



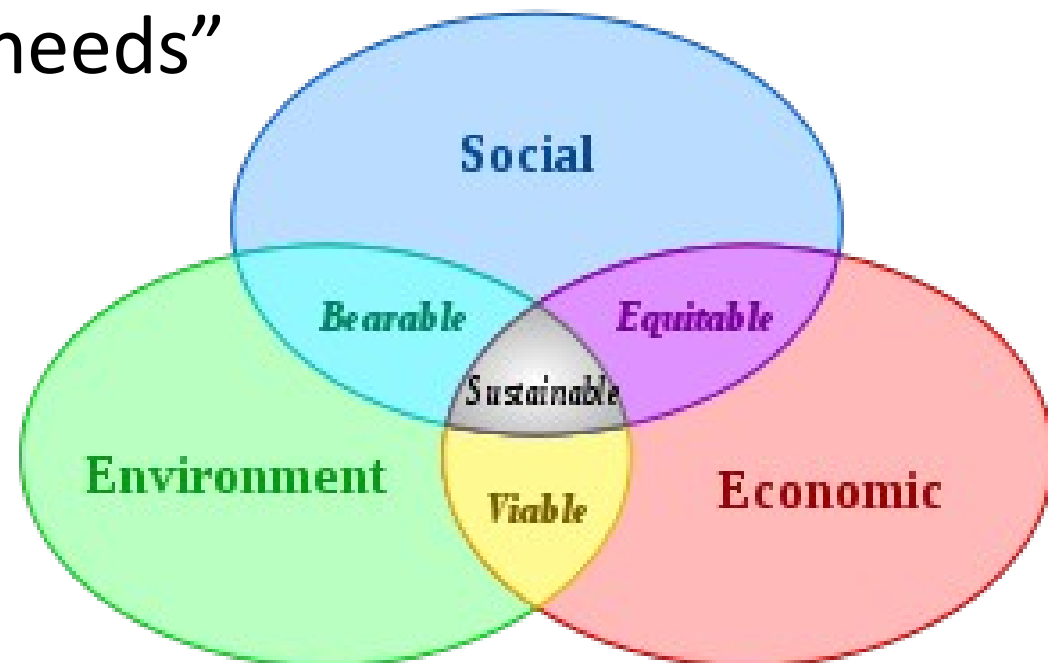
Social Issues and Environment

Introduction

- We live in a Natural as well as social world
- Development cannot be of only the rich nor it means only high living standards.
- Also not just ECONOMIC development
- It has to be a holistic approach.
- Social aspects, development and environment have a strong relation.

From Unsustainable to Sustainable

- G.H Bruntland, Director of World Health Organisation : “Meeting the needs of present without compromising the ability of future generations to meet their own needs”



Current status

- Earth Summit in Rio de Janeiro in 1992 (UN Conference on Environment and Development - UNCED)
- Agenda- 21 proposed
- Everyone talks and walks sustainability
- Many programmes have been initiated.

Key aspects of Sustainable development

- **Inter- generational equity**
 - ❖ Stop overuse
 - ❖ Reduce Impacts
 - ❖ Maintain ecological balance
 - ❖ Hand over a safe, healthy and resourceful environment to our future generations
- **Intra-generational equity**
 - ❖ Minimize gap between and within nations
 - ❖ Support economic growth of poorer countries
 - ❖ Provide technological help

Measures for Sustainable development

- Using appropriate technology: concept of “Design with nature”
- 3-R approach: Minimization of resource use, use again and process to get new product from same material.
- Promoting environmental awareness and education
- Carrying capacity: Supporting and Assimilative

Indian Scenario

- Tremendous Population
- Tremendous natural diversity
- Hence makes planning sustainably all the more important but complex.
- National Council of Environmental Planning and Coordination set up in 1972.
- Ministry of Environment and Forests set up in 1985.

Social Issues

- Urban problems related to ENERGY
- WATER CONSERVATION
- Resettlement and Rehabilitation issues
- Environmental ethics
- Climate Change
- Global Warming
- Acid Rain and Ozone layer Depletion
- Nuclear Accidents and Holocaust
- Wasteland Reclamation
- Consumerism and waste products

1. Urban problems related to energy

- Cities are the main centers of Economic growth, trade, education, employment
- Now 50% population lives in Urban areas
- Urban sprawl
- Difficult to accommodate
- Uncontrollable and unplanned growth
- Densely populated, consume more resources, **NEED MORE ENERGY**

Energy demanding activities

- Residential and Commercial lighting
- Private and Public transport
- Modern life style: electronic gadgets
- Industries
- Waste disposal
- Prevention and Control of pollution

Effects

- Unequal distribution of energy
- Power cuts and load – shedding
- Demand energy from other states
- Overall society suffers
- Economic development hampered.



Water Conservation

- Water is a vital resource.
- Majority of water resources are polluted heavily
- Its amount is limited for use
- So conservation is Extremely important
- **Water conservation** refers to reducing the usage of water and recycling of waste water for different purposes such as cleaning, manufacturing, and agricultural irrigation.

Actions...

- Some researchers have suggested that water conservation efforts should be primarily directed at farmers, in light of the fact that crop irrigation accounts for 70% of the world's fresh water use.
- Drip irrigation instead of sprinkle irrigation.
- Common strategies include: public outreach campaigns, tiered water rates (charging progressively higher prices as water use increases), or restrictions on outdoor water use such as lawn watering and car washing.
- 100's of ways to conserve water



Water your yard and outdoor plants early or late in the day to reduce evaporation.

Use a shut-off nozzle on your hose.



Use plants that require less water.



Mulch around plants to hold water in the soil.

Get an Energy Star labeled washing machine.



Wash only full loads.

Use a low flow showerhead.



Take shorter showers — five minutes or less is best.

Turn off the water while soaping hands and brushing teeth.



Turn off sink faucet while scrubbing dishes and pots.



Install new toilets that use less than 1.6 gallons per flush.

