Unit6- Human Communities and the Environment

(Human population growth: Impacts on environment, human health and welfare)

Learning outcomes:

After completing this lecture, you will be able to understand the following:

•Get knowledge about various important term used for the study of population growth.

Get awareness about Population growth, causes and effects of population growth on human and environment.

Human Communities and the Environment

Human Population Growth: The increase in the number of individuals in a population is known as *population growth*.

The study of human population trends is called *demography*.

Population growth was slow and stable till 1900, but a dramatic exponential growth occurred after 1930's following technological growth.

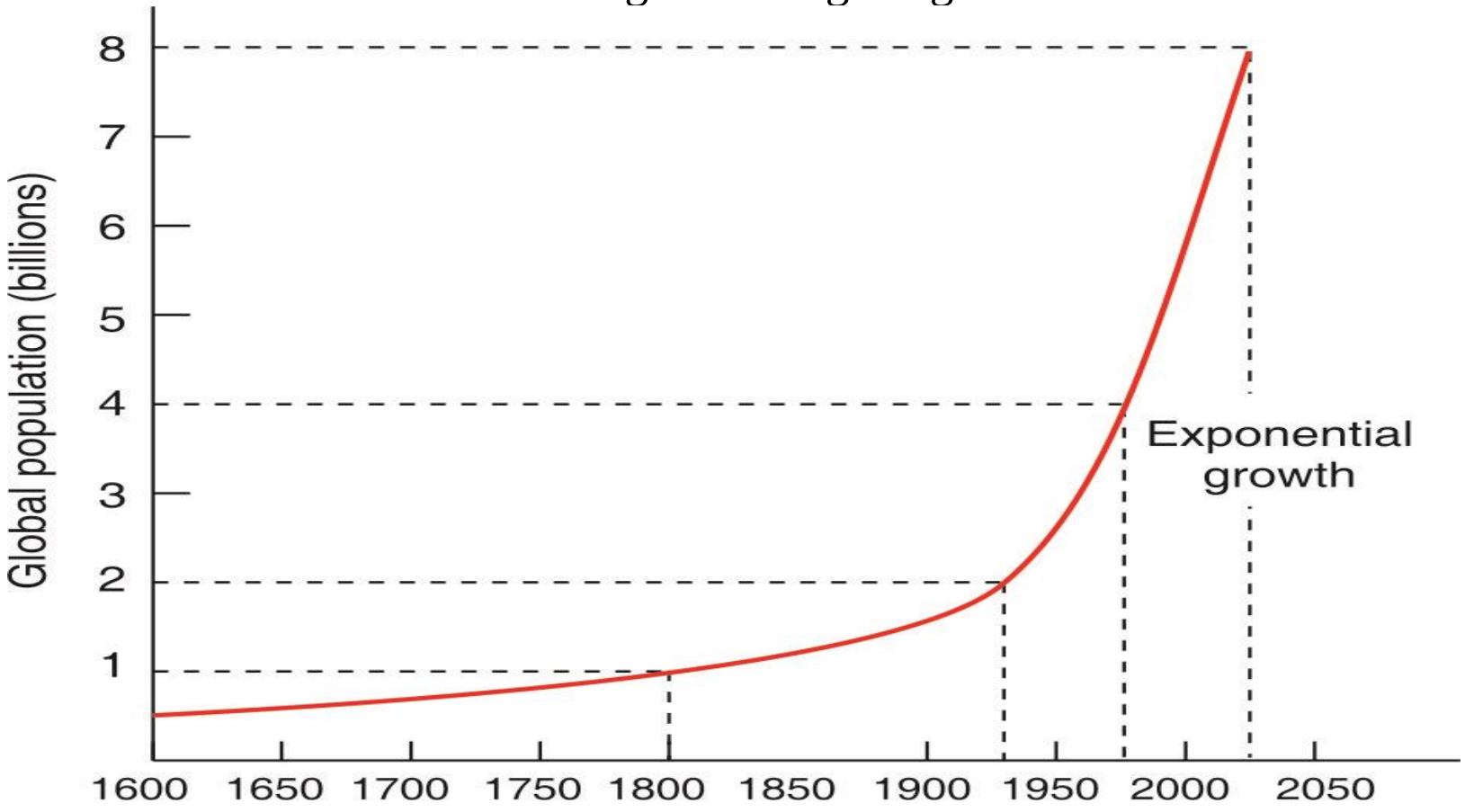

Fig. Global population growth trends in the last four centuries

Factors Influencing Population Size

Exponential growth: Population growth takes place exponentially and that explains the dramatic increase

Doubling time: The time needed for a population to double its size at a constant annual rate is calculated

$$Td = 70/r$$

where Td = Doubling time in years

r = annual growth rate

If a nation has 2% annual growth rate, its population will double in 35 years.

Total Fertility Rates (TFR): Fertility rates measures the average number of children per woman. The value of TFR varies from 1.9 in developed nations to 4.7 in developing nations.

Infant mortality is the death of young children under the age of 1.This death toll is measured by the infant mortality rate (IMR).

Infant mortality rate (**IMR**):- Infant mortality rate is the probability of deaths of children under one year of age per 1000 live births Infant mortality rate:

Replacement level:

Replacement level fertility is the total fertility rate- The average number of children born per woman at which a population exactly replaces itself from one generation to the next, without migration.

For developing nations, where infant mortality is high and life expectancy is low, the replacement level is approx. 2.7, whereas in developed nations it is 2.1

