

Energy Use Global Warming and Opportunities for Bangladesh

Professor Saifur Rahman
Director
Alexandria Research Institute
Virginia Tech

Greenhouse Effect

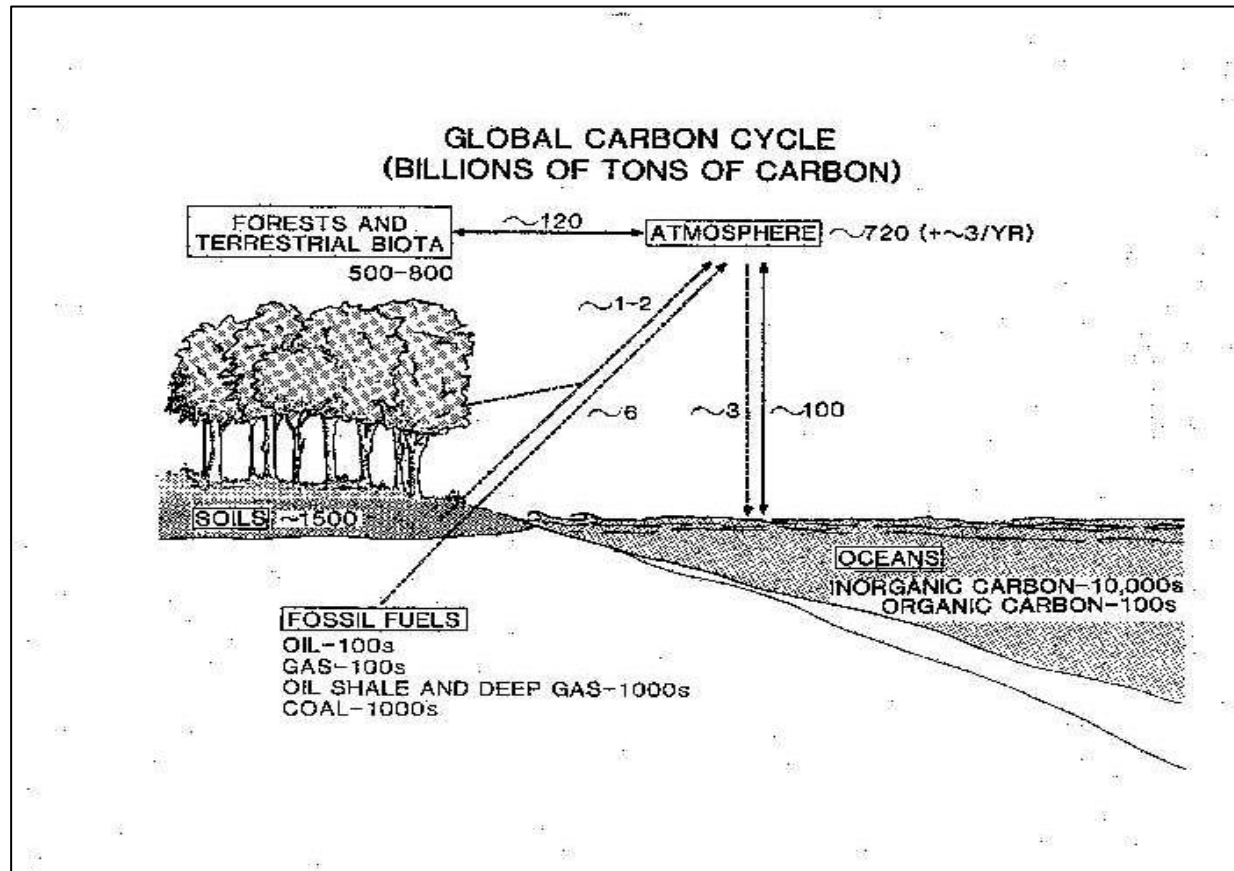
- 50% of incoming solar radiation reaches the surface of the earth
- 90% of the infrared radiation reflected by the earth 's surface is absorbed in the atmospheric trace gases
- These gases and clouds re-emit this radiation back to ground
- Short wavelength radiation escapes, long wavelength radiation is held back
- Earth will be 60° F cooler without this

Natural Greenhouse Gases

- Carbon dioxide (CO₂)
- Methane (CH₄)
- Nitrous oxide (N₂O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF₆)