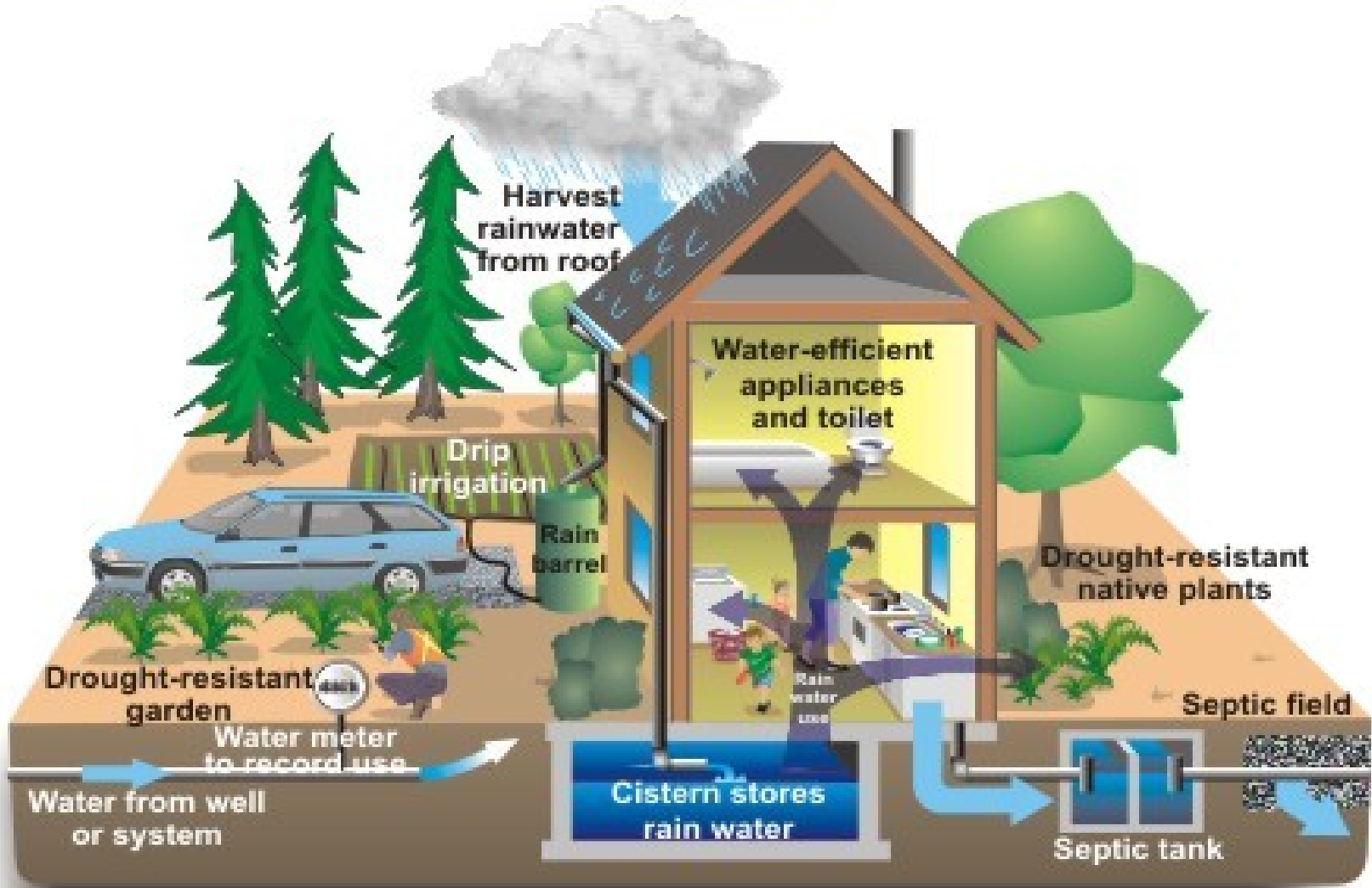


Put faucet aerators on sink faucets.

Use a broom, not a hose, to clean driveways and walkways.



The new way—
conservation



Rain Water Harvesting



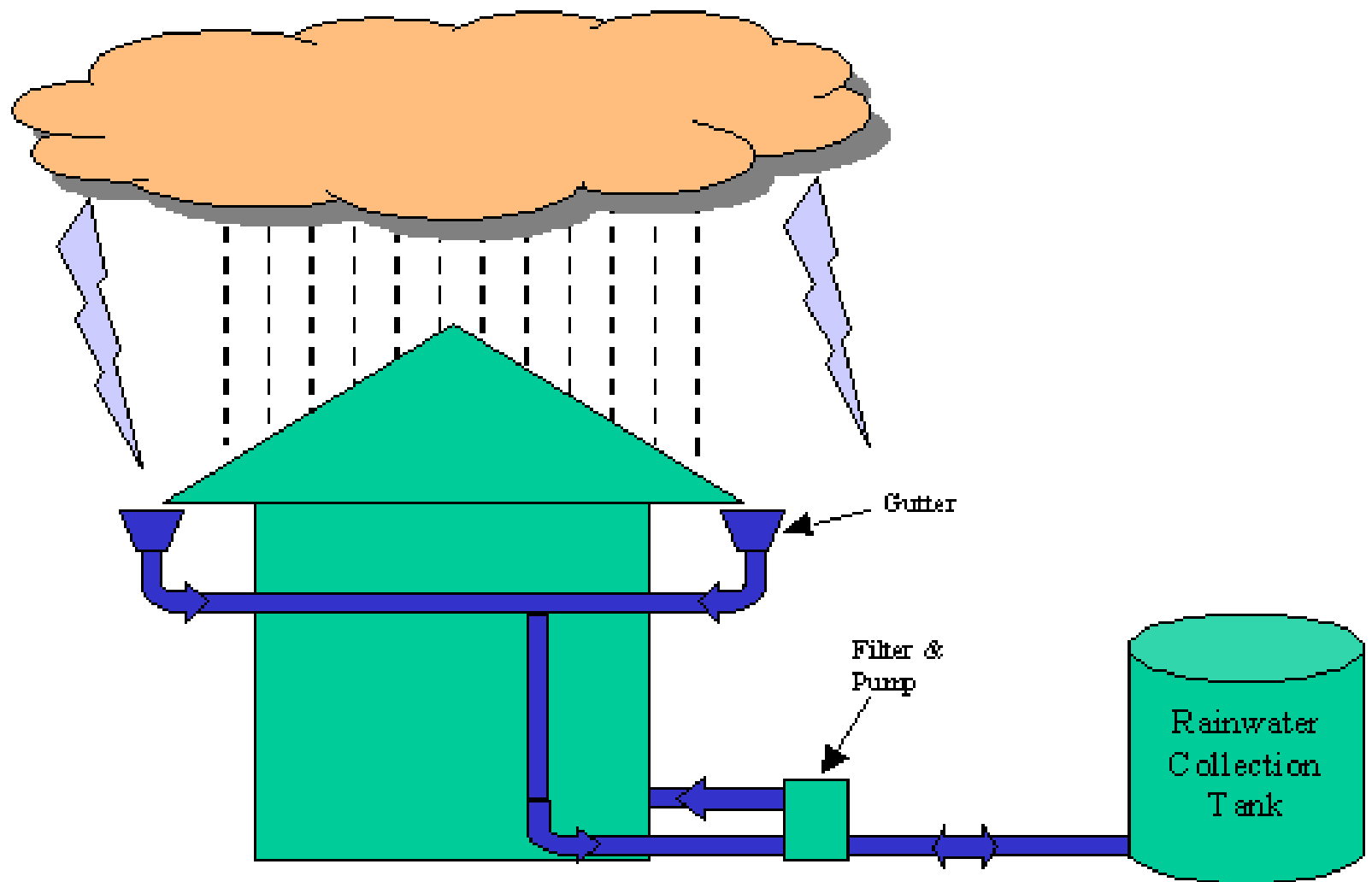
Introduction

- In urban areas, the construction of houses, footpaths and roads has left little exposed earth for water to soak in.
- In parts of the rural areas of India, floodwater quickly flows to the rivers, which then dry up soon after the rains stop. If this water can be held back, it can seep into the ground and recharge the groundwater supply.
- This has become a very popular method of conserving water especially in the urban areas.
- Rainwater harvesting essentially means collecting rainwater on the roofs of building and storing it underground for later use. Not only does this recharging arrest groundwater depletion, it also raises the declining water table and can help augment water supply.

Status

- Town planners and civic authority in many cities in India are making rainwater harvesting compulsory in all new structures.
- No water or sewage connection would be given if a new building did not have provisions for rainwater harvesting
- A number of government buildings have been asked to go in for water harvesting in Delhi and other cities of India.

Process



Rainwater Collection Overview

Case study

- The area surrounding the River Ruparel in Rajasthan, is an example of proper water conservation. The site does not receive even half the rainfall received by Cherrapunji, but proper management and conservation have meant that more water is available than in Cherrapunji.
- The water level in the river began declining due to extensive deforestation and agricultural activities along the banks and, by the 1980s, a drought-like situation began to spread.
- Under the guidance of some NGOs (non-government organizations), the women living in the area were encouraged to take the initiative in building johads (round ponds) and dams to hold back rainwater.