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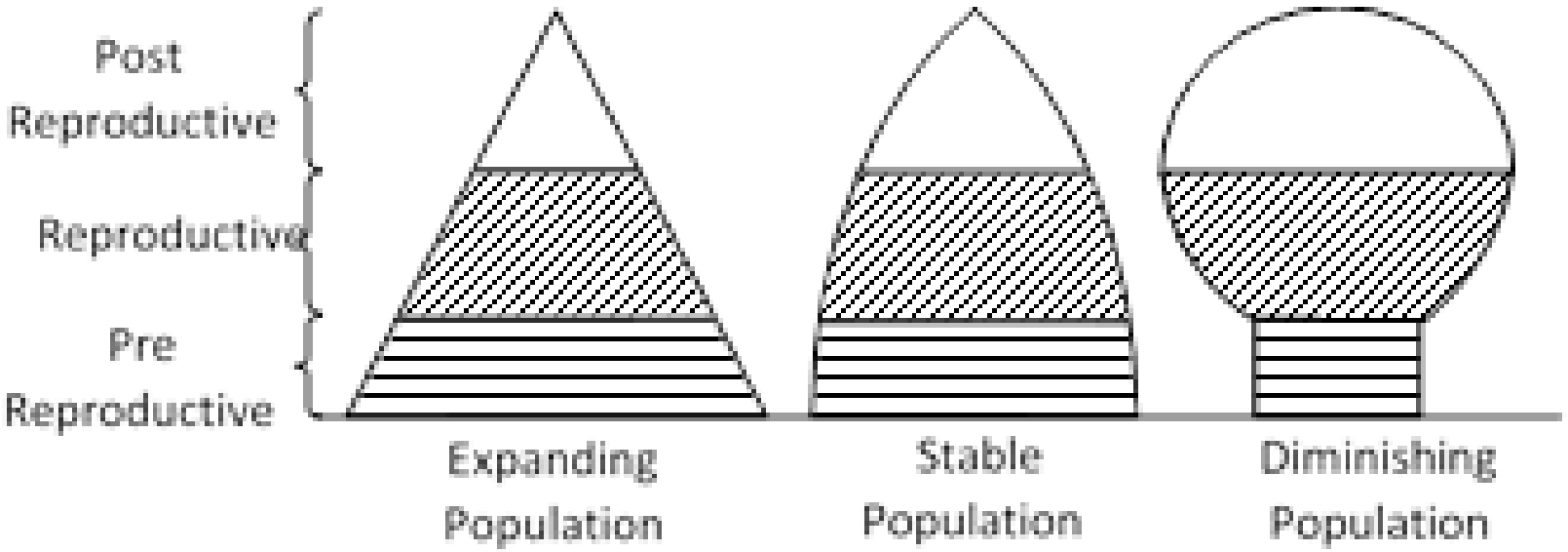
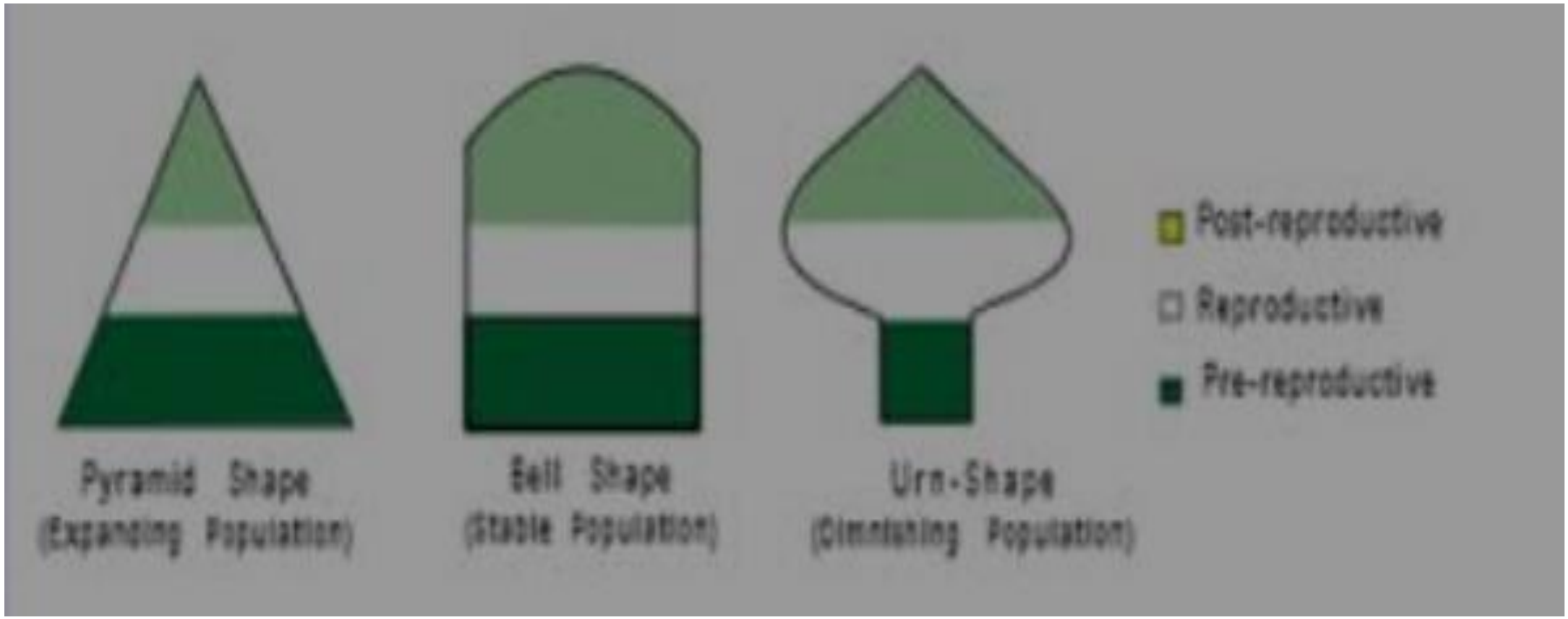
Age structure: pre-reproductive (0-14 years), reproductive (15-44 years) and post reproductive (45 years and above).



Age groups of human population

Three types of age pyramids are used for explaining age structure.

- **Pyramid shaped**
- **Bell shaped**
- **Urn shaped**



Population Explosion

The unprecedented growth of human population at an alarming rate is referred to as population explosion.

India has 1.39 billion people.

it will have 1.63 billion people by 2050

The Population Clock

Every second, on an average 4.3 children are born and 2 people die, thus resulting in net gain of nearly 2.3 persons everyday by 2,08,400 persons.

https://www.youtube.com/watch?v=PIZyHMUGdq0

Factors Deciding the Growth or Decline of Population

Birth Rate-Number of births per thousand people in a geographical area. Birth rate of the world is 22.69 births per 1,000 people. Birth vary between developed and developing countries.

Death rate-Number of deaths per thousand people in a geographical area. Death rate of the world is 6.58 deaths per 1,000 people . Advances in medicinal field resulted in lesser number of deaths.

Migration -Rate of population change for a specific area.

Causes of Population Growth

Major caused of population growth are given as

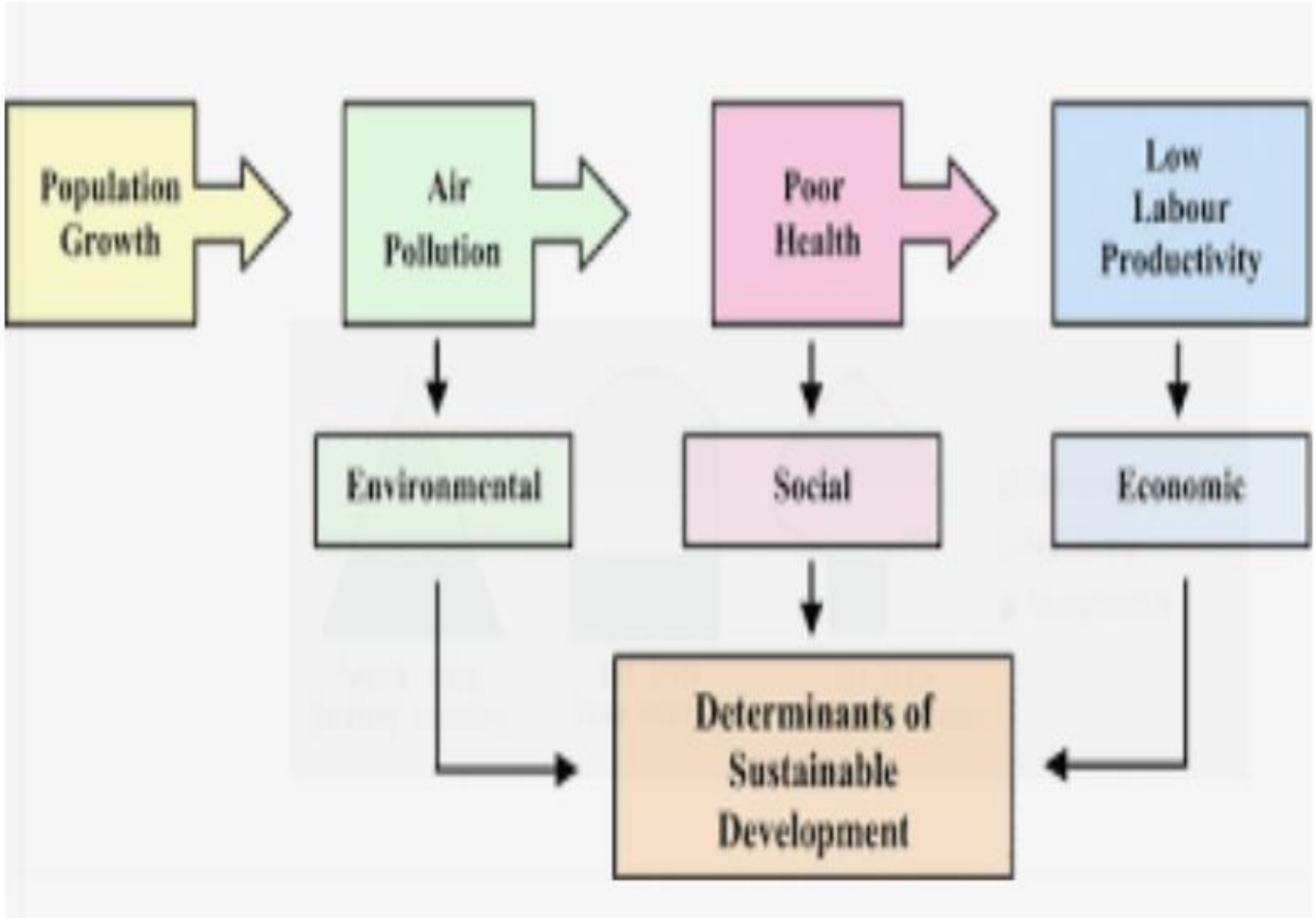
- Availability of cure for many life-threatening diseases
- Preference for sons
- Lower infant mortality
- Custom of early marriages
- Improvement in public health
- Illiteracy

