Global Climate change and its impact

BY

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The sand clock is on


Green House
Glass House
Poly House
Green House concept comes from cold !

COP 15 Climate conference COPENHAGEN

Dec. 7 – 19 , 2009

Place :	**Copenhagen**
Country :	**Denmark**
Venue :	**Bella Center**
Countries :	**192**
Leaders :	**100**

$ 100 Billion/Year by 2020 for poor nations

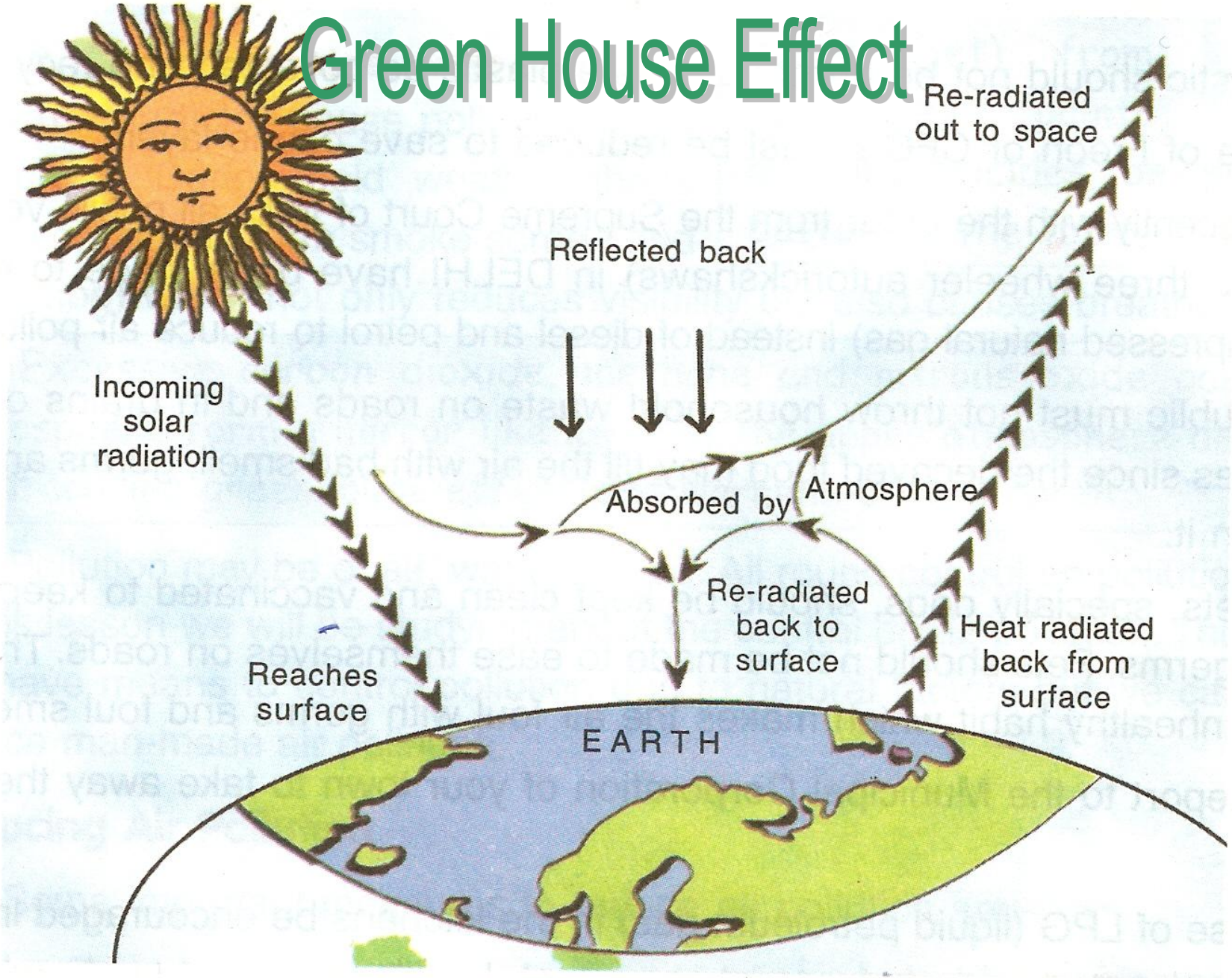
How old will you be in 2050 ?

The youth sought to remind delegates who will still be around in some 40 years.The decision they make today will affect the world they live in then !

Carbon Dioxide
Methane
Nitrogen Oxide
Ozone
Water vapors

Green house gases

Green House Effect



The greenhouse effect on earth.


King of North Pole finds no place to stand

Penguin family is worried about their future !

Sitting in a car with glasses closed

66% of the heat energy is received by earth from sun in the form of Ultraviolet rays , and is released back from the earth in the atmosphere in the form of Infrared rays.

Humanity's current energy profligacy and Industrial activities deposit 6 Billion tones of GHGs in the earths atmosphere. GHGs absorb infrared rays and results in to warming.

Unlimited use of fossil fuel

Carbon dioxide emission from fossil use in present developing countries is rising from 36% of world total now to about 50% by 2020 and to about 60% by 2050.

Over the past 100 years global mean temperature has risen by 0.3-0.6 c and we have experienced 5 warmest years in 1980s.

Increased use of fossil Fuel 1990-1995

Country	Rise
Developing	4%
Japan	12%
Canada	9.5%
Australia	8%
USA	6%

From Coal 2.8%

From Oil 3.4%

Natural Gas 11%

Rise in average global temperature

Year	Temperature	CO2 [ppm]
1860	**14.1**	**187**
1900	14.3	300
1950	14.5	310
2004	**15.3**	**375**

Causes of global warming

1. Green House Gases.
2. Growing Industrialization.
3. Rapid Urbanization.
4. Indiscriminate deforestation.
5. Imbalanced use of Fossil fuel.
6. Rice fields and Rumen Fermentation in cattles is releasing Methane which is 25 times dangerous than Carbon Dioxide.[World Resource Institute , U S]

Effects of Global warming

1. Alter the structure of the existing ecosystem.
2. Plant, Animal and Microbial species becoming extinct.
3. Melting of Ice caps.
4. Rise in see levels.
5. Flooding the low-lying islands and coastal lands.
6. Displacement of millions of people , reducing the area of land available for farming.

Indicators of Climate change

In a given single year :

1. **No. of cyclones we experienced ?**
2. **No. of Draughts we suffered from?**
3. **No. of days the temperature was above 40 c.?**
4. **No. of days in winter season one experiences summer heat ?**
5. **No. of volcanic eruptions ?**
6. **Number of underground Atomic explosions ?**

