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SAVING MOTHER EARTH FROM THE DISASTROUS EFFECTS OF CLIMATE CHANGE

** Dr. Jyoti Ramesh Singh,*

** Gurunanak College of Education & Research, Maharashtra, Mumbai.*

Abstract:

Climate is the usual weather of a place. Climate can be different for different seasons. A place might be mostly warm and dry in the summer. The same place may be cool and wet in the winter. Different places can have different climates. There's also Earth's climate. Earth's climate is what you get when you combine all the climates around the world together.

What is Climate Change?

Climate change is a change in the usual weather found in a place. This could be a change in how much rain a place usually gets in a year. Or it could be a change in a place's usual temperature for a month or season. Climate change is also a change in Earth's climate. This could be a change in Earth's usual temperature. Or it could be a change in where rain and snow usually fall on Earth. Weather can change in just a few hours. Climate takes hundreds or even millions of years to change.

Is Earth's Climate Changing?

Earth's climate is always changing. There have been times when Earth's climate has been warmer than it is now. There have been times when it has been cooler. These times can last thousands or millions of years. People who study Earth see that Earth's climate is getting warmer. Earth's temperature has gone up about one degree Fahrenheit in the last 100 years. This may not seem like much. But small changes in Earth's temperature can have big effects.

Some effects are already happening. Warming of Earth's climate has caused some snow and ice to melt. The warming also has caused oceans to rise. And it has changed the timing of when certain plants grow.

What is Causing Earth's Climate to Change?

Many things can cause climate to change all on its own. Earth's distance from the sun can change. The sun can send out more or less energy. Oceans can change. When a volcano erupts, it can change our climate.

Most scientists say that humans can change climate too. People drive cars. People heat and cool their houses. People cook food. All those things take energy. One way we get energy is by burning coal, oil and gas. Burning these things puts gases into the air. The gases cause the air to heat up. This can change the climate of a place. It also can change Earth's climate.

Causes of climate change:

Climate is influenced by a multitude of factors that operate at timescales ranging from hours to hundreds of

ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

millions of years. Many of the causes of climate change are external to the Earth system. Others are part of the Earth system but external to the atmosphere. Still others involve interactions between the atmosphere and other components of the Earth system and are collectively described as feedbacks within the Earth system.

Solar variability:

The luminosity, or brightness, of the Sun has been increasing steadily since its formation. This phenomenon is important to Earth's climate, because the Sun provides the energy to drive atmospheric circulation and constitutes the input for Earth's heat budget. Radiative energy from the Sun is variable at very small timescales, owing to solar storms and other disturbances, but variations in solar activity, particularly the frequency of sunspots, are also documented at decadal to millennial timescales and probably occur at longer timescales as well.

Volcanic activity:

Volcanic activity can influence climate in a number of ways at different timescales. Individual volcanic eruptions can release large quantities of sulphur dioxide and other aerosols into the stratosphere, reducing atmospheric transparency and thus the amount of solar radiation reaching Earth's surface and troposphere. Volcanoes and related phenomena, such as ocean rifting and subduction, release carbon dioxide into both the oceans and the atmosphere.

Tectonic activity:

Tectonic movements of Earth's crust have had profound effects on climate at timescales of millions to tens of millions of years. These movements have changed the shape, size, position, and elevation of the continental masses as well as the bathymetry of the oceans. Topographic and bathymetric changes in turn have had strong effects on the circulation of both the atmosphere and the oceans. Tectonic activity also influences atmospheric chemistry, particularly carbon dioxide concentrations. Carbon dioxide is emitted from volcanoes and vents in rift zones and subduction zones.

