Ecosystem Approach to DRR

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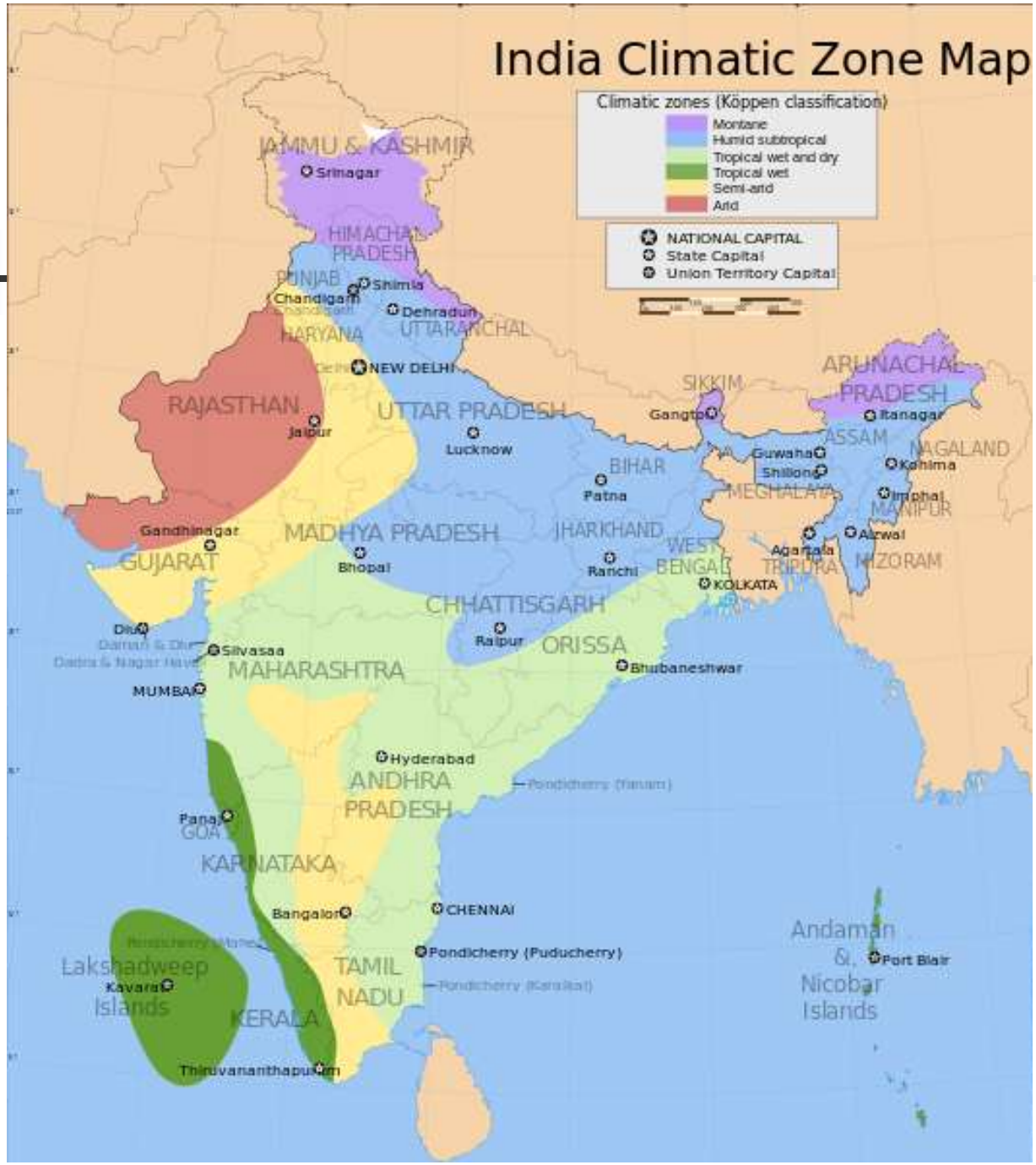
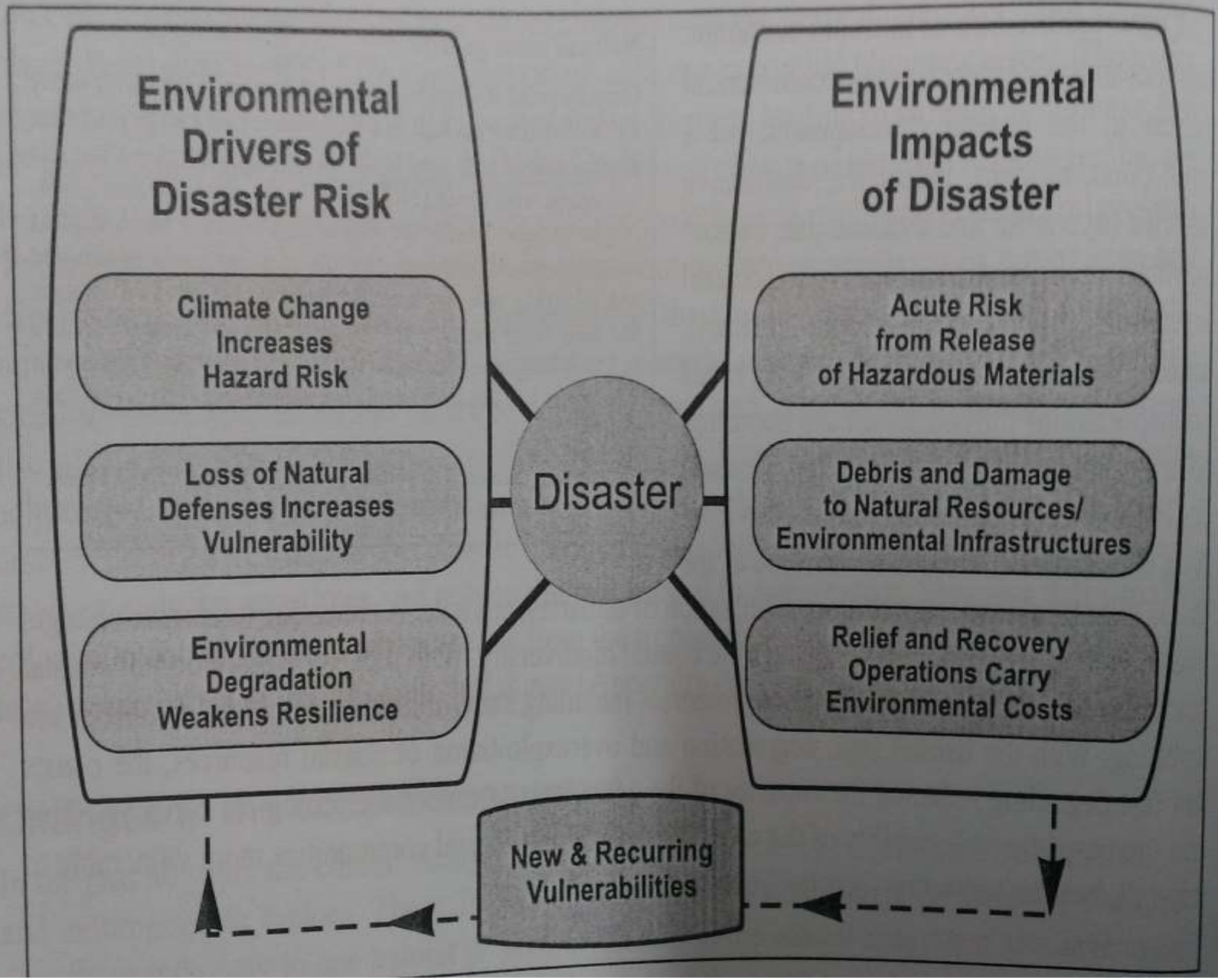

