CLIMATE CHANGE

IMPACT ON NATIONAL SECURITY

Lt Col Scott Hausman
Commander
14th Weather Squadron

Introduction

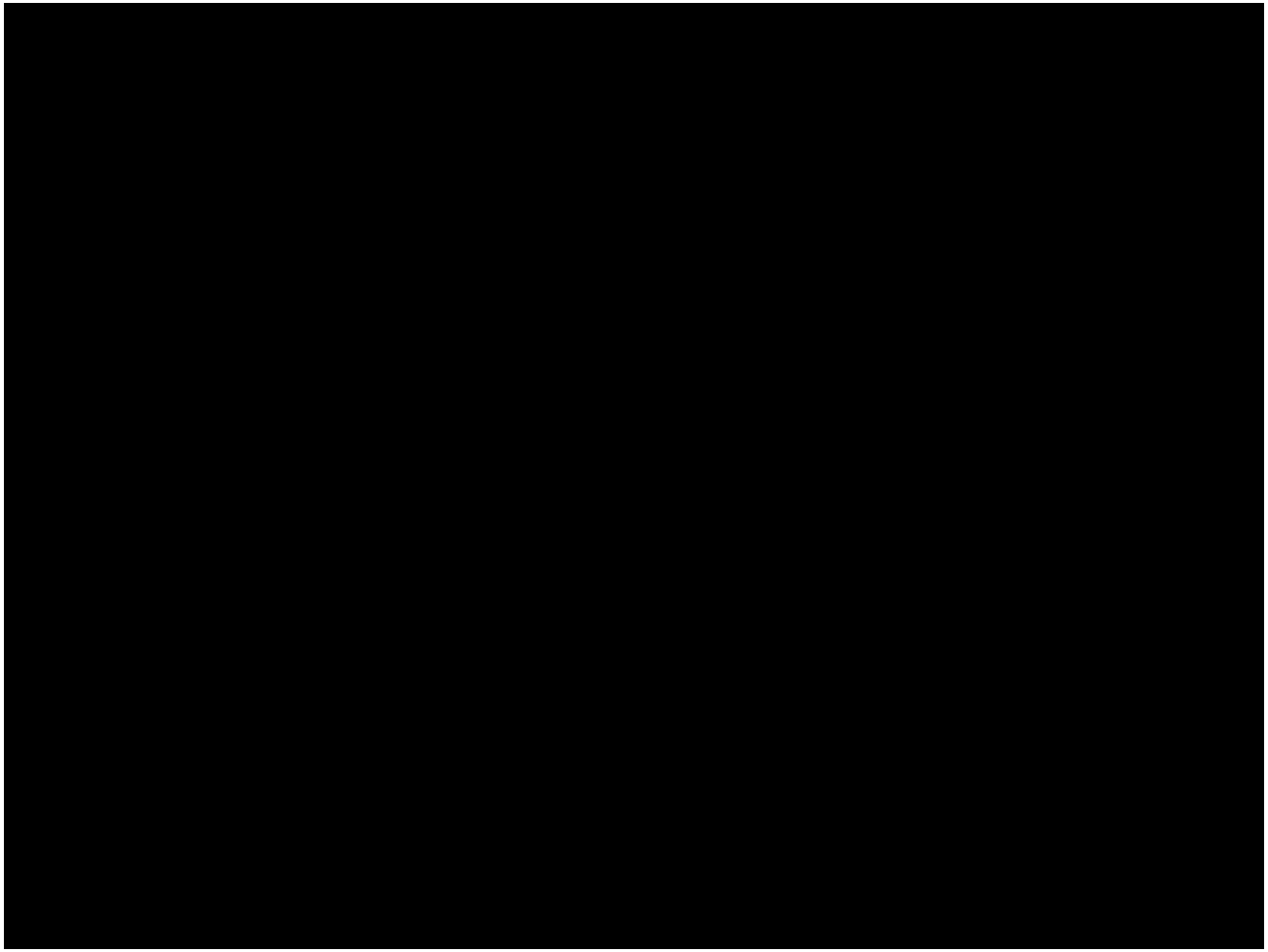
Day After Tomorrow

2004

20th Century Fox

Produced by:
Mark Gordon
Roland Emmerich

Directed by:
Roland Emmerich



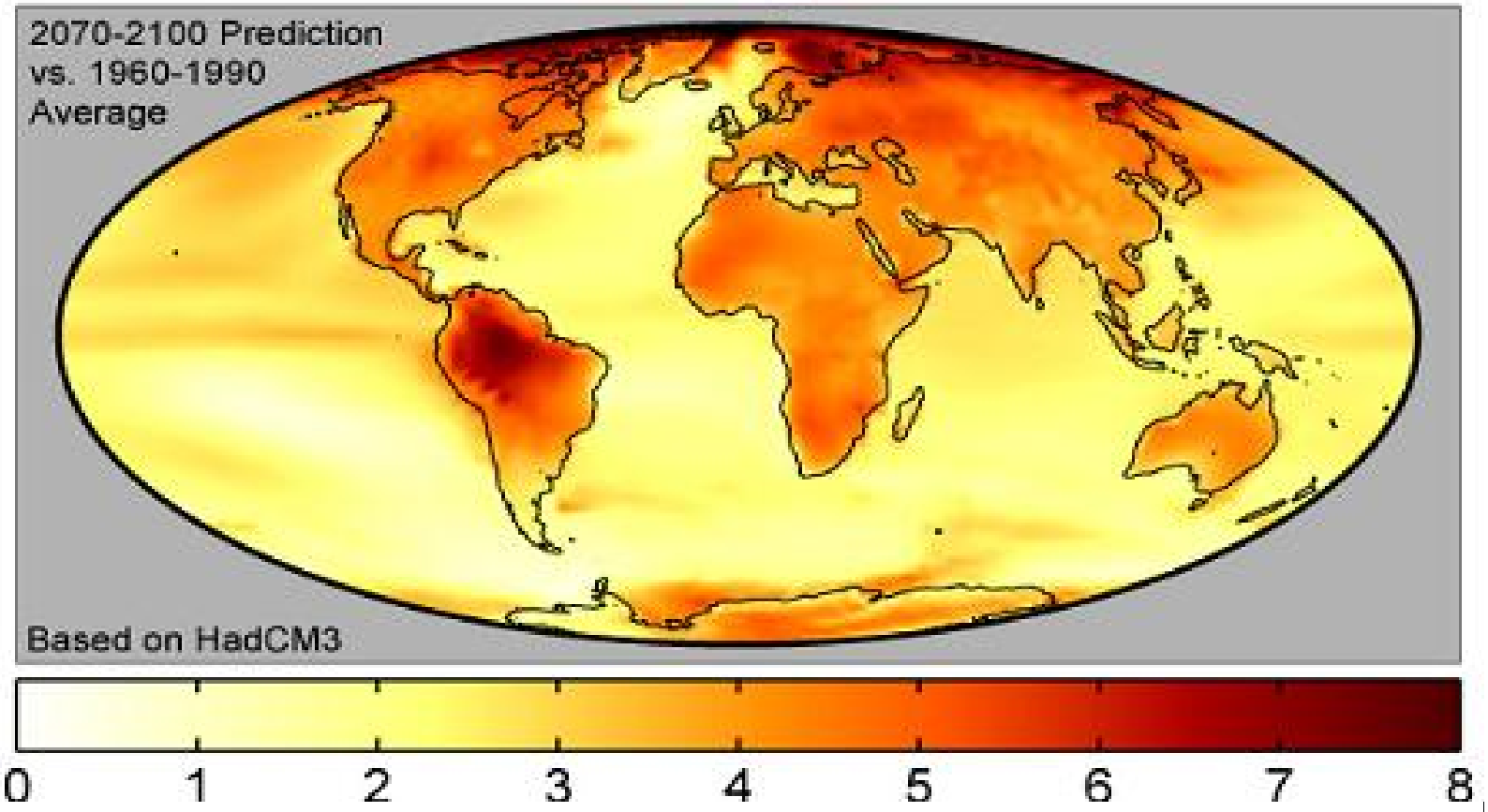
Purpose

- To examine potential impacts to US national security resulting from global warming
- Assumption is made that global warming is fact
- No consideration is given to:
  - Causes of climate change
  - Proposals for mitigation or adaptation to climate change

Outline

- Setting the Stage
- Evolving Challenge
- Threats and Impacts
  - Sea Level Rise - Coastal Inundation, Lost Territory & Mass Migration
  - Extreme Weather Events: Increased Natural Disasters
  - Scarcity of Water, Food and Public Health: Regional Instability and Failed States
  - Glacial and Sea Ice Melt: Global Conflict and Competition for Scarce Resources

GLOBAL WARMING



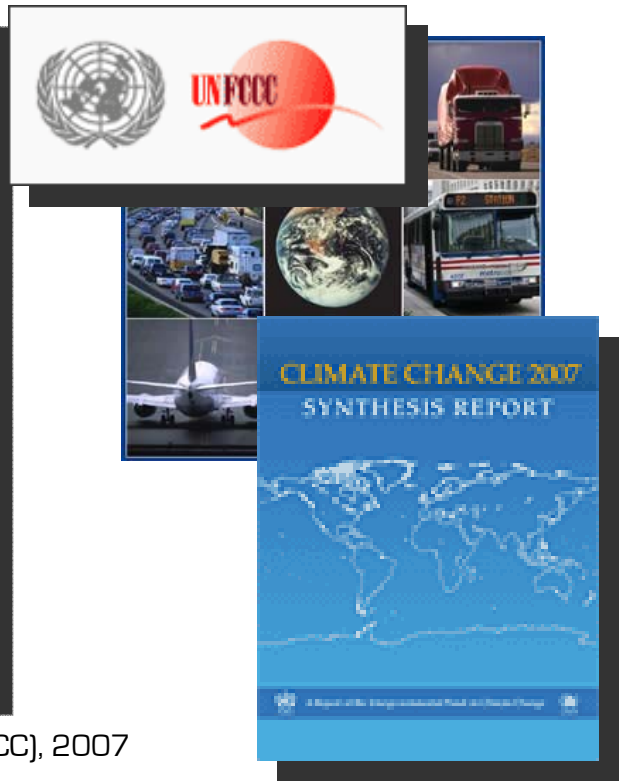
Setting the Stage

Definitions

Climate Change

Definitions of climate change

Climate change in IPCC usage refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity. This usage differs from that in the United Nations Framework Convention on Climate Change (UNFCCC), where climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.



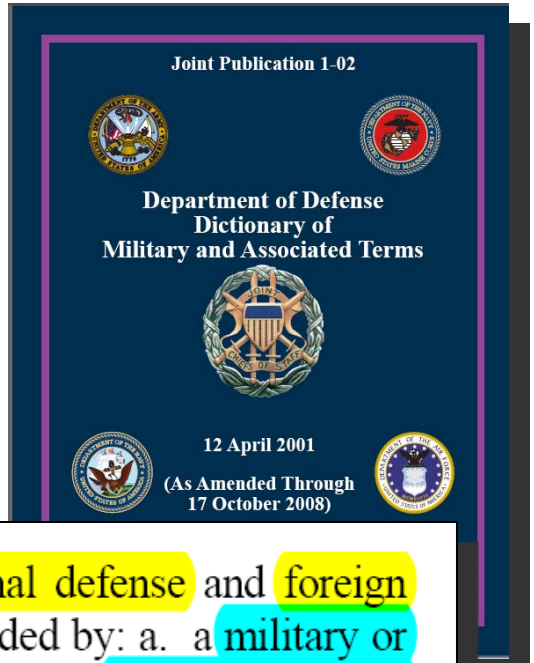
Source: Fourth Assessment Report, Intergovernmental Panel on Climate Change (IPCC), 2007

Projections of "global warming" due to green house gas emissions are of interest to national security decision makers.

Definitions

National Security

- No concrete definition; scope varies greatly:
  - Minimalist view restricts to defense of borders or homeland security
  - Broadest view includes even human and environmental security
  - Common view considers military threats, including terrorism, diplomatic disputes, and international economic security



national security — A collective term encompassing both national defense and foreign relations of the United States. Specifically, the condition provided by: a. a military or defense advantage over any foreign nation or group of nations; b. a favorable foreign relations position; or c. a defense posture capable of successfully resisting hostile or destructive action from within or without, overt or covert. See also **security.**

What happens in other countries affects our national security.

Evolving Challenge

Growing Concern

- 1974, CIA Report, Potential Implications of Trends in World Population, Food Production, and Climate
- 1980s, Ozone holes and acid rain dominated the debate over environmental change
- 1988, World Meteorological Organization (WMO) and UN Environmental Program (UNEP) formed the IPCC to address growing concerns (first report in 1990)
- 1990, Senate Armed Services Committee declared global warming and other environmental destruction "a growing national security threat"
- 2003, Pentagon commissioned *An Abrupt Climate Change Scenario and Its Implications for United States National Security*, a worst-case scenario with catastrophic consequences

Source: Carolyn Pumphrey (Editor), Global Climate Change: National Security Implications, May 2008

Call for Action

- *Fourth Assessment Report (4AR)*,Intergovernmental Panel on Climate Change (IPCC), 2007

  "Warming of the climate system is unequivocal" and "most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to observed increases in anthropogenic greenhouse gas concentrations."

  General Conclusions: 1) 5-7°F warming most likely, 2) 1-2 ft of sea level rise, 3) overall increase of precipitation but shifting pattern and 4) decreasing snow and ice cover

  - *The Age of Consequences, The Foreign Policy and National Security Implications of Global Climate Change,* Center for Strategic and International Studies (CSIS) and Center for New American Security (CNAS), 2007

- *National Security and the Threat of Climate Change*, Center for Naval Analysis (CNA) Corp, April 2007

Call for Action

CNA Report

Call for Action

CNA Report: Findings

1. Project climate change poses a serious threat to America's national security.
2. Climate change acts as a threat multiplier for instability in some of the most volatile regions of the world.
3. Projected climate change will add to tensions even in stable regions of the world.
4. Climate change, national security, and energy independence are a related set of global challenges.

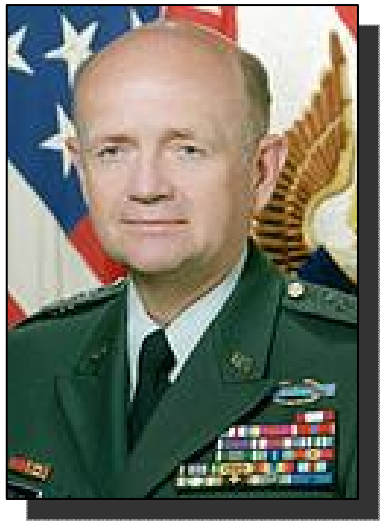
Call for Action

CNA Report: Assessment of Risk

NATIONAL SECURITY AND THE THREAT OF CLIMATE CHANGE

"We seem to be standing by and, frankly, asking for perfectness in science," Gen. Sullivan said. "People are saying they want to be convinced, perfectly. They want to know the climate science projections with 100 percent certainty. Well, we know a great deal, and even with that, there is still uncertainty. But the trend line is very clear."