Effects of population explosion on environment, Human Health & Welfare

- Severe resource depletion and environmental degradation.
- Limited resources like land, water, fossil fuels, minerals etc. are getting exhausted.
- Renewable resources like forests, grasslands etc. are under tremendous pressure.
- Industrial and economic growth are raising our quality of life but adding toxic pollutants into the air, water and soil.

Effects of population explosion on environment, Human Health & Welfare contd……..

- Ecological life-support systems are getting jeopardized.
- Human health is influenced by many factors like nutritional, biological, chemical or psychological, which are related to environment.
- Infectious organisms: Disease-causing organisms pose greater environmental threats to health, more severely in the developing countries especially the tropical ones. Microbes can cause food poisoning by producing toxins in the contaminated food. Some moulds grow on food and produce poisonous toxins.
- Infectious organisms can cause respiratory diseases (pneumonia, tuberculosis, influenza etc.) and gastrointestinal diseases (diarrhea, dysentery, cholera etc.).



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Disaster and Disaster Management

A *disaster* is defined as a sudden event or calamity that causes large-scale damage and destruction of human life and property.

Types of Disasters

Natural Disasters

- Air-related – Hurricanes, cyclones, storms, etc.
- Water-related – Floods, drought, etc.
- Earth-related – Earthquakes, landslides, volcanic eruptions, etc.

Man-made Disasters

- Industrial accidents ex:- Bhopal gas tragedy
- Wars, riots, terrorism, etc., Ex- First and Second world war
- Toxic spills, Ex- Leakage of oil due to accident in Ocean
- Transportation accidents Ex- Rail accidents

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Earthquake

The term *earthquake* is used to describe any seismic event, caused naturally or as a consequence of human activities, that leads to the generation of devastating seismic waves.

Causes of Earthquake

- Movement of hot gases and magma
- Volcanic activities
- Stress buildup due to water pressure
- Tectonic stress generated by movement of tectonic plates

Effects of Earthquake

- Destruction and demolition of buildings, dams, etc. Large-scale damage to life and property.
- Increased incidence of fire, landslides, etc.
- Increased incidence of *tsunami* waves, leading to inundation in coastal areas

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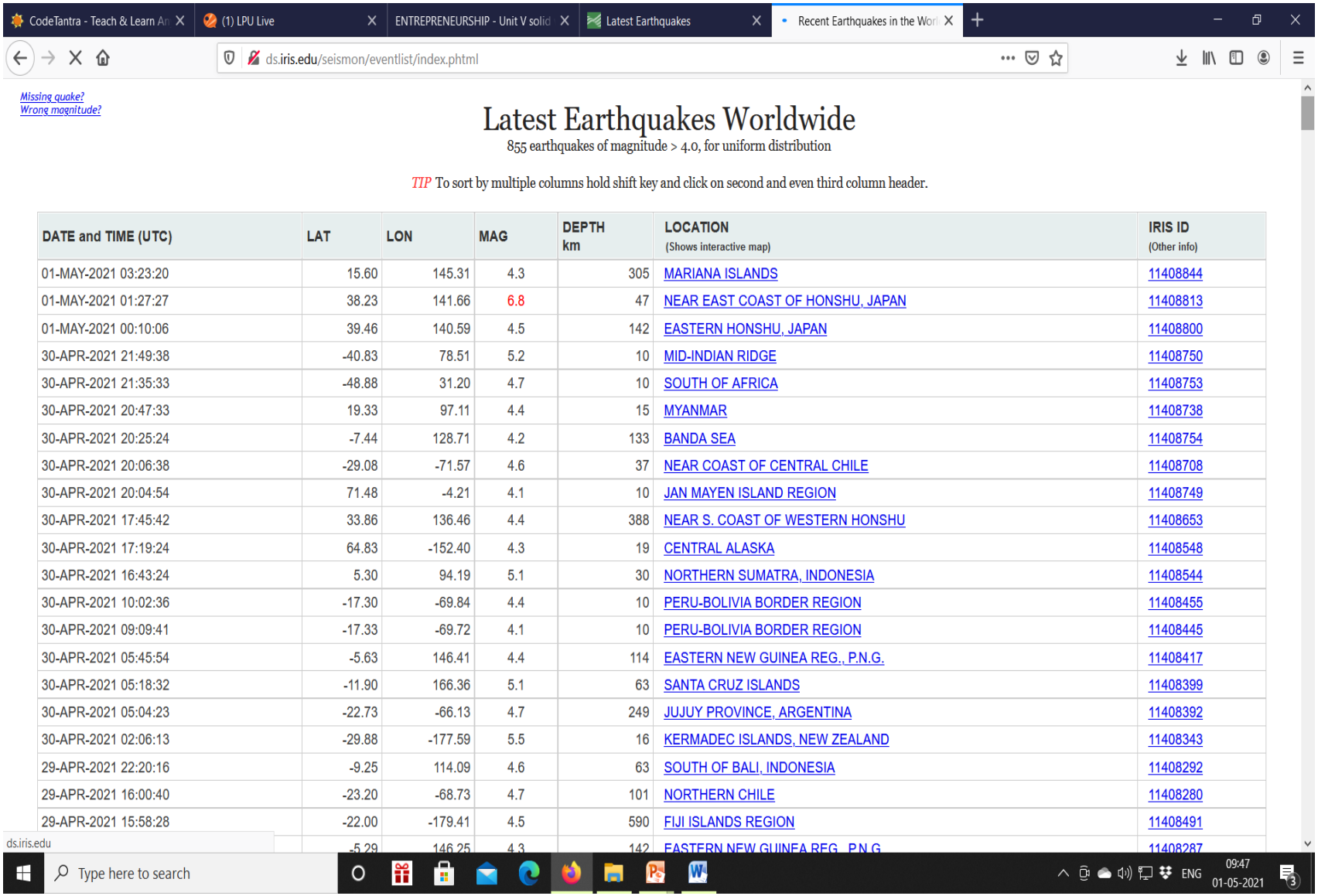
Recent data On Earthquakes



Source: http://ds.iris.edu/seismon/eventlist/index.phtml

Management of Earthquakes

•Marking earthquake-sensitive areas

•Construction of houses, factories, dams, bridges, etc., with appropriate design and materials and strategically placed vibration absorbers

•Forecast and early prediction of earthquakes

•Creating public awareness regarding the steps to be taken during emergencies

•Relief measures through timely support by individuals, government, and non-governmental organizations

Landslides

Landslides are natural phenomena during which large amounts of landmass slide downwards from hilly areas, mainly because of gravity, destroying everything lying in the path.

