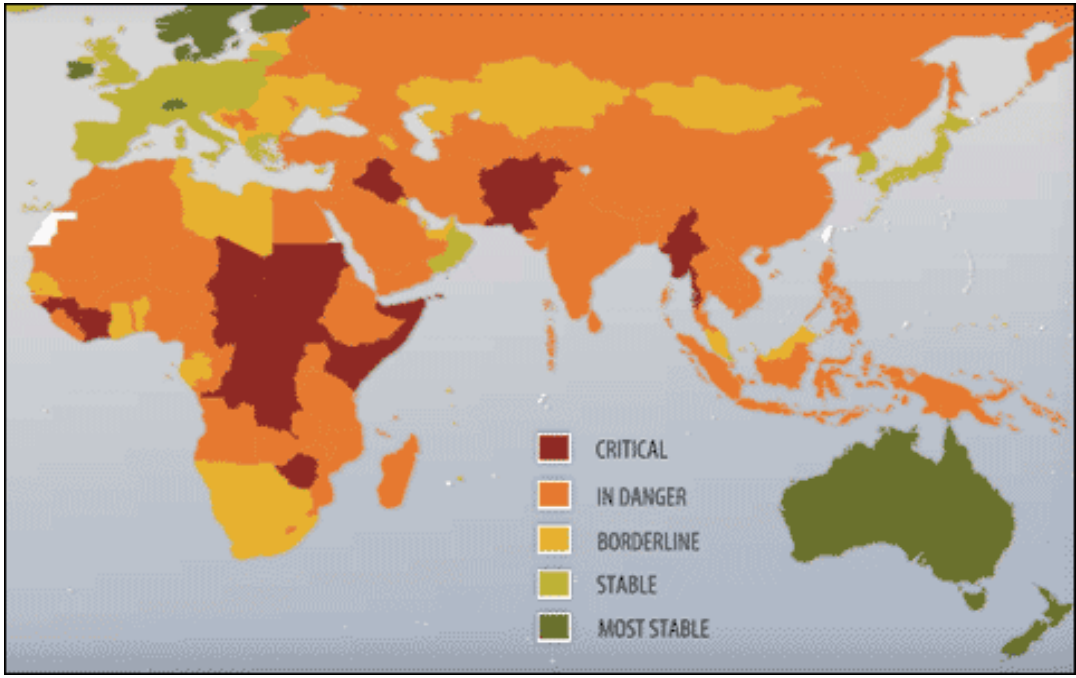
Byers & Dragojlovic, Human Security Bulletin, October 2004

