# Carbon Trading in Iron & Steel sector

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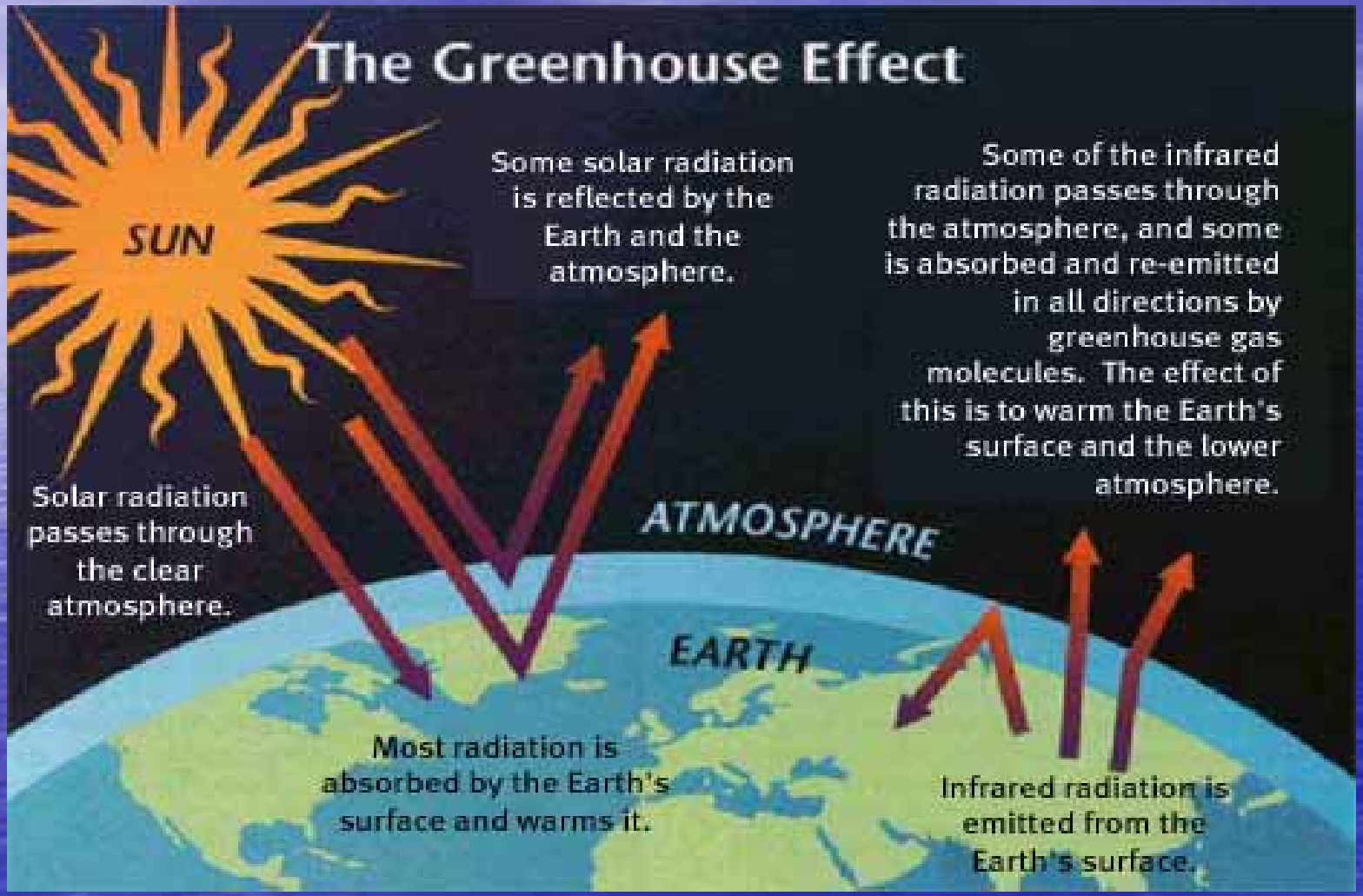
# Climate Change and its effect

# The Greenhouse Effect



# Climate Change – some facts

- Rising concentration of GHGs in the earth's atmosphere gives rise to greenhouse effect and result in increasing temperature of the earth's surface, in turn irreversible climate change
- Scientists worldwide accept that climate change/ Global Warming is a manmade phenomenon due to industrial growth (i.e. increase in GHG concentration)
- Atmospheric temperatures would continue to rise (1.4 to 5.8$^{0}$C by 2100, IPCC-TAR)
- Sea level rise between 10 cm to 90 cm by the year 2100