Causes of Landslides

- Earthquakes
- Glaciers and Torrential rain
- Construction of dams, bridges, tunnels, roads, etc
- Use of explosives for breaking rocks during mining
- Deforestation of mountain slopes

Effects of Landslides

- Rocks, large debris, and sliding landmasses destroy urban and rural habitation
- Damage to roads, dams, bridges, etc.
- Obstruction of river flow increasing the incidence of flood
- Severe damage to crops and agricultural lands

Management of Landslides

- Construction activities should be done only after properly evaluating the geological and geographic conditions.
- Regulating rate of water flow also helps in controlling landslides.
- Agriculture at slopes should be avoided as far as possible.
- Relief task through economic help supporting resettlement and rehabilitation of affected people at individual, community, and organizational levels should be carried out.

https://www.youtube.com/watch?v=mknStAMia0Q

Floods

The accumulation of a large quantity of water at a place or the presence of more water that cannot be handled by the drainage of the area is known as *flood*.

Types of Floods

•Flash floods:- A **flash flood** is a rapid flooding of low-lying areas: washes, rivers, dry lakes and depressions. It may be caused by heavy rain associated with a severe thunderstorm, hurricane, tropical storm, or meltwater from ice or snow flowing over ice sheets or snowfields.

•River floods:- A ***river flood*** occurs when a *river* overspills its banks; that is, when its flow can no longer be contained within its channel.

•Coastal floods: **Coastal flooding** occurs when normally dry, low-lying land is **flooded** by seawater.

Causes of Floods

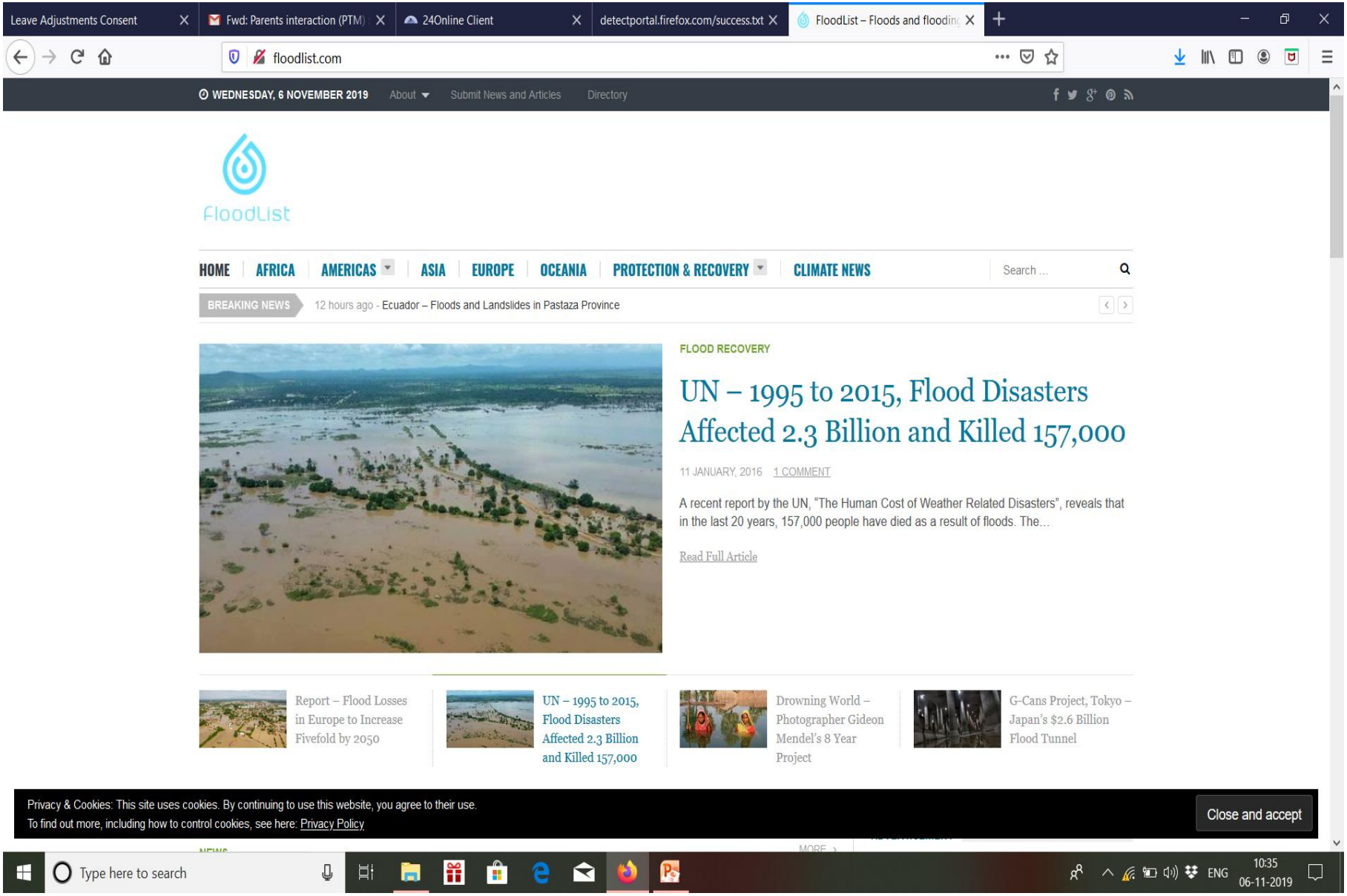
- Deforestation
- Urbanization
- Change in river course
- Riparian dams
- Man-made impediments in river channels
- Uncertain rainfall

Effects of Floods

- Damage to agricultural crops
- Damage to life and property
- Disturbances in transportation
- Increase in populations of disease vectors and pathogens
- Loss of biodiversity
- Economic crisis

https://www.youtube.com/watch?v=4PXj7bOD7IY

Recent Data on Flood Around Globe



Control of Floods

- Plantation on slopes: Plant have a tendency to absorb water and reduce the speed of running water. Thus reduce the adverse effect of flood.

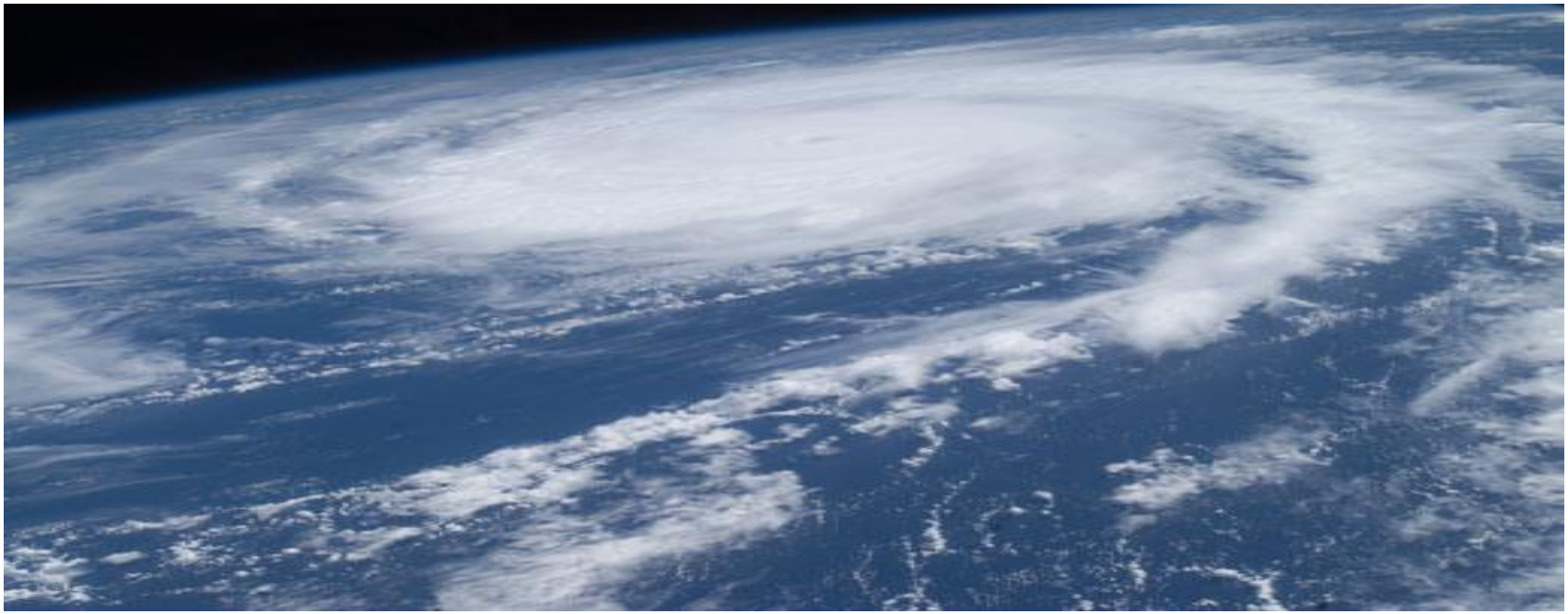
- Drainage management: Drainage water management is the practice of using a water control structure in the main, submain, (or sometimes lateral) drain to raise the drainage outlet to various depths. This allows farmers to have more control over drainage