India Climatic Zone Map
Climatic zones (Köppen classification)
Montane
Humid subtropical
Tropical wet and dry
Tropical wet
Semi-arid
Arid
NATIONAL CAPITAL
State Capital
Union Territory Capital
JAMMU & KASHMIR
Srinagar
HIMACHAL PRADESH
Shimla
PUNJAB
Chandigarh
Dehradun
HARYANA
UTTARANCHAL
NEW DELHI
RAJASTHAN
Jaipur
UTTAR PRADESH
Lucknow
SIKKIM
Gangtok
ARUNACHAL PRADESH
Itanagar
ASSAM
Guwahati
Shillong
NAGALAND
Kohima
BIHAR
Patna
MEGHALAYA
Imphal
MANIPUR
Aizwal
MIZORAM
Agartala
TRIPURA
Gandhinagar
GUJARAT
MADHYA PRADESH
Bhopal
JHARKHAND
Ranchi
WEST BENGAL
KOLKATA
CHHATTISGARH
Raipur
ORISSA
Bhubaneshwar
Diu
Daman & Diu
Dadra & Nagar Haveli
Silvasaa
MAHARASHTRA
MUMBAI
Hyderabad
ANDHRA PRADESH
Pondicherry (Yanam)
Pana
GOA
KARNATAKA
Bangalor
CHENNAI
Pondicherry (Puducherry)
Pondicherry (Karaikal)
TAMIL NADU
Lakshadweep Islands
Kavaratti
KERALA
Thiruvananthapuram
Andaman & Nicobar Islands
Port Blair

Ecosystem

It is a dynamic complex of living communities and their non-living environment interacting as a functional unit in a given area.

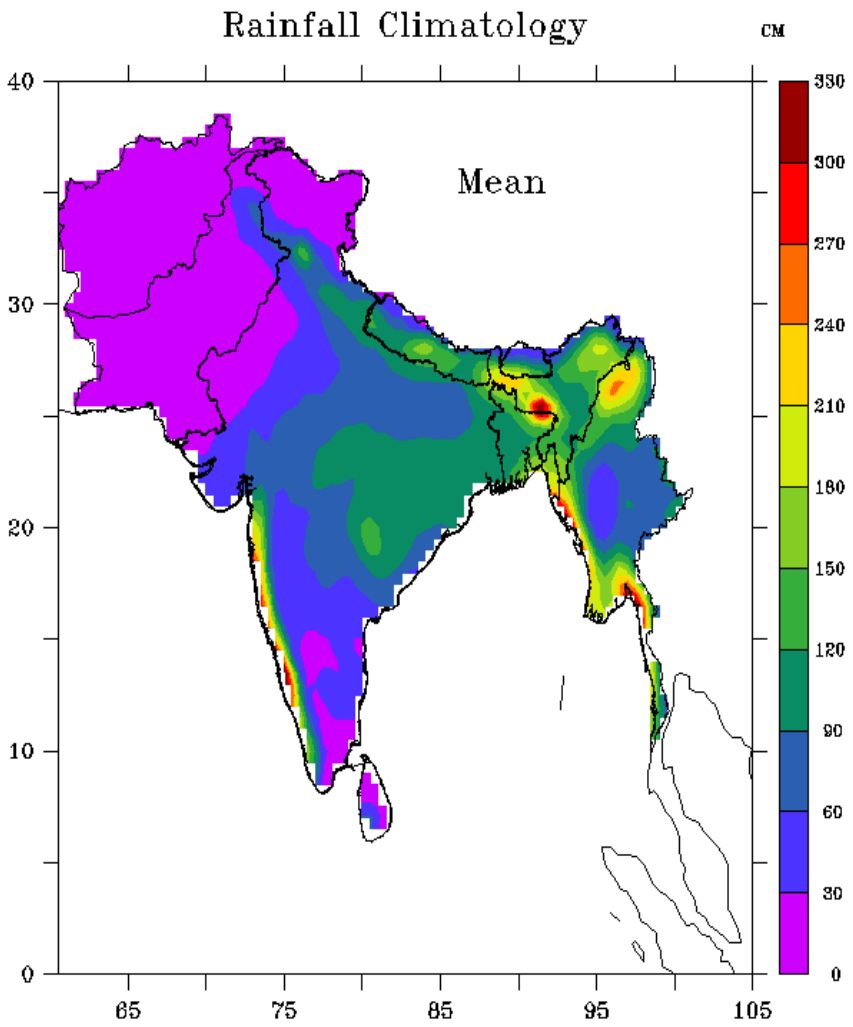

Environmental Drivers of Disaster Risk
Climate Change Increases Hazard Risk
Loss of Natural Defenses Increases Vulnerability
Environmental Degradation Weakens Resilience
Disaster
Environmental Impacts of Disaster
Acute Risk from Release of Hazardous Materials
Debris and Damage to Natural Resources/ Environmental Infrastructures
Relief and Recovery Operations Carry Environmental Costs
New & Recurring Vulnerabilities