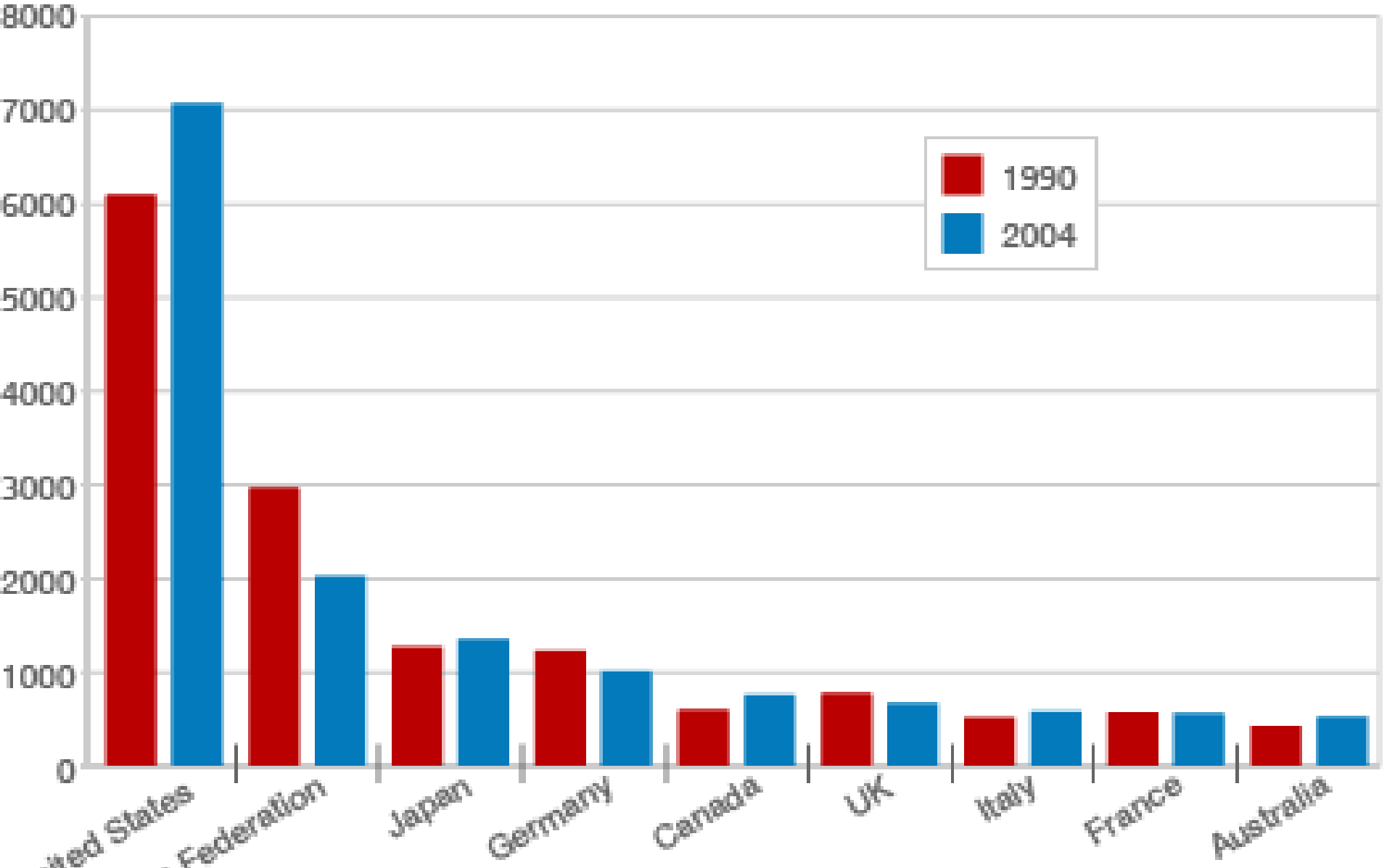
World Watch Institute

Computer model

- **Global atmosphere is distributed in imaginary 9 vertical parts.**
- **Horizontal imaginary lines on every 100 K M make the compartments.**
- **Every compartment is monitored for the following parameters.**
- ***1. Temperature.***
- ***2. Humidity.***
- ***3. Radiations coming in the atmosphere.***
- ***4. Radiations going out in the atmosphere.***

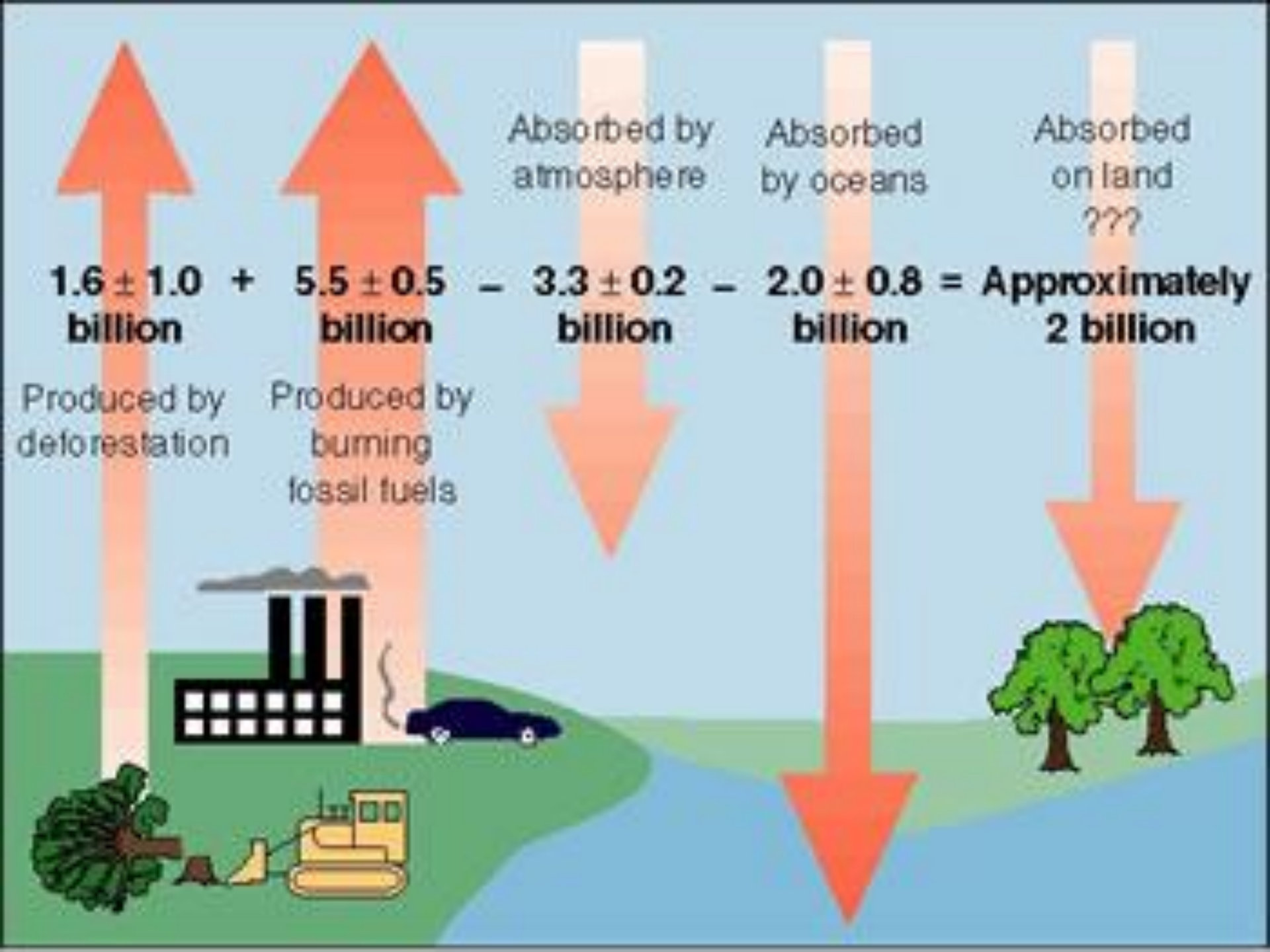
TOTAL GREENHOUSE GAS EMISSIONS

Million tonnes CO2 equivalent



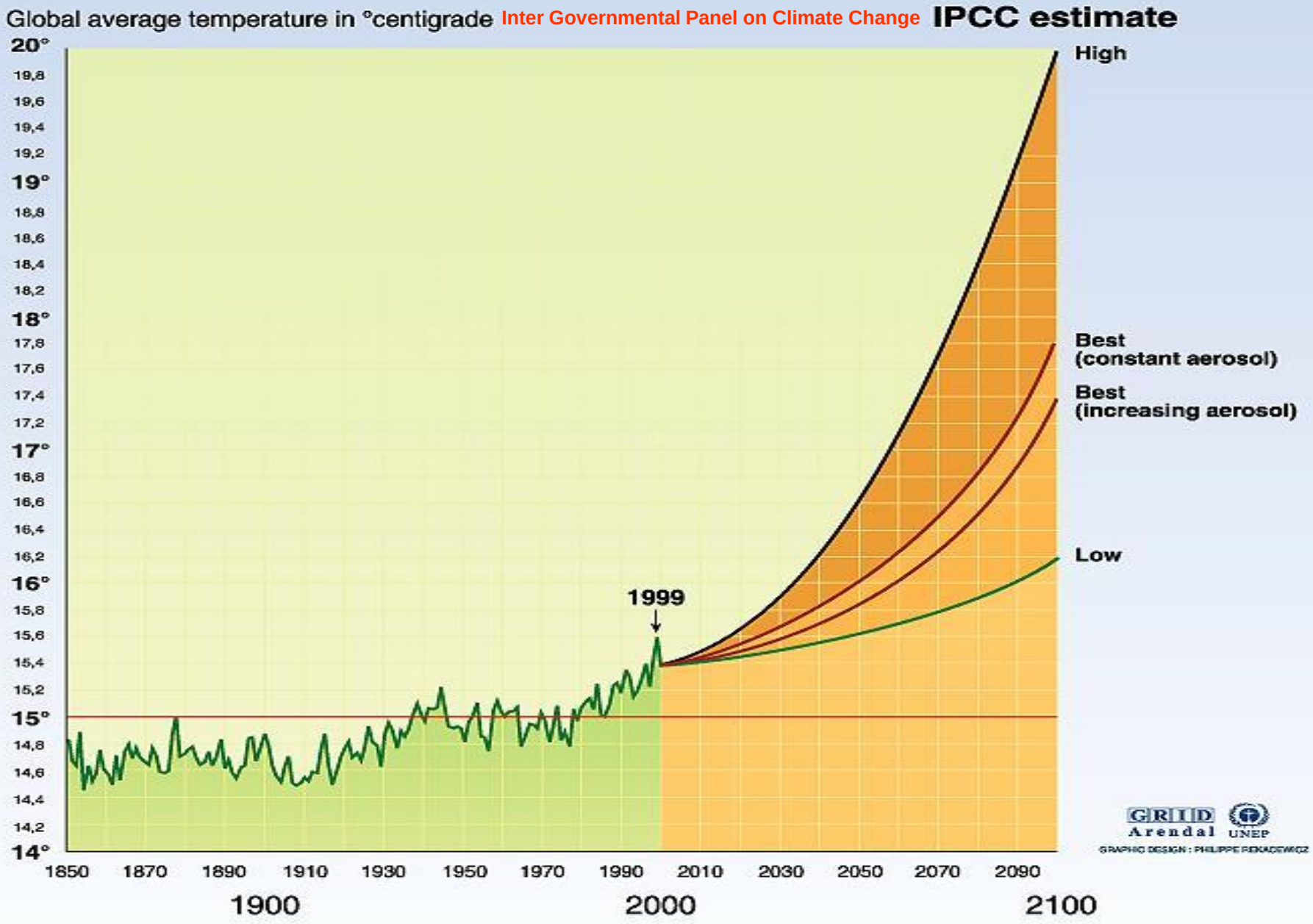
United Nations Framework Convention on Climate Change

SOURCE: UNFCCC


Absorbed by atmosphere
Absorbed by oceans
Absorbed on land ???
1.6 ± 1.0 billion + 5.5 ± 0.5 billion – 3.3 ± 0.2 billion – 2.0 ± 0.8 billion = Approximately 2 billion
Produced by deforestation
Produced by burning fossil fuels

Projected changes in global temperature:

global average 1856-1999 and projection estimates to 2100



Source : Temperatures 1856 - 1999: Climatic Research Unit, University at East Anglia, Norwich UK. Projections: IPCC report 95.