"We never have 100 percent certainty," he said. "We never have it. If you wait until you have 100 percent certainty, something bad is going to happen on the battlefield. That's something we know. You have to act with



Retired General Gordon Sullivan
Former Army Chief of Staff

Congress Acts

2008 Defense Authorization Act (Signed 28 Jan 08)

SEC. 951. DEPARTMENT OF DEFENSE CONSIDERATION OF EFFECT OF CLIMATE CHANGE ON DEPARTMENT FACILITIES, CAPABILITIES, AND MISSIONS.

(a) CONSIDERATION OF CLIMATE CHANGE EFFECT.—Section 118 of title 10, United States Code, is amended by adding at the end the following new subsection:

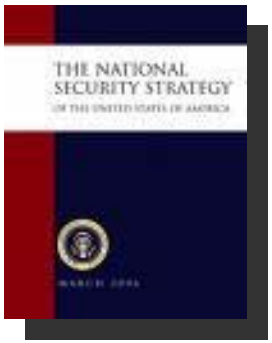
"(g) CONSIDERATION OF EFFECT OF CLIMATE CHANGE ON DEPARTMENT FACILITIES, CAPABILITIES, AND MISSIONS.—(1) The first national security strategy and national defense strategy prepared after the date of the enactment of the National Defense Authorization Act for Fiscal Year 2008 shall include guidance for military planners—

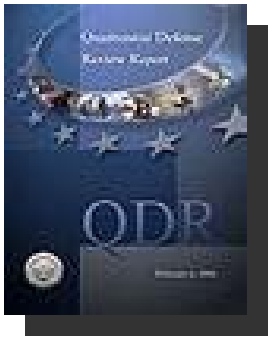
"(A) to assess the risks of projected climate change to current and future missions of the armed forces;

"(B) to update defense plans based on these assessments, including working with allies and partners to incorporate climate mitigation strategies, capacity building, and relevant research and development; and

"(C) to develop the capabilities needed to reduce future impacts.

"(2) The first quadrennial defense review prepared after the date of the enactment of the National Defense Authorization Act for Fiscal Year 2008 shall also examine the capabilities of the armed forces to respond to the consequences of climate change, in particular, preparedness for natural disasters from extreme weather events and other missions the armed forces may be asked to support inside the United States and overseas.





Congress Acts

2008 Defense Authorization Act (Signed 28 Jan 08)

"(3) For planning purposes to comply with the requirements of this subsection, the Secretary of Defense shall use—

"(A) the mid-range projections of the fourth assessment report of the Intergovernmental Panel on Climate Change;

"(B) subsequent mid-range consensus climate projections if more recent information is available when the next national security strategy, national defense strategy, or quadrennial defense review, as the case may be, is conducted; and

"(C) findings of appropriate and available estimations or studies of the anticipated strategic, social, political, and economic effects of global climate change and the implications of such effects on the national security of the United States.

Congress Acts

2008 Intelligence Authorization Act (Still in Congress)

Section 321. National intelligence estimate on global climate change.

Section 321 requires the DNI to submit to Congress a National Intelligence Estimate (NIE) within 270 days on the impact to U.S. national security of the geopolitical effects brought about by global climate change. The Committee notes that the National Intelligence Council (NIC) is presently writing such an assessment, which will either be produced as a National Intelligence Assessment or an NIE on an unclassified basis. Section 321 allows the DNI to determine whether the requirement to produce an NIE would be duplicative of the current NIC effort if both products would have the same drafting and review procedures.

Section 321 directs the DNI to use as the baseline for the NIE the mid-range projections of the fourth assessment report of the Intergovernmental Panel on Climate Change. The IC would therefore have no requirement to assess the underlying science of global climate change or predict its immediate effects. Rather, the NIE would focus on the direct impact from global climate change on U.S. national security and strategic economic interests. Changes resulting from global climate change present potentially wide-ranging threats to the United States that may require military, diplomatic, financial, and other national responses. It is the IC's responsibility to prepare Executive and Legislative branch policymakers for such possibilities.

Congress Acts

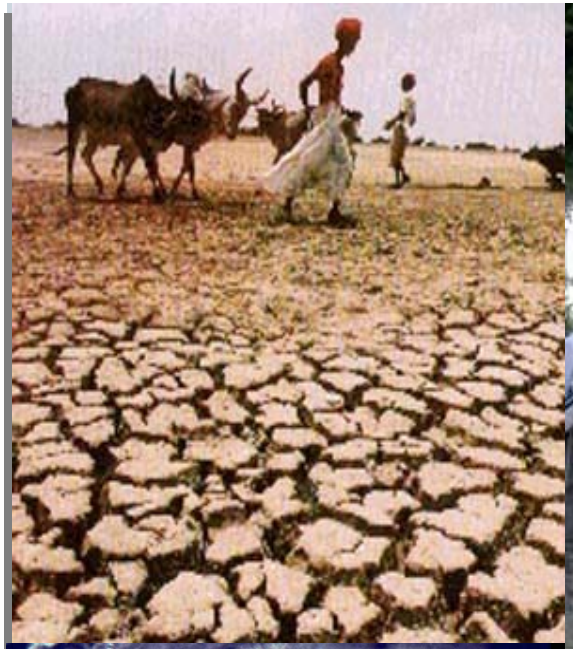
Testimony from Director of National Intelligence

- *National Security Implications of Global Climate Change Through 2030*, National Intelligence Council (NIC), consensus of 16 intel agencies, 2008 (Confidential)
- DNI testifies before Senate Select Committee on Intelligence on 12 Feb 09

ADM (Ret) Dennis C. Blair
Director of National Intelligence

Assessing the Impact of Climate Change

According to the United Nations Intergovernmental Panel on Climate Change IPCC), a failure to act to reduce green house gas emissions risks severe damage to the planet by the end of this century and even greater risk in coming centuries.... The intelligence Community recently completed a National Intelligence Assessment on the national security impacts of global climate change to 2030. The IC judges global climate change will have important and extensive implications for US national security interests over the next 20 years.

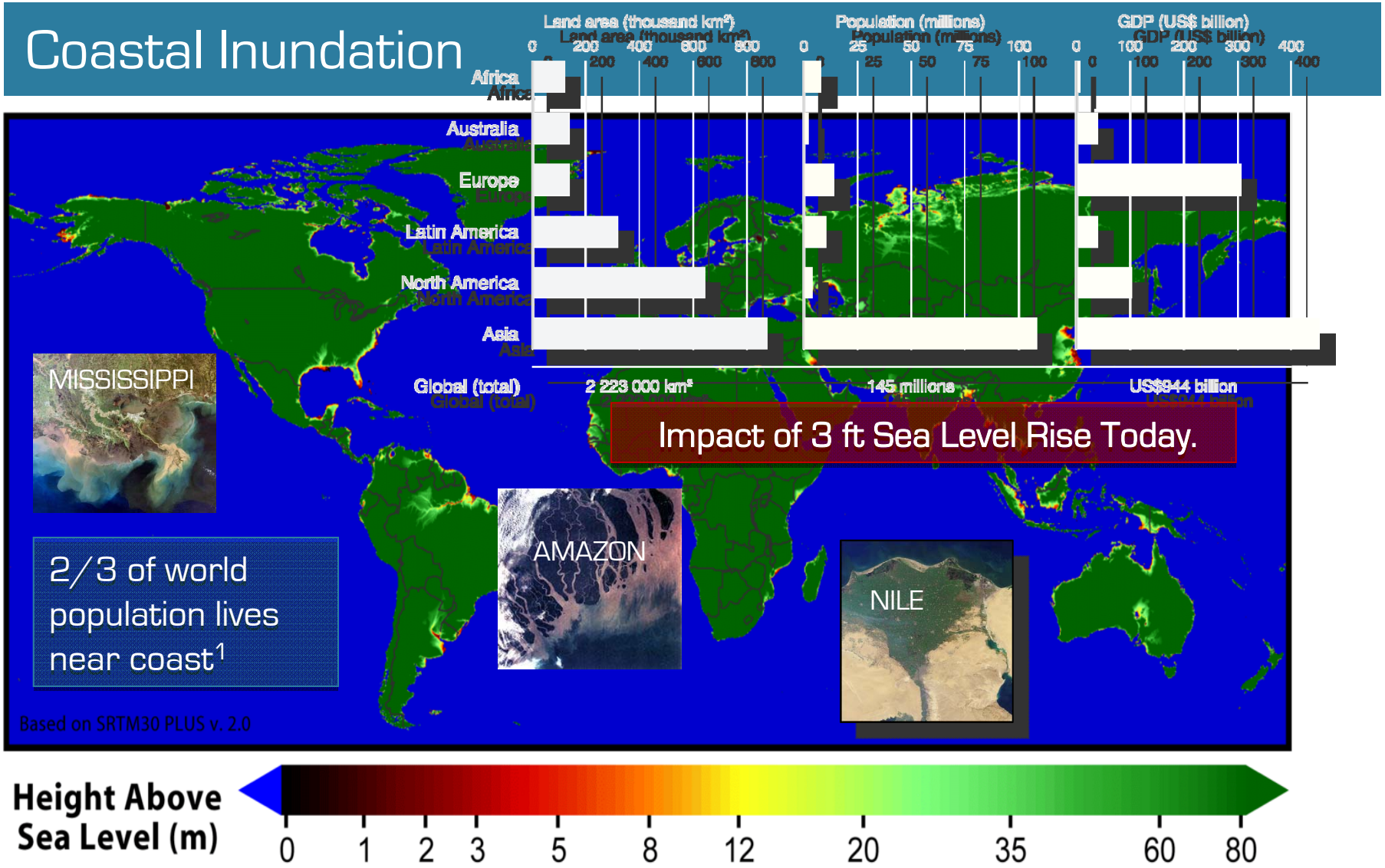


Threats and Impacts

Sea Level Rise: Coastal Inundation, Lost Territory & Mass Migration

Sea Level Rise

Coastal Inundation

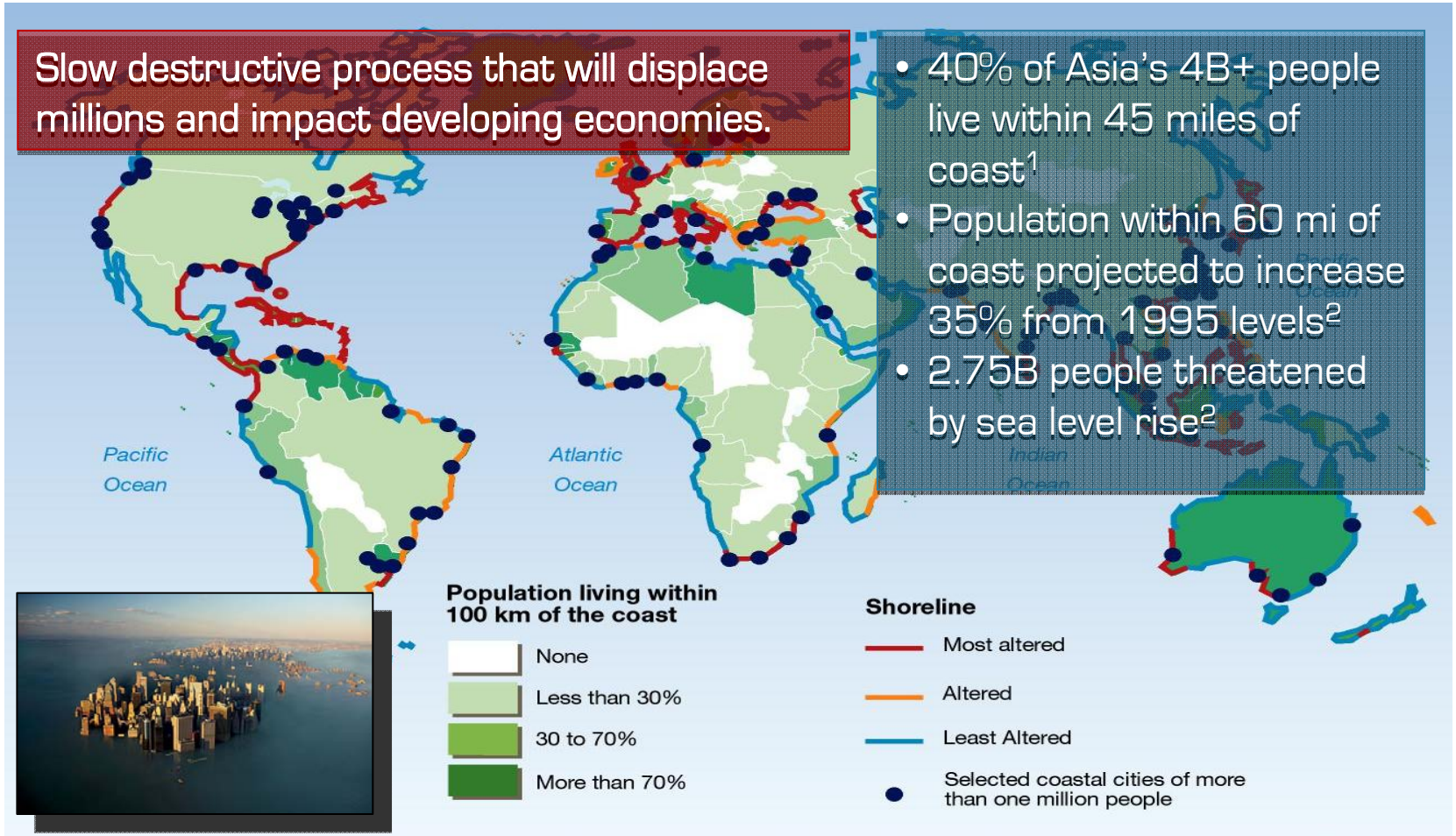


Sea Level Rise

Flooding of Population Centers

Slow destructive process that will displace millions and impact developing economies.