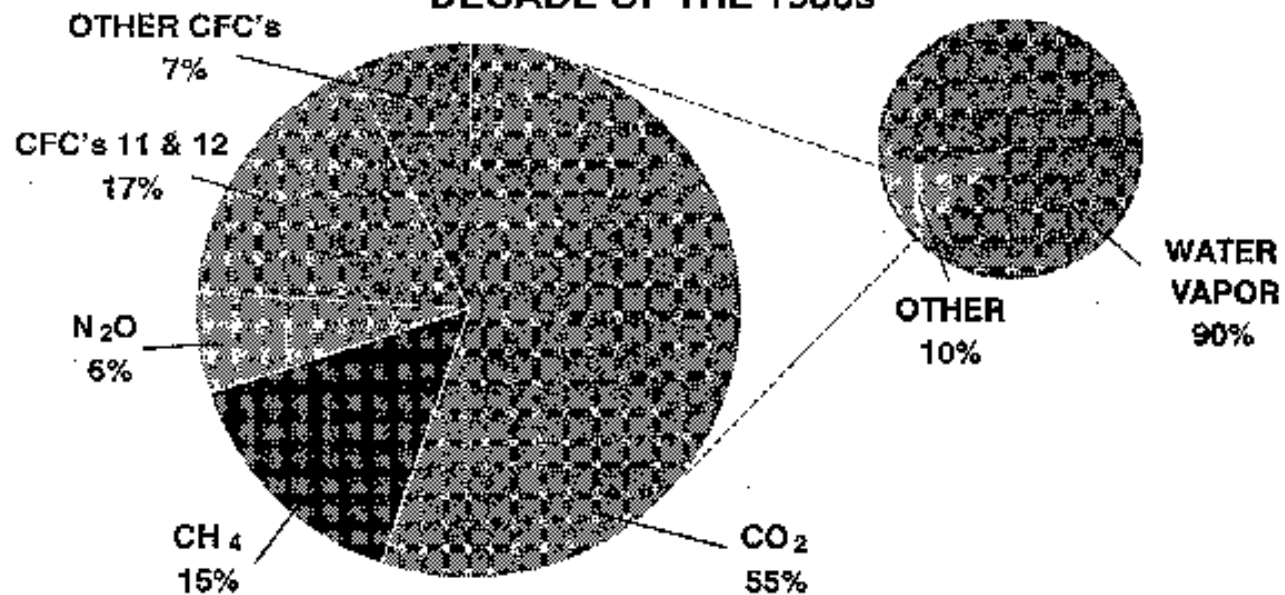
1997 carbon emissions from fossil fuels:
6 billion tons