Kyoto protocol

It is an International agreement linked to the United Nations Framework Convention on Climate Change [UNFCCC] adopted in Kyoto, Japan on 11th Dec. 1997 and entered into force on 16th Feb. 2005.184 countries have signed this agreement. America did not sign.

It sets binding targets for 37 Industrialized countries and the European community for reducing Green House Gas emission.

Kyoto Mechanism

*Average of 5% reduction in GHG emissions against 1990 levels over the period of 5 years. [2008-2012]

*Emission Trading : Carbon Credits.

*Clean Development Mechanism.

*Joint implementation.

Carbon Credits

*In Kyoto Protocol **International trading norms are set.**

***Carbon Dioxide is turning to Product** for people , Countries , Consultants , Corporations , and Farmers.

*They can **earn Billions of Rupees.**

*Last year global Carbon Credit trading was estimated at $5 Billions. **India's contribution was $1 Billion.**

Ways to reduce GHG levels

1. By adopting a new technology.

1. Improving upon the existing technology to attain new norms.

2. Tie up with developing nations and help them set up a new technology thereby helping developing countries "Earn Carbon Credits"

Emit 1 ton less and get 22 Euro

Indians are selling Carbon to Europe !

*British petroleum in U K is emitting more gas than the norms of UNFCCC.

*It can tie up with say its own subsidiary in India under **Clean Development Mechanism** [CDM].It can buy the Carbon Credits by making Indian plant more Eco-friendly with the help of technology transfer.It can tie up with other company like Indian oil.

*If this technology emits less carbon as compared to 1990s, **for every 1 ton less , British Petroleum will pay 22 Euros to India.**

Emit less and add to your profits.

Those Indians who new about the possibilities of earning profits , adopted the new technology , saved the credits and sold it to improve their bottom line.

Does it mean allow polluters in Europe to buy Carbon Credits and get away with it ?

NO !

Under UNFCCC the polluters can not buy 100% of Carbon Credits they are required to reduce.

Out of 100% ,they have to induce 75% locally by various means in their own country.

They can buy only 25% of Carbon Credits from developing countries.

IMPACT ON

MICROORGANISMS

Never underestimate the power of Microbes

Microorganisms are the only witness to all sorts of climate changes which occurred on this Earth in the last 3.5 Billion years

And still surviving with power !

[Ref. Western Warrawoona group of rocks in W Australia]

Do not forget that Microorganisms are the ultimate link in practically every food chain on this planet !

Significant contribution to Global Biomass

***Carbon biomass of Prokaryotic Microorganisms is 60 to 100 %**

of that thought to occur in plants

world wide.

***Microbial Phosphorus and Nitrogen biomass exceeds that of all other microorganisms**

***Microbial participation in Photosynthesis**

and Respiration rate and in Carbon ,Nitrogen and Phosphorus cycles is quite large.

1. Rising soil Temperature

Global warming with rising soil temperature is likely to cause indirect environmental changes

by increasing nutrient availability due to greater mineralization of soil organic matter by Microbes.

2. Impact on infectious diseases

Extreme weather patterns and Global warming have a direct negative impact on infectious diseases , especially vector borne like **MALARIA**. Climate change results in global redistribution of Malaria vector , which puts on extra pressure on the public health system. Infectious diseases have multiple disease determinants that are not just Biological but ecological , sociological and epidemiological.

3. IMPACT ON LOW DIVERSITY GROUPS

Changes in the microbial community composition, in accordance with changes in the functions that the microorganisms catalyze , have been observed for specific groups of low diversity catalyzing a very narrow range of

Biogeochemical functions such as **Ammonia oxidizing** bacteria.

4. Biogeochemical role in CO2

Microbial Respiration

Microbial respiration typically increases with increasing temperature . In the global warming scenario , one might imagine a transient burst of increased microbial respiration especially in the polar climates where permafrost can melt and suddenly make organic matter available for microbial consumption. This will cause a transient increase in CO2 , lasting until frozen substrates get depleted.

5. Biogeochemical role in Methane

Methane is oxidized by specialized bacteria called Methanotrophs that live where they have methane in an anoxic zone. Some Methanotrophs live as symbionts in invertebrates near natural methane sources

6. Biogeochemical role of Nitrous oxide

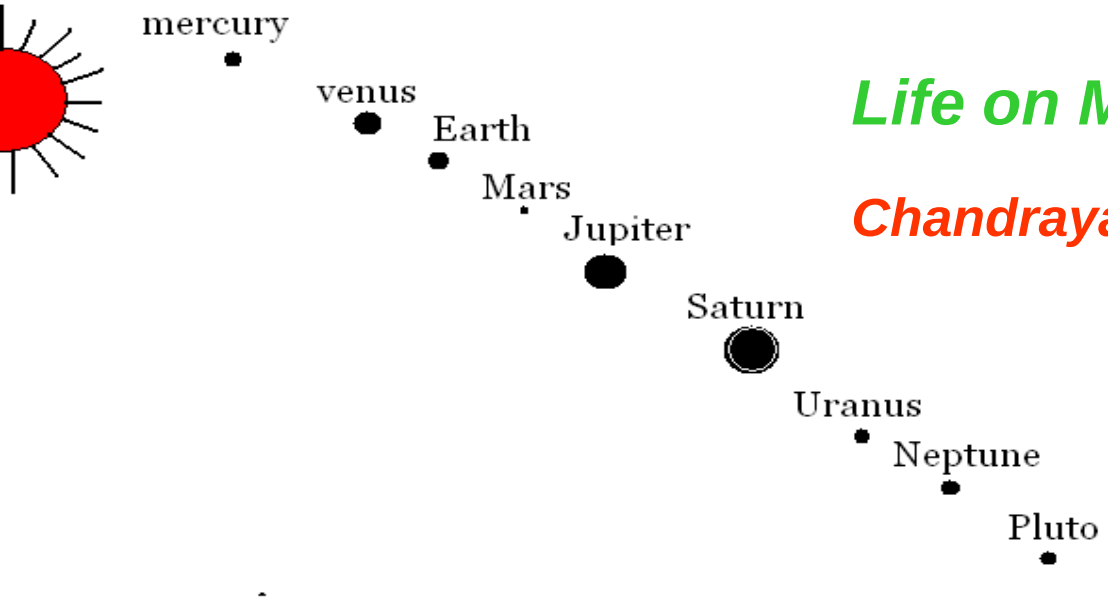
Nitrous oxide can be reduced by **Denitrifying bacteria** to N2 gas under anoxic conditions.

Big unanswered question is

How Microorganisms might respond to global climate change ?

Will they buffer some of the changes or Accelerate them?