Orbital variations:

The orbital geometry of Earth is affected in predictable ways by the gravitational influences of other planets in the solar system. Three primary features of Earth's orbit are affected, each in a cyclic, or regularly recurring, manner. First, the shape of Earth's orbit around the Sun, varies from nearly circular to elliptical (eccentric), with periodicities of 100,000 and 413,000 years. Second, the tilt of Earth's axis with respect to the Sun, which is primarily responsible for Earth's seasonal climates, varies between 22.1° and 24.5° from the plane of Earth's rotation around the Sun. The third cyclic change to Earth's orbital geometry results from two combined phenomena: Earth's axis of rotation wobbles, changing the direction of the axis with respect to the Sun, and the orientation of Earth's orbital ellipse rotates slowly. These two processes create a 26,000-year cycle, called precession of the equinoxes, in which the position of Earth at the equinoxes and solstices changes.

Greenhouse gases:

Greenhouse gases are gas molecules that have the property of absorbing infrared radiation (net heat energy) emitted from Earth's surface and reradiating it back to Earth's surface, thus contributing to the phenomenon

ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

known as the greenhouse effect. Carbon dioxide, methane, and water vapour are the most important greenhouse gases, and they have a profound effect on the energy budget of the Earth system despite making up only a fraction of all atmospheric gases.

Human activities:

Recognition of global climate change as an environmental issue has drawn attention to the climatic impact of human activities. Most of this attention has focused on carbon dioxide emission via fossil-fuel combustion and deforestation. Human activities also yield releases of other greenhouse gases, such as methane (from rice cultivation, livestock, landfills, and other sources) and chlorofluorocarbons (from industrial sources). There is little doubt among climatologists that these greenhouse gases affect the radiation budget of Earth; the nature and magnitude of the climatic response are a subject of intense research activity. Many climatologists have pointed to this warming pattern as clear evidence of human-induced climate change resulting from the production of greenhouse gases.

Effects:

The effects of climate change impact the physical environment, ecosystems, and human societies. The environmental effects of climate change are broad and far-reaching. They affect the water cycle, oceans, sea and land ice (glaciers), sea level, as well as weather and climate extreme events. The changes in climate are not uniform across the Earth. Climate change has degraded land by raising temperatures, drying soils and increasing wildfire risk.

An increase in sea surface temperature as well as ocean temperatures at greater depths. More frequent marine heatwaves, a reduction in pH value, a rise in sea level from ocean warming and ice sheet melting, sea ice decline in the Arctic, increased upper ocean stratification, reductions in oxygen levels, increased contrasts in salinity. Changes to ocean currents including a weakening of the Atlantic meridional overturning circulation, and stronger tropical cyclones and monsoons. The uptake of carbon dioxide from the atmosphere is leading to ocean acidification. All these changes have knock-on effects which disturb marine ecosystems.

Rain and snow:

Warming by greenhouse gas forcing has increased contrasts in rainfall amounts between wet and dry seasons. Warming has also resulted in a detectable increase in the precipitation of northern high latitudes. Higher temperatures lead to increased evaporation and surface drying. Widespread increases in heavy precipitation have occurred even in places where total rain amounts have decreased. The rising temperatures and extra heat will "intensify" the Earth's water cycle. Increased atmospheric water vapour results in more frequent and intense downpours and causes stronger extended droughts in certain regions. As a result, storm-affected areas are likely to experience increases in precipitation and an increased risk of flooding.

Heat waves and temperature extremes:

Large increases in both the frequency and intensity of extreme weather events (for increasing degrees of global warming) are expected.

Global heating boosts the probability of extreme weather events such as heat waves where the daily maximum

ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

temperature exceeds the average maximum temperature by 5 °C (9 °F) for more than five consecutive days. In the last 30–40 years, heat waves with high humidity have become more frequent and severe. Extremely hot nights have doubled in frequency. The area in which extremely hot summers are observed has increased 50–100 fold. Heat waves with high humidity pose a big risk to human health while heat waves with low humidity lead to dry conditions that increase wildfires. The mortality from extreme heat is larger than the mortality from hurricanes, lightning, tornadoes, floods, and earthquakes together.