- Flood plain zoning: Flood plain zoning means dividing the entire flood area into different zones and to restrict the occupancy of the different zones of the flood plain to uses which will suffer little or no damage during floods

- Forecasting: Forecasting is the process of making predictions of the future based on past and present data and most commonly by analysis of trends. Early forecasting can reduce the possible adverse effect of flood.

Cyclones

In northern hemisphere, a cyclone refers to an area of low atmospheric pressure surrounded by a wind system in a counter-clockwise direction.



Effects of Cyclones

- Cyclones generate storm surges.

- They damage installations, residences, communication systems, trees, etc., resulting in loss of life and property.

- They may cause river floods and submergence of low-lying areas.

- They pollute drinking water sources causing outbreak of epidemics.

Management of Cyclones

•Forecasting: Forecasting is the process of making predictions of the future based on past and present data and most commonly by analysis of trends. Early forecasting can reduce the possible adverse effect of flood.

•Proper construction of houses and Construction of cyclone shelters in the cyclone-prone areas

•Relief tasks must be completed in minimum time period to avoid more adverse effect of cyclones

•Community preparedness at all levels to deal with emergency situations and development of warning systems can provide help in Management of cyclones effects.

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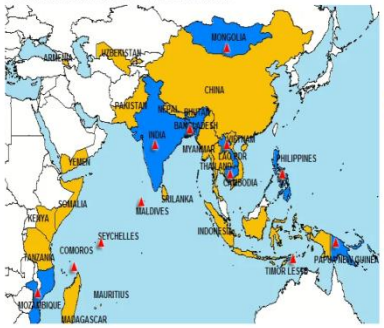
https://currentaffairs.gktoday.com/tags/cyclones

these areas.

Regional Integrated Multi-Hazard Early Warning System (RIMES)

It is intergovernmental body registered under United Nations. It is owned and managed by 45 collaborating countries in Asia Pacific and Africa Region. India is chairman of the body. It was established in 2009 and was registered with UN in July 2009. It operates from its regional early warning centre located at campus of Asian Institute of Technology in Pathumthani, Thailand. It has evolved from efforts of countries in Africa and Asia in aftermath of 2004 Indian Ocean tsunami.



Mandate

It seeks to establish regional early warning system within multi-hazard framework for generation and communication of early warning information and capacity building for preparedness and response to trans-boundary hazards. It provides information related to Tsunami and extreme weather conditions. It also acts as a test bed for emerging technologies and help to enhance performance.

Month: Current Affairs – November, 2018 Categories: Environment & Biodiversity
Tags: Cyclone • Cyclones • Disaster Management • Environment • Fluid Dynamics

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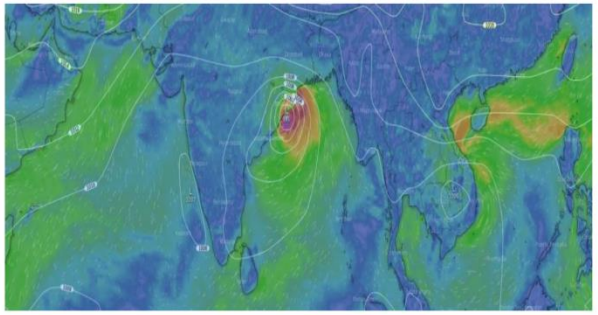
NATURAL DISASTERS

2019 set to be record-breaking cyclone year for India

Cyclone Bulbul, to hit Andhra and Odisha by November 9, to be seventh such storm this year

NEXT NEWS ›

By DTE Staff
Last Updated: Monday 04 November 2019



India will break its previous record of having been hit by the most number of tropical cyclones in a year, private weather forecasting agency Skymet said in its latest bulletin. Last year, the country broke its 33-year record, after having been hit by seven cyclones.

Cyclone Bulbul, which is brewing in the Bay of Bengal, will hit the states of Andhra Pradesh and Odisha by

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Tsunami

- Series of tall waves that hit the shore with great energy.
- Caused by under sea earthquake that set off waves in water.
- These waves may last just minutes, but can cause widespread devastation along the coast.
- Most occurs in Pacific ocean.

Impact of Tsunami

- Coastal erosion: Coastal erosion is the loss or displacement of land, or the long-term removal of sediment and rocks along the coastline due to the action of waves, currents, etc.
- Contamination of ground water and soil with salt water and sewage.
- Damage to coral reefs and Mangroves.
- Adverse effect on habitat of coastal species.

Ex-Asian tsunami

- In 2004, Asian tsunami was the biggest ever in history. Hits south-east and south Asia on Dec 26,2004.
- Triggered by massive undersea earthquake measuring 9.0 on Richter scale occurred in Sumatra.
- 230,000 people in 14 countries died.

Drought

It is a condition in which the region suffers from severe deficiency in its water supply.

CAUSES-

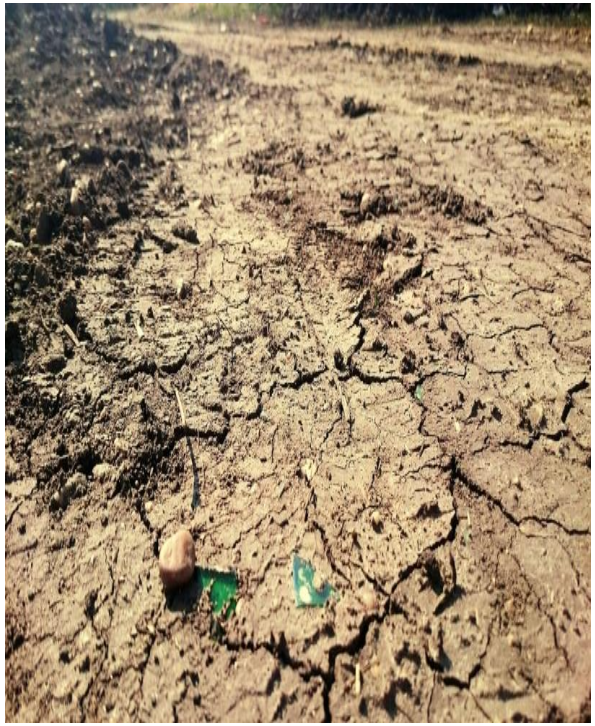
1)Below average rainfall.

2) Deforestation

3) Over population and unsustainable use of water resources.