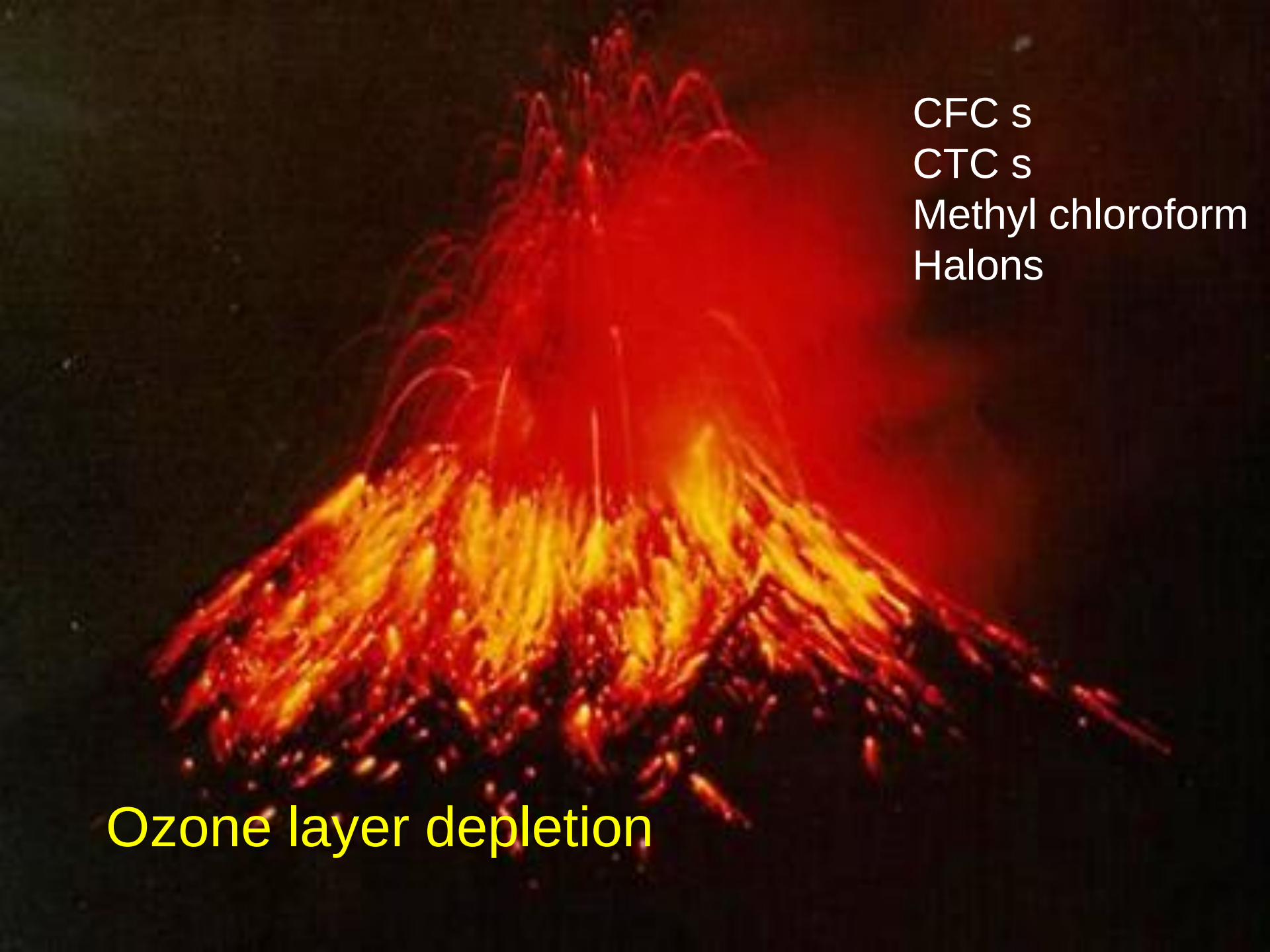
Extraterrestrial life ?



Life on Mars ?

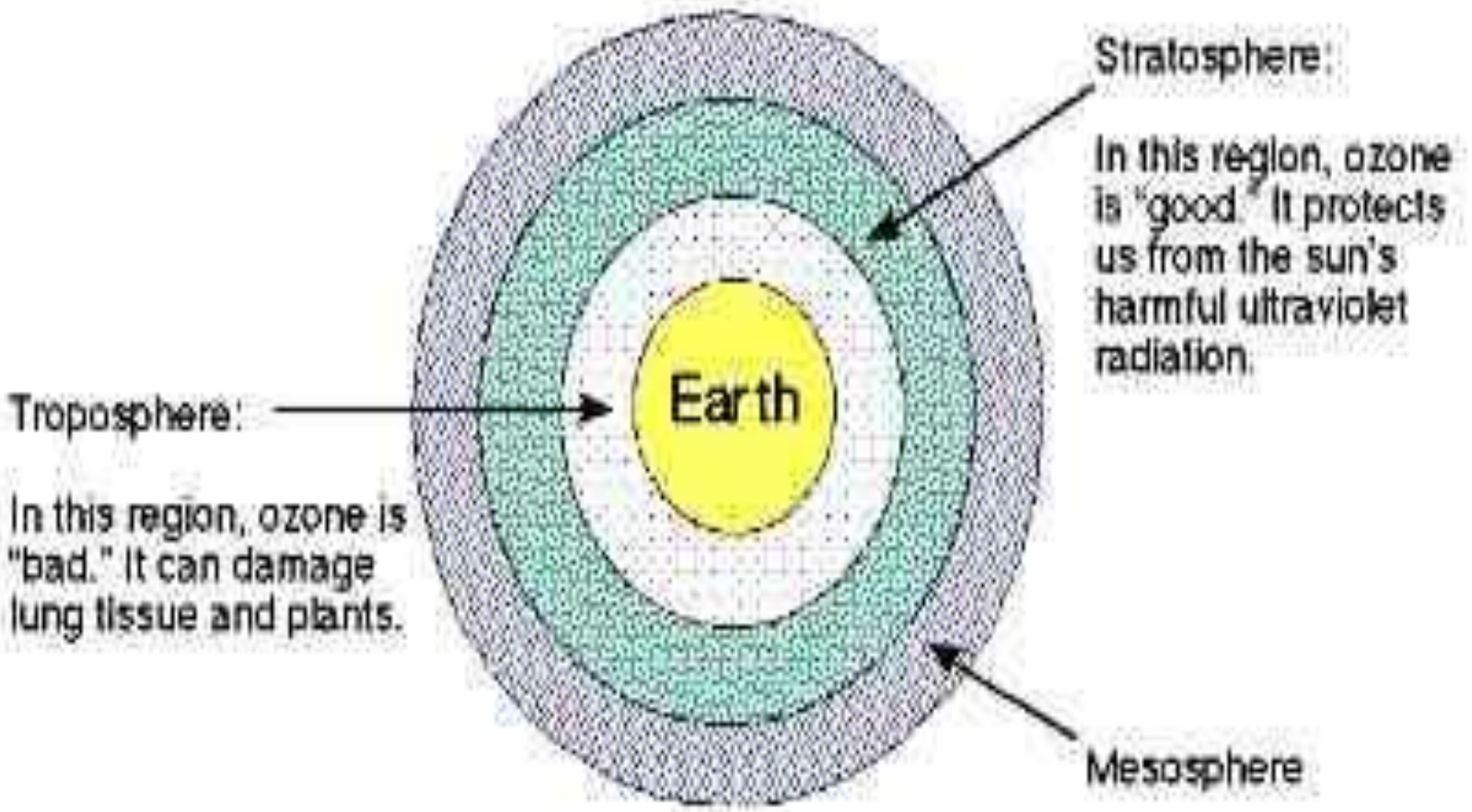
Chandrayan-1 identifies water on Moon ?

Experiments are designed by NASA to create Green House Effect on Mars Or Moon Soil surface to stimulate the dormant Microbial life on Mars.