Tropical cyclones and storms:

Climate change can affect tropical cyclones in a variety of ways: an intensification of rainfall and wind speed, a decrease in overall frequency, an increase in the frequency of very intense storms and a poleward extension of where the cyclones reach maximum intensity are among the possible consequences of human-induced climate change. Rapidly intensifying cyclones are hard to forecast and therefore pose additional risk to coastal communities.

Weather-related impacts:

A warming climate will intensify rainfall events. When floods occur in this warmer future, these floods will be more severe. Some regions will experience an increased in flooding, some a decrease. This depends on several factors, such as changes in snowmelt, soil moisture and rainfall. Global warming makes bigger storm events more common due to an intensification of the water cycle. A dry lakebed in California, which is in 2022 experiencing its most serious drought in 1,200 years, worsened by climate change.

Climate change affects multiple factors associated with droughts, such as how much rain falls and how fast the rain evaporates again. Warming over land drives an increase in atmospheric evaporative demand which will increase the severity and frequency of droughts around much of the world. The frequency and the duration of droughts have both increased. The prediction is that by 2050 more than 75% of humanity will live in drought conditions.

Wildfires:

Globally, climate change promotes the type of weather that makes wildfires more likely. In some areas, an increase of wildfires has been attributed directly to climate change. That warmer climate conditions pose more risks of wildfire is consistent with evidence from Earth's past: there was more fire in warmer periods, and less in colder climatic periods. Climate change increases evaporation, which can cause vegetation to dry out. When a fire starts in an area with very dry vegetation, it can spread rapidly. Higher temperatures can also make the fire season longer, the time period in which severe wildfires are most likely. In regions where snow is disappearing, the fire season may get particularly more extended. Even though weather conditions are raising the risks of wildfires, the total area burnt by wildfires has decreased globally. This is mostly the result of the conversion of savanna into croplands, after which there is less forest area that can burn.

Oceans:

Oceans have taken up over 90% of the excess heat accumulated on Earth due to global warming, reducing the amount of heat building up in the atmosphere.

ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

Among the effects of climate change on oceans are: an increase in sea surface temperature as well as ocean temperatures at greater depths, more frequent marine heatwaves, a reduction in pH value, a rise in sea level from ocean warming and ice sheet melting, sea ice decline in the Arctic, increased upper ocean stratification, reductions in oxygen levels, increased contrasts in salinity, changes to ocean currents including a weakening of the Atlantic meridional overturning circulation, and stronger tropical cyclones and monsoons. All these changes have knock-on effects which disturb marine ecosystems.

Warming of the ocean surface due to higher air temperatures leads to increased ocean temperature stratification. The decline in mixing of the ocean layers stabilises warm water near the surface while reducing cold, deep water circulation. The reduced up and down mixing reduces the ability of the ocean to absorb heat, directing a larger fraction of future warming toward the atmosphere and land. Energy available for tropical cyclones and other storms is expected to increase, nutrients for fish in the upper ocean layers are set to decrease, as is the capacity of the oceans to store carbon.

These changes disturb marine ecosystems, which can accelerate species extinctions or create population explosions, thus changing the distribution of species, and impact coastal fishing and tourism. Increase of water temperature will also have a devastating effect on various oceanic ecosystems, such as coral reefs. The direct effect is the coral bleaching of these reefs, which live within a narrow temperature margin, so a small increase in temperature would have a drastic effect in these environments. Ocean acidification and temperature rise will also affect the productivity and distribution of species within the ocean, threatening fisheries and disrupting marine ecosystems. Loss of sea ice habitats due to warming will severely impact the many polar species which depend on this sea ice. Many of these climate change pressures interact, compounding the pressures on the climate system and on ocean ecosystems.

Ice:

Melting of glacial mass is approximately linearly related to temperature increase. The cryosphere, the area of the Earth covered by snow or ice, is extremely sensitive to changes in global climate. Northern Hemisphere average annual snow cover has declined in recent decades. This pattern is consistent with warmer global temperatures.

The melting of the Greenland and West Antarctic ice sheets will continue to contribute to sea level rise over long time-scales. The Greenland ice sheet loss is mainly driven by melt from the top, whereas Antarctic ice loss is driven by warm ocean water melting the outlet glaciers. As the climate warms, snow cover and sea ice extent decrease.