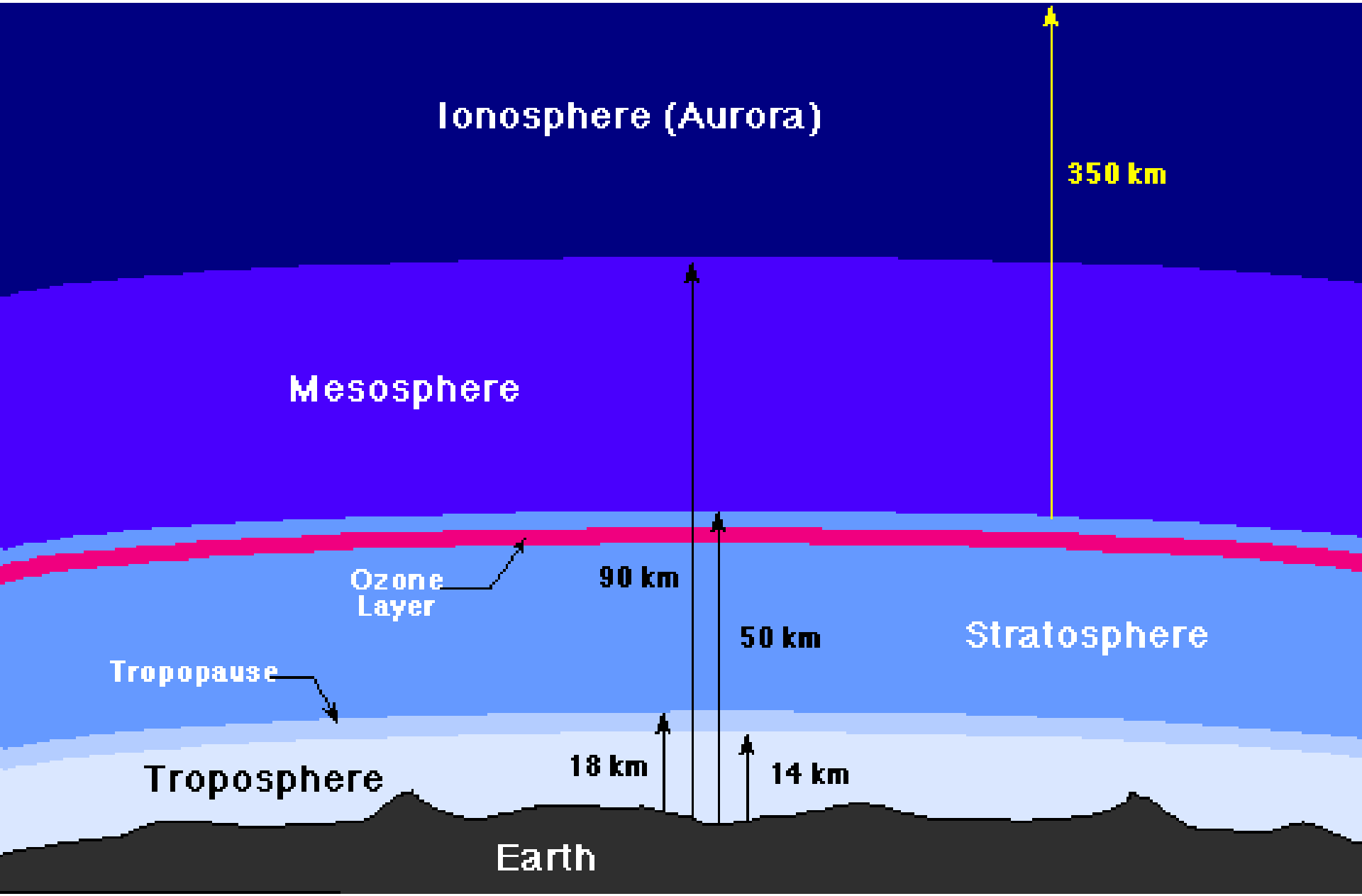
DRR and Ecosystem

Hazard	Services provided
Flooding	Provide space for flood waters Absorb impacts of floods with natural vegetation Block sudden storm surges
Landslide and Avalanches	Natural vegetation stabilizes slope Tree crowns reduce uniform build up of snow
Drought and desertification	Maintain drought resistant plants
Fire	Limit human encroachment, wildfire control, stability
Hurricanes	Coastal and marine ecosystems protect from storm surge and flooding
Earthquakes	Vegetation protects from landslide and rock falls
Climate Change	Extreme events

Most of the natural hazards are weather related

- WINTER (JAN-FEB)
  - Western Disturbance
    COLD WAVE, FOG, HEAVY SNOW, FROS
- PRE-MONSOON (MAR-MAY)
  - CYCLONIC DISTURBANCES
    HEAT WAVE
    THUNDER STORMS, SQUALLS
    HAIL STORM
    TORNADO
- MONSOON (JUN-SEP)
  - HEAVY RAINFALL,
  - FLOODS
  - DROUGHTS
- POST-MONSOON (OCT-DEC)
  - CYCLONIC DISTURBANCES
  - NORTHEAST MONSO (HEAVY RAINFALL)




Ionosphere (Aurora)
350 km
Mesosphere
Ozone Layer
90 km
50 km
Stratosphere
Tropopause
18 km
14 km
Troposphere
Earth

Prime Minister's Council on Climate Change

- 1. Prime Minister (Chairperson)
- 2. Minister of External Affairs (Member)
- 3. Finance Minister (Member)
- 4. Minister of Environment, Forests and Climate Change (Member)
- 5. Minister for Water Resources, River Development and Ganga Rejuvenation (Member)
- 6. Minister for Agriculture (Member)
- 7. Minister for Urban Development (Member)
- 8. Minister for Science and Technology (Member)
- 9. Minister of State for Power, Coal and New and Renewable Energy (Member)
- 10. Cabinet Secretary (Member)
- 11. Foreign Secretary (Member)
- 12. Secretary, Ministry of Environment, Forests and Climate Change (Member)
- 13. Dr. R. K. Pachauri, Director General, TERI (Member)
- 14. Shri Nitin Desai, Distinguished Fellow, TERI (Member)
- 15. Shri Chandrashekhar Dasgupta (Member
- 16. Shri Ajay Mathur, Director General, BEE (Member)
- 17. Shri J.M. Mauskar (Member)
- 18. Principal Secretary to Prime Minister (Member Convenor)

Eight National Missions

- **Jawaharlal Nehru National Solar Mission**
- **National Mission for Enhanced Energy Efficiency..**
- **National Mission on Sustainable Habitat.**
- **National Water Mission.**
- **National Mission for Sustainable Agriculture.**
- **National Mission for Sustaining the Himalayan Ecosystem**
- **National Mission for a Green India.**
- **National Mission on Strategic Knowledge for Climate Change**