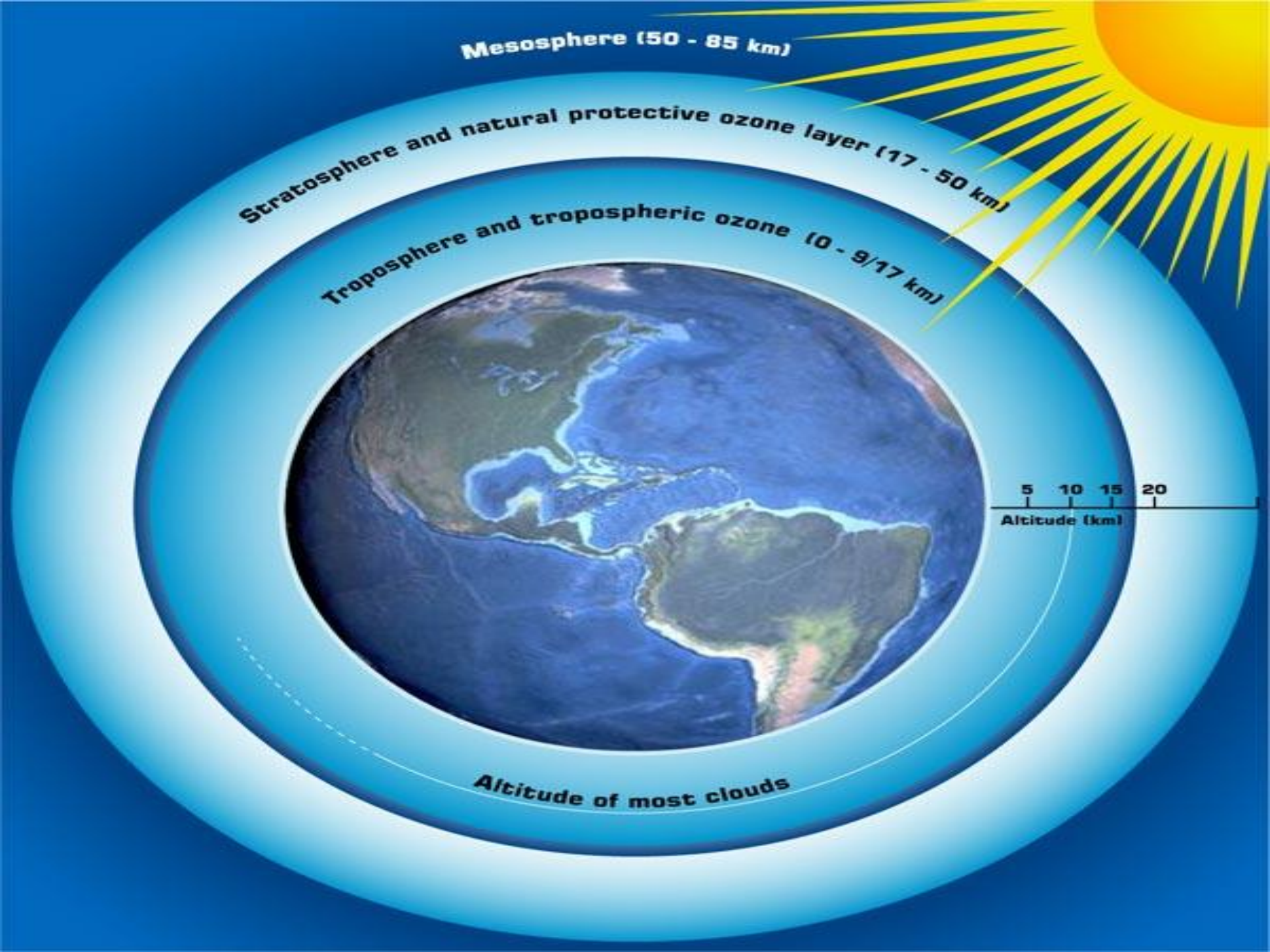


CFC s
CTC s
Methyl chloroform
Halons

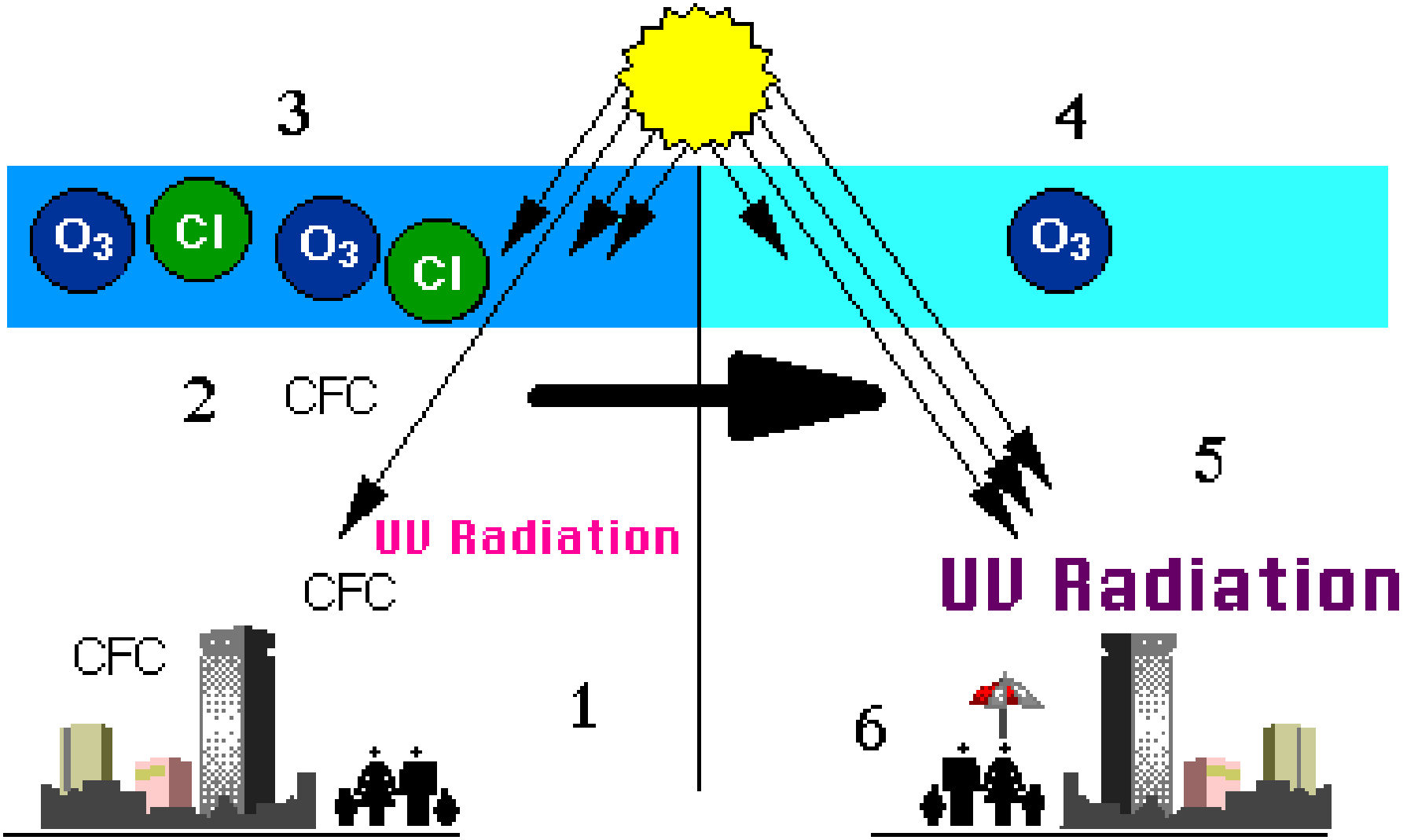
Ozone layer depletion



Ozone in Earth's Atmosphere


Mesosphere (50 - 85 km)
Stratosphere and natural protective ozone layer (17 - 50 km)
Troposphere and tropospheric ozone (0 - 9/17 km)
5
10
15
20
Altitude (km)
Altitude of most clouds

Ozone Depletion Process



1 - CFCs released
2 - CFCs rise into ozone layer
3 - UV releases Cl from CFCs
4 - Cl destroys ozone
5 - Depleted ozone -> more UV
6 - More UV -> more skin cancer