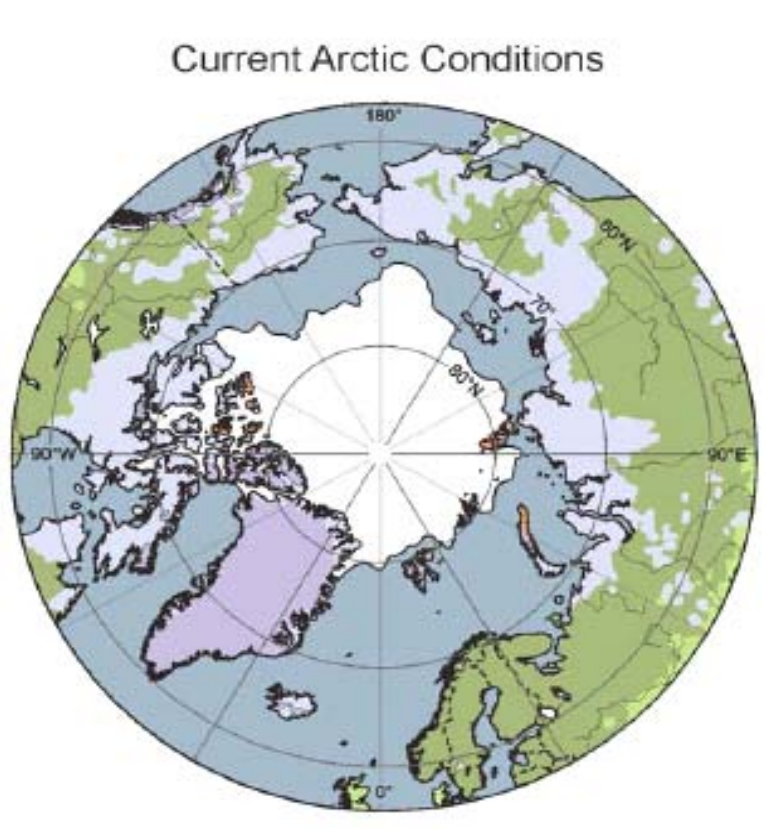
# GHGs and its sources

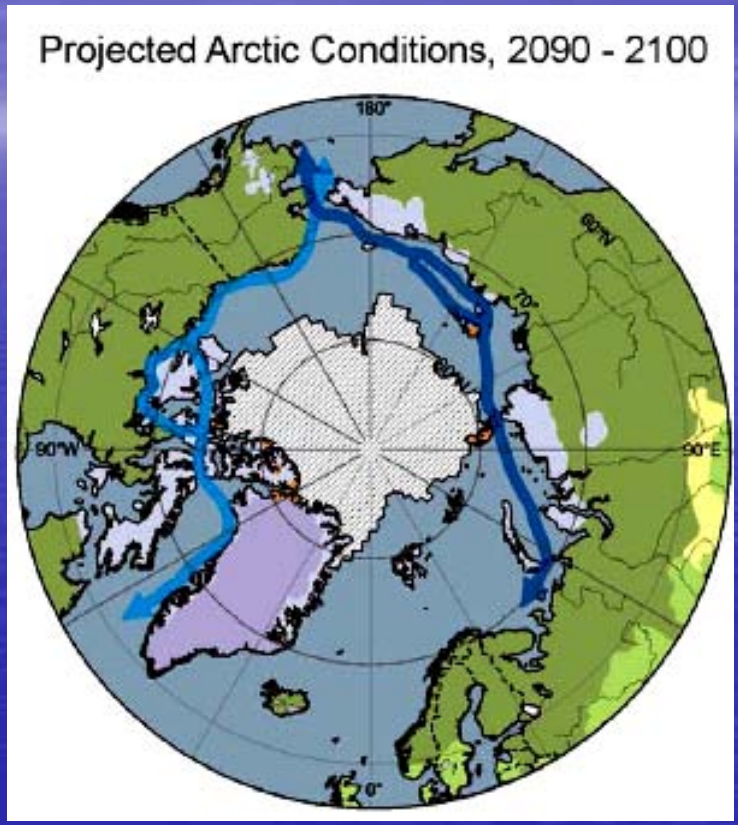
- **Carbon dioxide** – combustion of fossil fuels (coal, oil, natural gas)
- **Methane** – animal, agriculture & municipal wastes; rice cultivation
- **Nitrous oxides** – Combustion processes, chemical industry
- **Hydro fluorocarbons** – refrigerants
- **Per fluorocarbons** – semiconductors industry
- **Sulphur hexafluorides** – electrical insulation

# Climate Change – some facts

- Impacts
  - Melting of ice caps and glaciers
  - Sea level rise/erosion of costal area
  - Precipitation changes
  - Severe weather events like droughts, flooding, hurricanes etc.
  - Changing crop yields (food security), bio-diversity
  - Impact on water resources
  - Human and economic dislocations (particularly for developing countries and island nations)

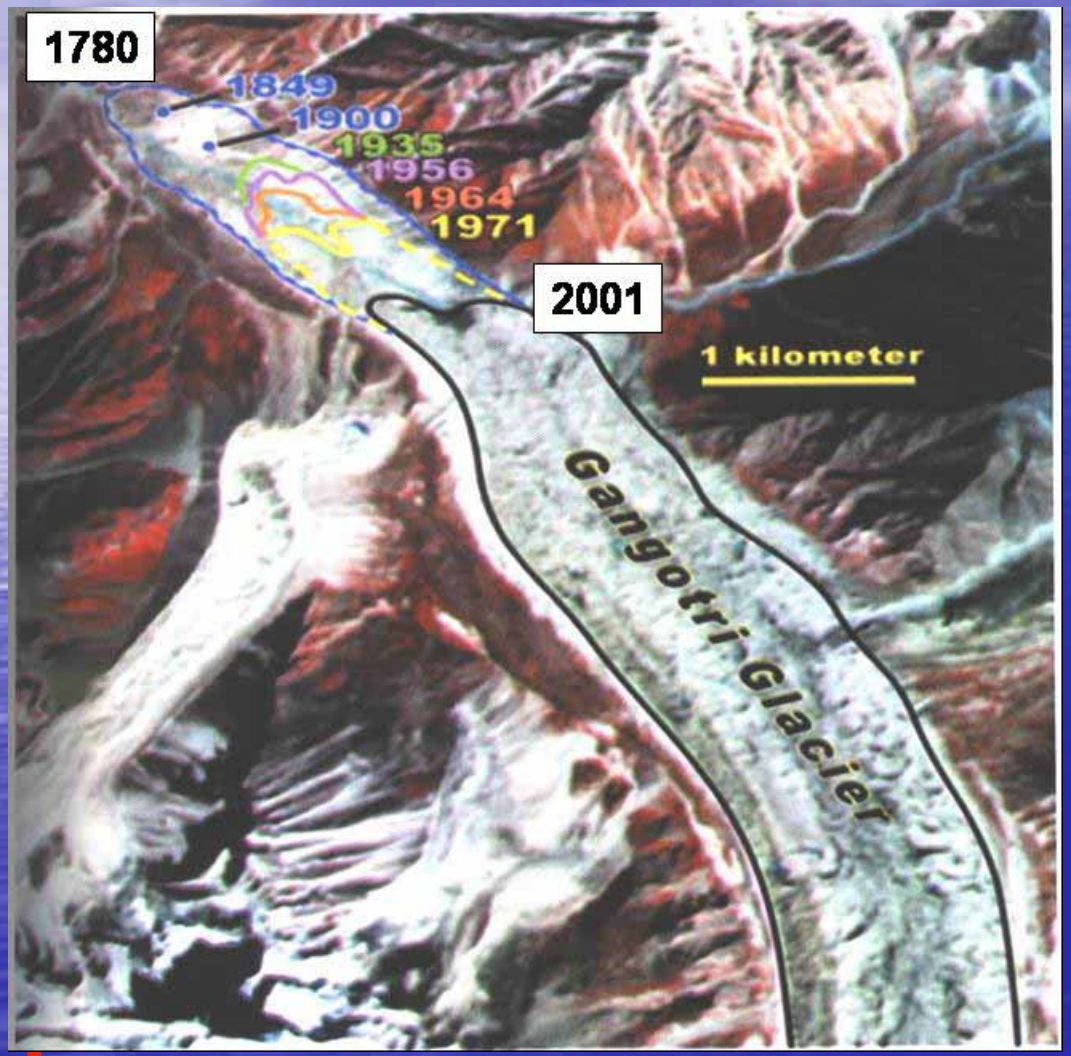
# More heavy precipitation and more droughts....