National Solar Mission

- Create an enabling policy framework for the deployment of 20,000 MW of solar power
- Create favourable conditions for solar manufacturing capability, particularly solar thermal for indigenous production and market leadership
- Achieve 20 million sq. meters solar thermal
- collector area
- • Deploy 20 million solar lighting systems for
- rural areas

National Mission for Enhanced Energy Efficiency

- Perform Achieve and Trade (**PAT**): A market based mechanism to facilitate energy efficiency
- improvements in large energy intensive industries and facilities, by issuing energy saving certificates that can be traded
- • Market Transformation for Energy Efficiency **(MTEE**): Accelerating the shift to energy efficient appliances and equipments in designated sectors through innovative measures that make such products more affordable
- • Energy Efficiency Financing Platform **(EEFP**): Creating mechanisms to finance demand side management programmes in all sectors of the economy by capturing future energy savings
- • Framework for Energy Efficient Economic Development **(FEEED**):

CO2 Emission Cut

The resultant annual reduction in carbon dioxide emissions is estimated to be around 98.55 million tonnes

National Mission on Sustainable Habitat

- Energy Conservation Building Code 2007 made mandatory for new as well as old buildings; incorporated in Central Public Works Department (CPWD) General Specification for Electrical Works in 2013
- • More than 50 capacity building programmes in various stages of Implementation

  • Long term transport plan for cities prepared

  • Sanctioned 760 water supply projects at an estimated cost of INR 35,650 crore (approx. USD 5.75 billion) under ongoing programmes such as JNNURM

National Water Mission

- Development of comprehensive water database in public domain and assessment of impact of climate change on water resources
- • Promotion of citizen and state actions for water conservation, augmentation and preservation
- • Focused attention to vulnerable areas including over-exploited areas
- Increase water use efficiency by 20%
- • Promotion of basin level integrated water resources management

National Mission for Sustainable Agriculture

- Rainfed Area Development: Adopt an area based approach for development and conservation of natural resources along with farming systems
- • On-Farm Water Management: Enhance water use efficiency by promoting efficient on-farm water management technologies and equipment
- • Soil Health Management: Promote location as well as crop specific sustainable soil health management

National Mission for Sustaining the Himalayan Ecosystem

- Mission Objective
- To evolve management measures for sustaining and safeguarding the Himalayan glaciers and mountain ecosystem and attempt to address key issues namely impacts of climate change on the Himalayan glaciers, biodiversity, wildlife conservation and livelihood of traditional knowledge societies

National Mission for a Green India

- Increase forest/tree cover on 5 million hectares

of forest/non-forest lands and improve quality of

forest cover on another 5 million hectares.

• Improve ecosystem services including biodiversity, hydrological services and carbon sequestration through treatment of an area of 10 million hectares.

- • Increase forest-based livelihood income of about

3 million households living in and around the forests.

- • Enhance annual CO2 sequestration by 50 to 60 million tonnes in the year 2020

National Mission on Strategic Knowledge for Climate Change

- Mission Objective
- To identify the challenges and the responses to climate change through research and technology development and ensure funding of high quality and focused research into various aspects of climate change

Weather vis-à-vis Climate

- **WEATHER is the day-to-day state of the atmosphere and its short-term (from hours to a few weeks) variations such as temperature, humidity, precipitation, cloudiness, visibility or wind.**

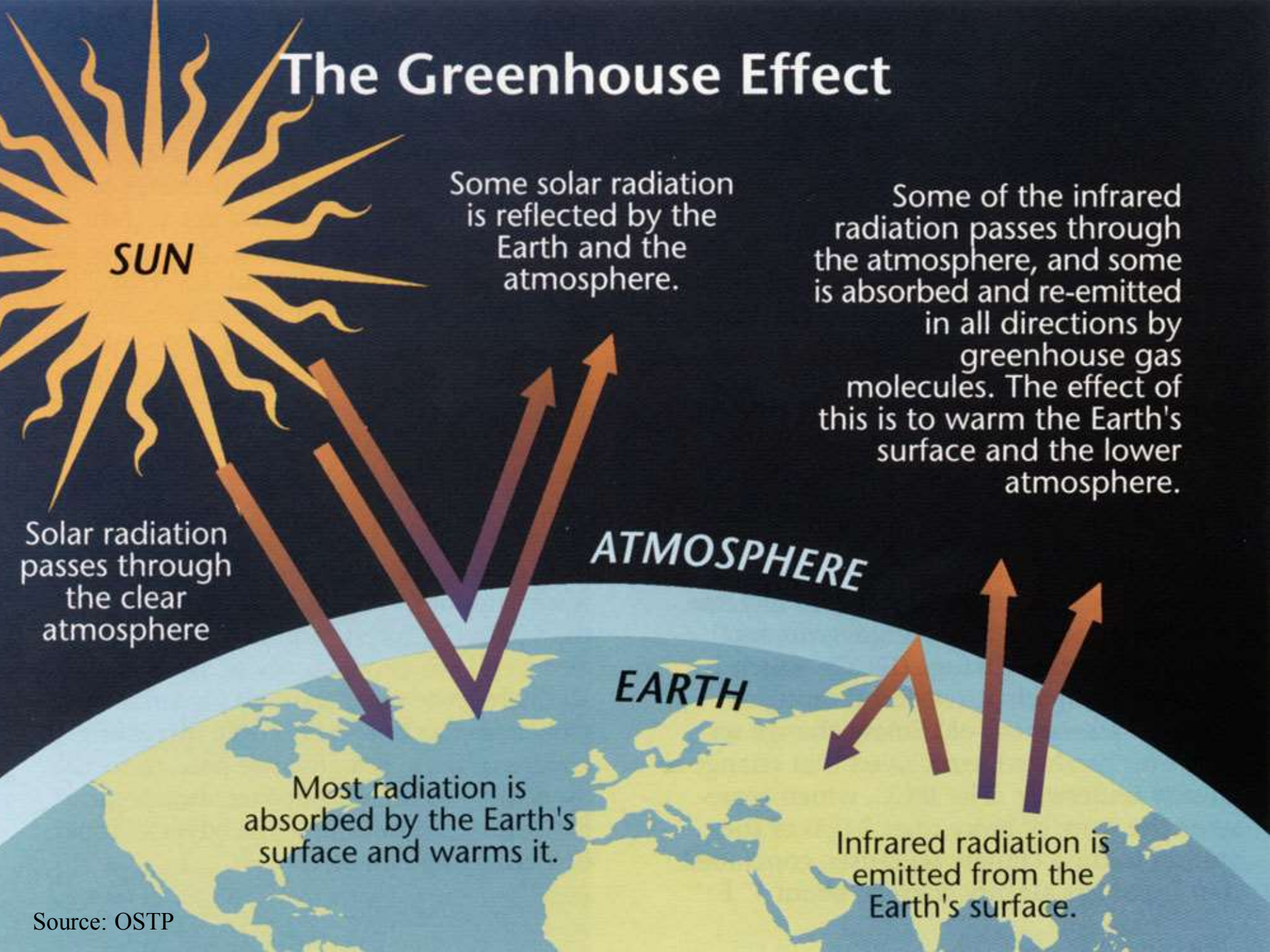
- **CLIMATE** Climate is the measurement of average weather conditions that is maintained or changes over a long period of time usually 10 to 30 years.