INTRA-STATE CONFLICT

- Ethnic conflict
- Civil strife
- Terrorism
- Social Fragmentation

STATE COLLAPSE

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

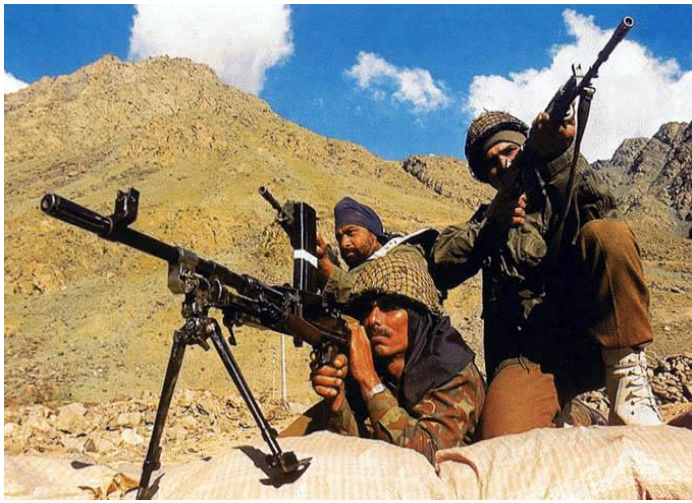


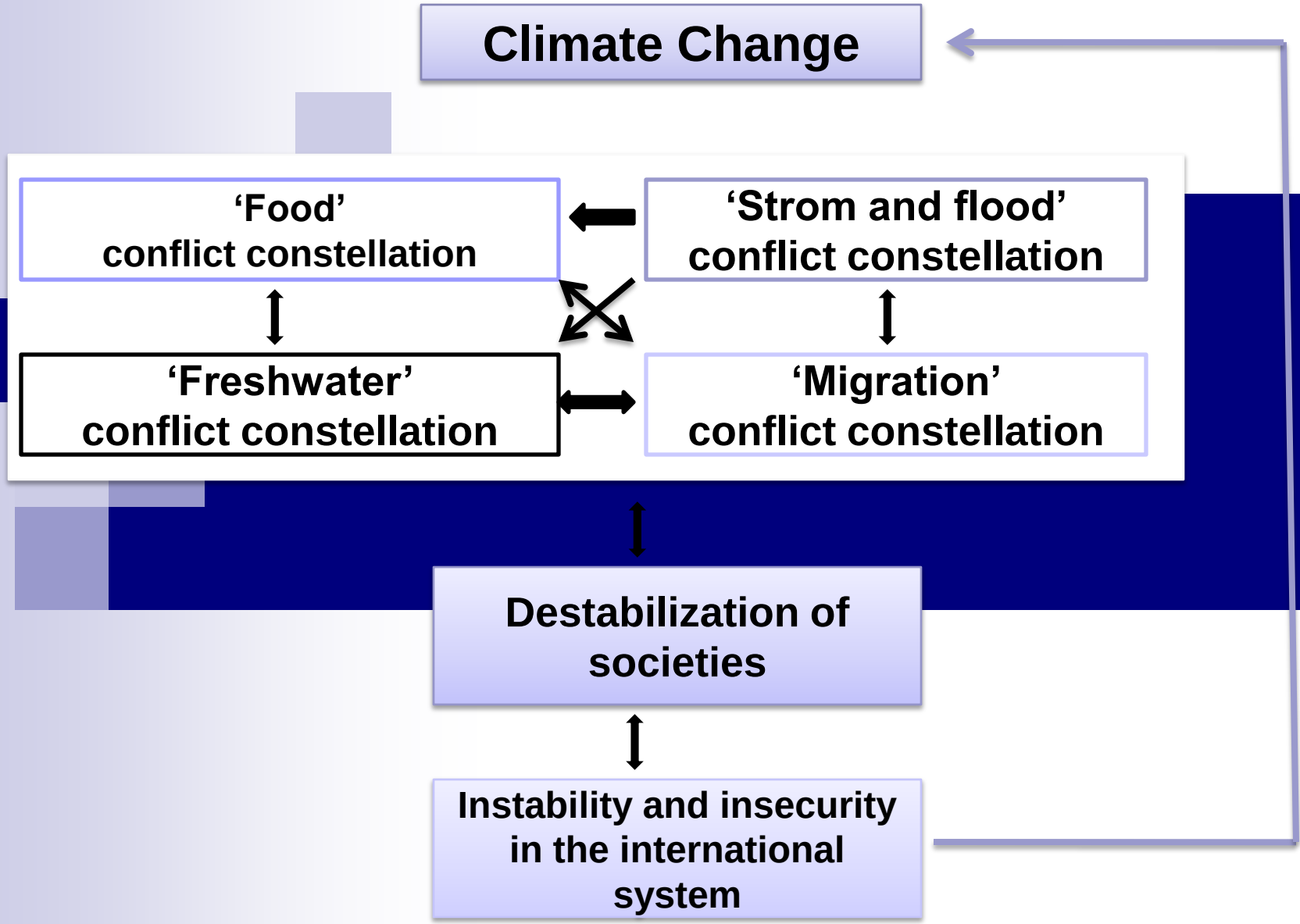
"When climate change significantly or environmental conditions deteriorate to the point that necessary resources are not available, societies can become stressed sometimes to the point of collapse"

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

REGIONAL DESTABILISATION

- Climate change acts as a threat multiplier for instability in some of the most volatile regions including South Asia.
- 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.

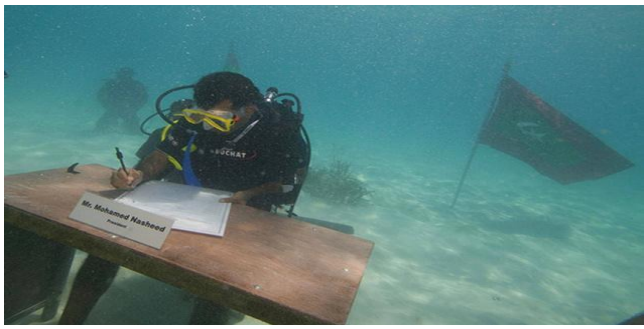




Climate Change as drivers of international destabilization

IMPACTS ON MILITARY SYSTEM

- Direct impact on the military system, infrastructure and operations
- Vulnerabilities of weapon system and platforms
- Military bases and installation are under risk of sea level rise and natural disasters
- Severe weather has a direct effect on military readiness such as ships and aircraft operations



Conclusion

- Common problems need common solutions
- Only cooperation among the countries of South Asia can reduce the imminent natural disasters and the consequent man made conflicts.
- Improved relations among the countries of the region and harmonisation of strategies and actions.

"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

Bangladesh Institute of Peace and Security Studies (BIPSS)

www.bipss.org.bd