Global Carbon Cycle



GLOBAL CONTRIBUTIONS TO THE GREENHOUSE EFFECT

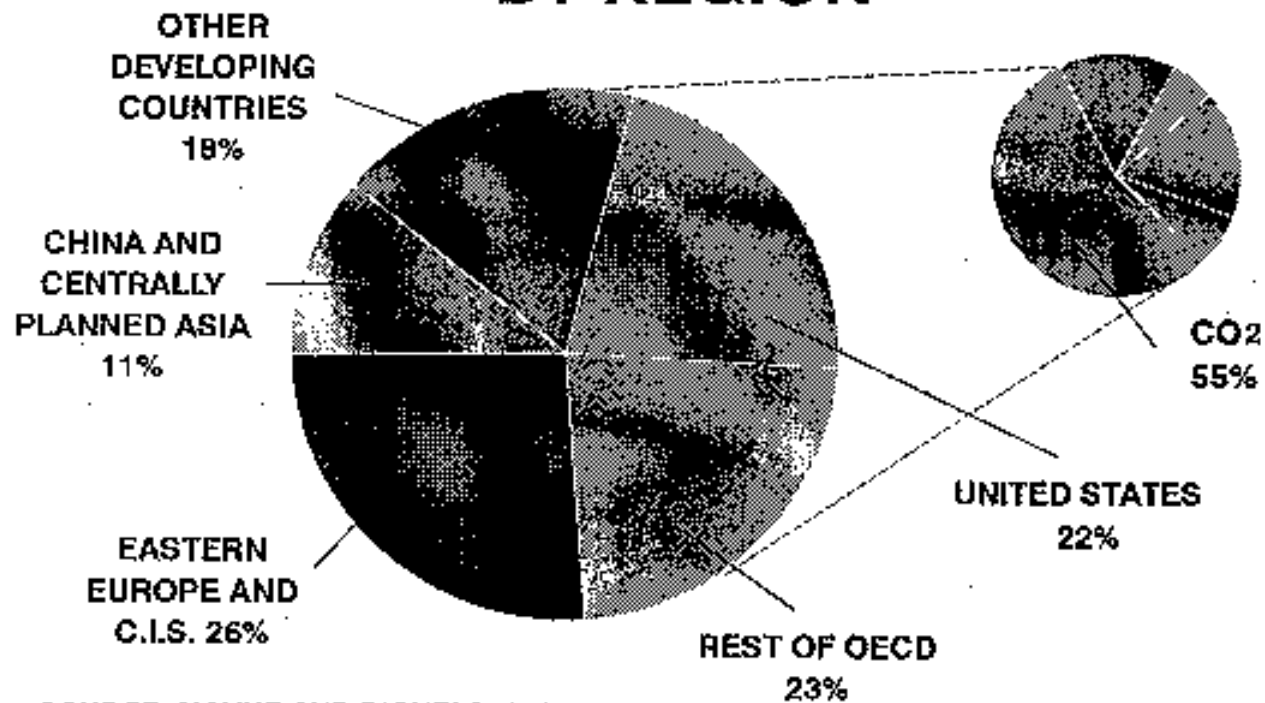
DECADE OF THE 1980s



NOTE: OZONE, THE EFFECTS OF WHICH MAY BE SIGNIFICANT, IS NOT INCLUDED.

SOURCE: 'SCIENTIFIC ASSESSMENT OF CLIMATE CHANGE', IPCC POLICY MAKER'S SUMMARY, 1990

GLOBAL CO₂ EMISSIONS BY REGION



SOURCE: MANNE AND RICHELIS, 1991

Anthropogenic Carbon Emissions

- Electric Power Plants (33%)
- Transportation (33%)
- Direct Industrial Use (20%)
- Residential & Commercial Use (12%)

One kWhr of coal-based electricity releases 2 lbs of CO₂

One gallon of gasoline releases 25 lbs of CO₂ from manufacture to consumption in a vehicle

Growth since Industrial Revolution (1765-1999)

- CO₂ from 280 ppm to 360 ppm
- Methane concentration has doubled
- N₂O has risen by 15%
- Earth has warmed by about 1°C since mid-19th century
- Earth is the warmest (in 1998) compared to last 2000 years

Table 1. CO₂ Emissions from Fossil-fuel Generation in Selected OECD Countries, 1997			
	Carbon (10⁶ MT)	Population million	Carbon tons/ capita
OECD Total	1,237	905	1.37
Australia	46	18	2.49
France	20	59	0.34
Germany	105	81	1.29
Japan	135	126	1.07
Norway	-	4	-
UK	75	59	1.27
US A	705	268	2.63
			9

Table 2. CO₂ Emissions from Fossil-fuel Generation in Selected Non-OECD Countries, 1997			
	Carbon (10⁶ MT)	Population (million)	Carbon (tons/ capita)
Non-OECD Total	937	4,952	0.19
Bangladesh	2	122	0.01
China	259	1,244	0.21
India	97	955	0.10
Indonesia	16	201	0.08
Nepal	0	23	-
Saudi Arabia	19	19	0.97
Former USSR System	206	297	0.69

UN Panel on Climate Change

“The balance of evidence suggests that there is a discernible human influence on global climate change ”

- CO₂ level will reach 600 ppm by the end of this century
- More than double the level held for 10,000 years
- Global temp rise by 1°C to 3.5°C

Impacts of Climate Change

- Changes in precipitation
- Extreme weather
- Sea level rise

Kyoto Protocol Issues

- Industrialized countries to reduce CO₂ equivalent emissions by 5 to 8% from 1990 levels by 2008 to 2012
- US plans to purchase at least 450 million tons of CO₂ credit out of estimated 550 million tons reqd.
- Allowance for CO₂ emissions trading
- Developing countries are exempt

Opportunities for Bangladesh

- Participate through the Clean Development Mechanism
- Develop quantifiable base case scenarios
- Develop infrastructure to monitor, enforce and protect the integrity of transactions
- Obtain funds for promoting energy efficiency and renewable energy

UN Human Development Report

Developing countries can mimic industrial countries. Or, they can leapfrog over some of the inefficient and wasteful technologies used to arrive at the current environment.

Conclusion

Bangladesh plays a small role in Greenhouse gas emissions. But the country needs to understand the mechanics to take part in treaty negotiations and benefit from carbon trading opportunities