- Gradually, water began coming back as proper methods of conserving and harvesting rainwater were followed.
- The revival of the river has transformed the ecology of the place and the lives of the people living along its banks. Their relationship with their natural environment has been strengthened.



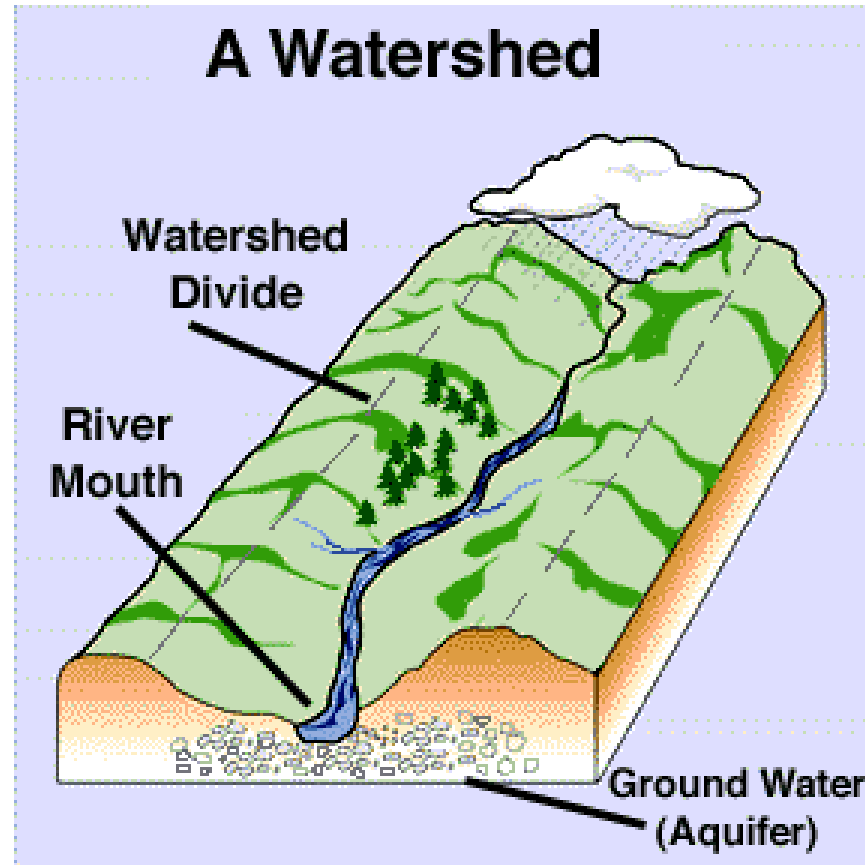
Water Harvesting: A Great Success At Kalakhoont, (Jhabua, MP), 2001

- For the first time in India drought proofing, rather than drought management, was the focus of the state Governments (Madhya Pradesh & Gujarat).
- For two years these state governments took up water conservation activities in the hope that monsoon this year would not be wasted even if it rained below the normal level.
- Kalakhoont village of Jhabua district in Madhya Pradesh (MP) spin out of the poverty cycle with the beginning of rainy season this year. Four days of the rain filled up to the brim the long- forgotten tank. Now almost the entire village is enriched by water overflowing from the tank.

Way to Success

- Crippled by two consecutive droughts, when an NGO, Action for Social Advancement (ASA), offered to renovate the tank, it was hard for the residents to decide to contribute 25 percent of the tank's renovation cost of Rs. 3 lakh.
- Three meters of silt, which had eroded from the surrounding hills, was removed from the tank. This was used as manure in farmlands and the tank was soon renovated. The decision paid rich dividends and to changed the lives of the villagers forever.
- According to Nana Basna, President of the Lift-irrigation Society formed to regulate water use in the village “there is enough water for the next three years”. The stored water is enough to irrigate more than 61 hectares (ha) of land. The recharged wells will be an additional source. Now water is overflowing from the dam and residents are planning to revive a defunct lift irrigation point as a result of which three villages will be irrigated.

WATER SHED MANAGEMENT



Concept of Watershed

- Watershed is a geo hydrological unit or piece of land that drain at a common point.
- A watershed is defined as any spatial area from which rain or irrigation water is collected and drained through a common point.
- The watershed and drainage basin are synonymous term indicating an area surrounded by a ridge line that is drained through a single outlet.

- A watershed is simply the land that water flows across or through on its way to a common stream, river, or lake.
- A watershed can be very large (e.g. draining thousands of square miles to a major river or lake or the ocean), or very small, such as a 20-acre watershed that drains to a pond.



Objectives of watershed management

1. To control damaging runoff and degradation and thereby conservation of soil and water.
2. To manage and utilize the runoff water for useful purpose.
3. To protect, conserve and improve the land of watershed for more efficient and sustained production.
4. To protect and enhance the water resource originating in the watershed.
5. To check soil erosion and to reduce the effect of sediment yield on the watershed.
6. To rehabilitate the deteriorating lands.
7. To moderate the floods peaks at down stream areas.
8. To increase infiltration of rainwater.
9. To improve and increase the production of timbers, fodder and wild life resource.
10. To enhance the ground water recharge, wherever applicable.

Watershed management practices

- Watershed management involves many techniques
- The techniques can be summarized as : Grassland development, Gully Plugs, Tree plantation and contour trenching on hill tops and slopes, Contour bunding, Water conservation structures, Lift irrigation schemes, Land leveling etc.
- Public participation and awareness

INTEGRATED WATERSHED DEVELOPMENT PROJECT

- The Integrated Watershed Development Project (Hills-II) started in April 1999.
- It has a budget of US\$24.4 million and is being run by experts from different line departments.
- It is World Bank-funded and operated in Haryana, Jammu and Kashmir, Punjab, Himachal Pradesh and Uttaranchal.
- One of its working areas lies in northeast Haryana in the most degraded watersheds of the Siwalik hills and their adjoining piedmont plains. The project area has been identified as one of India's eight most degraded rainfed agro-ecosystems.

The Sukhomajri - Water Shed Management Project : A Success Story of Participatory Approach

- Sukhomajri, a small hamlet of about one hundred families with average land holding of 0.57 ha, is located in the foothills of Shivaliks in Panchkula district of Haryana.
- It is at a distance of about thirty kilometers by road to the north-east of Chandigarh.
- Central Soil & Water Conservation Research and Training Institute, Chandigarh.

- Until 1975, Sukhomajra had no source of regular irrigation. The entire agricultural land (52 hectares) was under rain-fed single cropping.
- Small land holdings (less than one hectare per family) coupled with frequent crop failures due to erratic distribution of rainfall, made agriculture least dependable as a means of adequate livelihood.
- Consequently, the people of Sukhomajri were forced to keep a large number of sheep, goats and cows to eke out a living.
- But, once the domestic animals, especially the goats and cows, were allowed to graze freely in the nearby hills, followed by indiscriminate felling of trees for fuel and other domestic consumption, **the hill slopes, once covered with lush green vegetation, soon became bare and not even a blade of grass was to be seen.**

- In the year 1975, the continuing problem of silting of the prestigious man-made Sukhna Lake in Chandigarh drew the attention of the Central Soil and Water Conservation Research and Training Center, Chandigarh.
- A reconnaissance survey conducted by the Centre under the leadership of Shri P.R. Mishra, the then Officer-in-Charge, revealed that the major source of sediment was about twenty-six per cent of the catchment area located in the close proximity of Sukhomajri and a few nearby villages.
- Sedimentation was caused by the erosion of the bare hill slopes caused by over-grazing particularly by goats whose rearing had been the traditional occupation of the Gujjars inhabiting the village.