The Nobel Prize in Chemistry 1995

Paul J. Crutzen

Prize share: 1/3

Mario J. Molina

Prize share: 1/3

F. Sherwood Rowland

Prize share: 1/3

U V Radiations

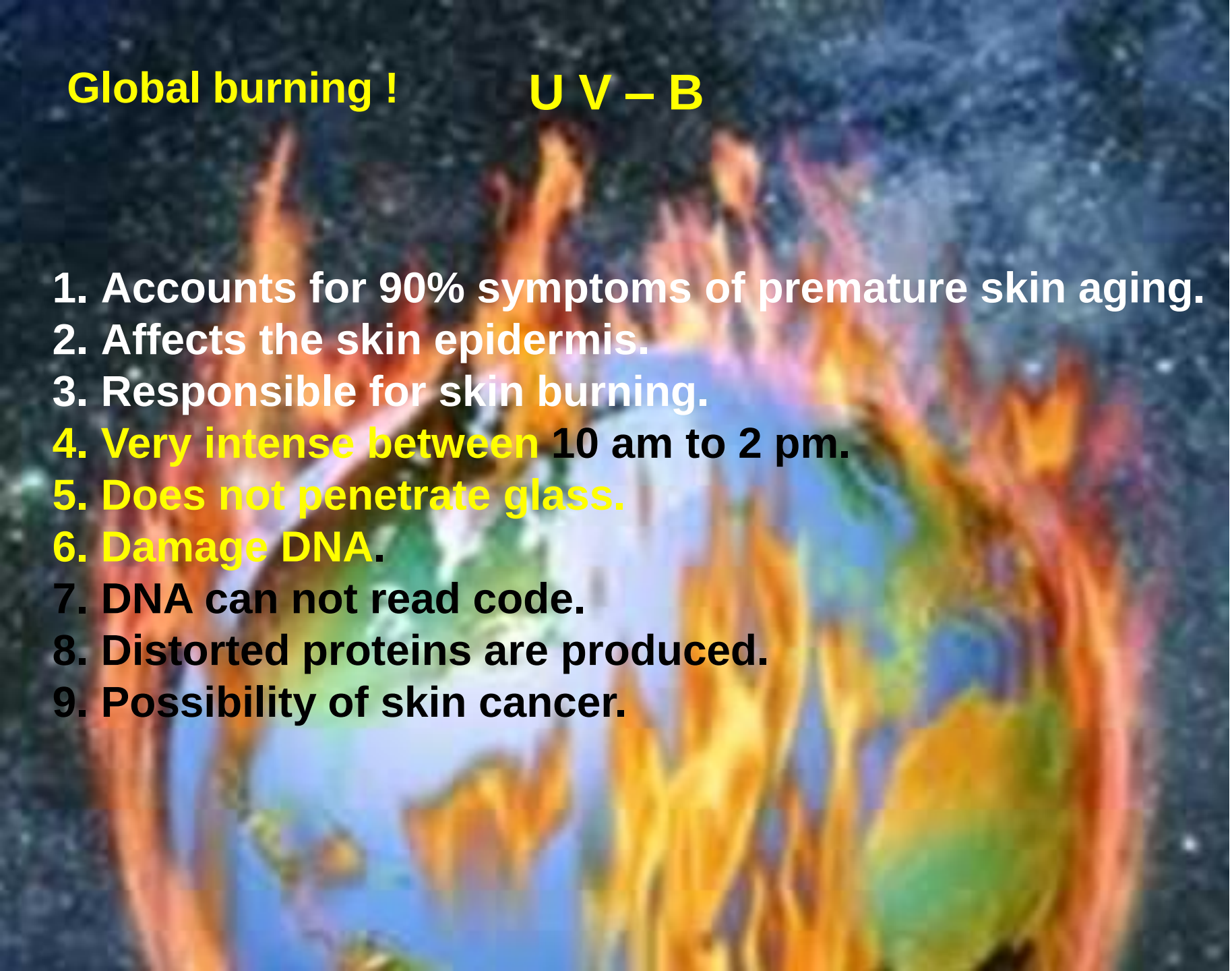
U V –A : 320 to 400 nm

U V –B : 290 to 320 nm

U V – C: 100 to 290 nm

X-rays---100----290----320----400--------700---IR

UV-C UV-B UV-A Visible


Global burning !
U V – B
1. Accounts for 90% symptoms of premature skin aging.
2. Affects the skin epidermis.
3. Responsible for skin burning.
4. Very intense between 10 am to 2 pm.
5. Does not penetrate glass.
6. Damage DNA.
7. DNA can not read code.
8. Distorted proteins are produced.
9. Possibility of skin cancer.

Red signal !

Depletion of protective layer of Ozone was brought to our notice

by Russians in 1967 ,

by British in 1970,

by Nimbus-7 American Satellite in 1985.

Toronto

International Conference on the changing atmosphere

1. Reducing the use of fossil fuel by 5% , thereby reducing the Carbon dioxide emission by 20% , by 2005.

2. Financially promoting the technology for Solar , Wind , Geothermal and Nuclear energy generation.

3. Promoting the Biogas in place of fossil fuel.

Toronto

4. Stop deforestation , and taking a forestation programmes on large scale.

5. Every domestic commodity should be non polluting and ecofriendly.

6. By 2000 complete ban on CFC.

Montreal protocol

International agreement designed to protect Stratospheric Ozone layer.

Treaty was signed on 16th Sept.1987 and then amended in 1990 and 1992.

Production and consumption of compounds that deplete Ozone in stratosphere like CFCs , Halons , CTC are to be phased out by 2000. Methyl chloroform by 2005.

Facts !

1. Ozone layer would reduce by 3% over the next 50 years.
2. If emission doubles , 12% ozone layer could disappear.
3. Ozone monitoring station in Antarctica have already detected average loss of 30-40% of ozone level over the region during spring. At the same altitude the loss may be as high as 95%.
4. Each 1% reduction in ozone is likely to cause an increase of about 2% of UV-B

CFCs

Sr.No.	Nomenclature	Ozone Depletion %	Application
1.	CFC-11	1.0	Propellant Refrigerant Cleaning Blowing
2.	CFC-12	0.9	P,R,B
3.	CFC-113	0.8	R,C,B
4.	CFC-114	0.6	P,R,B
5.	CFC-115	0.3	R,B

Hydro Chlorofluorocarbons

[Alternative to Chlorofluorocarbons]

Sr.No	Nomenclature	Ozone Depletion %	Application
1.	**CFC-142-B**	**>5**	**R,B.**
[Replacement for CFC-11 and CFC-12]			
2.	**CFC-125**	**0**	**R**
[Blend of CFC-22 and CFC-152 , for car air conditioner]			

Reasons !

1. Nitrogen compounds in chemical fertilizers are indiscriminately used.
2. CFC in cooling system.
3. Aerosols : Deodorants , Perfumes.
4. Exhaust of supersonic Aero planes.
5. Use of Carbon Tetra Chloride

CTC using industries.

A :Textile , Offset and Film Industry :

Textile industry : Fabric stain remover
Wool scouring.

Yarn spinning Mills: Rubber cot cleaning.

Offset printing : Film cleaning.

Film distributors : Film cleaning.

CTC using industries.

B : Iron and Steel :

*Engineering and	: Film cleaning ,
*Electroplating	Precision cleaning
	Stainless steel forging
*Foundries	: Investment casting,
	Millipore test.
*Refrigeration and	: Circuitry cleaning.
Air conditioning.	
*Ship Yard	: Machine maintenance.
Steel plants	: Motor cleaning
	Vessel cleaning

CTC using industries.

C : Miscellaneous industry :

*Fire extinguisher	: Extinguisher agents.
*Jeweler	: Investment casting.
	Diamond cleaning.
*Manufacturing	: Contact cleaning.
Service	Motor cleaning.
	Machine cleaning.

CTC using industries.

*Oil refineries : Analysis of refined oil.

*Oxygen manufacturing : Pipe line , valve and nozzle cleaning.

*Power plants : Generator cleaning

Effects of Ozone depletion

Increased **UV-B** reduces the effectiveness of body immunity , produces eye cataract , skin cancer , Affect aquatic plants , organisms , fish stock and food production.