Source: IPCC AR4 WGII Chapter 15: figure 15.3

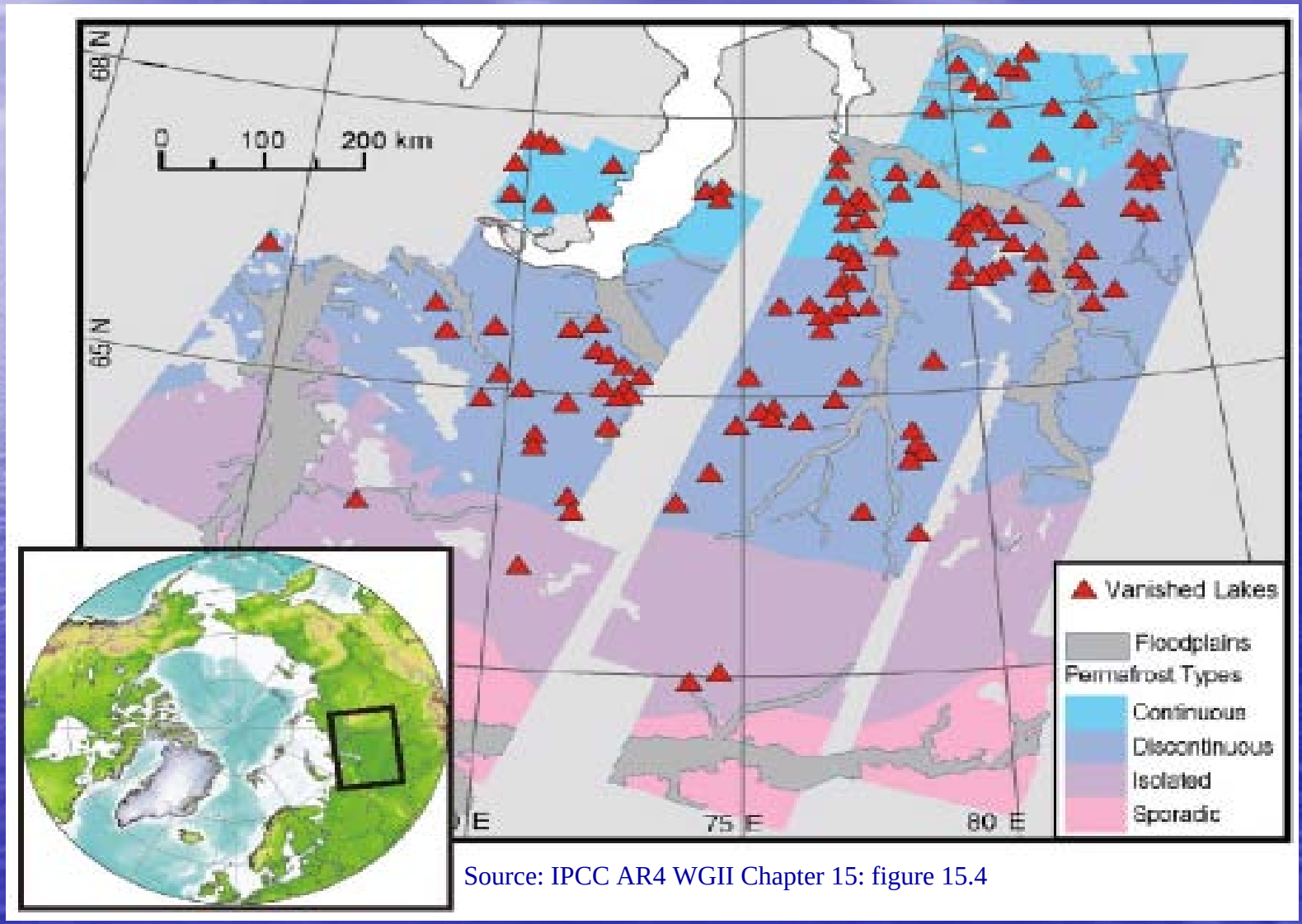
# Impact of climate change on Gangotri glacier




The Gangotri Glacier is retreating at a rate of 18 m/yr. It has retreated 2 km since 1780