- To address the problem the Research Center applied soil conservation techniques developed by comprising of mechanical and vegetative measures.
- This reduced the runoff sediment from the highly eroded Shivaliks at a spectacular rate from eighty tonnes to less than one tonne per hectare, within a short span of a decade.
- The vegetative measures consisted of planting of tree species like khair (*Acacia catechu*) and shisham (*Dalbergia sissoo*), in pits and bhabbar grass (*Eulaliopsis binata*) at mounds of trenches, and also *Agave americana* and *Ipomea cornea*, in critical areas to protect the soil against erosion.
- However, all these measures for containing the sediment in situ did not succeed in the absence of the willing cooperation from the people of Sukhomajri, who depended for their sustenance on the resources available in the catchment area.

- Hence, to promote agriculture and water availability in the area earthen dams were constructed. This resulted in rain water harvesting & storage which could be used by the villages for agriculture through out the year.
- Villagers agreed to protect the hilly watersheds from grazing and illicit cutting of vegetation and in turn, were allowed to cut grass to stall feed their cattle and collect dry and dead wood or pruned branches for their domestic fuel consumption.
- As a result, the forest areas which had a desolate look in the beginning of the project were covered with grass and trees within a period of 10 to 15 years. Grass production increased more than double in the same period (from 3.82 t/ha to 7.72 t/ha).

- At Sukhomajri, four earthen dams have been built between 1976 and 1985. These serve three main purposes;
- to check instantly the gully formation in agricultural fields and, thereby, effectively prevent silting through the erosion of soil;
- to store surplus rainwater from the catchment area to be used later for irrigation after the withdrawal of monsoon and
- rehabilitation of the catchment.

LESSONS FROM SUKHOMAJRI

- Peoples' participation must be ensured right from the beginning.
- The needs and the problems of the people must be identified at the outset.
- Unless a project is aimed at meeting their needs, solving their problems and mitigating their hardship, it may not succeed.
- Watershed Management Projects should have short gestation period. The benefits should be available in shortest possible period.
- Constitution of a village society (HRMS) must be a pre-requisite before taking up such projects.
- The emphasis should be on sustainability and equity, i.e., all the common property resources must be available to all sections of the society.

Resettlement and Rehabilitation



Intro

- Development projects essential
- To have development natural resources are utilized.
- Most affected are locals or native people
- Poorest of poor and underprivileged people
- Various types of project lead to displacement of locals

Displacement due to dams

- Need space for such huge project.
- Locals, tribals and natives are affected.
- Families have to leave the ancestral place and need to settle elsewhere.
- Hirakund dam: 20000 people in 250 villages
- Bhakra Nangal : not even half of displaced resettled.
- Sardar Sarovar: 41,000 families will get displaced due to reservoir.
- Tehri dam: 10000 people of Tehri town

- A review by the World Bank posits that an average of 13,000 people are displaced by each new large dam constructed currently (Cernea 1996b).
- By this estimate, Indians displaced by the country's 3000+ large dams would number over 39 million.

Displacement due to mining

- Several thousand hectares of land are covered in Mining operations
- Mining accidents also cause displacement.
- Jharia Coal Mines, Jharkhand: 0.3 million people asked to leave the place
- Reason: Underground fires
- No alternative provided yet.
- Cost of R& R: 18000 crores

Displacement due to creation of Protected area

- Displacement also takes place where protected areas are established as compensatory measures for the forest lands and natural habitats that are lost.
- A welcome step for natural resource conservation
- But tribals lose the right to their natural homes
- Entry is prohibited in core areas.
- Valmiki Tiger reserve: 142 villages in Bihar of Tharu Community
- Wayanad Wildlife Sanctuary: 53,472 tribal families in Kerala.

Rehabilitation- issues and policies

- Right to housing a basic human right
- Government acquires land for various reasons
- Already poor tribals most affected.
- Loss of land, food, home, jobs, property assets, social isolation
- Cash compensation not enough, Tribals are unaware so might be a case of cheating.
- Communal settlement does not happen.

Policy

- Department of Land Resources, Ministry of Rural Development has formulated a National Policy on Resettlement and Rehabilitation for Project Affected Families, 2003 with the objectives to:
- Minimize displacement and to identify non-displacing or least-displacing alternatives;
- Plan the resettlement and rehabilitation of Project Affected Families, (PAFs) including special needs of tribals and vulnerable sections;
- Provide better standard of living to PAFs; and
- Facilitate harmonious relationship between the Requiring Body and PAFs through mutual cooperation.
- National Policy on Rehabilitation and Resettlement 2007

Cases

- Sardar Sarovar Project
- Pong Dam

Resettlement and Rehabilitation of the Urban Poor: the Mumbai Urban Transport Project

- Mumbai, the capital of Maharashtra and the commercial capital of India, has a population of 12 million people.
- The suburban rail system is the lifeline of the city and it is estimated that 7.4 million passenger trips are made daily at an average distance of 25 kms. per trip.
- Over 88% of all commuters in the city travel by suburban trains or buses. About 4500 passengers travel in a 9-car rake during peak hours as against a rated carrying capacity of just 1700.

- There are three suburban rail lines in Mumbai: Central, Western and Harbour that link the central business districts of Bombay Island with the so-called 'suburban' areas in the North of the city.
- The Central line from CST to Thane has about 8,000 families living alongside the track; the Western line from Churchgate to Dahisar has about 3000 slum families and the Harbour line from CST to Mankhurd around 13,000.
- These families have been living along the tracks for more than two decades. In some cases, their huts are hardly a metre away from the tracks and the passing trains.

- Many new lines are to be laid and slum dwellers along the railway tracks to be resettled.
- About 15000 families living along the tracks will have to be resettled
- This case study looks at the resettlement and rehabilitation (R&R) of more than 10,000 families along the railway tracks.
- According to the recommendations of the Task force, which were accepted by the GOM, each project affected family was to get a 225 sq. ft. tenement free of cost or, where shifting had to be done urgently, transit accommodation of 120 sq. ft. with basic amenities.

- The safety zones (30 feet on either side of the tracks) of the 3 rail corridors in Mumbai have been cleared of all slums. More than 10000 families have been resettled, about 40% in permanent and the rest in transit accommodation, without the use of any municipal or police force.
- Secure tenure and basic amenities of water, sanitation and electricity are assured.
- As a consequence, more trains are running on the same tracks and at greater speeds. Traveling time has been reduced and the rail system's performance improved.
- All of this was done in just over a year by June 2001.

Climate change

- Climate is average weather of an area
- Control temperature, evaporation rate, seasons, moisture content.
- Conditions if prevail for 30 years...its said to be the climate of an area
- Currently Climate is Changing



GLOBAL WARMING



- Overall increase in temperature few degrees.
- It happens when greenhouse gases (carbon dioxide, water vapor, nitrous oxide, and methane) trap heat and light from the sun in the earth's atmosphere, which increases the temperature.
- This hurts many people, animals, and plants.
- Many cannot take the change, so they die.