4) over farming, excessive irrigation

5) Pollution



EFFECTS

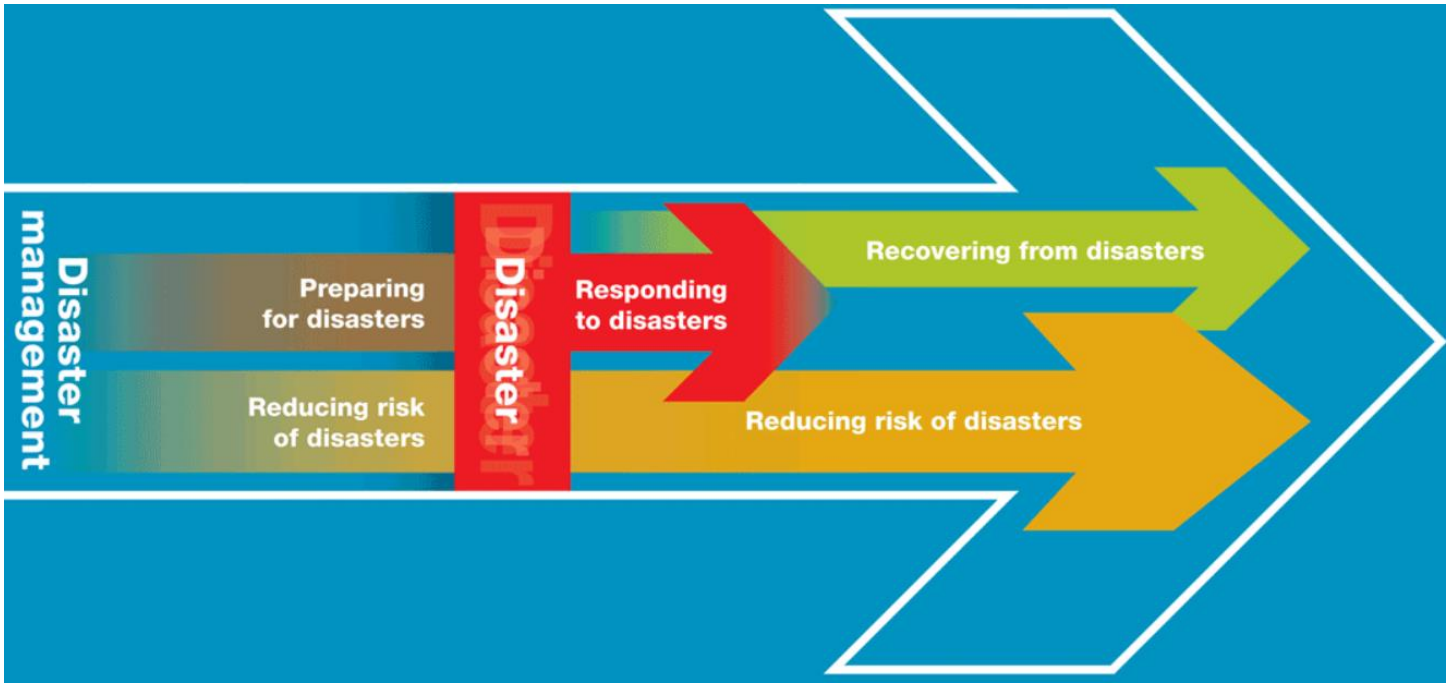
1) Water shortages affect the health, well-being, and quality of life of the people.
2) Economic Crisis.
3) Diminished crop growth or yield production- Famine due to lack of water for irrigation
4) Mass migration to other places.
5) Desertification

https://www.youtube.com/watch?v=Xo1Jyzba7rA

MANAGEMENT-

1) Sustainable use of water.
2) Building water harvesting systems- rain water harvesting.
3) Cloud seeding - a form of intentional weather modification to induce rainfall.
4) Desalination of sea water for irrigation or consumption.

Disaster Management can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters.



Disaster Management

Objectives:

- Reduce, or avoid, losses from disasters
- Assure prompt assistance to victims
- Achieve rapid and effective recovery

Disaster management:

- Mitigation: Minimizing the possible effects of a disaster
- Preparedness: Planning how to respond to a disaster so that impact of disaster can reduced.
- Response: Taking immediate measures to save life and property, providing medical relief, etc.
- Recovery: Returning the community to normal conditions

- Mitigation is the reduction of something harmful or the reduction of its harmful effects. It may refer to measures taken to reduce the harmful effects of hazards that remain *in potentia*, or to manage harmful incidents that have already occurred. It is a stage or component of emergency management and of risk management.

National Policy on Disaster Management

- A holistic, and proactive approach towards prevention, mitigation, and preparedness.
- Adequate funds to be set apart for vulnerability reduction and preparedness.
- Mitigation measures built into ongoing schemes and programmes.
- Projects in hazard-prone areas should include mitigation measures and vulnerability reduction.
- National disaster management law to be enacted covering all the existing mechanisms.

Environmental Ethics

The field of environmental ethics concerns human beings ethical relationship with the natural environment.

Creating a moral sense of environmental conservation in each person is called *environmental ethics*.

Environmental ethics is a branch of **ethics** that studies the relation of human beings and the **environment** and how **ethics** play a role in this. **Environmental ethics** believe that humans are a part of society as well as other living creatures, which includes plants and animals

Purpose of Environmental ethics.

The practical purpose of environmental ethics, they maintain, is to provide moral grounds for social policies aimed at protecting the earth's environment and remedying environmental degradation

Environmental ethics deal with issues related to the rights of individuals that are fundamental to life and well being. Resource consumption patterns and the need for equitable utilization: It deals with how we utilize and distribute resources. Two important view in this contrast are given as:

The Contrasting Views:

Utilitarian justification (also known as individualistic ethics). conservation of nature is important because the environment, ecosystem, habitat, or species provides individuals (aka humans) with direst economic benefits.

Ecological justification (also known as moral justification): conservation of nature is based on the knowledge that a species, ecological community, ecosystem, or the Earth's biosphere provides specific function necessary to the persistence of our life.

Environmental Equity and Priority Principle:
Always respect nature except in cases where strong human rights are at stake

Public awareness of the environment is the ability to understand the surrounding world, including understandings to all the changes occurring in the environment, understanding of cause and- effect relationships between the quality of the environment and human behavior, and a sense of responsibility of preserving them to next generations.

Methods to generate public awareness

The methods to generate environmental awareness generally falls in two categories :

Formal Method

Introduction of Environmental Studies as a course in schools and colleges

Non Formal Method

- Mass media such as newspapers, magazine, radio, T.V., etc
- Organizing meetings, seminars and conferences
- Organizing various competitions
- Through folk songs, street plays, TV serials, etc.

Methods of public awareness:

Key ways to increase awareness of environmental issues worldwide are:

1. Targeted Efforts

Environmental awareness campaigns are most successful when targeted to specific groups or populations. Many people don't pay much attention to environmental problems because they don't understand how the problem would affect them or their lifestyle. One reason that hybrid cars, energy-saving appliances, and solar panels have become so popular in the past few years is because of targeted awareness.

Showing people how much money they could save by purchasing a hybrid or installing a solar panel has helped to "convert" people who normally wouldn't have paid much attention to environmental problems.

2. **Local Outreach**

Environmental education is just as important in the developing world as it is in industrialized nations; however, reaching out to the people in those countries can be very difficult. Language barriers, illiteracy, and cultural differences can prevent them from learning about environmental issues, particularly in rural or tribal areas.

Reaching out to tribal, religious, and community leaders can often help a government organization or non-governmental organization (NGO) educate the people on environmental issues. Community leaders can help ease communication problems and bridge the cultural divide that often stands in the way of outreach efforts.