*(Thakur et al, DST 1991)*

# Locations of Siberian lakes that have disappeared




Source: IPCC AR4 WGII Chapter 15: figure 15.4

# Current knowledge about future impacts

## Africa

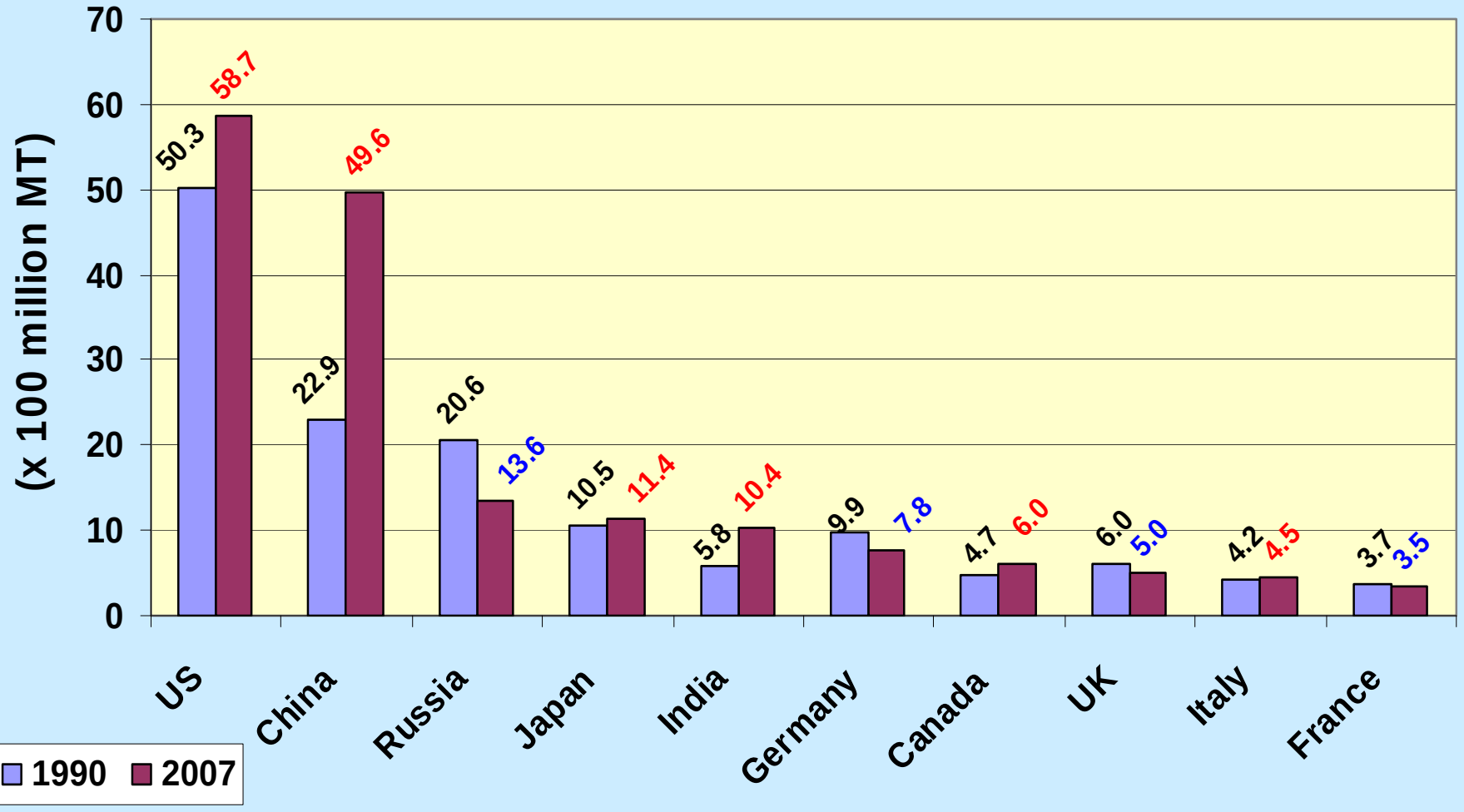
- By 2020, between 75 and 250 million people are projected to be exposed to an increase of water stress.
- Agricultural production, including access to food, in many African countries and regions is projected to be severely compromised by climate variability and change.

## Asia

- Glacier melt in the Himalayas is projected to increase flooding, rock avalanches from destabilised slopes, and affect water resources within the next two to three decades
- Endemic morbidity and mortality due to diarrhoeal disease primarily associated with floods and droughts are expected to rise in East, South and Southeast Asia due to projected changes in hydrological cycle associated with global warming. Increase in coastal water temperature would exacerbate the abundance and/or toxicity of cholera in South Asia.

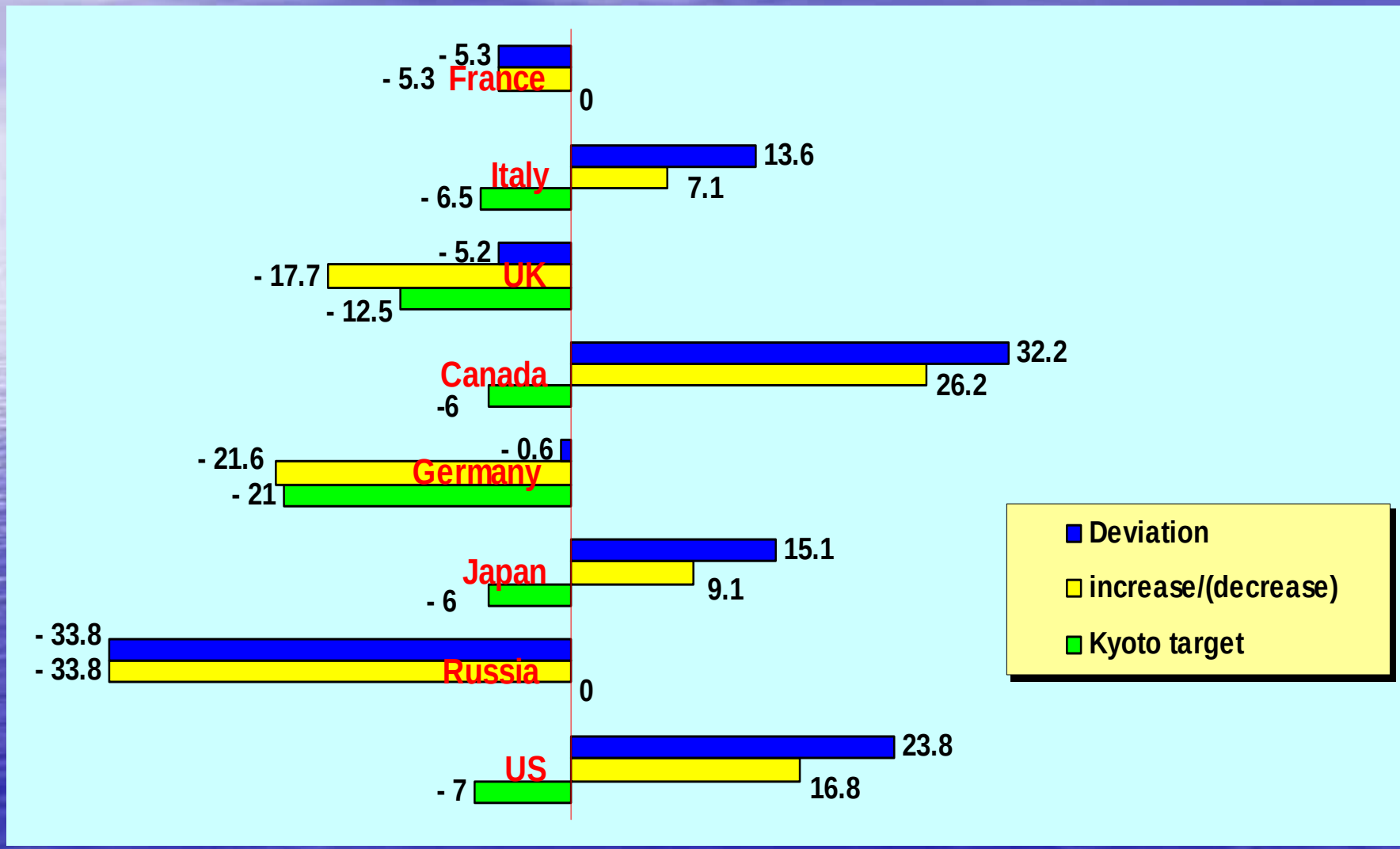
# Worldwide GHG emission and India's position