What is Climate change?

- Climate change is any *long-term significant change in the "average weather"* that a given region experiences.

Greenhouse Effect

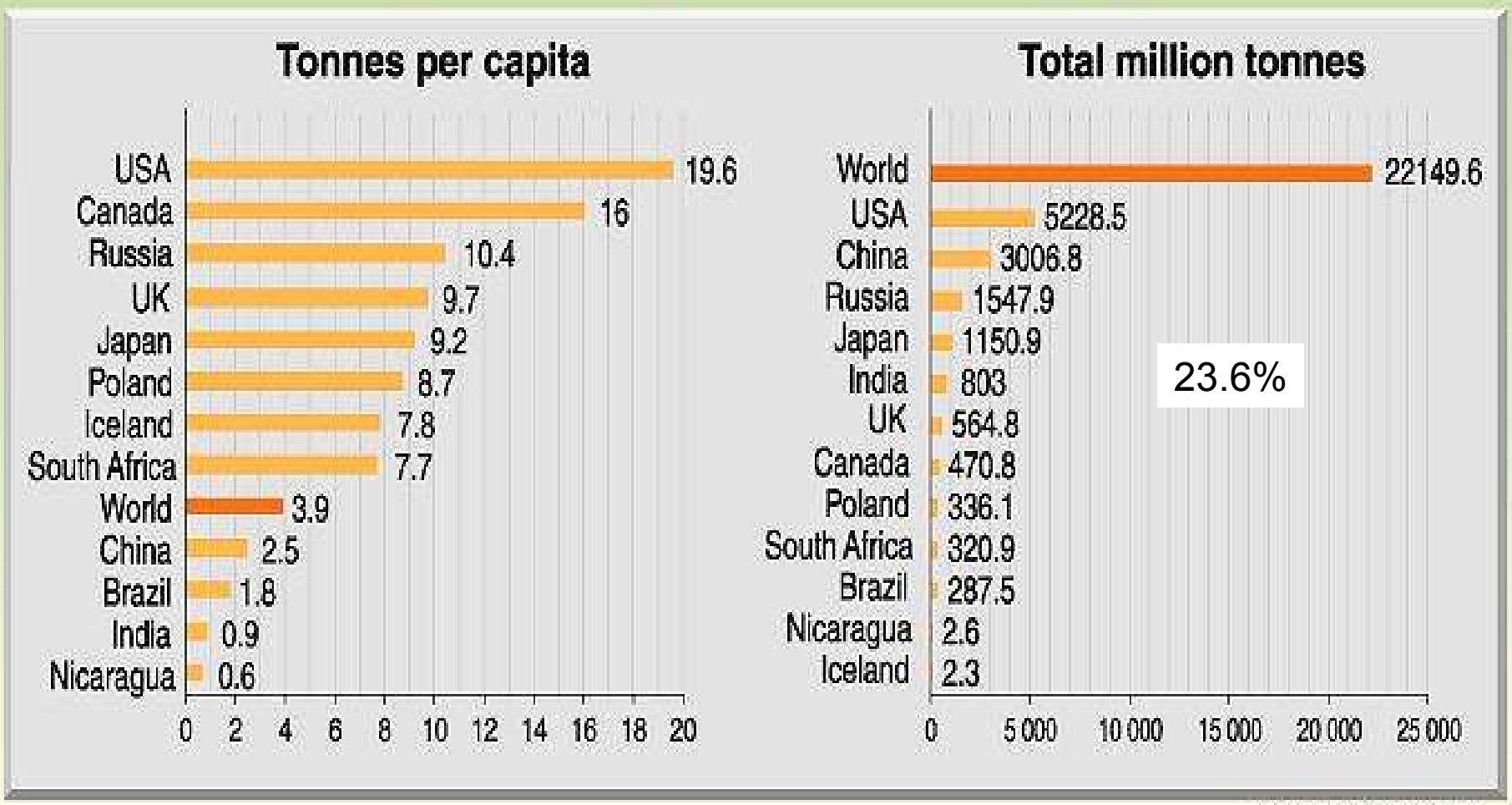
- **Greenhouse effect refers to the trapping of heat by a blanket of gases around the earth.**
- **It maintains the earth's surface temperature at the level necessary to support life (approx 15°C).**
- GHGs CO2, CH4, N2O, O3


The Greenhouse Effect
SUN
Some solar radiation is reflected by the Earth and the atmosphere.
Some of the infrared radiation passes through the atmosphere, and some is absorbed and re-emitted in all directions by greenhouse gas molecules. The effect of this is to warm the Earth's surface and the lower atmosphere.
Solar radiation passes through the clear atmosphere
ATMOSPHERE
EARTH
Most radiation is absorbed by the Earth's surface and warms it.
Infrared radiation is emitted from the Earth's surface.

Source: OSTP

Rank	Country	MtCO2	World total	Tons CO2 per person
1	USA	230,200.80	26.37%	791.6
2	EU (25)	187,773.90	21.51%	411.6
3	CHINA	83,515.60	9.57%	64.8
4	RUSSIAN FEDERATION	81,779.50	9.37%	565.6
5	GERMANY	49,946.20	5.72%	605.1
6	JAPAN	41,057.30	4.70%	321.8
7	UK	31,415.702	3.60%	527.3
8	INDIA	22,098.00	2.53%	20.8
9	UKRAINE	21,722.20	2.49%	454.3
10	FRANCE	19,854.90	2.27%	330.8

Emissions of CO_2 - selected countries (1995)



GRAPHIC DESIGN : PHILIPPE REKACEWICZ

GRID Arendal UNEP

Top 8 countries make 44% of CO_2

Source : International Energy Agency, 1998.

What is a carbon footprint?

- Carbon footprint (FP): is "the total set of GHG (greenhouse gas) emissions caused directly and indirectly by an individual, organization, event or product"

  (UK Carbon Trust 2008).