Wildlife and nature:

Recent warming has strongly affected natural biological systems. Species worldwide are moving poleward to colder areas. On land, species may move to higher elevations, whereas marine species find colder water at greater depths.

Climate change has been estimated to be a major driver of biodiversity loss in cool conifer forests, savannas, mediterranean-climate systems, tropical forests, and the Arctic tundra. In other ecosystems, land-use change may be a stronger driver of biodiversity loss, at least in the near-term. Beyond the year 2050, climate change may be

ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

the major driver for biodiversity loss globally. Climate change interacts with other pressures such as habitat modification, pollution and invasive species. Interacting with these pressures, climate change increases extinction risk for a large fraction of terrestrial and freshwater species

Amazon rainforest:

Rainfall that falls on the Amazon rainforest is recycled when it evaporates back into the atmosphere instead of running off away from the rainforest. This water is essential for sustaining the rainforest. Due to deforestation the rainforest is losing this ability, exacerbated by climate change which brings more frequent droughts to the area. The higher frequency of droughts seen in the first two decades of the 21st century, as well as other data, signal that a tipping point from rainforest to savanna might be close.

Marine ecosystems:

Marine heatwaves have seen an increased frequency and have widespread impacts on life in the oceans, such as mass dying events and coral bleaching. Harmful algae blooms have increased in response to warming waters, loss of oxygen and eutrophication. Between one-quarter and one-third of our fossil fuel emissions are consumed by the earth's oceans, which are now 30 percent more acidic than they were in pre-industrial times. This acidification poses a serious threat to aquatic life, particularly creatures such as oysters, clams, and coral with calcified shells or skeletons.

Warm water coral reefs are very sensitive to global warming and ocean acidification. Coral reefs provide a habitat for thousands of species and ecosystem services such as coastal protection and food. The resilience of reefs can be improved by curbing local pollution and overfishing, but 70–90% of today's warm water coral reefs will disappear even if warming is kept to 1.5 °C.

Tipping points and irreversible impacts:

The climate system exhibits "threshold behaviour" or tipping points when these feedbacks lead parts of the Earth system into a new state, such as the runaway loss of ice sheets or the destruction of forests. Tipping points are perhaps the most 'dangerous' aspect of future climate changes, leading to irreversible impacts on society. Many tipping points are interlinked, so that triggering one may lead to a cascade of effects.

There are a number of climate change impacts on the environment that may be irreversible, at least over the timescale of many human generations. These include the large-scale singularities such as the melting of the Greenland and West Antarctic ice sheets, and changes to the Atlantic Meridional Overturning Circulation. In biological systems, the extinction of species would be an irreversible impact. In social systems, unique cultures may be lost or the survival of endangered languages may be exacerbated due to climate change.

Health and food security:

The effects of climate change on human health include direct effects of extreme weather, leading to injury and loss of life, as well as indirect effects, such as undernutrition brought on by crop failures or a lack of access to safe drinking water.

Health is also acutely impacted by extreme weather events (floods, hurricanes, droughts, wildfires) through injuries, diseases and air pollution in the case of wildfires. Other health impacts from climate change include

ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

migration and displacement due rising sea levels; food insecurity and undernutrition, reduced availability of drinking water, increased harmful algal blooms in oceans and lakes and increased ozone levels as an additional air pollutant during heatwaves.

The effects of climate change on mental health and well-being can be rather negative, especially for vulnerable populations and those with pre-existing serious mental illness. The direct pathway includes stress related conditions being caused by exposure to extreme weather events, such as post-traumatic stress disorder (PTSD). Mental health outcomes have been measured in several studies through indicators such as psychiatric hospital admissions, mortality, self-harm and suicide rates. Vulnerable populations and life stages include people with pre-existing mental illness, Indigenous peoples, children and adolescents. The emotional responses to the threat of climate change can include eco-anxiety, ecological grief and eco-anger.