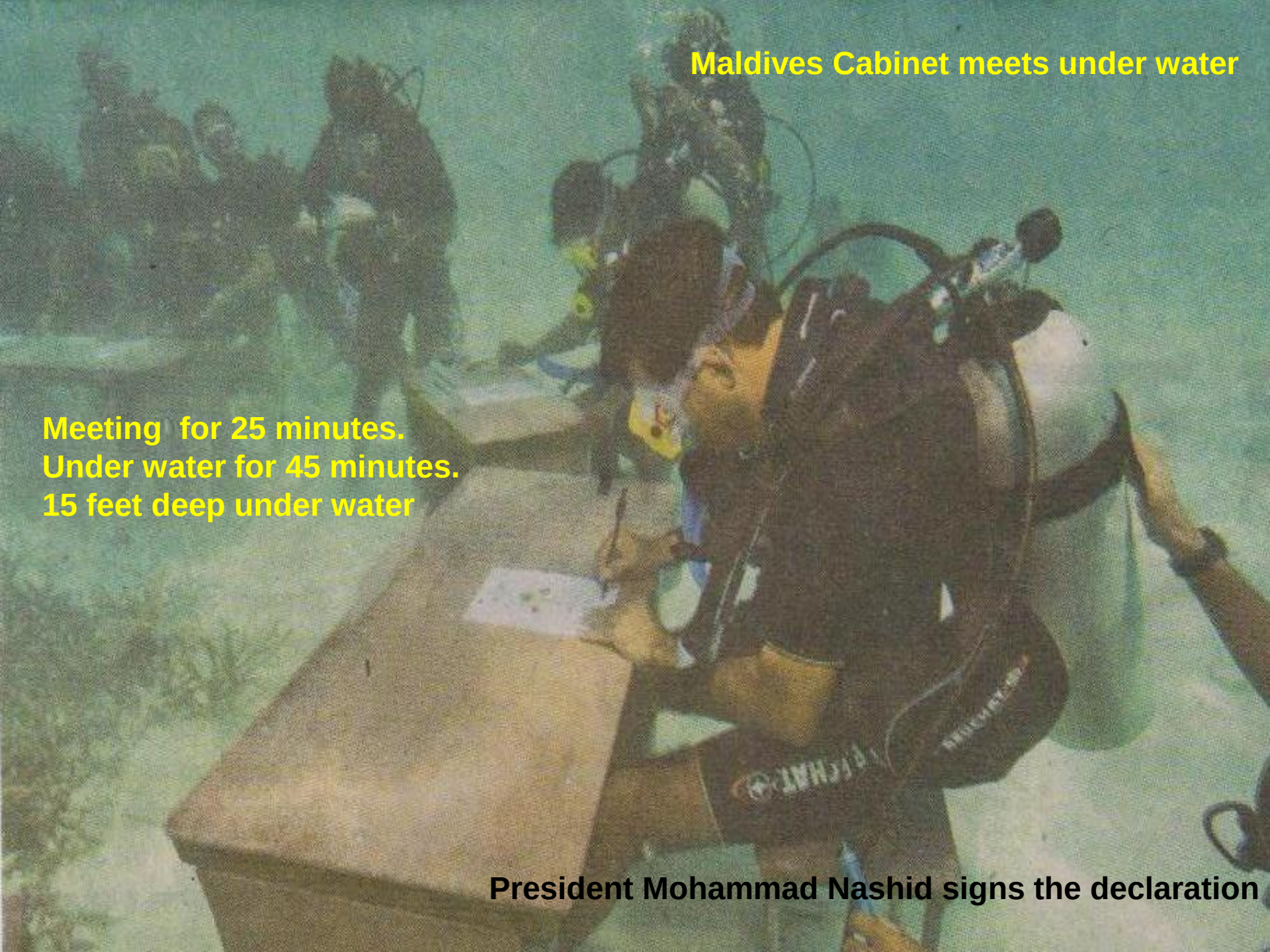
Sea Level Rise

Mountain glacier melting

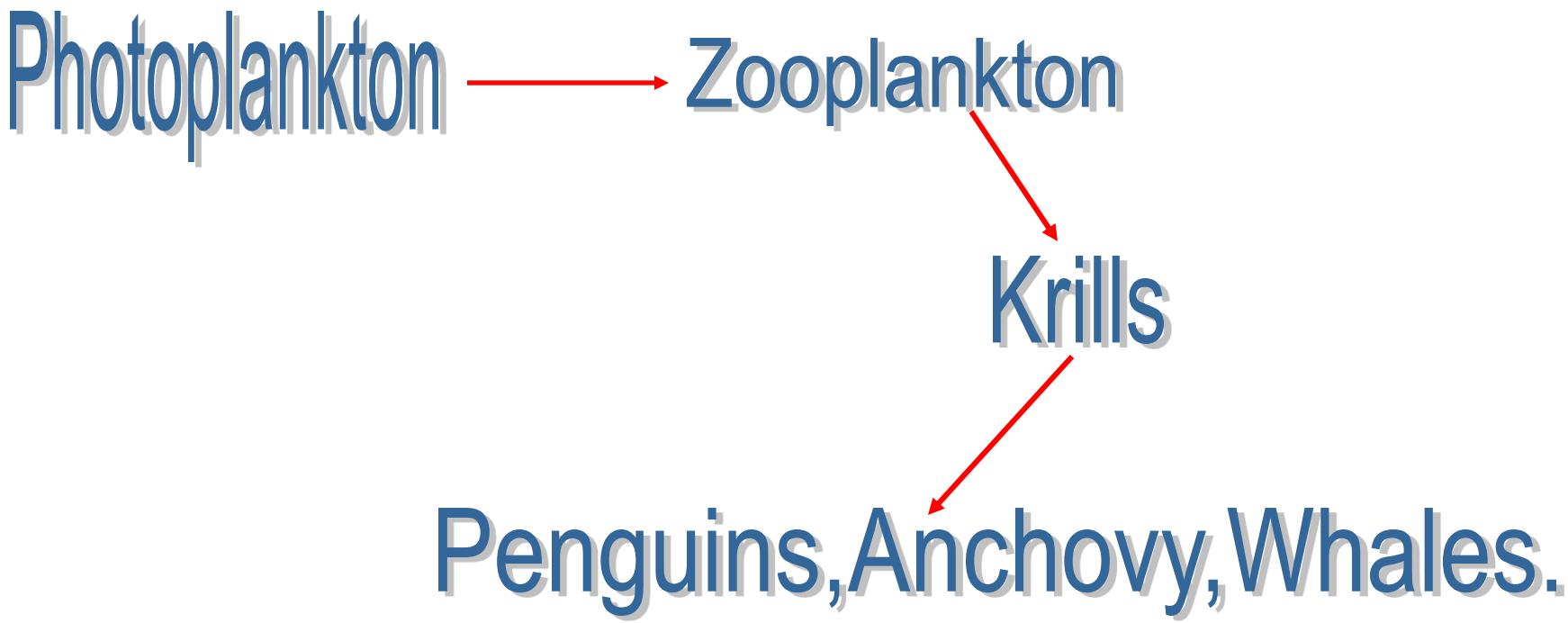
Greenland Ice sheet melting

Antarctic Ice sheet melting

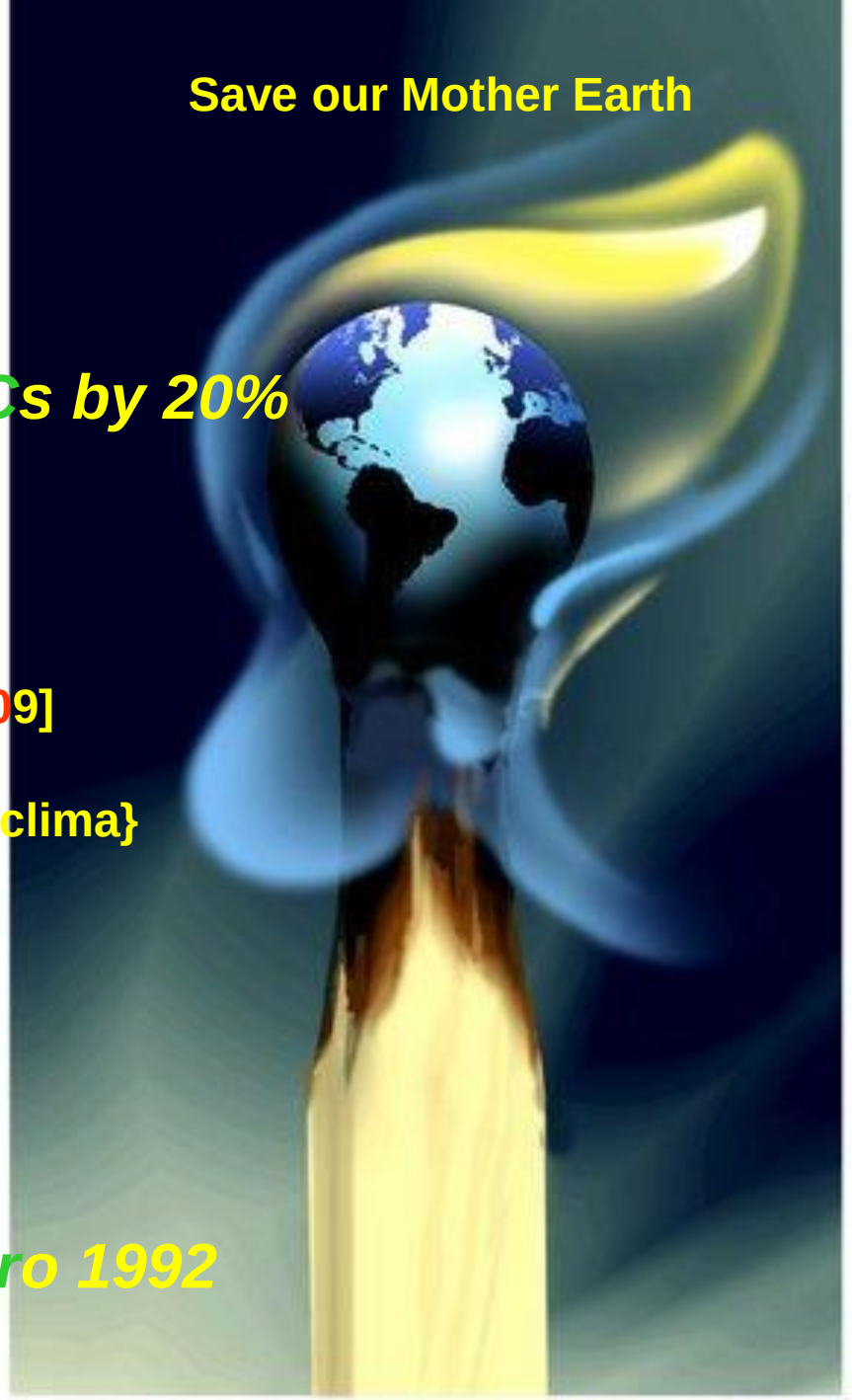
Threat to Mangroove swamp


Maldives Cabinet meets under water
Meeting for 25 minutes.
Under water for 45 minutes.
15 feet deep under water
President Mohammad Nashid signs the declaration

Aquatic Ecosystem



Remedies



*Green fridge by Green Peace

*Reduce the production of CFCs by 20%

*Reuse of CFC

*Phase-out programme

[Complete phase – out of CTC in Dec 2009]

by

{German Technical Corporation GTZ Proclima}

*Montreal protocol 1987

[Canada]