Facts

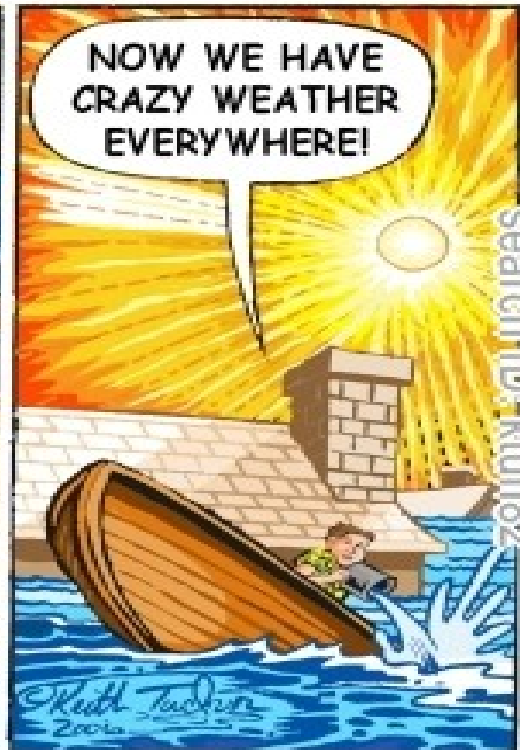
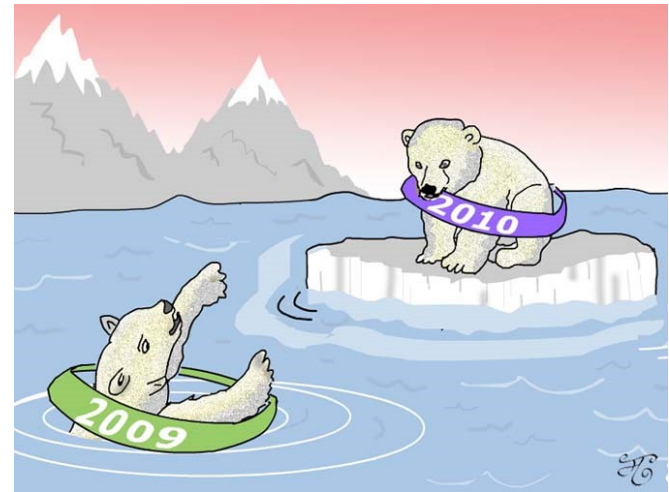
- Unsustainable consumption patterns of the rich industrialized nations are responsible for the threat of climate change.
- Only 25% of the global population lives in these countries, but they emit more than 70% of the total global CO₂ emissions and consume 75 to 80% of many of the other resources of the world.
- Impacts are already being seen in unprecedented heat waves, cyclones, floods, salinisation of the coastline and effects on agriculture, fisheries and health.

Climate change Evidence

- Intergovernmental Panel On Climate Change.
- Published evidence of climate change
- Observed that earth's climate has changed over years.
- Average temperatures have fluctuated by 0.5 to 1 ° C.
- Anthropogenic activities are affecting climate
- Its not uniform in all places. Poles will be more warmer

Why should India be Concerned about Climate Change?

- India is home to a third of the world's poor, and climate change will hit this section of society the hardest.
- Set to be the most populous nation in the world by 2045, the economic, social and ecological price of climate change will be massive.
- The three main 'categories' of impacts are those on agriculture, sea level rise leading to submergence of coastal areas, as well as increased frequency of extreme events. Each of these pose serious threats to India.
- India's main energy resource is coal. With the threat of climate change, India is called upon to change its energy strategy based on coal, its most abundant resource, and to use other energy sources (e.g. oil, gas, renewable and nuclear energy) which may turn out to be expensive.



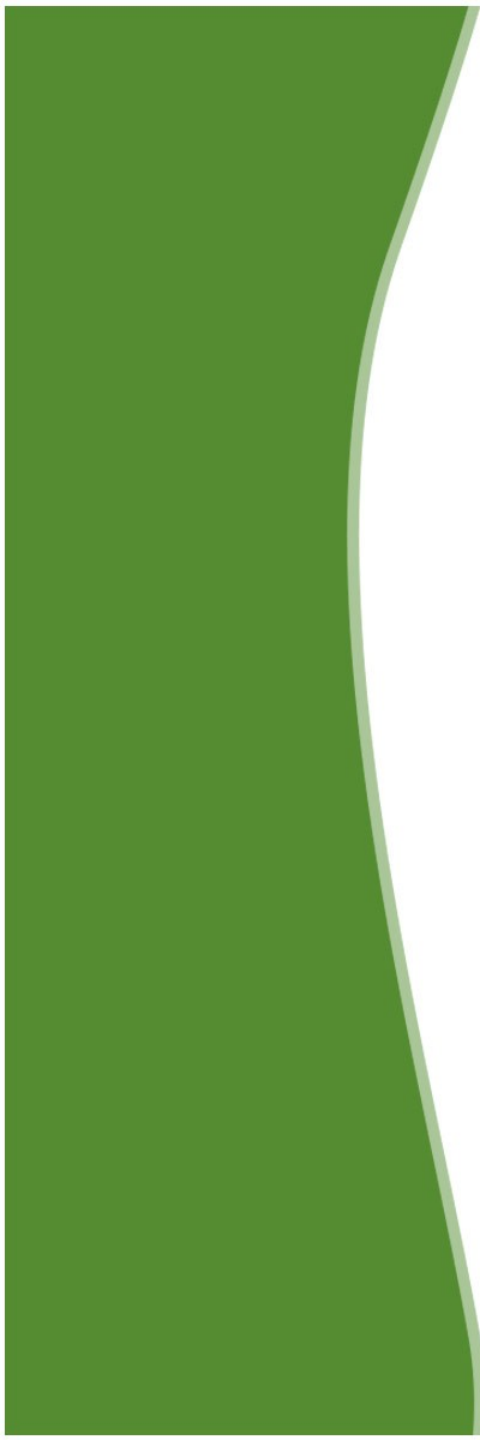
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Keith Taylor
2006

Green House Effect

- The **greenhouse effect** is a naturally occurring process that aids in heating the Earth's surface and atmosphere.
- It results from the fact that certain atmospheric gases, such as **carbon dioxide**, *water vapor*, and **methane**, are able to change the energy balance of the planet by absorbing **longwave radiation** emitted from the Earth's surface.
- Without the greenhouse effect life on this planet would probably not exist as the average temperature of the Earth would be a chilly -18° Celsius, rather than the present 15° Celsius.

- 
- Anthropogenic activities increase the concentration of green house gases.
 - Enhanced green house effect
 - Carbon dioxide from emissions
 - Chlorofluorocarbons
 - Methane
 - Nitrogen oxides

The Earth's Greenhouse Effect

SUN

About half the solar energy absorbed at the surface evaporates water, adding the most important greenhouse gas to the atmosphere. When this water condenses in the atmosphere, it releases the energy that powers storms and produces rain and snow.

About 30% of incoming solar energy is reflected by the surface and the atmosphere.