Climate change will impact agriculture and food production around the world due to the effects of elevated CO2 in the atmosphere; higher temperatures; altered precipitation and transpiration regimes; increased frequency of extreme events; and modified weed, pest, and pathogen pressure. Droughts result in crop failures and the loss of pasture for livestock. Loss and poor growth of livestock cause milk yield and meat production to decrease. In many areas, fisheries have already seen their catch decrease because of global warming and changes in biochemical cycles.

Water security:

Water resources can be affected by climate change in various ways. The total amount of freshwater available can change, for instance due to dry spells or droughts. Heavy rainfall and flooding can have an impact on water quality: pollutants can be transported into water bodies by the increased surface runoff. In coastal regions, more salt may find its way into water resources due to higher sea levels and more intense storms. Higher temperatures also directly degrade water quality: warm water contains less oxygen.

Global climate change is "likely to increase the complexity and costs of ensuring water security. Changes in the water cycle threaten existing water infrastructure and make it harder to plan future investments that can cope with uncertain changes in hydrologic variability. This makes societies more vulnerable to extreme water-related events and therefore increases water insecurity.

Economic impacts:

Climate change has contributed towards global economic inequality. Wealthy countries in colder regions have either felt little overall economic impact from climate change, or possibly benefited, whereas poor hotter countries very likely grew less than if global warming had not occurred. Thermal power stations (fossil fuel plants and nuclear power plants) depend on water to cool them. Not only is there increased demand for fresh water, but climate change can increase the likelihood of drought and fresh water shortages. The result of diminished river flow can be a power shortage in areas that depend heavily on hydroelectric power.

Oil and natural gas infrastructure is affected by the effects of climate change and the increased risk of disasters such as storm, cyclones, flooding and rising sea levels.Roads, airport runways, railway lines and pipelines,

ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

(including oil pipelines, sewers, water mains etc.) may require increased maintenance and renewal as they become subject to greater temperature variation.

Impacts on societies:

Climate change impacts health, the availability of drinking water and food, inequality and economic growth. The effects of climate change are often interlinked and can exacerbate each other as well as existing vulnerabilities. The impacts are often exacerbated by related environmental disruptions and pressures such as pollution and biodiversity loss. Some areas may become too hot for humans to live in. People in some areas may experience internal or long-distance displacement (and thus become climate refugees) triggered by climate change related changes or disasters.

Displacement and migration:

Climate change affects displacement of people in several ways. Involuntary displacement may increase through the increased number and severity of weather-related disasters which destroy homes and habitats. Effects of climate change such as desertification and rising sea levels gradually erode livelihood and force communities to abandon traditional homelands for more accommodating environments. On the other hand, some households may fall into poverty due to climate change, limiting their ability to move to areas less affected.

Conflict:

Climate change can worsen conflicts by exacerbating tensions over limited resources like drinking water (in the case of water conflicts). Climate change also has the potential to cause large population dislocations and migration, which can also lead to increased tensions. However, factors other than climate change are judged to be substantially more important in affecting conflict. These factors include intergroup inequality and low socio-economic development. In some cases, climate change can even lead to more peaceful relationships between groups, as environmental problems require common policy to be developed.

Social impacts on vulnerable groups:

The impacts of climate change on humans are not distributed uniformly within communities. Individual and social factors such as gender, age, education, ethnicity, geography and language lead to differential vulnerability and capacity to adapt to the effects of climate change. The following more vulnerable groups have been identified:

People living in poverty: Climate change disproportionally affects poor people in low-income communities and developing countries around the world. Those in poverty have a higher chance of experiencing the ill-effects of climate change due to the increased exposure and vulnerability

Women: Climate change increases gender inequality, reduces women's ability to be financially independent, and has an overall negative impact on the social and political rights of women, especially in economies that are heavily based on agriculture.