3. The Media

In developed countries and urban areas, the use of print, broadcast, and Internet media can be a great way to increase education and awareness. By working with the media, government agencies and nonprofit organizations can help spread their message, either by holding press briefings, issuing printed press releases, or even setting up online databases that can be used as information centers.

Information centers can be useful tools to educate both the public and journalists about environmental concerns. Many media outlets may want to increase their coverage of environmental issues, but don't know where to find accurate information. Having a central information clearinghouse that is accessible to journalists and the public can be extremely useful.

4. **Classroom Education**

Thirty percent of the world's population is under the age of eighteen, according to UNEP, which is why educating children and young adults about environmental problems is crucial to long-term success. This will help them foster a sense of responsibility and "proactive citizenship," so that when they become adults they will make choices that help the environment rather than harm it.

Many schools, however, do not currently teach their students about environmental issues. Integrating environmental education into current science classes or teaching environmental science as a separate discipline is one of the best ways to educate children and teens about environmental problems, particularly if the classes involve some sort of "hands-on" learning, like starting a garden or caring for an animal.

Role of an Individual in Conservation of Natural Resources

- Use recyclable resources like reuse paper page and encourage recycling.
- Use alternative energy sources such as solar energy for domestic heating
- Make equitable use of water for personal and domestic purposes.
- Through better use and maintenance of non-maintainable resource.
- Prefer to use renewable and non-conventional energy sources.

https://www.youtube.com/watch?v=r-m_x60gkAc

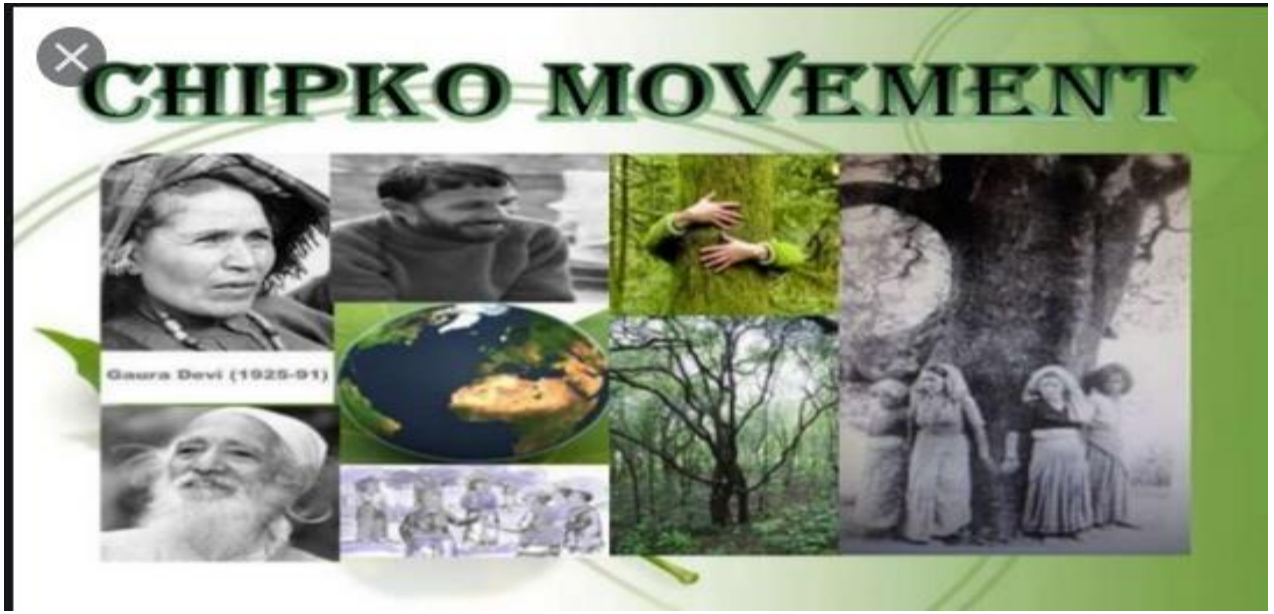
Environmental movements in India for Environmental Protection.

1. Chipko movement.

The Chipko movement or Chipko Andolan, was a forest conservation movement in India. It began in 1970s in Uttarakhand, then a part of Uttar Pradesh (at the fothills of Himalayas) went on to become a rallying point for many future environmental movements all over the world. It created a precedent for starting nonviolent protest in India, and its success meant that the world immediately took notice of this non-violent movement, which was to inspire in time many similar eco-groups by helping to slow down the rapid deforestation, expose vested interests, increase social awareness and the need to save trees, increase ecological awareness, and demonstrate the viability of people power.

Above all, it stirred up the existing civil society in India, which began to address the issues of tribal and marginalized people.

The Chipko Andolan or the Chipko movement is a movement that practiced methods of Satyagraha where both male and female activists from Uttarakhand played vital roles, including Gaura Devi, Suraksha Devi, Sudesha Devi, Bachni Devi and Chandi Prasad Bhatt, Virushka Devi and others. Today, beyond the eco-socialism hue, it is being seen increasingly as an ecofeminism movement.

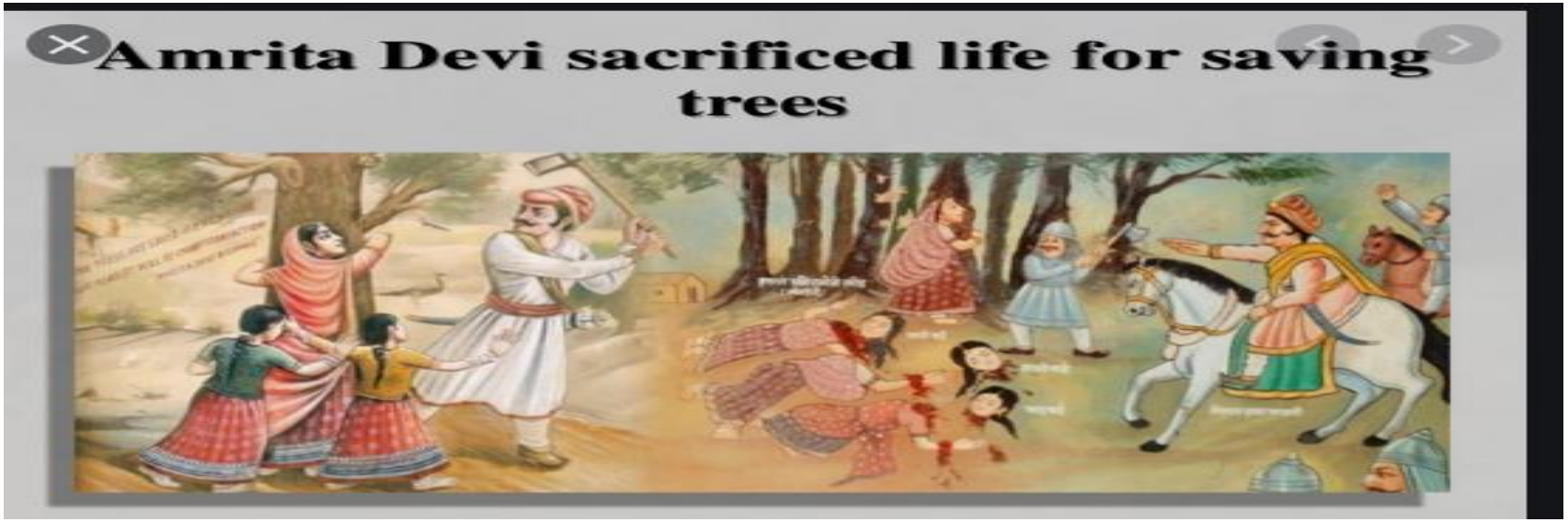


Although many of its leaders were men, women were not only its backbone, but also its mainstay, because they were the ones most affected by the rampant deforestation, which led to a lack of firewood and fodder as well as water for drinking and irrigation. Over the years they also became primary stakeholders in a majority of the afforestation work that happened under the Chipko movement. In 1987, the Chipko movement was awarded the Right Livelihood Award "for its dedication to the conservation, restoration and ecologically-sound use of India's natural resources

https://www.youtube.com/watch?v=Hqwns1tyN0M

2. Bishnoi's of Rajasthan.

The Bishnoi narrate the story of Amrita Devi, a member of the group who inspired more than 100 other Bishnois to go to their deaths in protest of the cutting down of Khejri trees in September 1730. The maharajah of Jodhpur, Abhay Singh, requiring wood for the construction of a new palace, sent soldiers to cut trees in the village of Khejarli, which was called Jehnad at that time. Noticing their actions, Devi hugged a tree in an attempt to stop them. Her family then adopted the same strategy, as did other local people when the news spread.