- 40% of Asia's 4B+ people live within 45 miles of coast[1]
- Population within 60 mi of coast projected to increase 35% from 1995 levels[2]
- 2.75B people threatened by sea level rise[2]

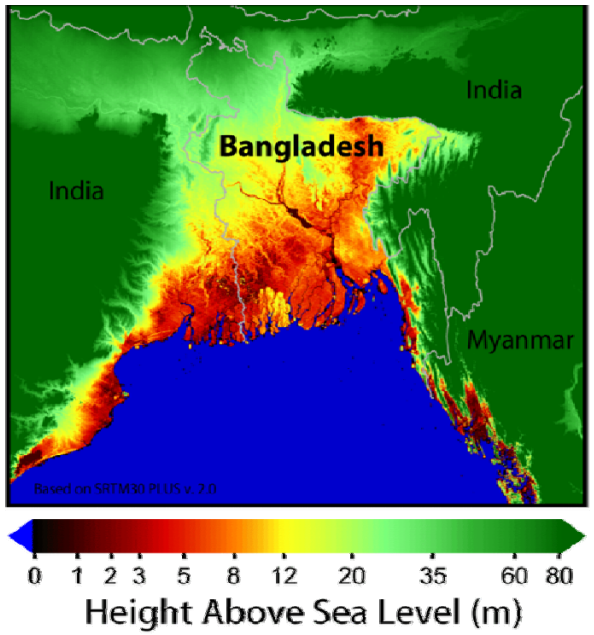


Source: Burke et al., World Resources Institute, Washington DC, 2001; Paul Harrison,Fred Pearce, *AAAS Atlas of Population and Environment 2001*, American Association for the Advancement of Science, University of California Press, Berkeley.

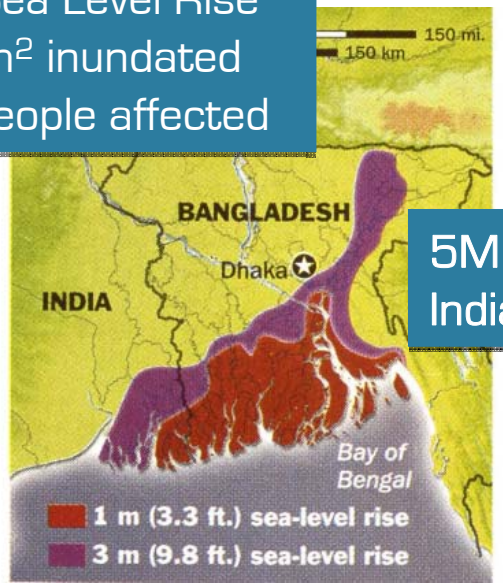
PHILIPPE REKACEWICZ
FEBRUARY 2002

Mass Migration

Bangladesh



- 1.5m Sea Level Rise
- 22K km^2 inundated
- 17M people affected

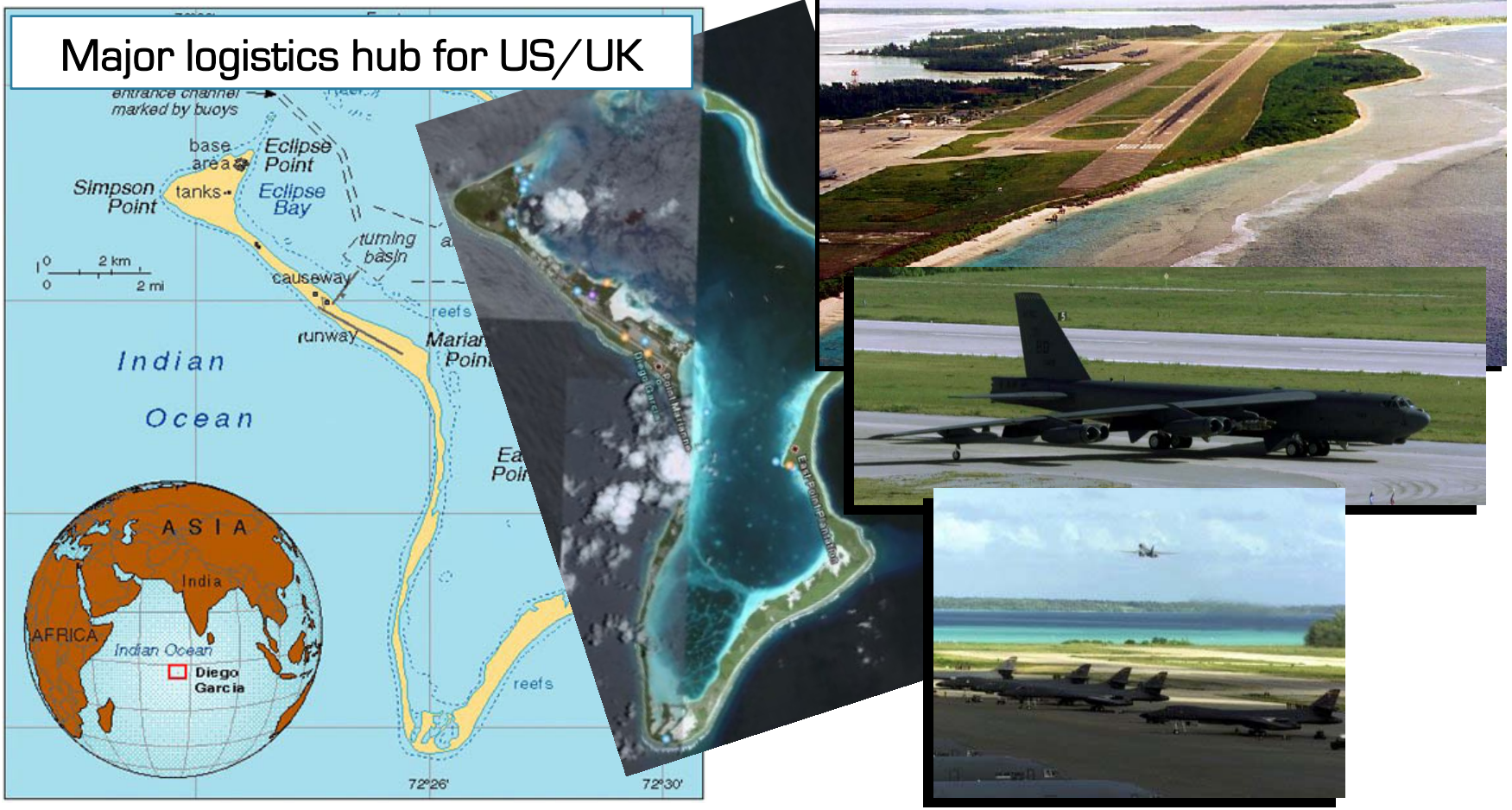


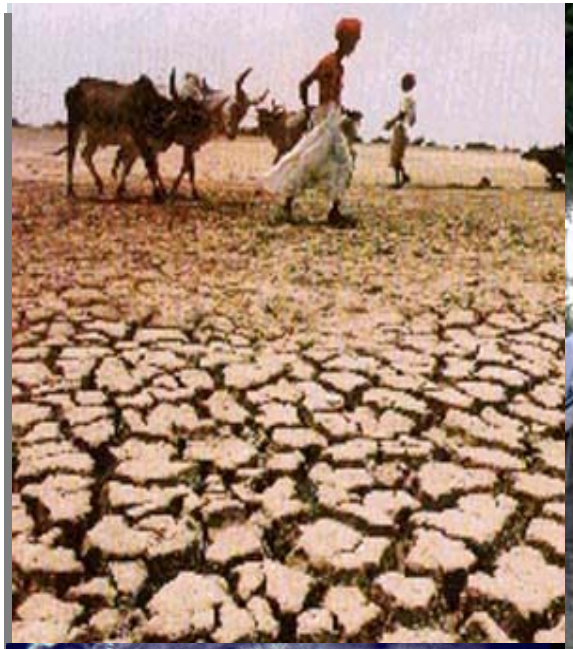
5M living illegally in India[4]

- 156M People (7th most populous country)[1,2]
- 134K km^2 (slightly smaller than Iowa; highest population density for country > 2000 km^2) [1,2]
- Many live in coastal delta region