# $CO_{2eq}$ Emission (1990-2007)



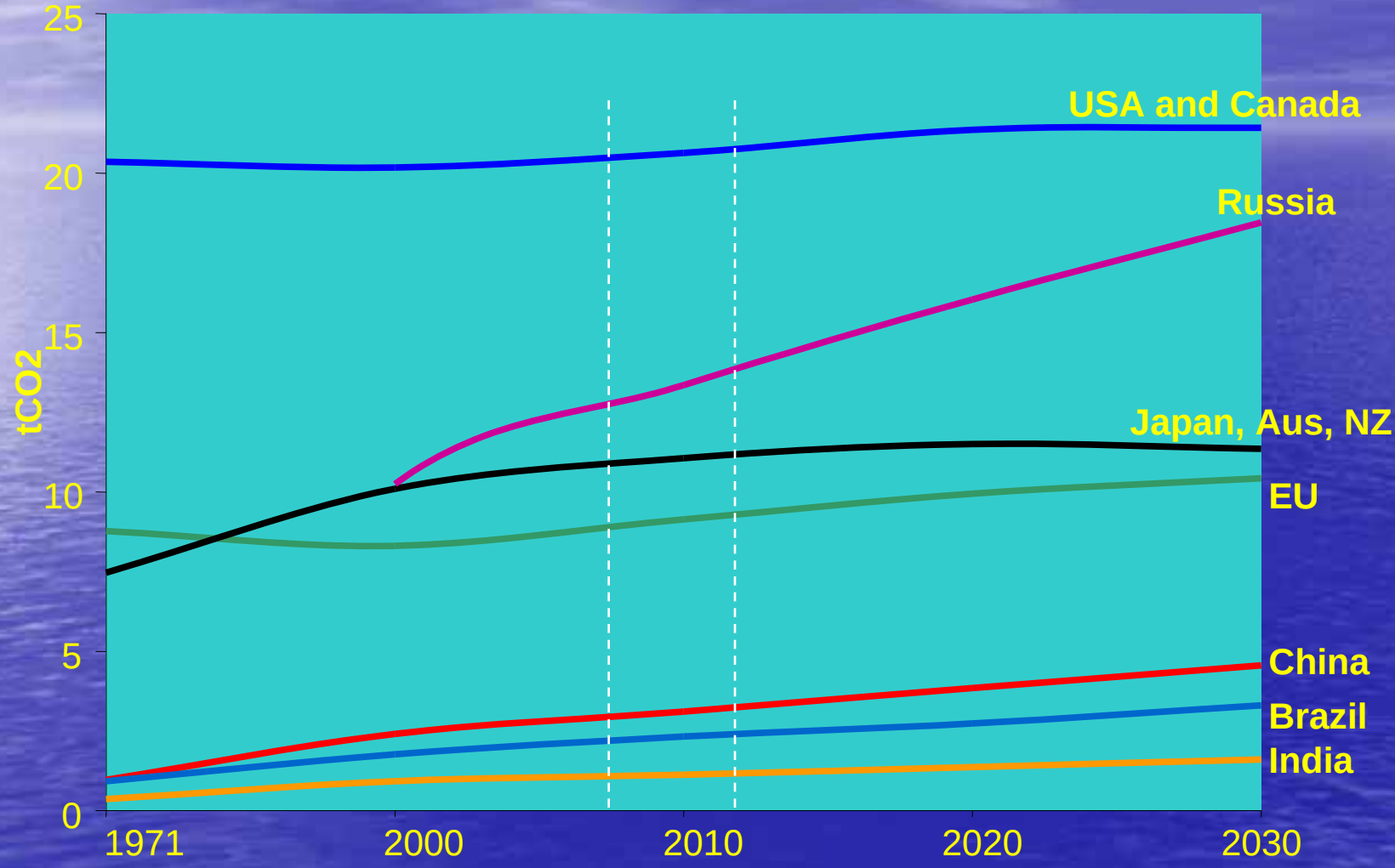

Source: EIA (2008), WWF report (2009)

# %age deviation from Kyoto targets




Source: WWF report (2009)

# Per Capita $CO_2$ Emissions




*IEA (2002), WDR (2001)*

# What is CDM

# Evolution of UNFCCC

- WMO and the UNEP established the IPCC in 1988
  - provide the policy makers up-to-date scientific information on climate change
- IPCC First Assessment Report in 1990 confirmed that human induced climate change was indeed a threat and called for global treaty to address the problem
- UN General Assembly launched negotiations on a framework convention on climate change
  - UNFCCC evolved and was opened for signature at the Earth Summit at Rio
  - Came into force in March 1994
  - 186 governments (including the EC) are Party to UNFCCC

# The Kyoto Protocol

- Adopted at CoP3 in Kyoto, Japan, in Dec. 1997
- Provides legally binding commitments for Annex-I Countries to bring their GHG emissions to an average of approx. 5.2% per cent below their 1990 levels during the 2008-2012
- Target gases – $CO_2$, $CH_4$, $N_2O$, HFCs, PFCs, $SF_6$

# What is CDM?

One of the three flexibility mechanisms in the Kyoto Protocol to the UNFCCC

- Joint Implementation
- International Emission Trading
- Clean Development Mechanism