Everyone in this room has an FP

History of Climate Change Science

1976

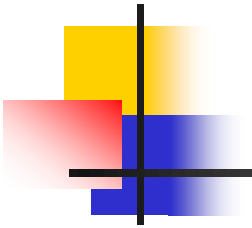
- Studies find that CFCs (1975) and also methane and ozone (1976) can make a serious contribution to the greenhouse effect

1977

- Scientific opinion tends to converge on global warming as the biggest climate risk in ***NEXT century.***

Contd.

Major landmarks (Protocols) in the study of climate



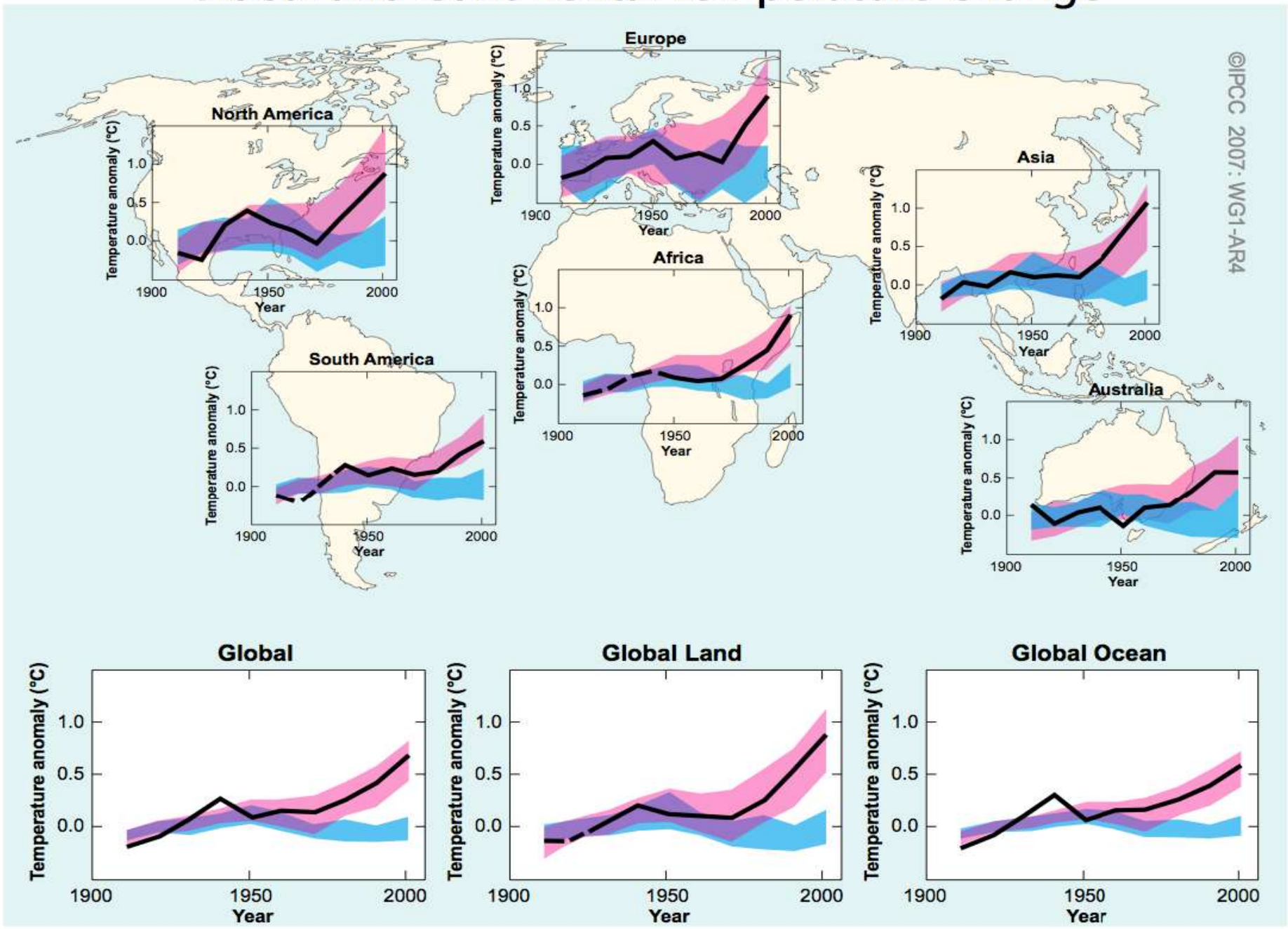
1979	First World Climate Conference, which led to the establishment of the World Climate Programme
1985	Vienna Convention on the Protection of the Ozone Layer
1987	Montreal Protocol
1988	Creation of the WMO/UNEP Intergovernmental Panel on Climate Change (IPCC)
1990	Second World Climate Conference, which initiated GCOS
1992	United Nations Conference on Environment and Development
1992	United Nations Framework Convention on Climate Change(UNFCC)
1996	United Nations Convention to Combat Desertification
1997	Kyoto Protocol
2001	IPCC Third Assessment Report
2002	World Summit on Sustainable Development
2007	IPCC Fourth Assessment Report

History of Climate Change Science

- **The warmest year** on record, globally averaged (1995, 1997, 1998 and 2001-2006 were near the same level).

Contd.

Global and Continental Temperature Change



Causes of Deforestation

- ***Used for Urban and Construction Purposes***
- ***To Grow Crops***
- ***To Create Grazing Land***
- ***Used for Fuel***
- ***Mining***
- ***Forest Fire***

Effects of Deforestation

- ***Erosion of Soil***
- ***Disruption of the Water Cycle***
- ***Loss of Biodiversity***
- ***Flooding and Drought***
- ***Climate Change***