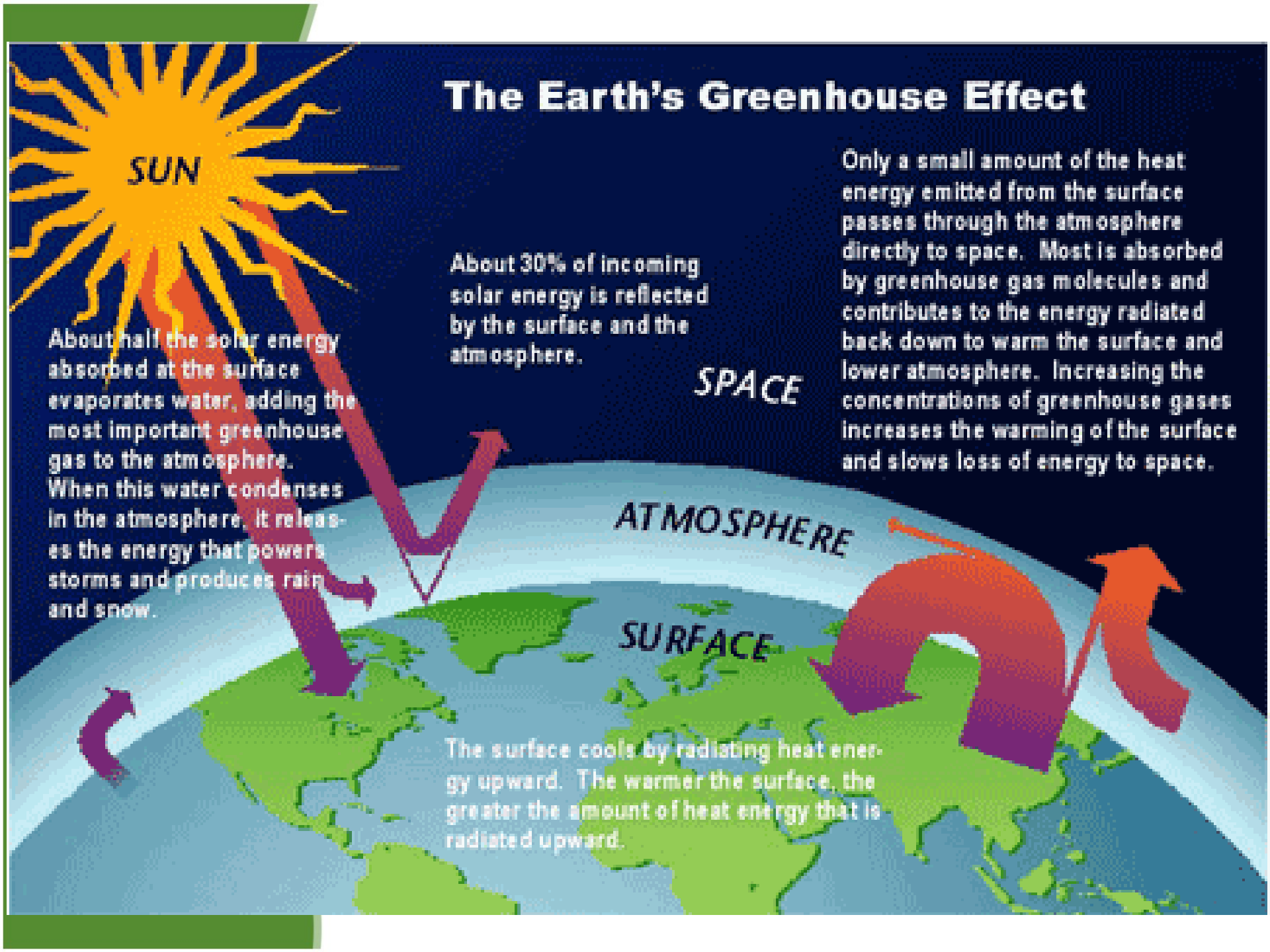
SPACE

Only a small amount of the heat energy emitted from the surface passes through the atmosphere directly to space. Most is absorbed by greenhouse gas molecules and contributes to the energy radiated back down to warm the surface and lower atmosphere. Increasing the concentrations of greenhouse gases increases the warming of the surface and slows loss of energy to space.

ATMOSPHERE

SURFACE

The surface cools by radiating heat energy upward. The warmer the surface, the greater the amount of heat energy that is radiated upward.

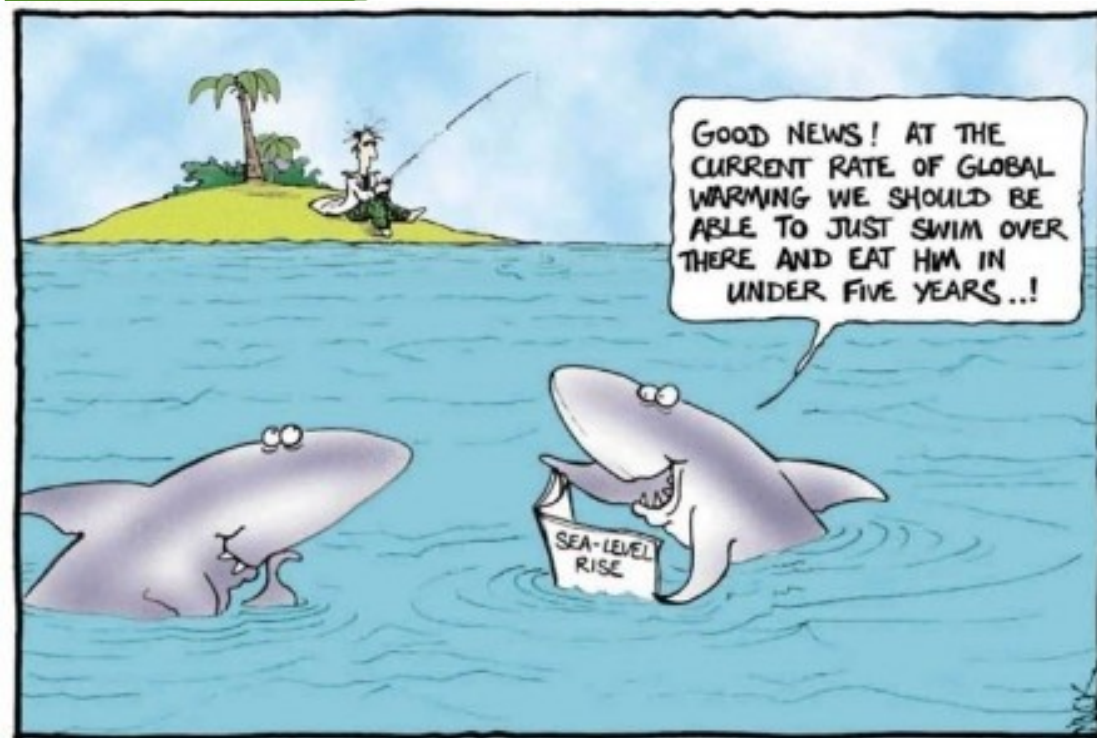


Effects

- Change in Wind current patterns
- Ocean currents will change
- Hydrological cycle will intensify
- Sea level rise: submergence of areas.
- Changed agricultural production
- Cases of flood, droughts, cyclones on a rise.

- Global warming is affecting many parts of the world. Global warming makes the sea rise, and when the sea rises, the water covers many low land islands. This is a big problem for many of the plants, animals, and people on islands.
- The water covers the plants and causes some of them to die. When they die, the animals lose a source of food, along with their habitat. .
- When the plants and animals die, people lose two sources of food, plant food and animal food. They may also lose their homes. As a result, they would also have to leave the area or die. This would be called a break in the food chain, or a chain reaction, one thing happening that leads to another and so on.