Purpose

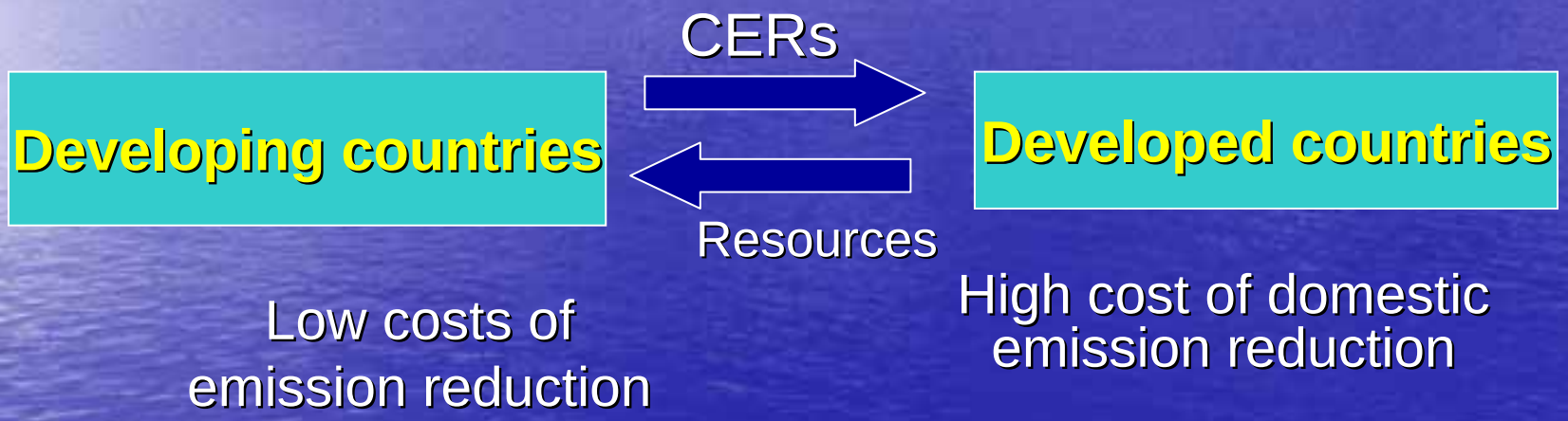
- Assist developed countries in achieving compliance with their QELRCs
- Contribute to the ultimate objective of the Convention, and
- Assist developing countries in achieving sustainable development

# What is carbon trading?

- Developed countries have targets to reduce GHG emissions under the Kyoto Protocol
- Countries that find it easier to meet their targets can sell surplus emission reductions to others
- Countries that don't have targets (i.e. developing countries) can sell emission reductions to others after registering projects with CDM Executive Board

# CDM : - Article 12

## CDM: Project based mechanism




**Guiding principles**

**Achieve SD, TT, Investment**

**Meet ER targets in a cost effective way**

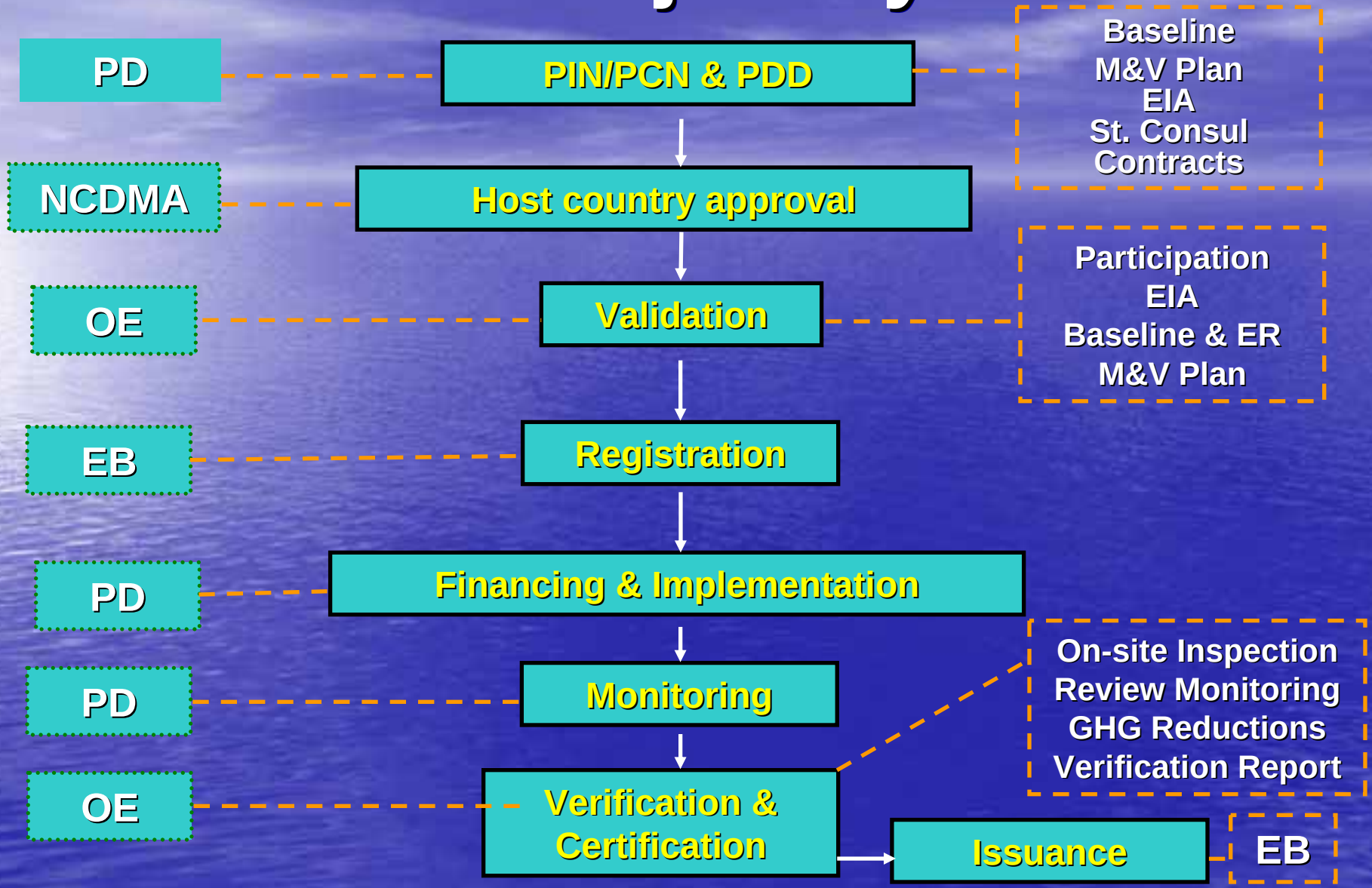
# About CDM

## Eligibility Criteria

For a project to be considered a CDM project it should fulfill following eligibility criteria:

- The project contributes to the sustainable development of the host country
- The project results in real, measurable and long term benefits in terms of climate change mitigation, and
- The reductions must be additional to any that would have occurred without the project

# CDM Project Cycle



# Total Registered Projects

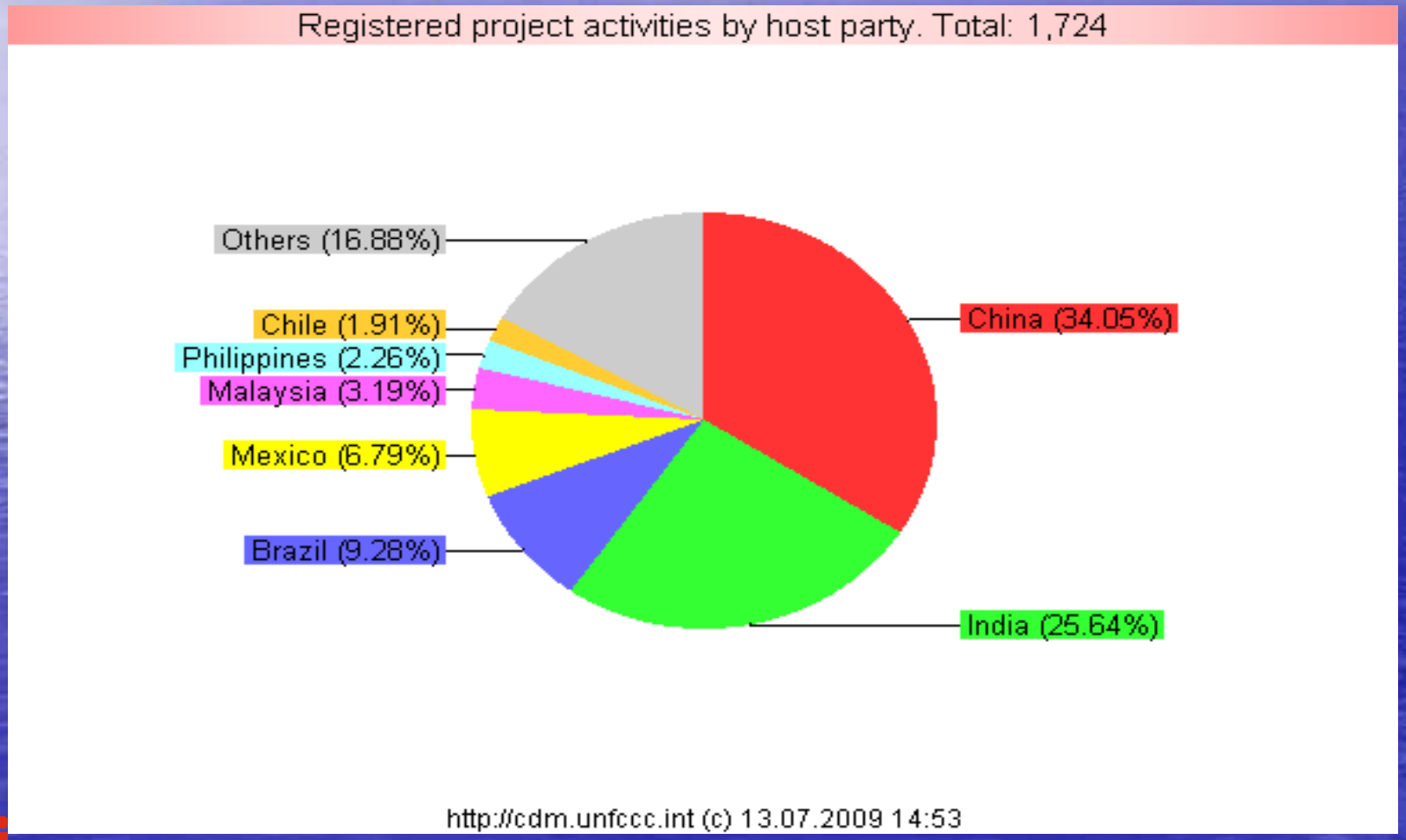
(as on 14th July 2009)

- Regd. Projects - 1724
- CERs issued - 311,743,267
- CERs till 2012 - 1,620,000,000
- Projects in pipeline - >4200
- Expected CERs till 2012 - 2,900,000,000
- Projects requesting regn.- 52
- Expected CERs from 52 projects (till 2012) - 20,000,000

# Registered projects

(as on 14th July 2009)