Lost Territory

Diego Garcia, Indian Ocean



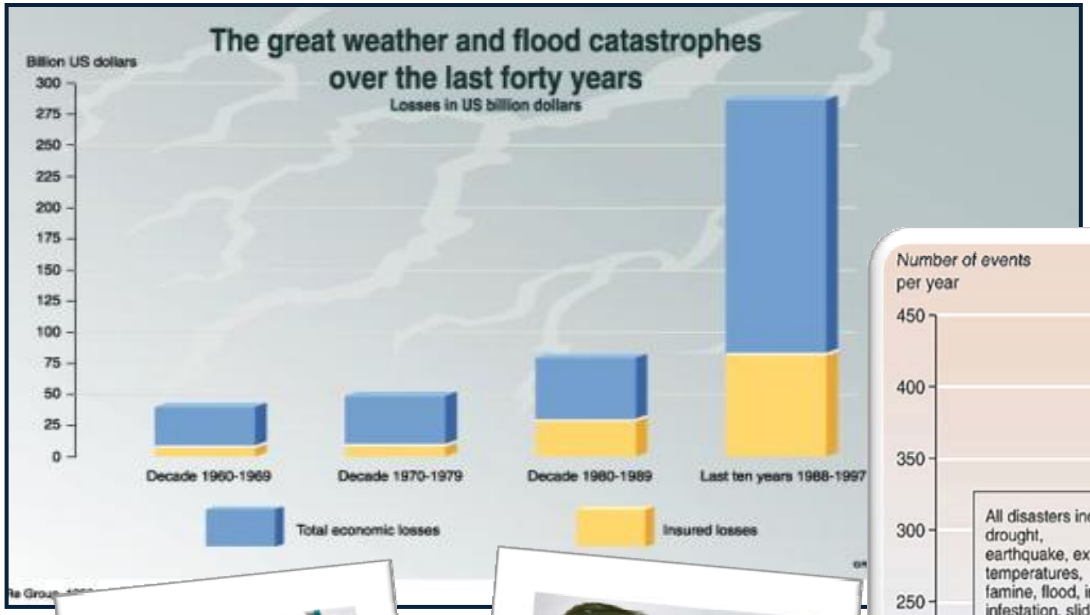


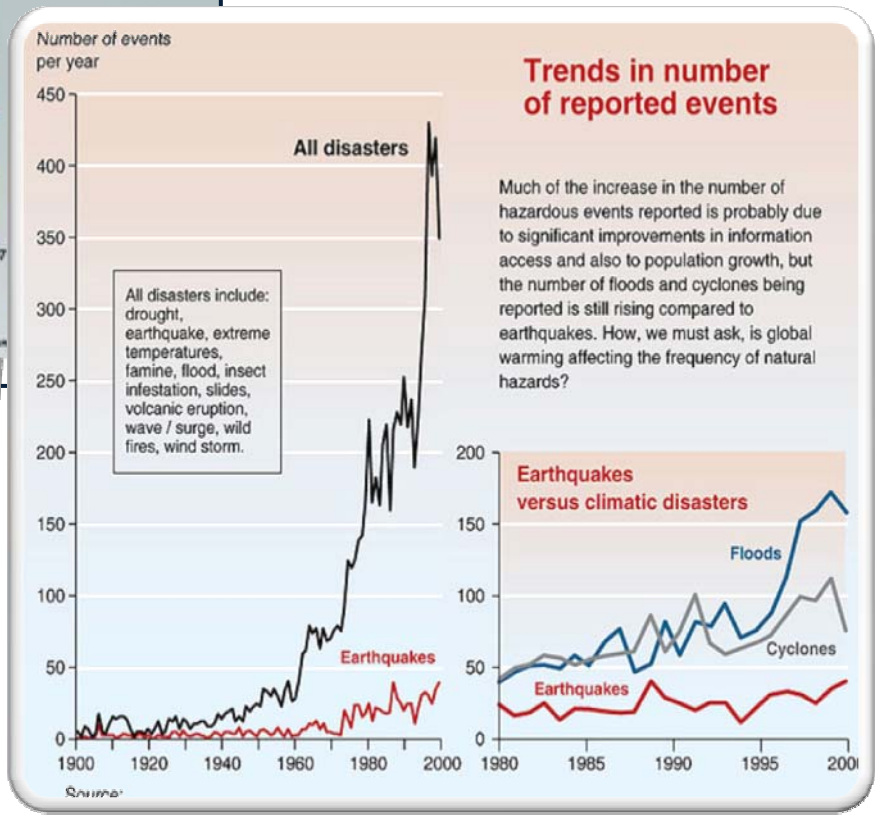
Threats and Impacts

Extreme Weather Events: Increased Natural Disasters

Extreme Weather Events

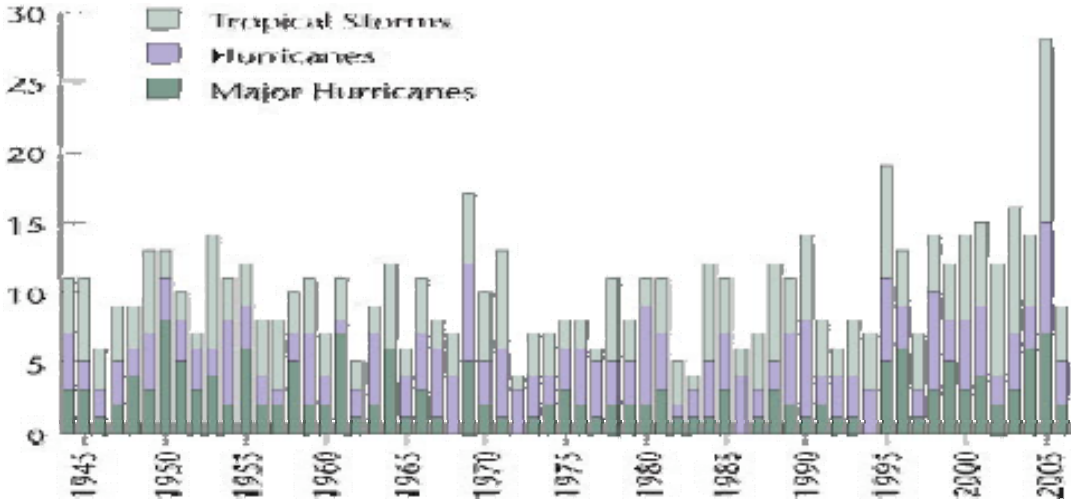
Increasing Frequency and Cost

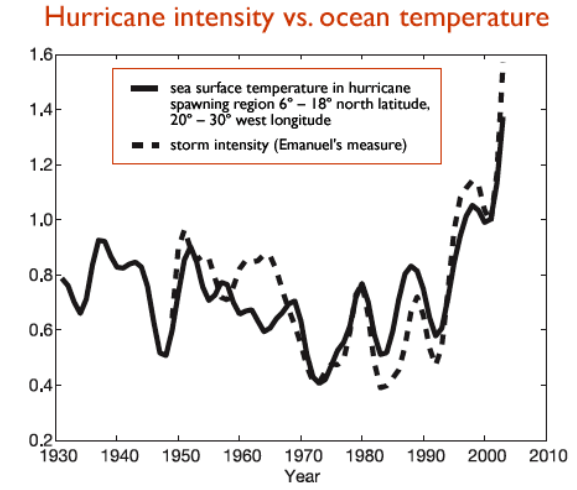


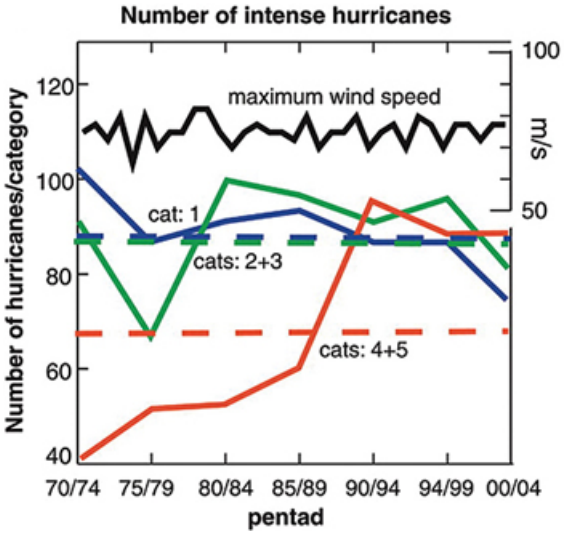


Extreme Weather Events

Tropical Cyclones



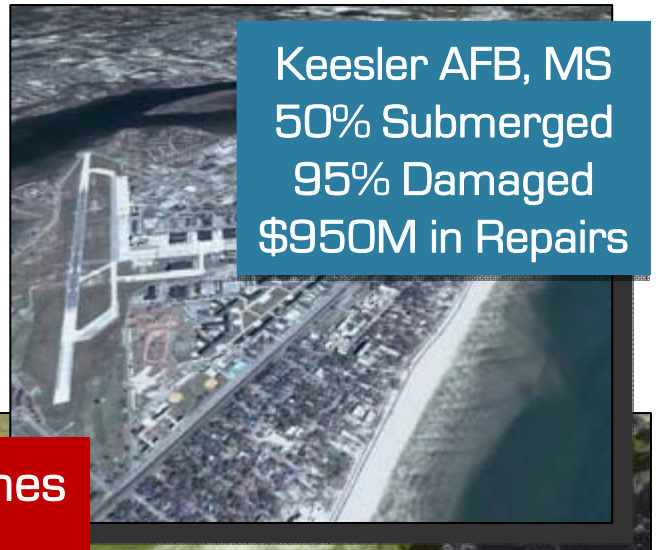




- 2007 Gonu: Strongest storm ever in Arabian Sea (1st Cat 5)
- 2006 Ioke: Longest lived Cat 4; most intense in Central Pacific
- 2006 Monica: Strongest storm in S Hemisphere
- 2005 Wilma: Lowest central pressure in Atlantic
- 2004 Catarina: First known hurricane to form in South Atlantic and strike Brazil

Increased Natural Disasters

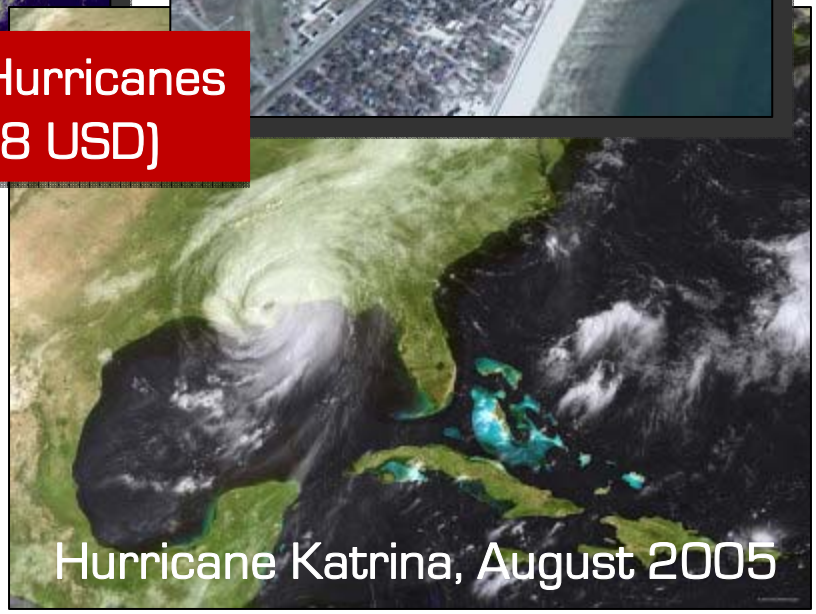
Destruction of Coastal Installations



Keesler AFB, MS
50% Submerged
95% Damaged
$950M in Repairs

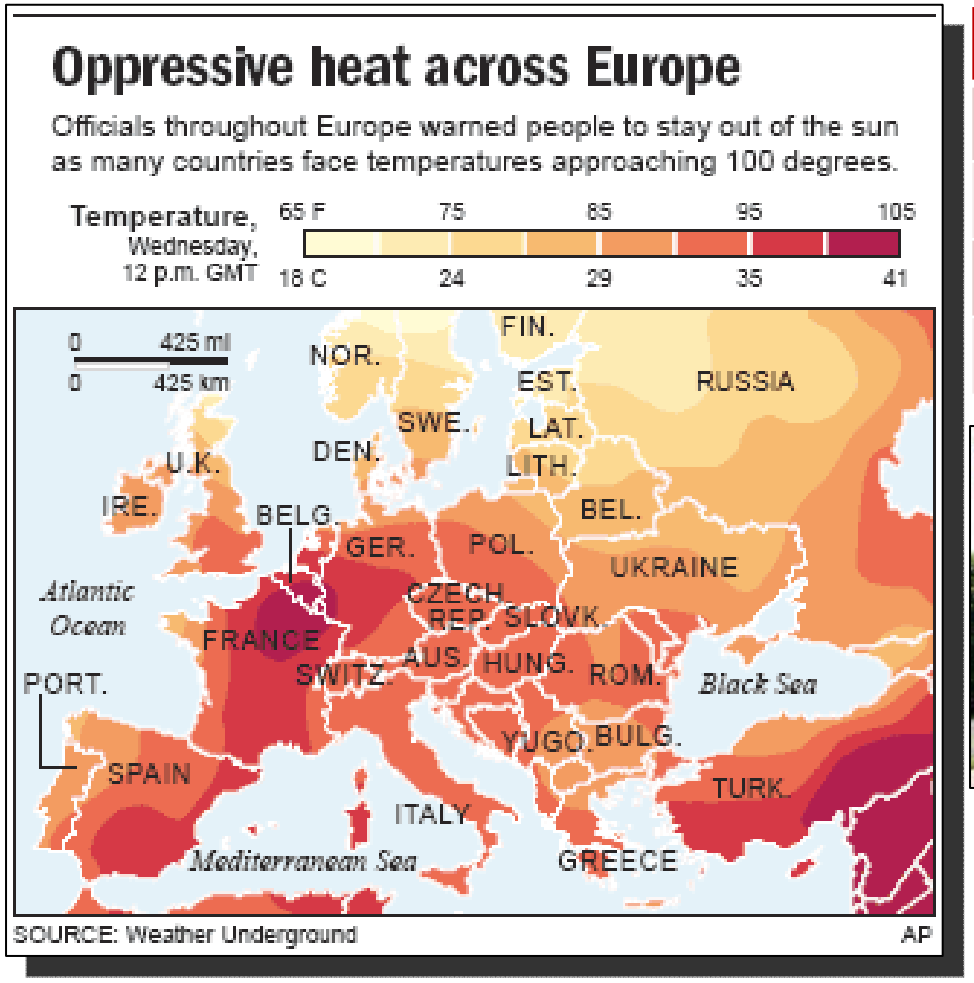
Two Most Costly Hurricanes
$130.3B (2008 USD)

Homestead AFB, FL
97% Damaged; Over $100M in Repairs

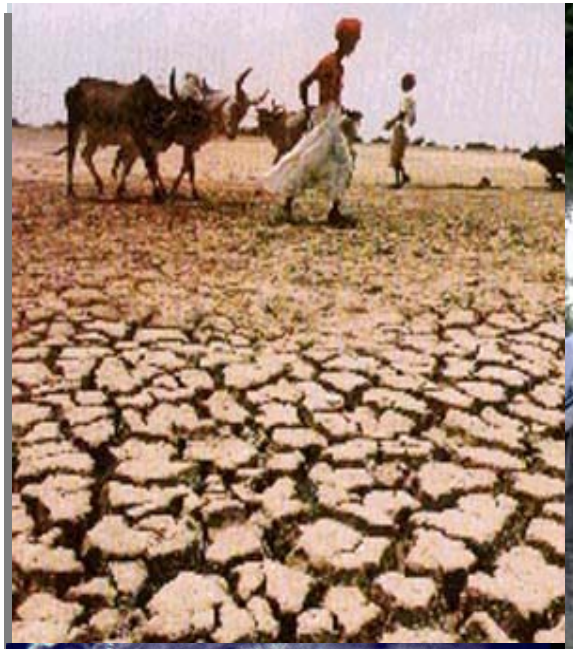


Increased Natural Disasters

Severe Heat Waves



Event	Death Toll
2006 Europe	3,418
2003 Europe	52,000
2003 India	1,900
1998 India	2,541

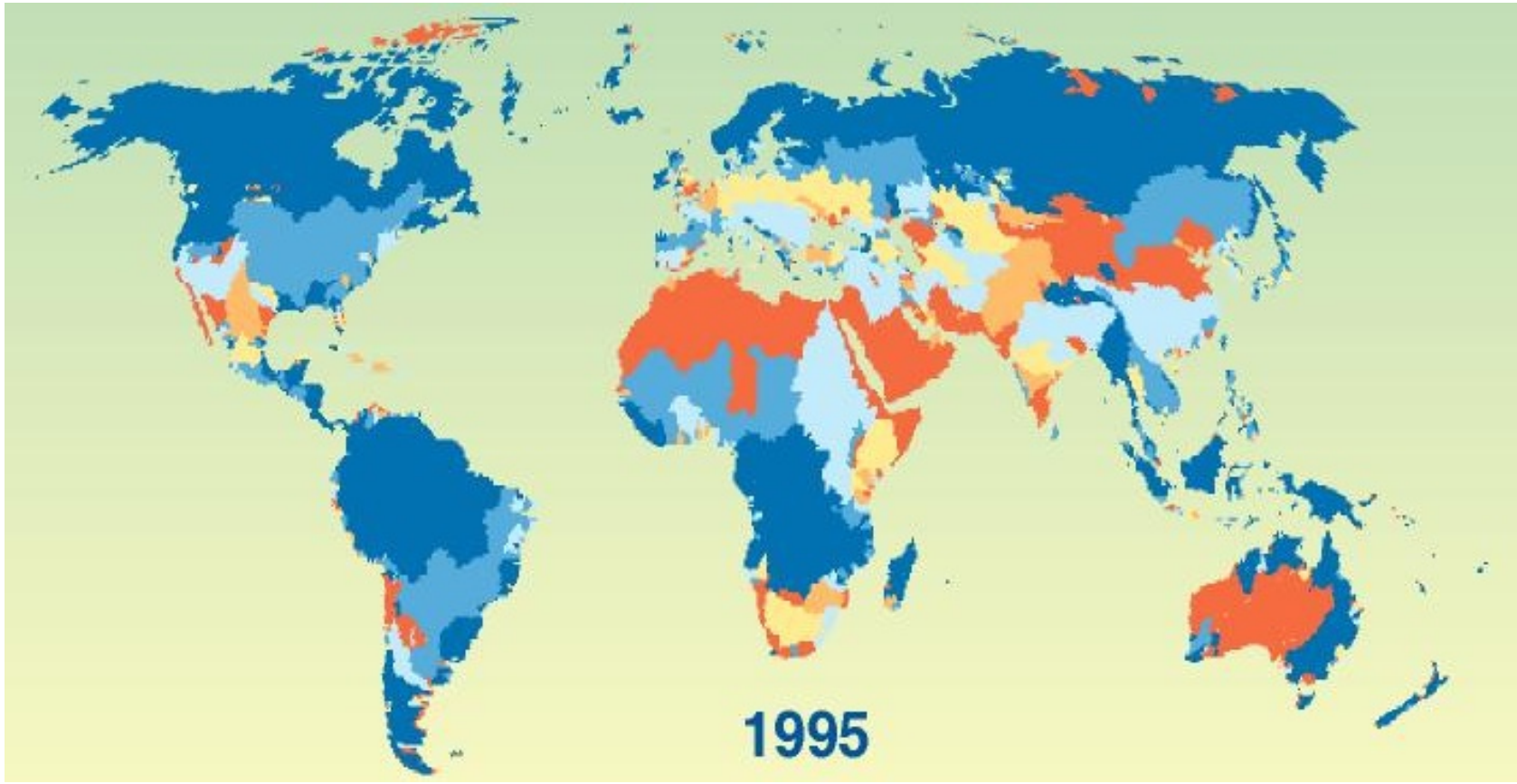


Threats and Impacts

Scarcity of Water, Food and Public Health: Regional Instability and Failed States