Indigenous peoples: Indigenous communities geographically tend to be located in regions more vulnerable to climate change such as native rainforests, the Arctic, and coastal areas. Indigenous communities across the globe generally have economic disadvantages that are not as prevalent in non-indigenous communities due to the

ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

ongoing oppression they have experienced.

Children: The Lancet review on health and climate change lists children as the worst-affected category by climate change. Children are also 14–44 percent more likely to die from environmental factors, again leaving them the most vulnerable. Those in urban areas will be affected by lower air quality and overcrowding, and will struggle the most to better their situation.

Racial minorities: The environmental justice (EJ) movement and climate justice (CJ) movement address environmental racism in bringing attention and enacting change so that marginalized populations are not disproportionately vulnerable to climate change and pollution.

Human settlements:

A 2020 study projects that regions inhabited by a third of the human population could become as hot as the hottest parts of the Sahara within 50 years without a change in patterns of population growth and without migration, unless greenhouse gas emissions are reduced. The projected annual average temperature of above 29 °C for these regions would be outside the human temperature niche.

In small islands and megadeltas, inundation as a result of sea level rise is expected to threaten vital infrastructure and human settlements. This could lead to issues of statelessness for populations in countries such as the Maldives and Tuvalu and homelessness in countries with low-lying areas such as Bangladesh. Climate change threatens the health and survival of urban trees and the various benefits they deliver to urban inhabitants.

Possibility of societal collapse:

Several researchers have suggested that collapse of the current societal organization – the contemporary global, interconnected civilization – could occur at 3 degrees of warming, especially when considering that climate change is not the only environmental pressure and challenge humanity faces.

Severe impacts of climate change can combine, including with climate-unrelated, concurrent risks such as worldwide pollution, fragility, resource depletion, political disenchantment, poverty or wealth inequality, and biotechnology risk, to result in a confluence of developments that cause a drastically aggravated impact on societies or humanity – such or multiple concurrent crises are sometimes referred to as a perfect storm.

Disaster Management:

The Indian subcontinent due to its unique geographical locational, and geological features has the distinction of being one of the most vulnerable areas to natural hazards, causing colossal losses of life and property. The country is visited by almost all kinds of natural disasters like floods, cyclones, droughts, earthquakes, landslides, avalanches and forest fires.

All such situations require disaster management as discussed below:

Drought Management: Drought occurs mainly due to low and uncertain rainfall, particularly during the cropping season. This requires an effective policy and strong institutional support. The development policy must deal directly with poverty, which is the root cause of drought-famine relationship.

Promotion of sustainable agricultural sector should be geared to increase in production in order to attain national and regional food self-reliance, enhance employment and generate income. Drought management through

ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

resources management approach received wider emphasis in the low rainfall regions to manage the drought conditions. One of them is to increase the moisture availability by bringing more water to the site from different layers and making more efficient use of water. Agronomic practices supplemented by land configuration play a vital role in managing scarce water for crop production. These include minimum tillage, early planting, crop substitution, mulching, inter-cropping, bonding and water harvesting etc.

Drought management through crop management should be by the technologies designed to mitigate the adverse effect of low average rainfall. These technologies give good yield stability and performance, and good returns even during the low rainfall years.

Flood Management: The first priority after floods is to provide food to people, first aid and portable shelter. Rehabilitation is the re-establishment of basic community services and the restoration of basic living conditions. Emotional counselling process should take place to enable survivors to resume normal life. People face many water-borne diseases during floods. Water-borne diseases are those in which infectious agents remain alive in drinking water i.e. typhoid, para-typhoid and gastro-enteritis etc. Further, malaria, skin ulcers, scabies and amoebic dysentery are general diseases during floods.

It is the duty of local health department to control diseases by providing free medical help to the suffering people. Early warning system plays a vital role in minimising any kind of disaster. There has been meteorological observation over various catchments.