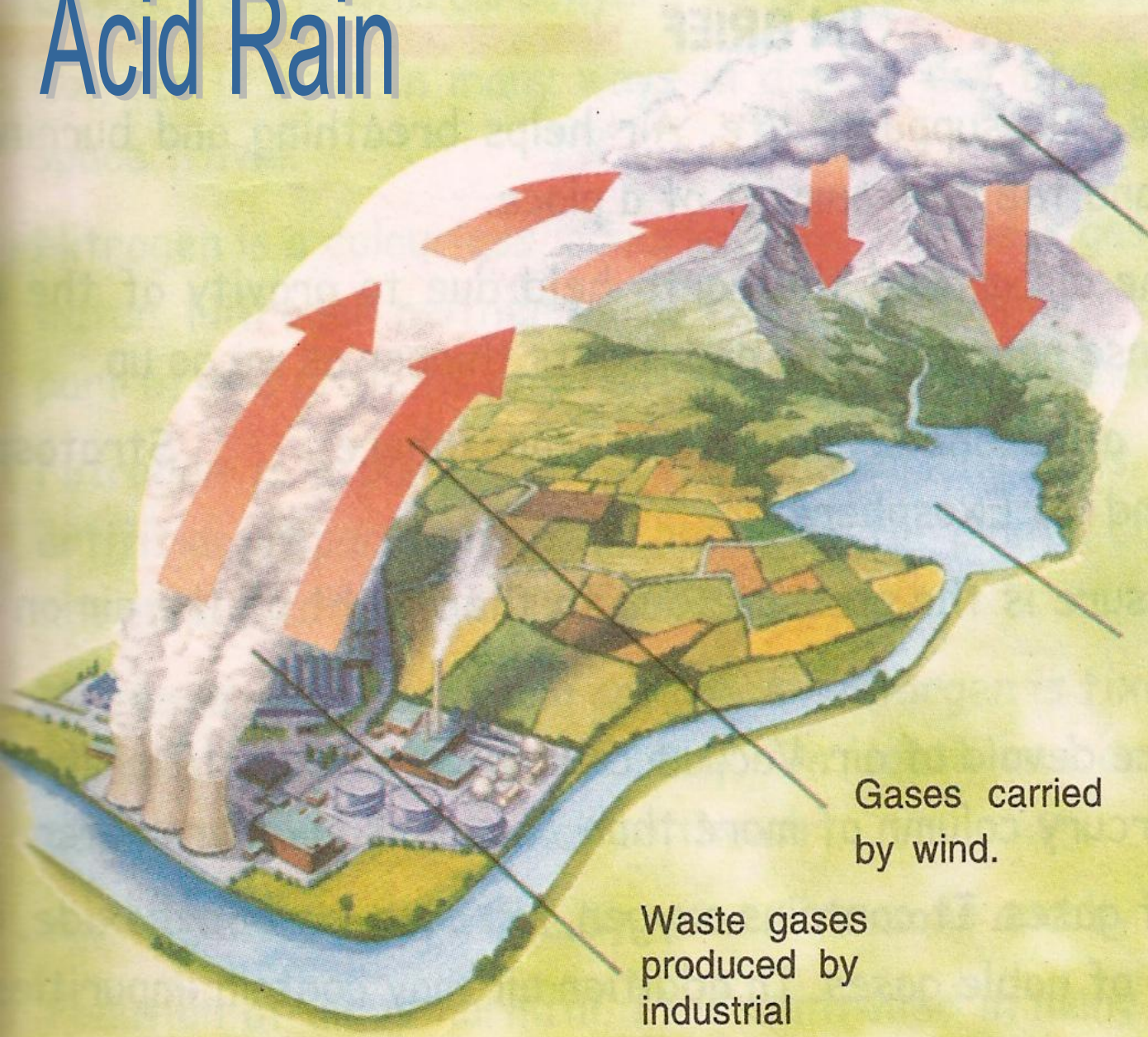
*Kyoto protocol 1997

[Japan]

*Earth summit at Rio de Janeiro 1992

[Brazil]

Acid Rain


Gases react with water droplets in clouds and fall as acid rain
Forests and lakes are damaged by acid rain
Gases carried by wind.
Waste gases produced by industrial processes

Acid Rains

Atmospheric Sulfur , Nitrogen and Carbon compounds react with Vapor and Oxygen resulting in to Acids. pH 2.4.

$2SO_2 + O_2 \text{---} 2SO_3$

$SO_3 + H_2O \text{ -- } H_2SO_4$ **Sulfuric Acid**

$2NO_2 + O_2 \text{---} 2NO_3$

$2NO_3 + H_2O \text{ --- } 2HNO_3$ **Nitric Acid**

$CO_2 + H_2O \text{ ---- } H_2CO_3$ **Carbonic Acid**

Facts

*Acid Rains were observed in Scotland in 1974 for the first time.

*200 lakes in New York city are dead.

*Trout fish species are extinct from 400 lakes in Canada.

*Railway tracks in Poland are rusted hence railway can not run with more than 40 KPH.

*Earthworms can not survive under soil.

*Clothing , Furniture , Paintings ,leather articles are spoiled.

*Because of refinery in Mathura Tajmahal is in danger.

Remedies

1. Maintain the pH of Water bodies by using Calcium carbonate.

2. Minimize the use of fossil fuel.

3. Put Catalytic converters on Automobile exhaust pipes.

4. Minimize the industrial exhaust of Sulfuric , Nitric and Carbonic acids by innovations in technology.

Smoking Gun proof !

Home on fire !

Why is it burning ?

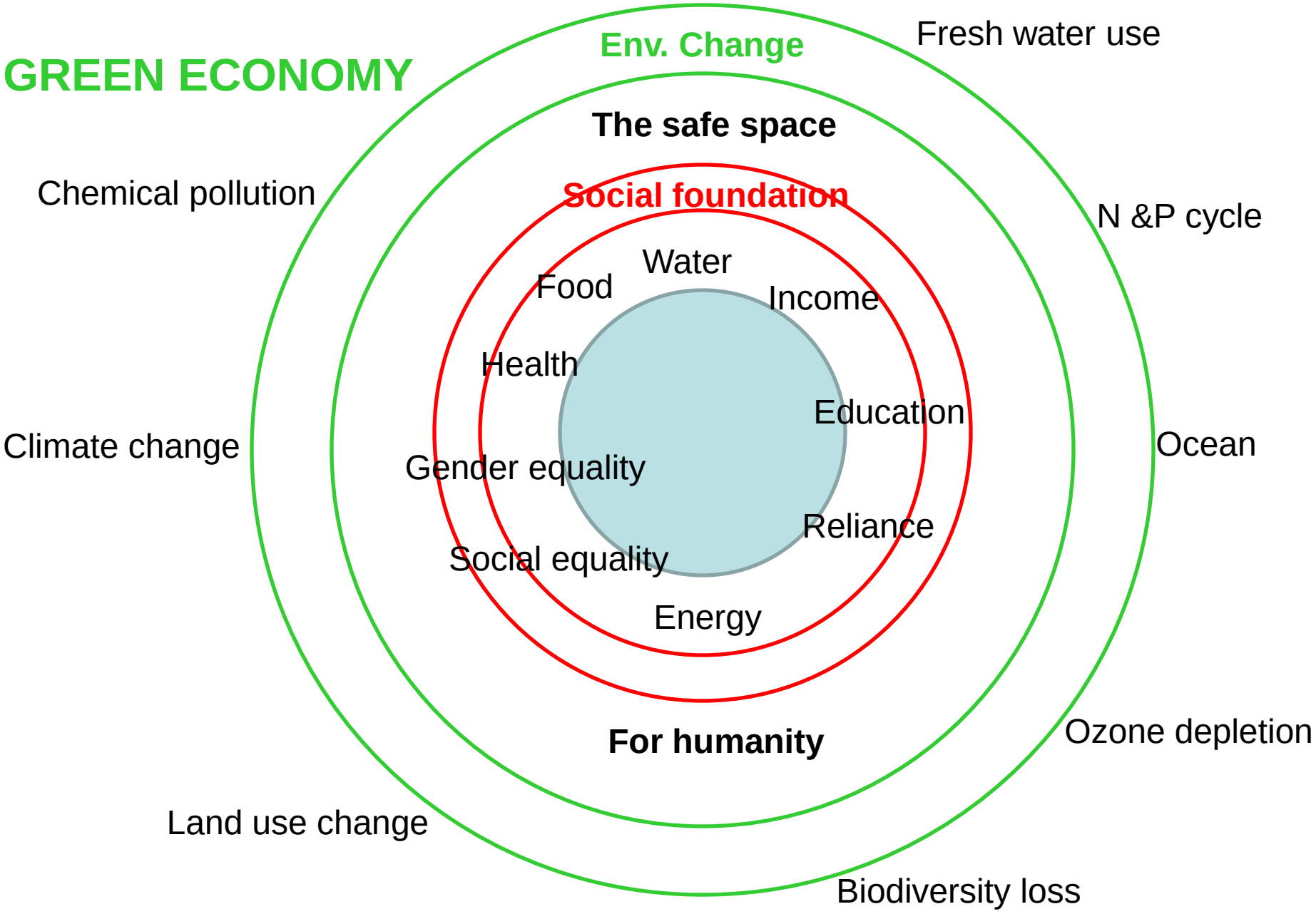
Who is responsible ?

I am not responsible ?

The one who is responsible, should put off the fire !

It is high time now ! Stop quarreling on old political issues , Developing and Developed countries must come together soon and fight for the issue like Climate change only. What is our future ? Climate change is at our doorstep. I am afraid !

Pittsburgh, USA , Sept.2009
G-20 Conference
Yugaratna Shriwastava
[13 yr girl , India.]


GREEN ECONOMY
Env. Change
Fresh water use
The safe space
Chemical pollution
Social foundation
N &P cycle
Water
Food
Income
Health
Education
Climate change
Ocean
Gender equality
Reliance
Social equality
Energy
For humanity
Ozone depletion
Land use change
Biodiversity loss

What Can you contribute ?

1. Use of CFC free refrigerator.

2. Do not use Deodorants and Perfume spray.

3. Minimize your Air travel.

4. Auto exhaust must remain under threshold limits.

5. Do not use CTC in Industrial activity.

6. Do not cover multistoried buildings with Glass.

7. Stop using Air conditioning systems in public and private places.

8. Go for alternative to Fossil fuel as a energy source.


Please care for my existence !
THANK YOU
Forum is open for discussion