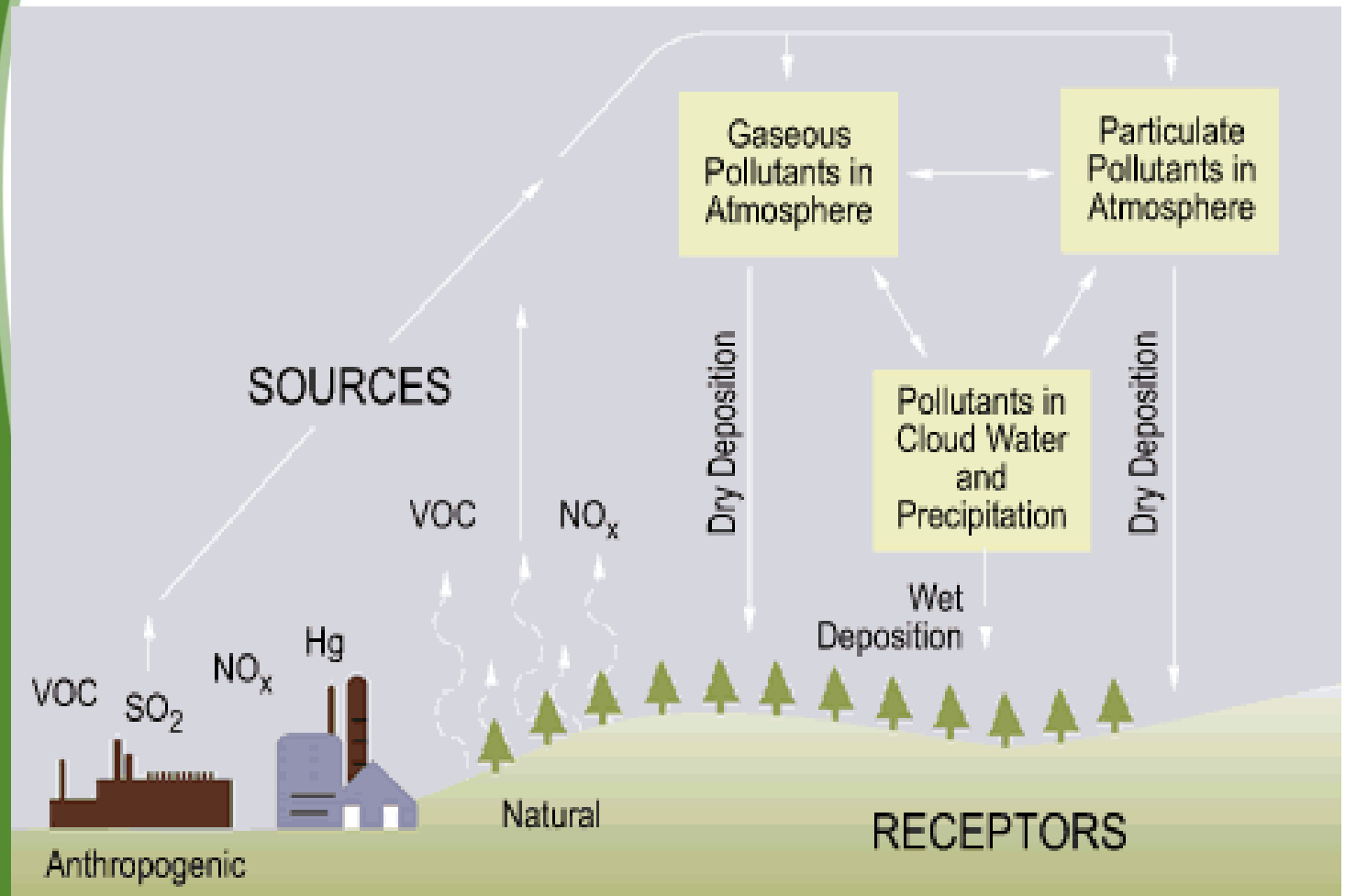
- The oceans are affected by global warming in other ways, as well. Many things that are happening to the ocean are linked to global warming. One thing that is happening is warm water, caused from global warming, is harming and killing algae in the ocean.
- It is killing algae, but it is also destroying many huge forests.
- Global warming is also causing many more fires that wipe out whole forests. This happens because global warming can make the earth very hot. In forests, some plants and trees leaves can be so dry that they catch on fire.



Solution

- Renewable energy
- Biofuels
- Afforestation
- Reduce the current rate of CFCs use
- Trap methane for fuel
- Potential of algae in Carbon dioxide utilization
- Sustainable agriculture

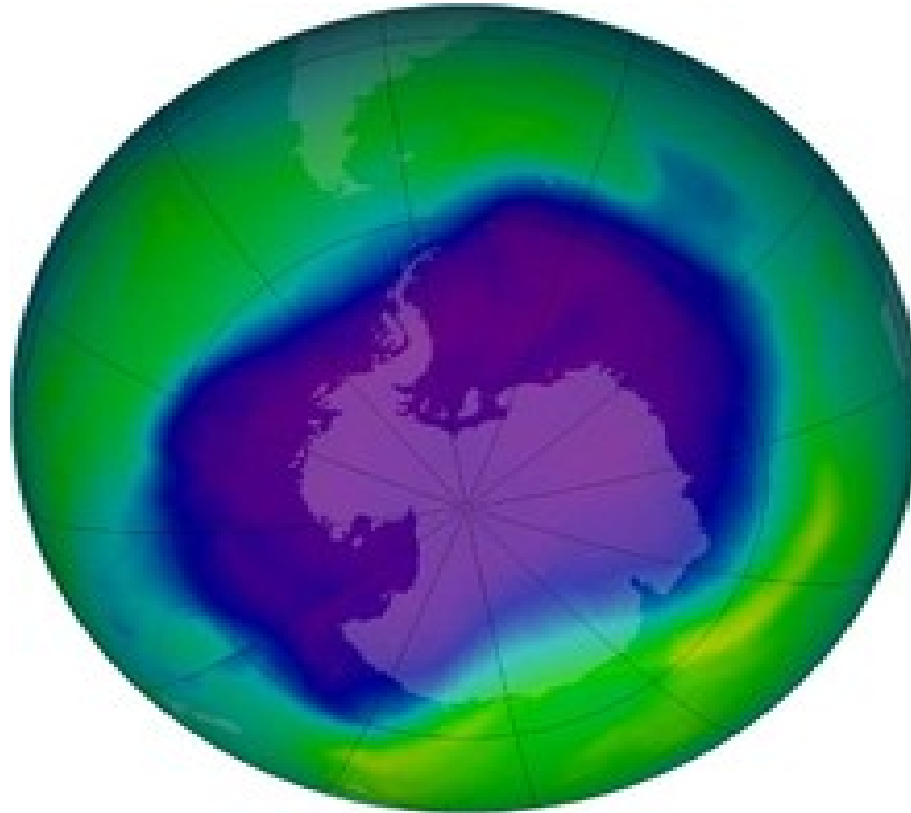
Acid Rain



- "Acid rain" is a broad term referring to a mixture of wet and dry deposition (deposited material) from the atmosphere containing higher than normal amounts of nitric and sulfuric acids.
- Acid rain occurs when these gases react in the atmosphere with water, oxygen, and other chemicals to form various acidic compounds. The result is a mild solution of sulfuric acid and nitric acid.
- When sulfur dioxide and nitrogen oxides are released from power plants and other sources, prevailing winds blow these compounds across state and national borders, sometimes over hundreds of miles.
- pH less than 5.6