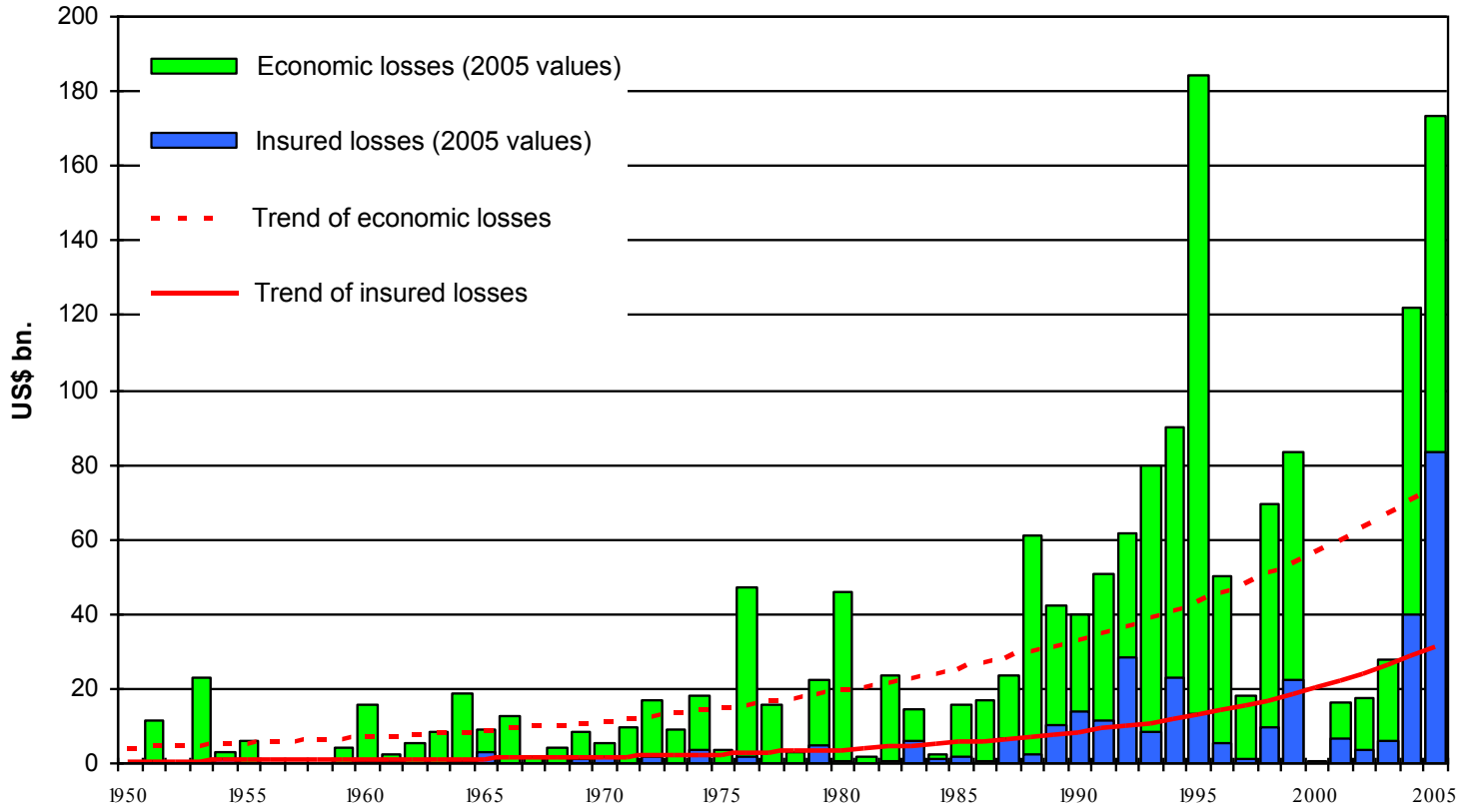
Effects of Global Warming

- Melting of glaciers
- Sea level rise
- Increased extreme weather events
- Low agriculture productivity
- Food scarcity
- Biodiversity loss
- Spread of epidemics
- Huge economic loss

Weather-related economic damages have increased

Great Natural Disasters 1950 – 2005

Economic and insured losses



HIMALAYAN GLACIERS ARE RETREATING FAST

SO, MAJOR STREAMS ARE EXPERIENCING EARLY PEAKS IN DISCHARGE

STREAMS TO ACCOMMODATE LARGER VOLUME OF WATER NOW, OR FLOOD MORE OFTEN

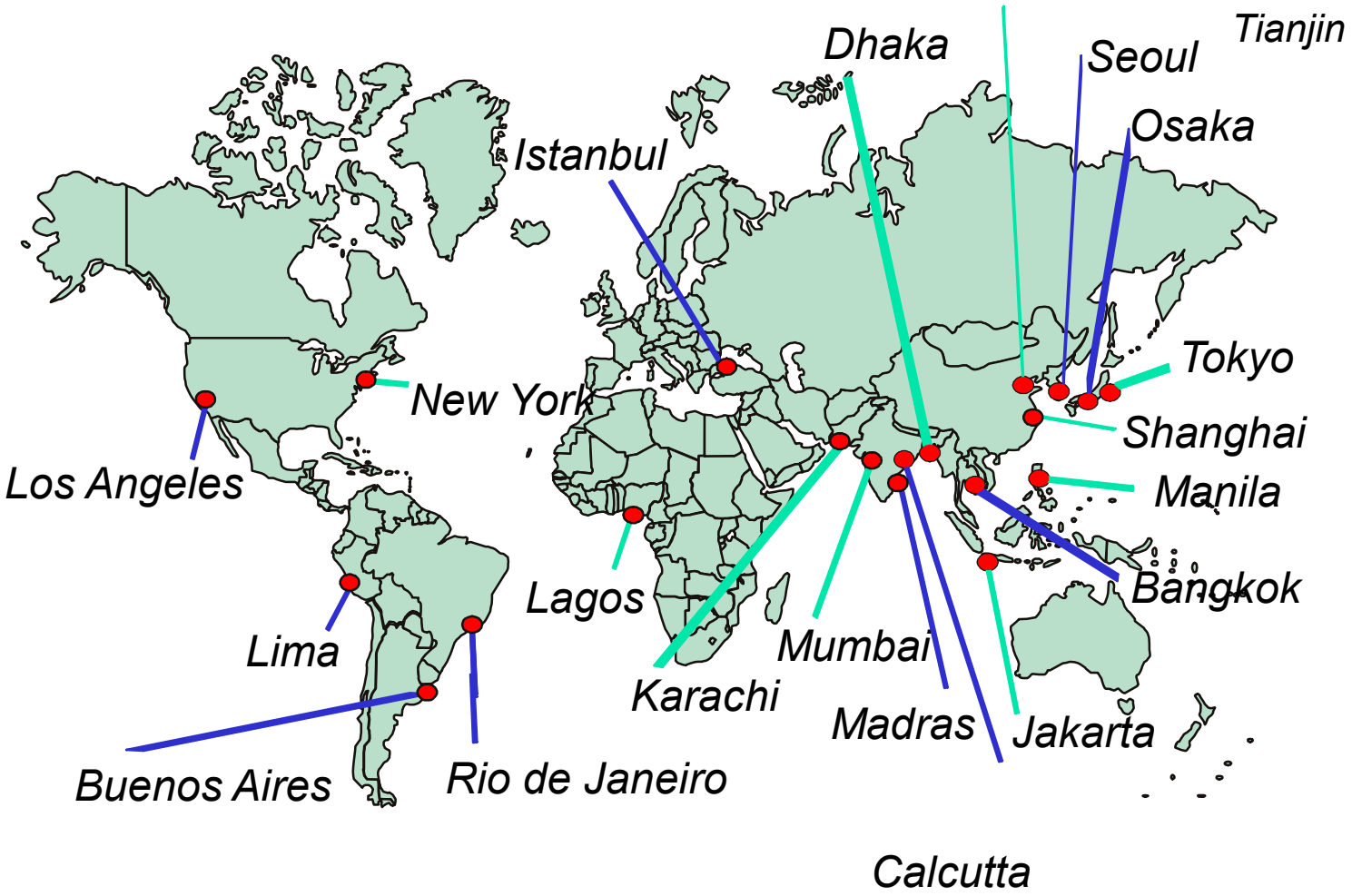
NEXT PHASE WILL SEE A MAJOR WATER CRISIS