In the warning system, early detection and appropriate citizen response to these warnings have been very effective in reducing the impact of disaster. But the problem is that many district headquarters are totally cut-off from the State headquarter and neighbouring districts due to damaged cables or submerged telephone exchanges. Consequently, the need for reserve and relief operations cannot be communicated to the State headquarters. In order to overcome this problem, Public Switched Telephone Network (PSTN) line has been started which connects all Government and private offices, police stations, fire stations, hospitals and majority of homes and business places by transmitting and receiving voice, fax and data. The use of wireless phones such as mobile phones also helps.

There should be enhanced afforestation in the flood prone areas, thereby reducing the capacity of weathering and erosion of hill slopes. Further, construction of installations, houses and other structures on the old place of channel of a river should be avoided.

Cyclone and Tsunami Management: Relief measures should be started immediately after the cyclone or tsunami. It requires short-term emergency measures like rescue, relief, water pumps, and machines to remove debris and communication equipment's. The disaster management should take into account the entire resource inventory and resource damages of the cyclone prone region to solve the crisis of devastation. The resources include social, economic, human and Environmental resources.

The prediction of cyclone or tsunami may be made on the basis of past history of the affected area. Since tsunamis occur seldom, there is need to acquire tsunami warning system. The re-establishment of basic community services and the restoration of basic living conditions should be done on war-footing. People face many water-

ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

borne diseases during floods. Water-borne diseases are those in which infection agents remain alive in drinking water such as typhoid, para-typhoid and gastro-enteritis etc. Further, malaria, skin ulcer, scabies and amoebic dysentery are general diseases during cyclone.

It is the duty of local health department to control diseases by providing free medical help to the suffering people. Early warning system plays a vital role in minimising any kind of disaster. There has been meteorological observation over various catchments. In the warning system, early detection and appropriate citizen response to these warnings have been very effective in reducing the impact of disaster. The Indian Meteorological Department has a role in predicting and making preparedness for cyclones and tsunamis.

Earthquake Management: Mitigation is a cornerstone of emergency management. It is an ongoing effort to lessen the impact that the earthquakes have on people, property and infrastructure. In most cases, the structural inadequacy of the building structures, especially the houses, to stand up against the earthquake is the single major cause of the loss of life and property. The recent example is the disaster during the Gujarat earthquake in multi-storied buildings, well within the municipal limits of Ahmedabad, Gandhi Dham and Bhuj etc. Constructed by unethical builders, this was the main cause of needless deaths in these towns during the Gujarat earthquake.

There is no mention of the consideration of natural disasters in the shifting and planning of the settlements in the National Capital Regional Planning Board Act of 1985. Amendments have however been made after the Gujarat earthquake in some of these byelaws by making a reference to National Building Code and other relevant codes of practice and thus attempts have been made to incorporate safety provisions. Emotional counselling process should take place to enable survivors to resume normal life. Research has shown that early emotional counselling hastens recovery.

Earthquake management measures should include the following:

(a) Minimum construction works should be done in earthquake prone areas;

(b) There should be a check on mining and construction of big dams;

(c) Promotion of earthquake resistant housing construction with strict enforcement of model building byelaws; and

(d) Lessons learnt in the earthquakes of Gujarat and Jammu & Kashmir should be carried forward to other earthquake vulnerable States of India.

Disaster education plays a significant role in disaster reduction, such as an earthquake. It arouses awareness about the environmental hazards. NGO's may support the education system through organizing seminars, workshops and exhibitions etc. They may also be helpful in providing such practical training to the college students under the guidance of trained instructors when some disaster may happen at local/regional level. Public awareness about disaster management by means of holding street or village meetings at the Panchayat level can also help.

The public awareness programme should include the following safety measures during the earthquake situation:

1. Identify a safe place in each room of your house.
2. Identify emergency exist in your house and always keep it clear.

ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

3. Plan safe evacuation of children, elderly and the physically handicapped persons on priority.
4. Keep helmets, rope, crowbar, axe, fire-extinguishers and other tools handy in your house. These could be useful.
5. Make family emergency kit with first aid box, essential medicines, family prescriptions, cash, torch, transistor, extra batteries, dry food items, drinking water, whistle, clothes, and sleeping kit etc.
6. If indoors on the ground floor, move out quickly to an open space.
7. If outdoors, move to an open space away from buildings, overhead power lines and bridges etc.
8. If driving a vehicle, pull to the side of the road and stop. Move away from flyovers, electric lines and poles or advertisement hoardings etc.
9. If trapped in a building, whistle or shout to draw attention.
10. Do not use a staircase or a lift as these are not safe and may collapse.