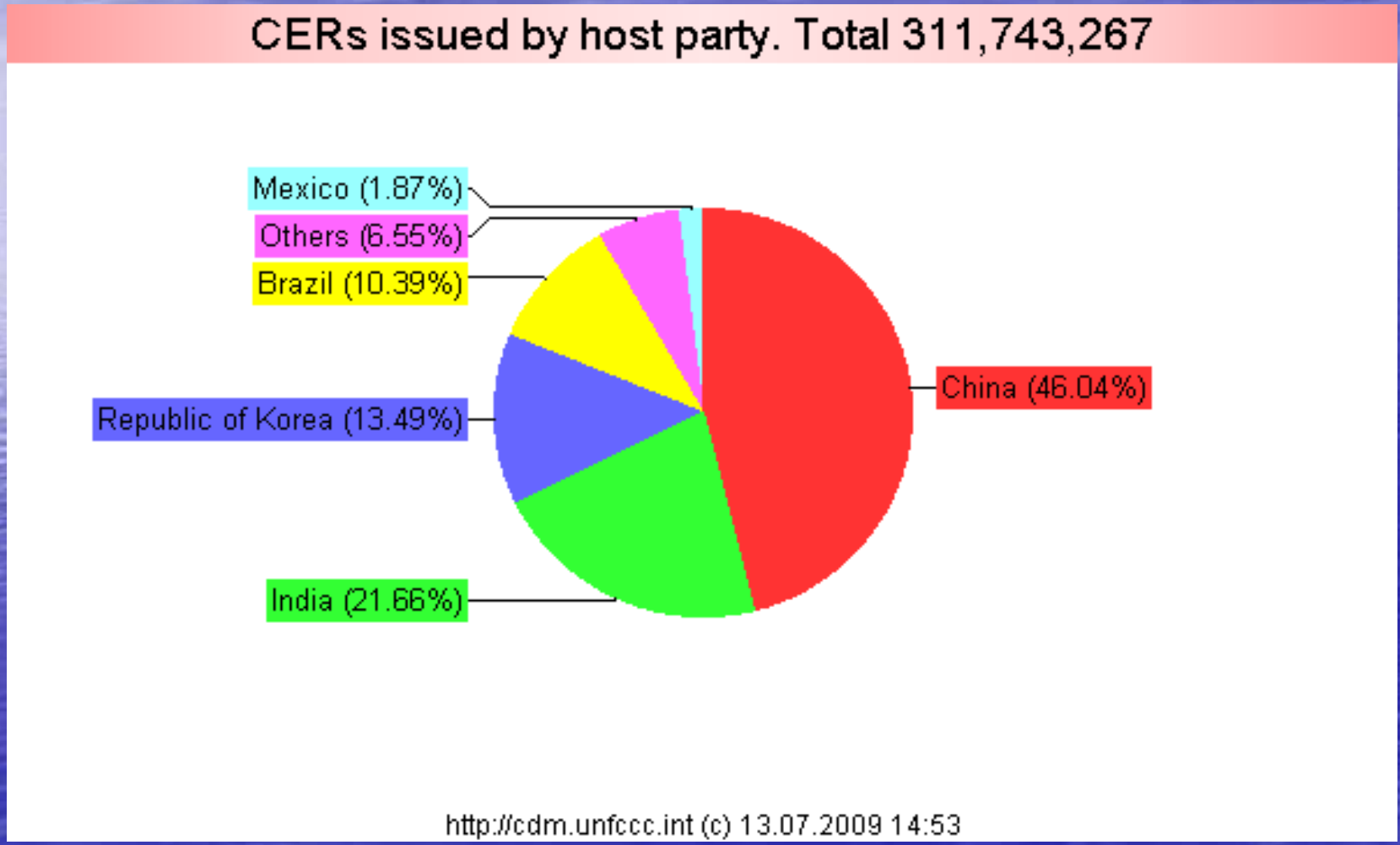
- **Projects from India - 442 (25.64%)**



# Registered projects

(as on 14th July 2009)

- **CER issued to India - 67, 523, 591**



# CDM in Indian Iron & Steel Industry

# Indian Iron & Steel Industry

- India is 5th largest steel producer in the world
- Crude steel production for 2007-08 is 54 million tonnes
- CO2 emission from this sector is about 100-120 million tonnes
- Specific emission for India is about 2.5 tCO2/ ton of crude steel
- World average specific emission intensity (for all steel making process) is 1.7

# Possible CDM projects in Iron & Steel Industry

- Process technology based
- Waste energy recovery
- Fuel switchover
- Demand side management
- Renewable Energy

# Possible CDM projects in Iron & Steel Industry

- **Process technology based**
  - Waste heat recovery from kilns, furnaces, soaking pits, sinter coolers, molten slag, etc and gases in the process
  - Use of recovered gas (from coke oven, etc) as fuel for co-gen power plant
  - Coke dry quenching
  - Top Recovery Turbine
  - Coal moisture control
  - Regenerative ( re) heating furnaces
  - Use of latest technologies (e.g. Castrip, FINEX process, etc)
  - Scrap preheating in EAF
  - Reducing coke rate by beneficiation of coal and ore
  - Coal dust/tar injection in blast furnaces

# Possible CDM projects in Iron & Steel Industry

- **Fuel switchover**
  - Fuel switch over mainly from existing fossils based to alternate fuels
- **Demand Side Management**
  - Ultra high power transformers
  - Variable speed drives
  - Other energy saving measures
- **Renewable Energy**
  - Possibility of using biomass based fuels, generating electricity based on renewable energy sources (wind, solar, etc.), etc.

# Potential CDM Methodologies for Iron & Steel Industry

| | |
|---|---|
| AM0066 | GHG emission reductions through waste heat utilisation for pre-heating of raw materials in sponge iron manufacturing process |
| AM0068 | Methodology for improved energy efficiency by modifying ferroalloy production facility |
| ACM0002 | Consolidated methodology for grid-connected electricity generation from renewable sources |
| ACM0012 | Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects |
| AMS-I.C. | Thermal energy production with or without electricity |

# Potential CDM Methodologies for Iron & Steel Industry

| | |
|---|---|
| AMS-I.D. | Grid connected renewable electricity generation |
| AMS-II.C. | Demand-side energy efficiency activities for specific technologies |
| AMS-II.D. | Energy efficiency and fuel switching measures for industrial facilities |
| AMS-III.Q. | Waste Energy Recovery (gas/heat/pressure) Projects |
| AMS-III.V. | Decrease of coke consumption in blast furnace by installing dust/sludge recycling system in steel works |

# CDM project status for Iron & Steel Industry (1st July 2009)

| | AM0066 | AM0068/AMS-3.V. | ACM0004 | ACM0012 | AMS-I.D. | AMS-II.D. | AMS-III.Q. | AMS-IC+I.D.+III.Q. |
|---|---|---|---|---|---|---|---|---|
| Registered | 0 | 0 | 44 | 0 | 0 | 1 | 0 | 0 |
| Review req. | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| Correction req. | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Registration req. | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| Rejected | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 |
| At validation | 1 | 0 | 5 | 32 | 0 | 6 | 10 | 1 |
| Rejected at validation | 0 | 0 | 5 | 3 | 0 | 3 | 2 | 0 |
| Withdrawn | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

# Thank you !

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