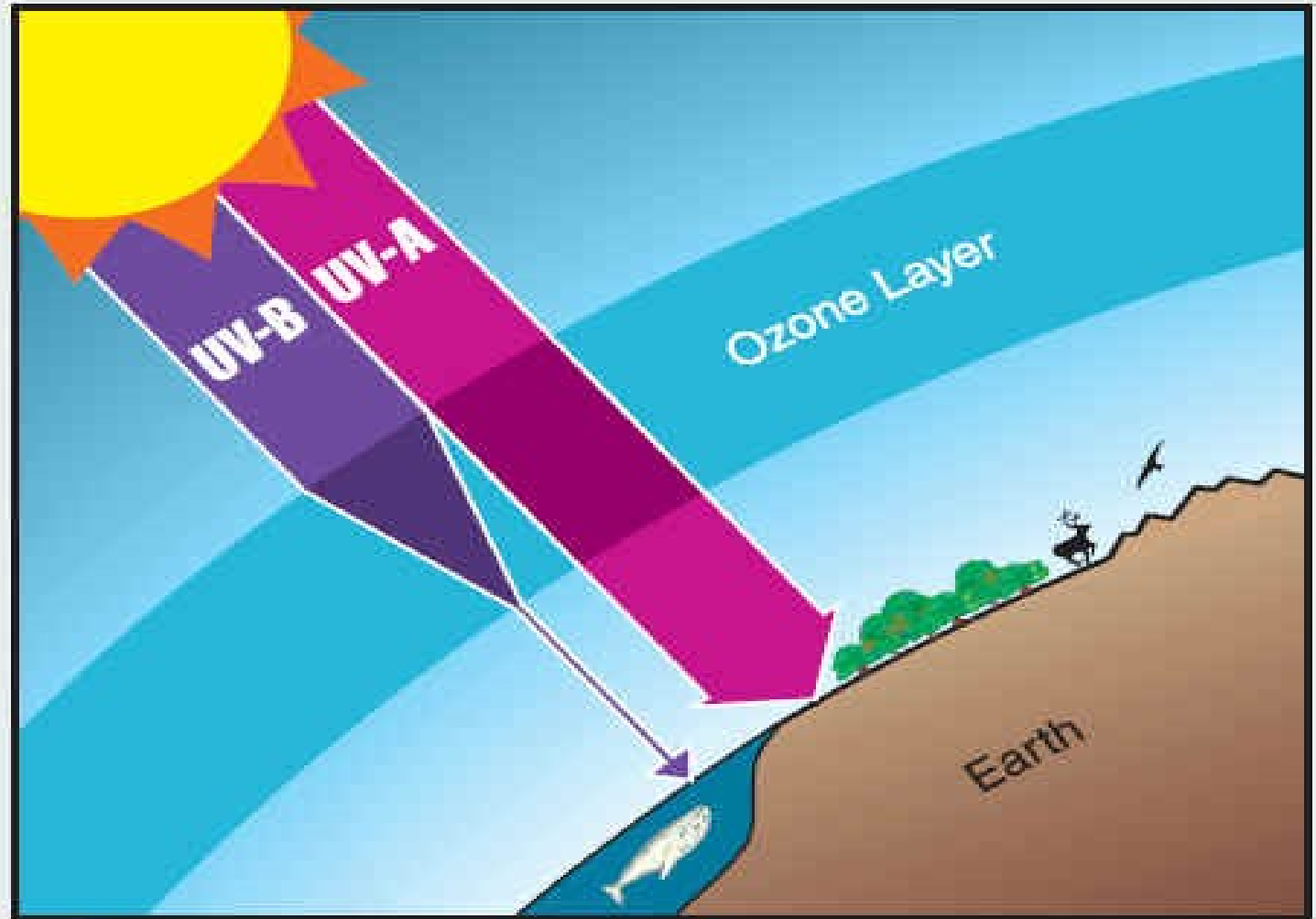
- If The acid chemicals in the air are blown into areas where the weather is wet, the acids can fall to the ground in the form of rain, snow, fog, or mist.
- As this acidic water flows over and through the ground, it affects a variety of plants and animals.
- The strength of the effects depends on several factors, including how acidic the water is.
- In areas where the weather is dry, the acid chemicals may become incorporated into dust or smoke and fall to the ground through dry deposition, sticking to the ground, buildings, homes, cars, and trees.
- Taj Mahal in Agra

Ozone layer depletion

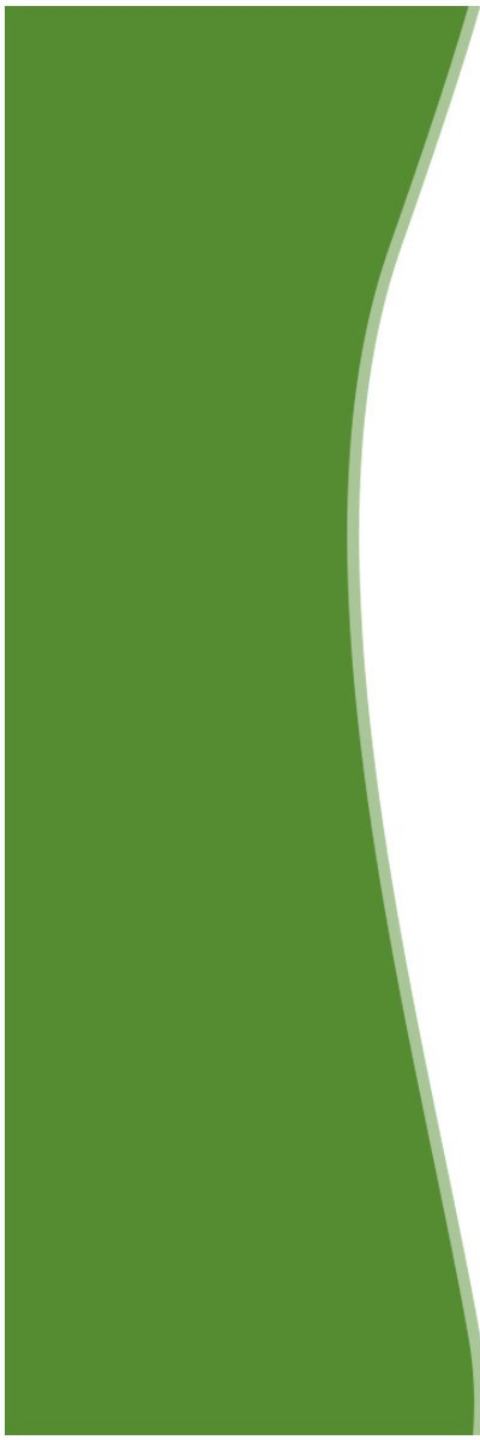


Natural sunscreen: Ozone layer

UV Protection by the Ozone Layer



- The production and emission of CFCs, chlorofluorocarbons, is by far the leading cause.
- CFCs in the stratosphere. There, the chlorine atom is removed from the CFC and attracts one of the three oxygen atoms in the ozone molecule. The process continues, and a single chlorine atom can destroy over 100,000 molecules of ozone.
- In 1984, ozone layer hole was discovered over Antarctica

- 
- MONTREAL PROTOCOL
 - Phase out the use of CFC's

 - Increase risk of Skin cancer
 - Loss of phytoplankton: they are sensitive to UV.
 - Fair people at higher risk

Consumerism and waste products

- Consumption of resources by people
- Earlier human needs were less, so was consumption rate
- Now changing lifestyles demand more
- Population also an issue

- People over -population
- Consumption over- population
- Model by Paul Ehrlich and John Hodlern:
- Number of people x per capita use of resources x waste generated = Overall environmental impact

ENVIRONMENTAL LEGISLATION

- India first country to have made provisions for environment protection in its constitution
- After Stockholm Conference , 1972
- Many laws and rules have been made
- **Article 48- A** : *The state shall endeavour to protect and improve the environment and to safeguard forests and wildlife of the country.*
- **Article 51 A (g)**: - *It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures*

ACTS

- Wildlife (Protection) Act, 1972
- Water (Prevention and Control of Pollution) Act, 1974
- Forest (Conservation)Act, 1980
- Air (Prevention and Control of Pollution) Act, 1981
- The Environment (Protection) Act, 1986
- The Biomedical waste (Management and Handling) Rules , 1998
- The Municipal Solid Waste (Management and Handling) Rules, 2000
- The Noise Pollution (Regulation and Control) (Amendment) Rules,2002
- The Biological Diversity Act,2002

Environmental Ethics

- Ethical behaviour is of utmost importance
- We believe and think: Man is all powerful and supreme creature of the earth.
- Nature has provided us with resources and she nourishes us like our mother, so we should respect and nurture her
- Live sustainably.

- Two views:
- Anthropogenic and Eco centric.
- Earth ethics or environmental guidelines help us to protect our mother earth.
- DO NOT's and DO's
- Having fewer wants = limits to growth = good environment



• THANK YOU