Retreat @ 34 m/year during last 3 decades

PEAK DISCHARGE ALONG THE GANGA MAY GRADUALLY INCREASE TO 120-133% OF THE PRESENT FOR ~2 DECADES; BY 6TH DECADE IT MAY SEE ~50% DECLINE. THE INDUS MAY SHOW 15-90% HIGER DISCHARGE, BUT DECLINE EXPECTED IN 10 DECADES.

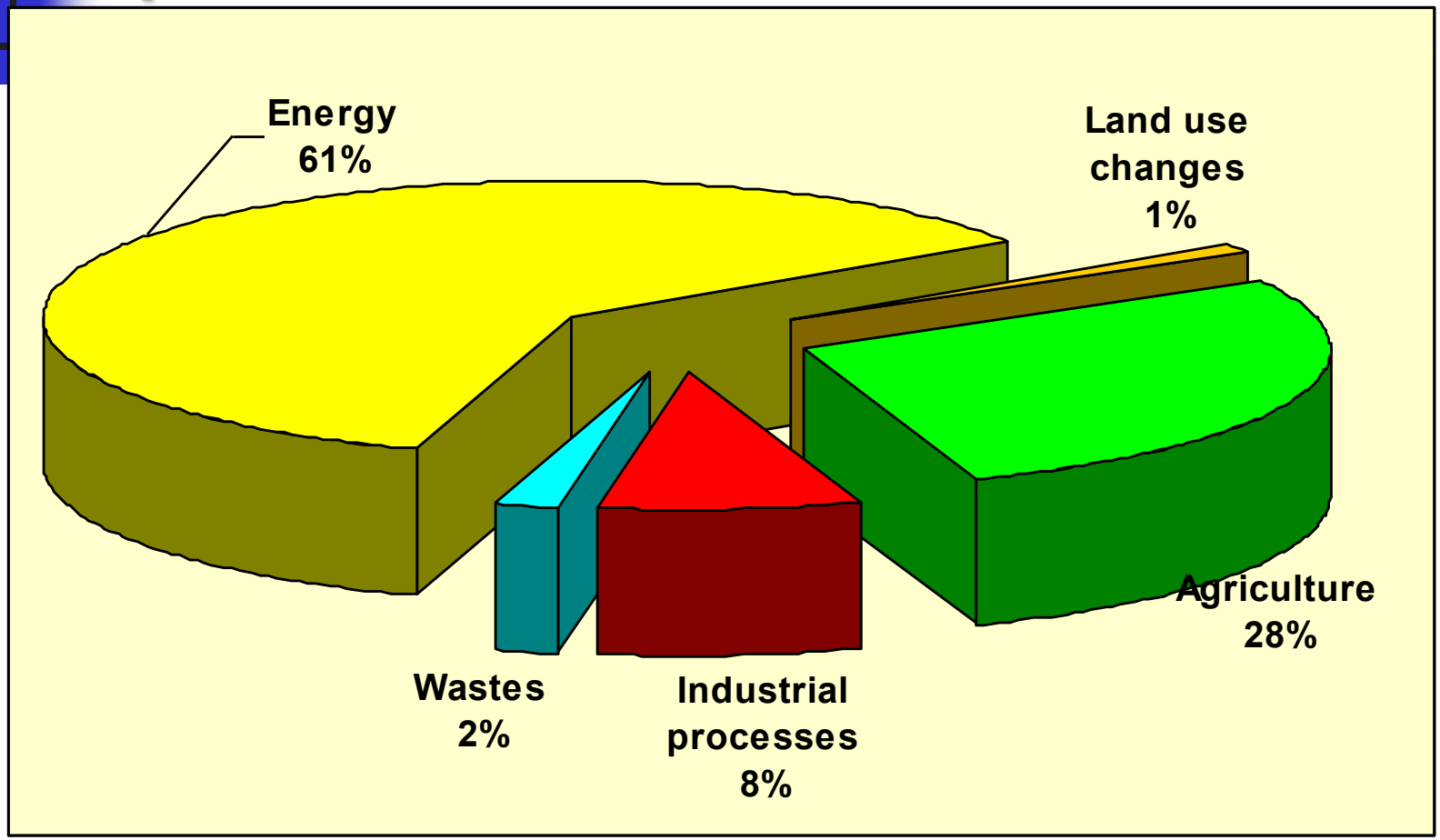
Projected Coastal Flooding : 2100

Most vulnerable regions of coastal flooding will be South and South-East Asia; Africa; Carribean; Indian Ocean Islands; Pacific Ocean Islands.



What is the contribution of different sectors in India to climate change?

(Sources of Greenhouse Gas emissions in India)



Fossil fuel used in agriculture considered in energy sector

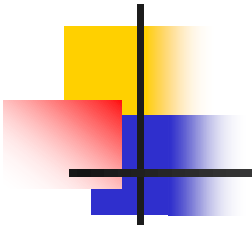
Source: India's Initial National Communication on Climate Change, 2004

Energy Sector

- Use of non-conventional energy sources
- Solar Photovoltaic Programme (SPV)
- Biomass Power
- Wind power
- Akshay Urja Shops
- Ocean Energy
- Battery Operated Vehicles

Ten things to do

- **1. Reduce, Reuse, Recycle**
- **2. Use Less Heat and Air Conditioning**
- **3. Change a light bulb**
- **4. Drive less and drive smart**
- **5. Buy Energy-Efficient Products**
- **6.Use Less Hot Water**
- **7.Use the "Off" Switch**
- **8. Plant a Tree**
- **9. Get an Energy Audit Report Card**
- **10. Encourage Others to Conserve**



- Thanks