Water Scarcity

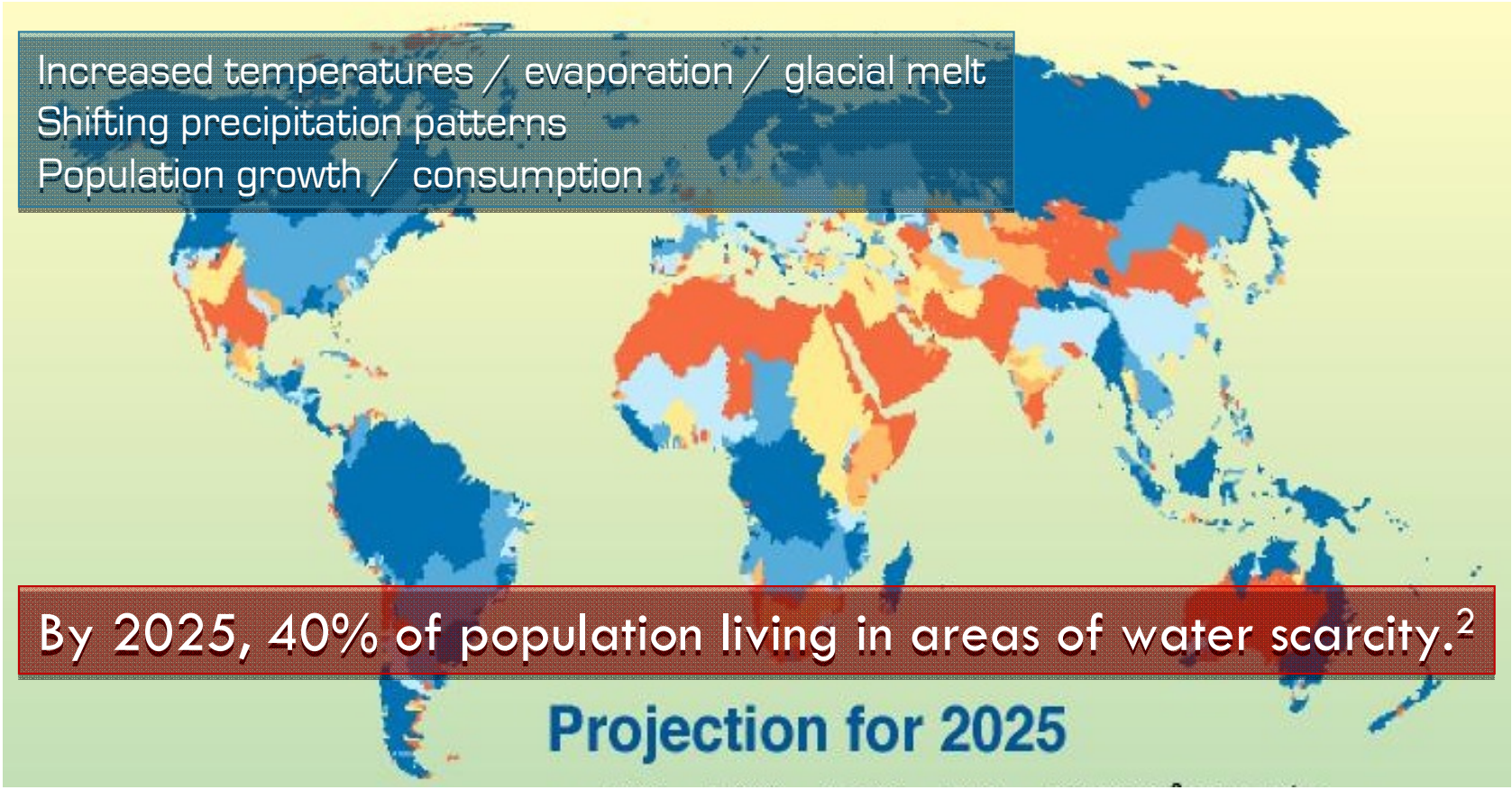
World's Freshwater Supply Stressed



Water Stress/Scarcity = Drought

Water Scarcity

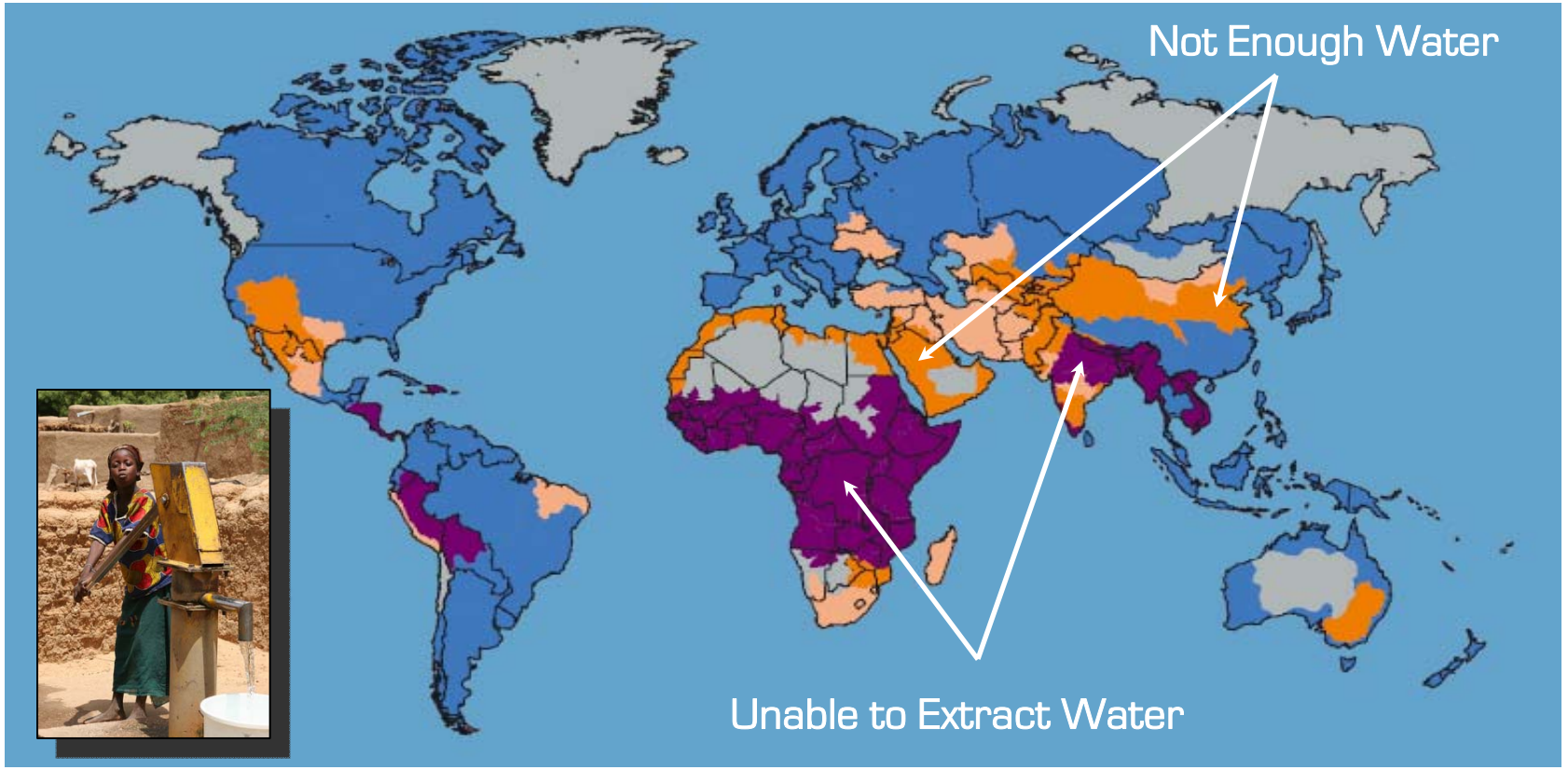
World's Freshwater Supply Stressed



Water Stress/Scarcity = Drought

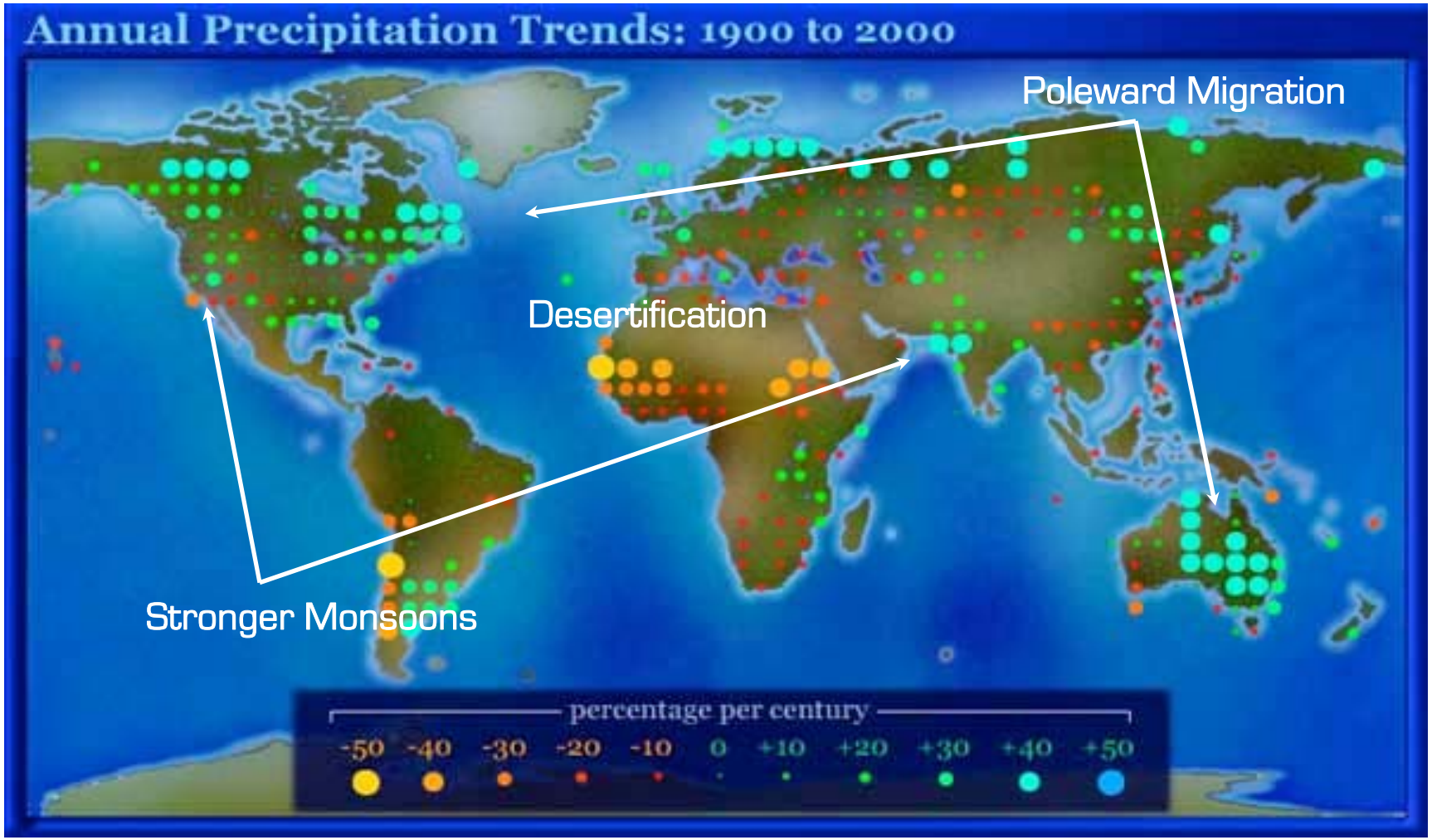
Water Scarcity

Inability to Exploit Existing Water Resources



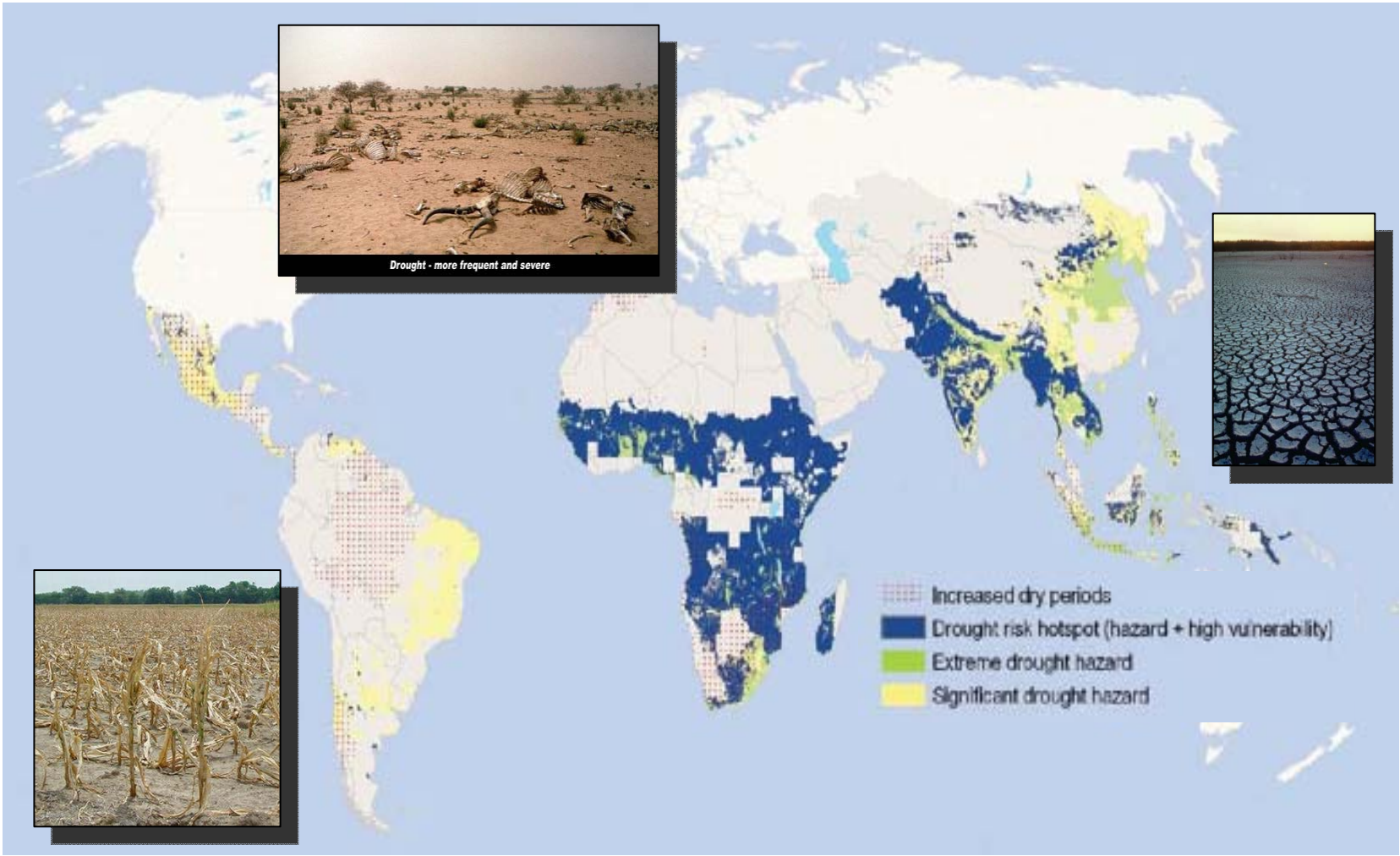
Water Scarcity

Change in Precipitation Patterns



Food Scarcity

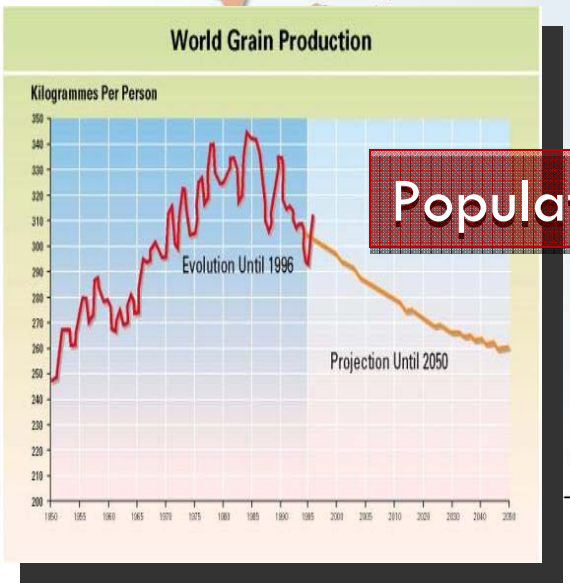
Expanding Drought Regions



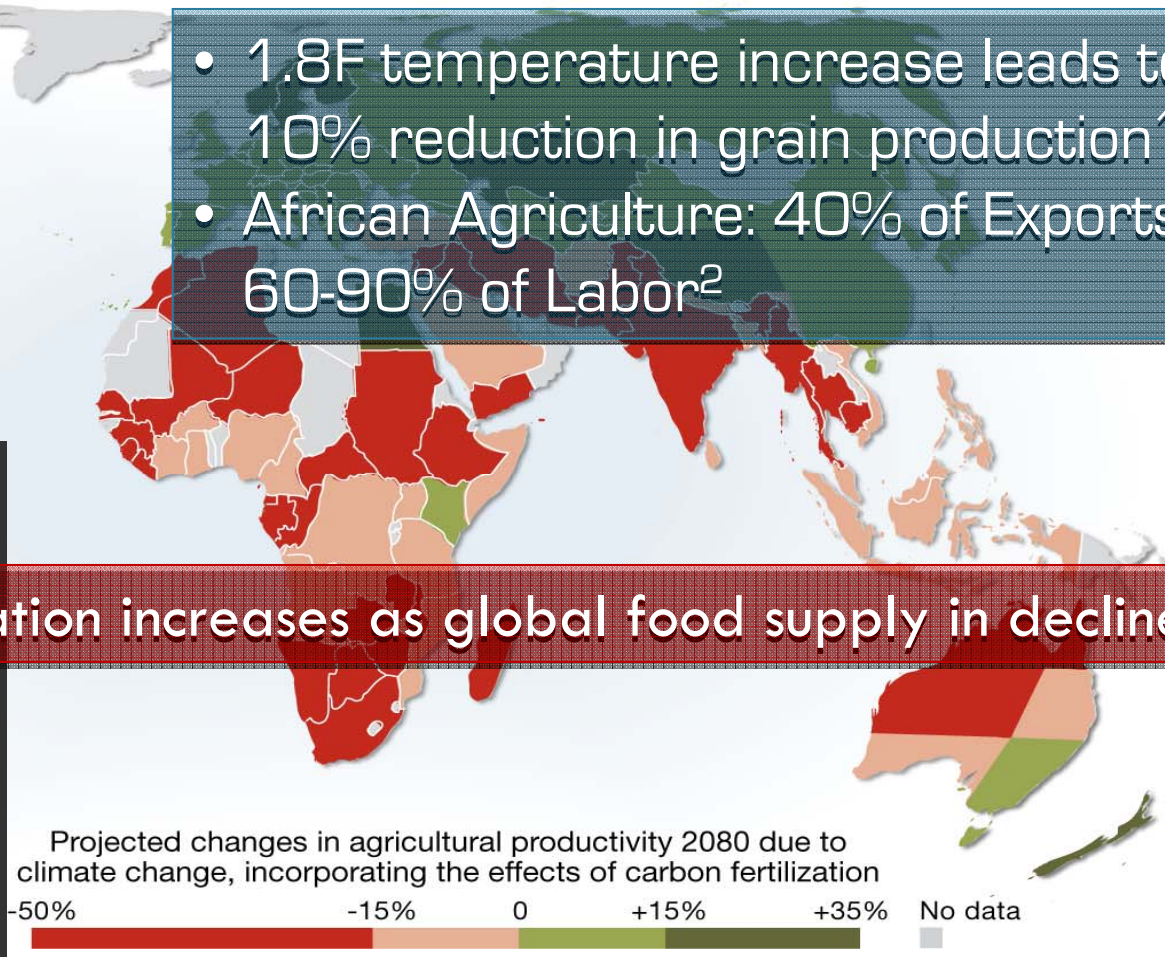
Food Scarcity

Agricultural Decline