She told the soldiers that she considered their actions to be an insult to her faith and that she was prepared to die to save the trees. The soldiers did indeed kill her and others until Abhay Singh was informed of what was going on and intervened to stop the massacre

Some of the Bishnois who were killed protecting the trees were buried in Khejarli, where a simple grave with four pillars was erected. Every year, in September, the Bishnois assemble there to commemorate the sacrifice made by their people to preserve their faith and religion.

Government of India as to remember the contribution of **Amrita Devi** announced **Amrita Devi Bishnoi** national **award** for **wildlife conservation.**

https://www.youtube.com/watch?v=SSPHdbmu4kA

A Bishnoi woman breastfeeding a young buck along with her child

3. Silent valley:

Save Silent Valley was a social movement aimed at the protection of Silent Valley, an evergreen tropical forest in the Palakkad district of Kerala, India. It was started in 1973 by an NGO led by school teachers and the Kerala Sastra Sahithya Parishad(KSSP) to save the Silent Valley from being flooded by a hydroelectric project. The valley was declared as Silent Valley National Park in 1985. The Kuntipuzha is a major river that flows 15 km southwest from Silent Valley.

It takes its origin in the lush green forests of Silent Valley. In 1928 the location at Sairandhri on the Kunthipuzha River was identified as an ideal site for electricity generation. In 1970 Kerala State Electricity Board(KSEB) proposed a hydroelectric dam across the Kunthipuzha River that runs through Silent Valley, that will submerge 8.3 sq km of untouched moist evergreen forest. In February 1973, the Planning Commission approves the project at a cost of about Rs 25 crores.

4. Swachh Bharat Abhiyan (**SBA**) or **Clean India Mission**

Swachh Bharat Abhiyan (SBA) was a nation-wide campaign from 2014 to clean up the streets, roads and infrastructure of cities, towns, and rural areas. Its objectives included eliminating open defecation through the construction of household-owned and community-owned toilets and establishing an accountable mechanism of monitoring toilet use. Run by the Government of India, the mission aimed to achieve an "open-defecation free" (ODF) India by 2 October 2019, the 150th anniversary of the birth of Mahatma Gandhi,

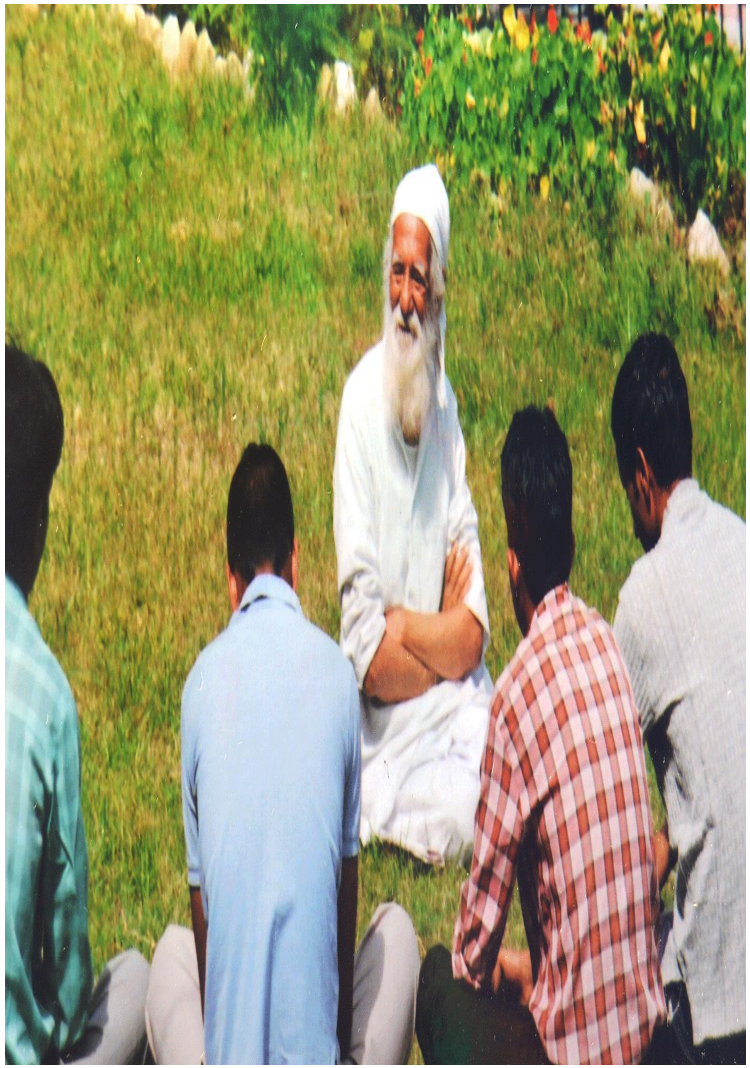
Environmental Activism

Sunita Narain has been with the Centre for Science and Environment (CSE) since 1982. She is currently the director general of the Centre and the treasurer of the Society for Environmental Communications and editor of the fortnightly magazine, Down To Earth.

Environmental Activism

Vandana Shiva is an Indian scholar, environmental activist, food sovereignty advocate, ecofeminist and anti-globalization author. Based in Delhi, Shiva has written more than 20 books. She is often referred as "Gandhi of grain" for her activism associated with anti-GMO movement.

Environmental Activism



Sunderlal Bahuguna (9 January 1927 – 21 May 2021) was an Indian environmentalist and Chipko movement leader. The idea of the Chipko movement was suggested by his wife. He fought for the preservation of forests in the Himalayas, first as a member of the Chipko movement in the 1970s, and later spearheaded the anti-Tehri Dam movement from the 1980s to early 2004. He was one of the early environmentalists of India, and later he and others associated with the Chipko movement and started taking up wider environmental issues, such as being opposed to large dams.

Environmental Activism

Medha Patkar is an Indian social activist working on various crucial political and economic issues raised by tribals, dalits, farmers, labourers and women facing injustice in India. She is an alumnus of TISS, a premier institute of social science research in India.

Important Web-Links-Lecture 26

Reading Material

http://collegesat.du.ac.in/UG/Envinromental%20Studies_ebook.pdf

https://www.nature.com/scitable/knowledge/environmental-ethics-96467512/

https://www.conserve-energy-future.com/environmental-ethics.php

Acknowledgment

Some images, animation, and material have been taken from the following sources:

1- Text Books: PERSPECTIVE IN ENVIRONMENTAL STUDIES by ANUBHA KAUSHIK, C P KAUSHIK, NEW AGE INTERNATIONAL PUBLISHERS

2- References Book: TEXT BOOK OF ENVIRONMENTAL STUDIES by D. DAVE AND S. S. KATEWA, CENGAGE LEARNING

3- All slides can be used for reading purpose only

Important Video/Web Link

https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf

https://www.nrdc.org/stories/global-warming-101#warming

https://www.nationalgeographic.com/environment/global-warming/acid-rain/

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