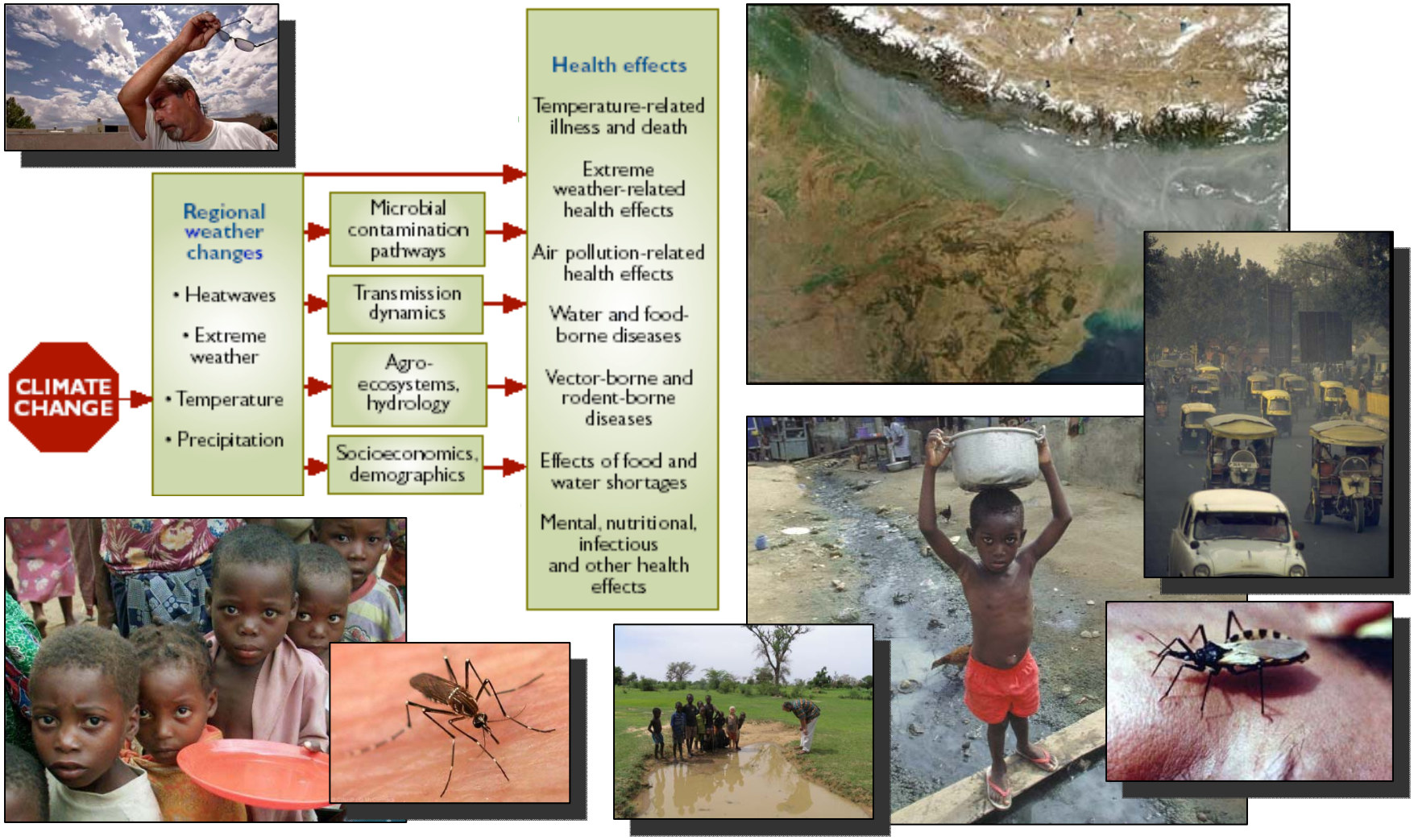
- 1.8F temperature increase leads to 10% reduction in grain production[1]
- African Agriculture: 40% of Exports; 60-90% of Labor[2]



Population increases as global food supply in decline.



Public Health

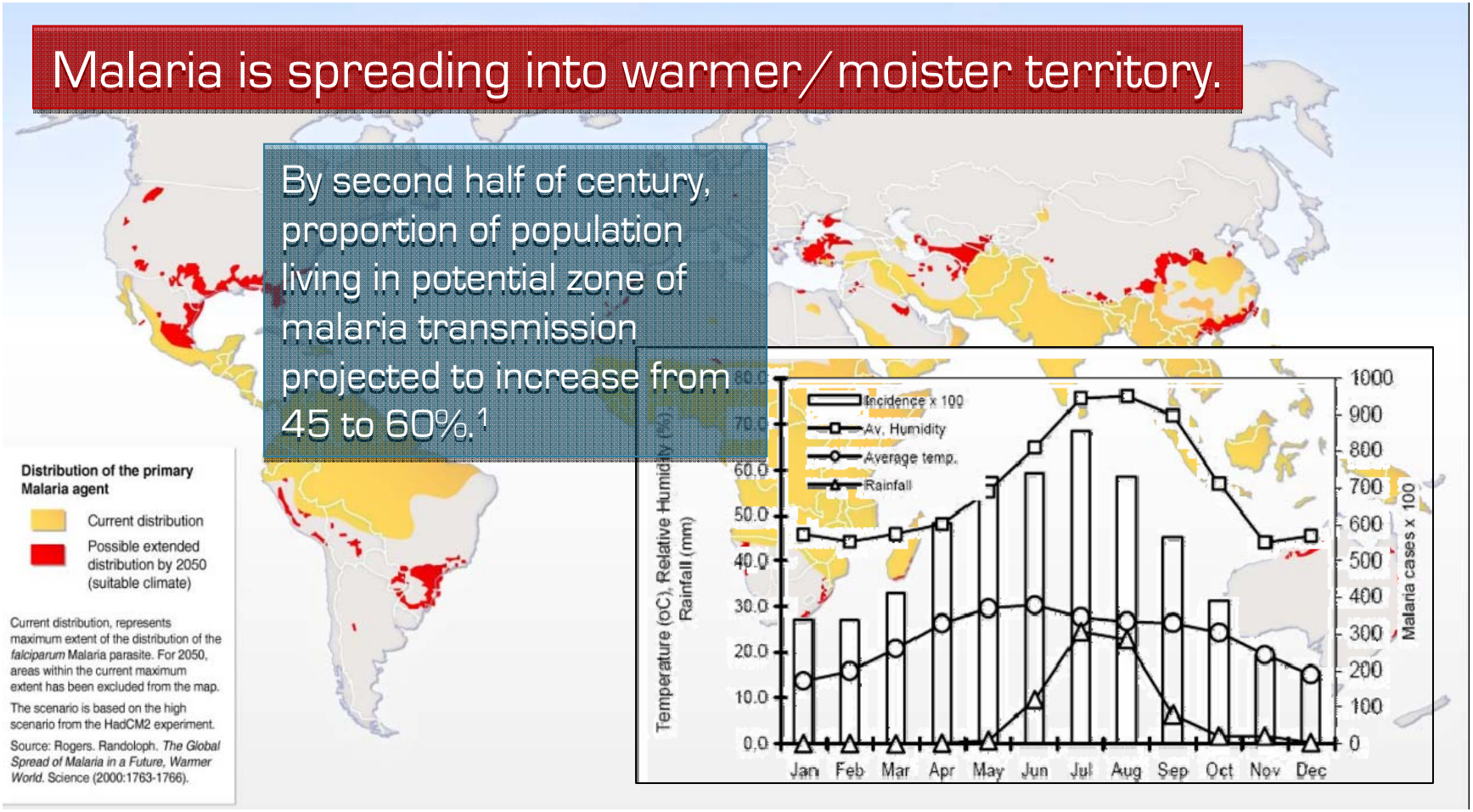


Public Health

Spread of Vector Born Diseases

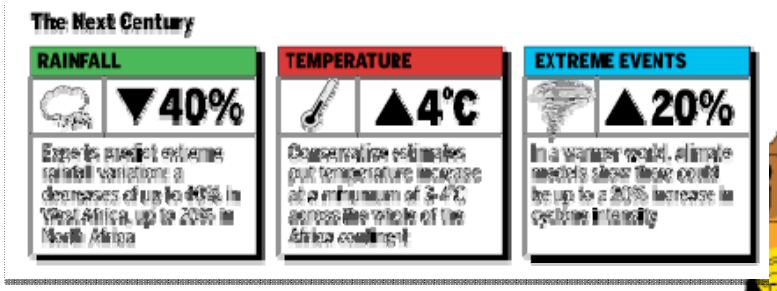
Malaria is spreading into warmer/moister territory.

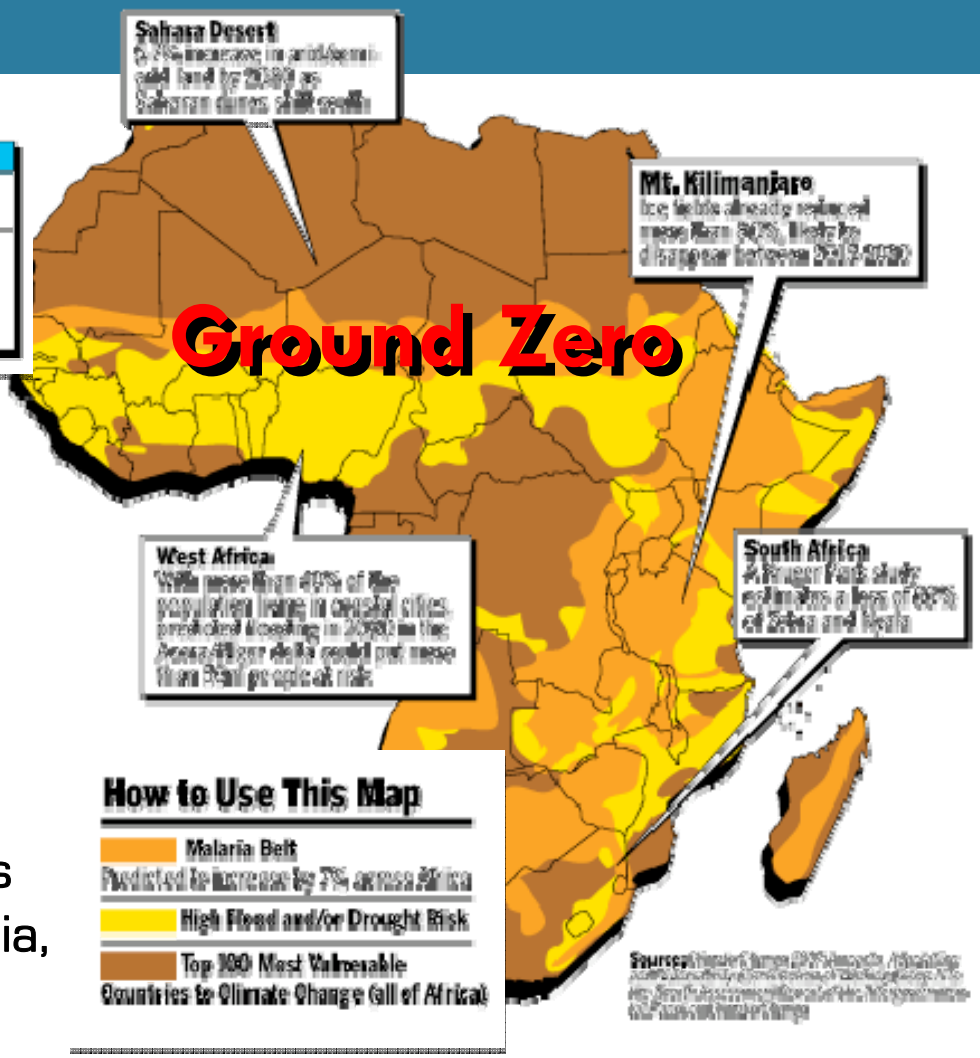
By second half of century, proportion of population living in potential zone of malaria transmission projected to increase from 45 to 60%.[1]



Regional Instability and Failed States

Africa

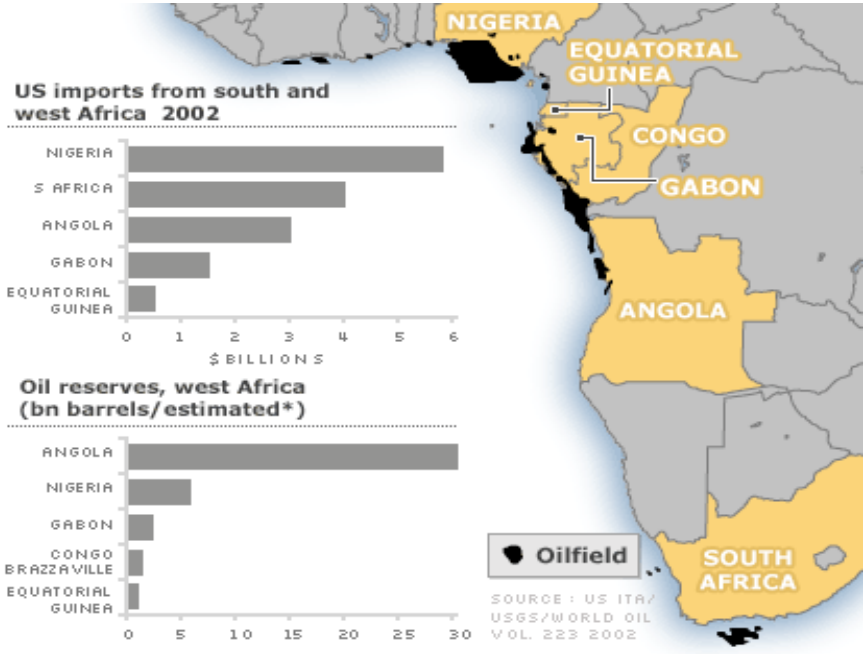


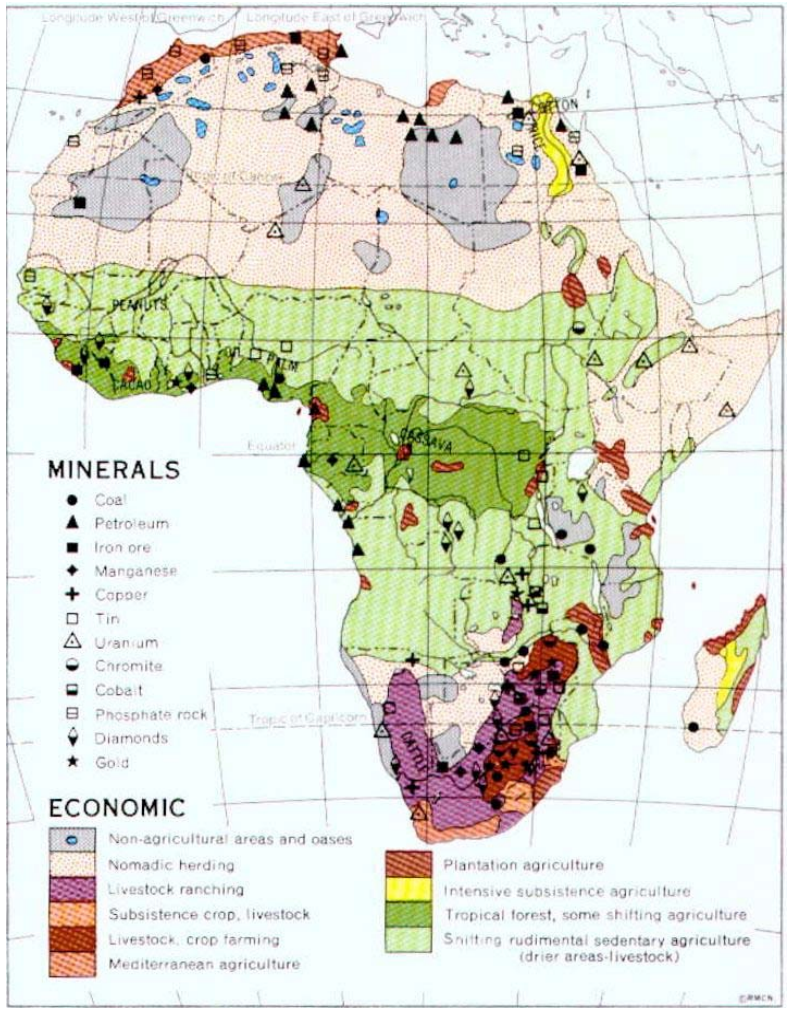


- Expanding arid/desert regions
- Increased water scarcity and food shortages
- Alternating periods of severe floods and droughts
- Coastal inundation and increased storm surge
- Spread of vector born diseases
- Darfur, Ethiopia, Eritrea, Somalia, Angola, Nigeria, Cameroon, W Sahara

Regional Instability and Failed States

Africa





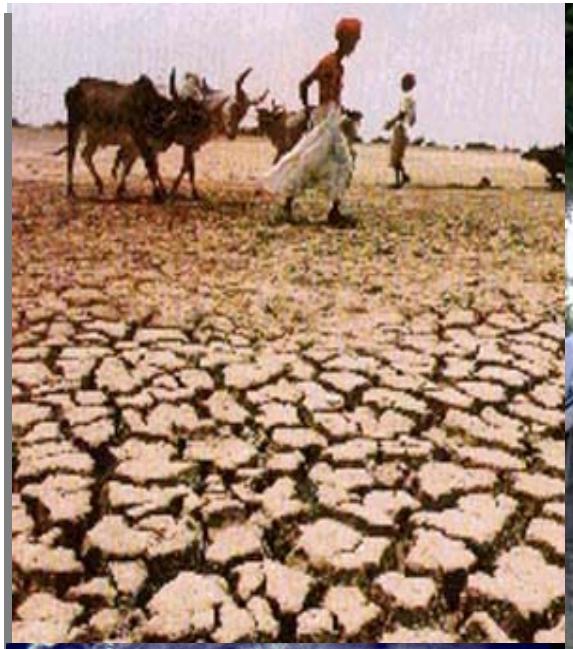
- 15% of US oil is from Africa[1]
- By 2025, Africa will supply 25-40% of US oil[2]
- Also a supplier of critical minerals

Regional Instability and Failed States

Africa

- Weakened governance
- Economic collapse
- Human migrations
- Potential conflicts

- Stability operations
- Humanitarian missions

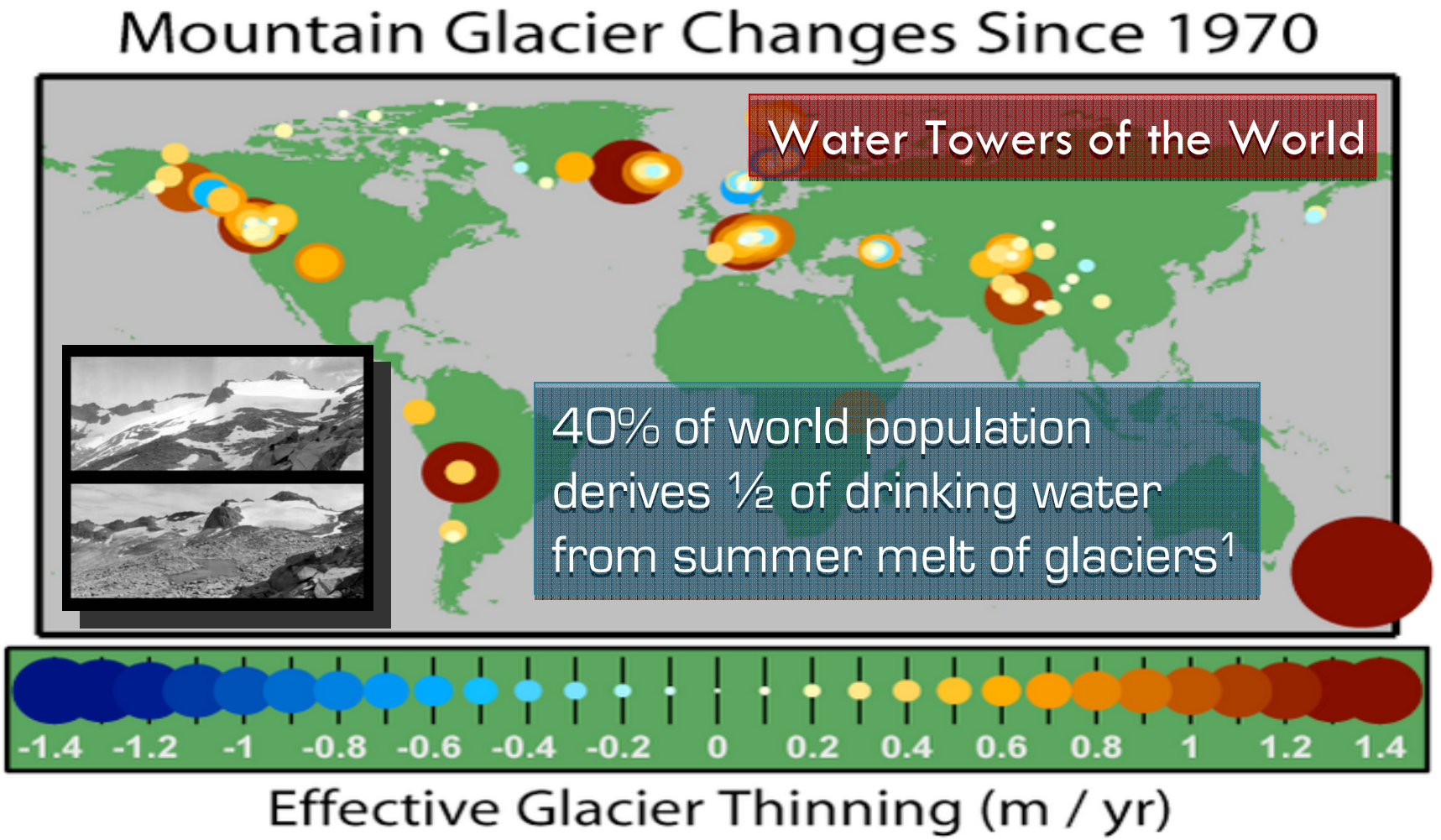


Threats and Impacts

Glacial and Sea Ice Melt: Global Conflict and Competition for Scarce Resources

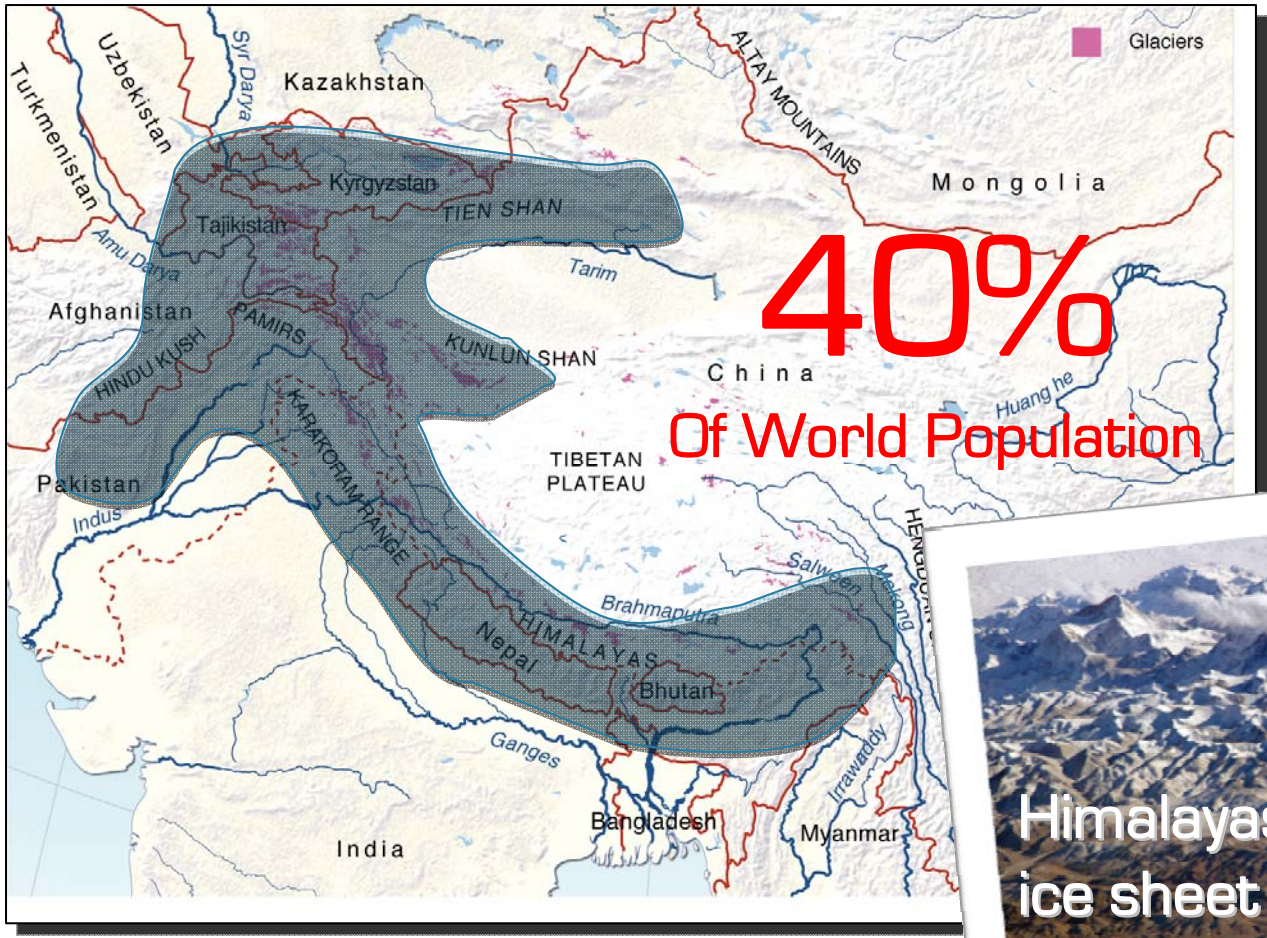
Glacial Melt

Dwindling Water Reservoirs



Glacial Melt

Asian Water Towers

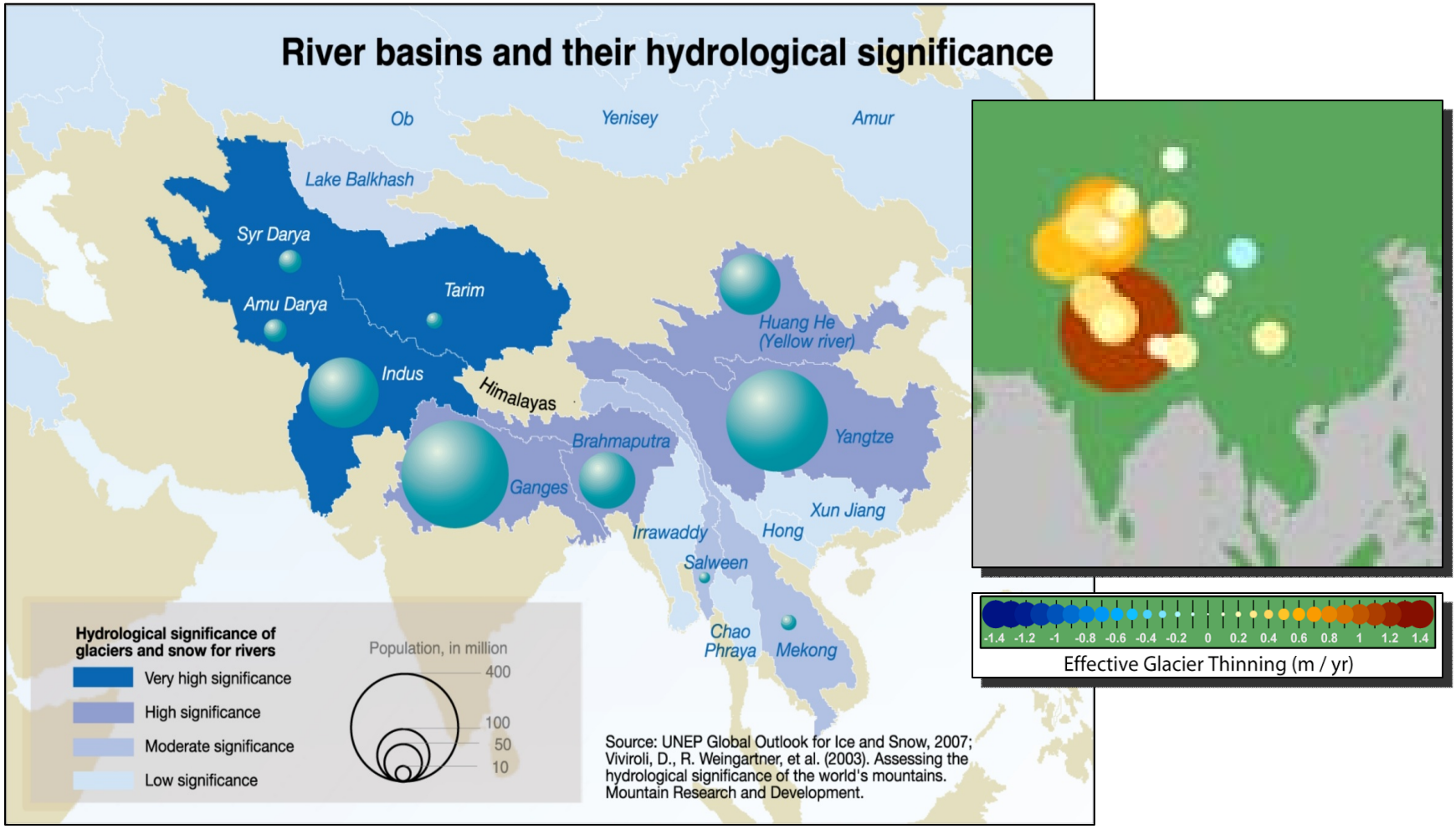


Water Towers

Himalayas
Hindu Kush
Kunlun Shan
Pamir
Tien Shan
Tibet

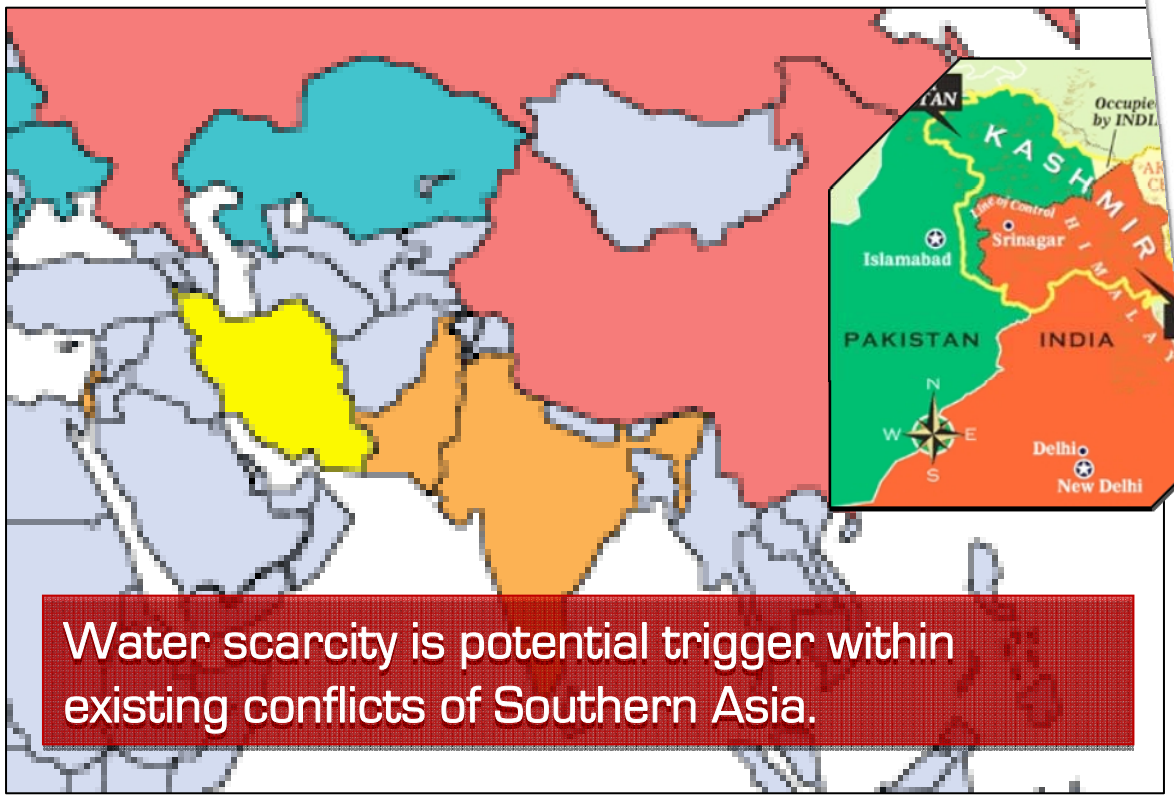
Glacial Melt

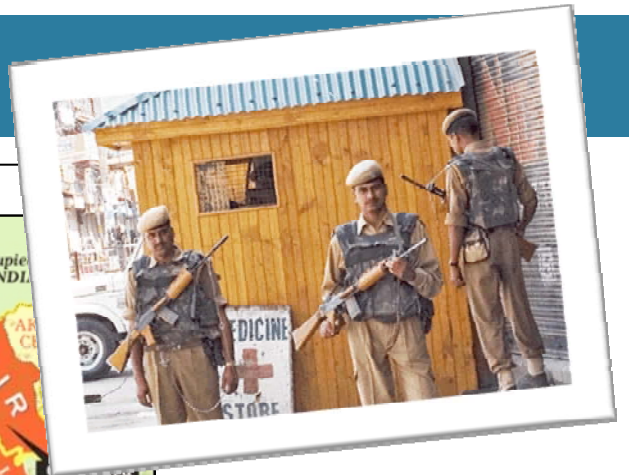
Asian Water Towers



Global Conflict

Nuclear Time-Bomb

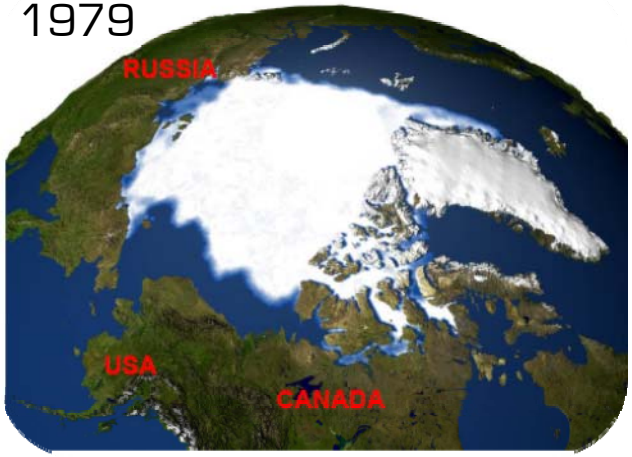




Sea Ice Melt

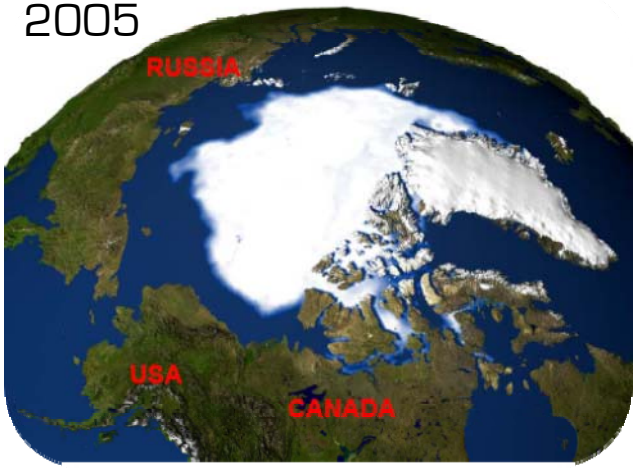
Arctic

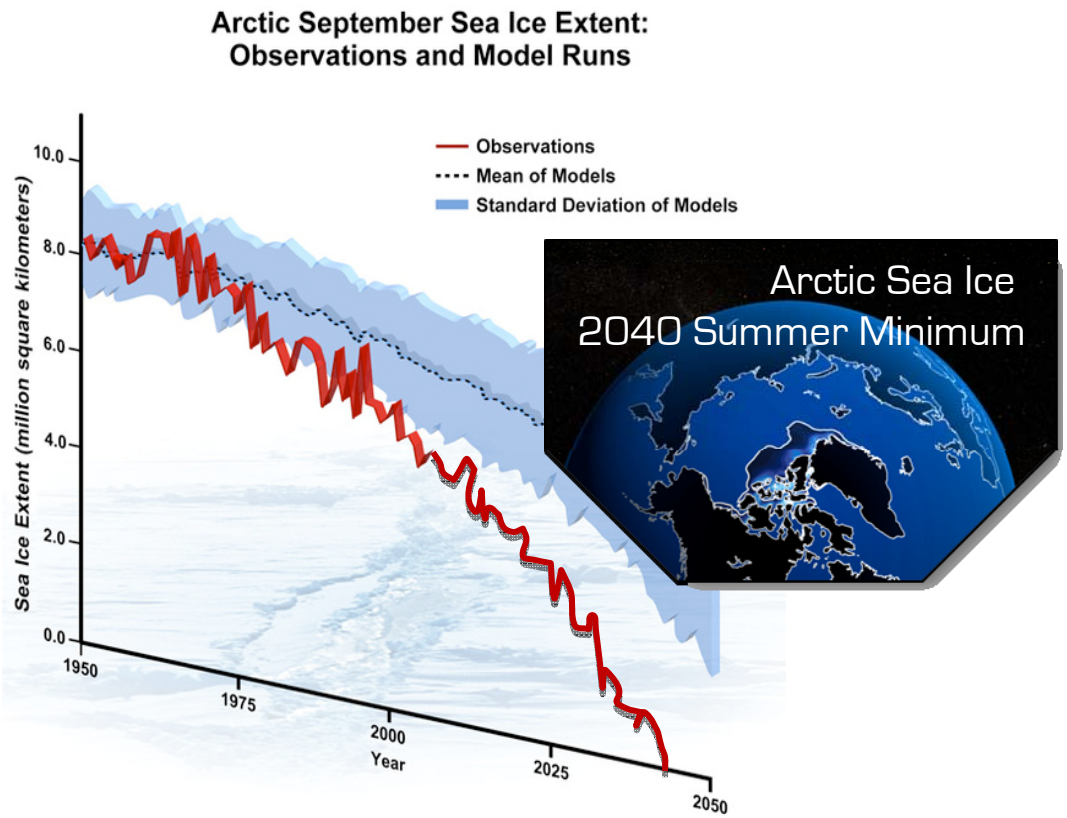
1979



Sea Ice Minimum

2005





Arctic could be ice free during summer by 2040[1].

Competition for Scarce Resources

Arctic

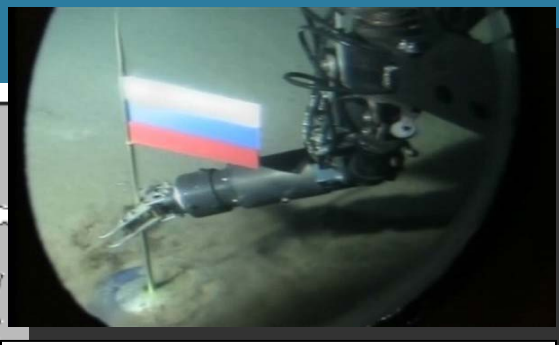
- Fisheries moving into Arctic
- Trade routes cut 38%
- 25% of undiscovered oil and gas reserves

Everyone wants a piece of the Arctic.

Competition for Scarce Resources

Arctic

Increased militarization of Arctic to protect scarce resources may lead to future conflict.



3 August 2007, Russians plant flag on sea floor beneath North Pole

Russia says won't stand still in race for Arctic REUTERS

Thu Mar 26, 2009 1:47pm EDT

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1 of 1 Full Size

By Christian Lowe

MOSCOW (Reuters) - Russia will not allow itself to be left behind in the race to exploit the resources of the Arctic now being opened up by global warming, the Kremlin's special representative for the region said in an interview.

Scientists say the ice is receding so fast that drilling for oil and gas high in the Arctic will soon become routine and cargo ships could sail between the Atlantic and Pacific along a new shipping lane much shorter than the routes used now.

Summary

- IPCC AR4 concludes climate change is a reality, and current Presidential Administration and Congress support this conclusion
- Defense and intelligence agencies directed to plan for impacts on national security
- Impacts are already being revealed and are predicted to worsen
- Next step is to develop strategies to overcome or compensate for threats generated by climate change

CLIMATE CHANGE

IMPACT ON NATIONAL SECURITY

Lt Col Scott Hausman
Commander
14th Weather Squadron