National Calamity Management Act, 2000:

The Act is meant to institutionalise a mechanism at national, state and district levels for responding to natural disasters.

Objectives of the Act:

The Act has the following objectives:

(a) To ensure the efficiency and effective management of natural and other calamities.

(b) To achieve a greater coordination and responsiveness in respect of prevention and mitigation of disaster.

(c) To provide for better relief and rehabilitation of the victims of disasters.

National Calamity Contingency Fund:

There shall be a National Calamity Contingency Fund in the nature of an imprest which shall remain at the disposal of the President of India to enable advances to be made by him out of this fund for meeting the urgent and unforeseen expenditure for the purpose of calamity management and for more effectively carrying out the objectives of this Act.

At the national level, the Ministry of Home Affairs is the nodal authority to coordinate disaster management activities. But the State Governments have been given the main responsibility of managing natural disasters of all types.

Powers and Functions of the State Government:

(i) Subject to the provisions of this Act and subject to the general control and supervision by the Government of India, the State Government shall have the power to take all such measures, as it deems necessary or expedient for the purpose of preventing and managing calamities.

(ii) Such measures may include measures with respect to all or any of the following matters, namely.

(a) Co-ordination of actions taken by officers, officials and other authorities and Non-Governmental Organisations (NGOs) under this Act or Rules made there under or under any other law.

(b) Planning and execution of a State-wise programme for management of disasters caused by calamities.

(c) Laying down procedures and safeguards for management of calamities.

ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

(d) Collection and dissemination of information in respect of matters relating to calamities including propagation of vital information affecting the public.

(e) Preparation of manuals, codes, or guidelines relating to management of calamities and updating thereof from time to time.

(iii) The State Government may constitute a Standing Technical Committee for the purpose of facilitating procurement related to calamity management and assuring the quality of material, equipment's and services to be procured in connection therewith.

(iv) The State Government shall appoint a State Relief Commissioner who shall be an officer not below the rank of the Secretary to that Government and may appoint an Additional State Relief Commissioner or such other officer or officers to assist the State Relief Commissioner in discharging his functions for the purpose of calamity management.

(v) The State Government may also appoint any officer or officers as District Relief Commisisoner(s) at the District level in addition to the District Magistrate of the District and officer(s) so appointed shall be responsible for performing all functions relating to calamity management within his territorial jurisdiction.

(vi) The State Government may empower the State Relief Commissioner and other officers and authorities to exercise such powers and to perform such functions as might be required for more effectively carrying out the objectives of this Act.

(vii) It shall be the duty of the State Government to notify the calamity prone areas for the general information of the public and also for the purpose of implementation of the provisions of the Act or Rules made there under.

(viii) The State Government shall draw up a plan for calamity management in advance and ensure that the concerned officials and local inhabitants are given adequate training for the successful execution of the plan.

(ix) The State Government shall declare an area where a calamity has occurred to be a calamity affected area and then it would be the bonded duty of all concerned authorities to take necessary actions required for carrying out the objectives of the Act.

(x) Notwithstanding anything contained in any other law but subject to the provisions of this Act, the State Government, in exercise of its powers and performance of its functions may frame Rules under this Act and/ or issue directions or orders in writing to any person, officer, or authority and such person, officer, or authority shall be bound to comply with such directions or orders.

Disaster Management in India:

Disasters are being managed in India through close coordination among Central, State and local governments and various NGOs. At the level of Central Government, the Ministry of Home Affairs is the nodal agency for coordinating management activities of all natural disasters, except drought which is managed by the Ministry of Agriculture.

There are a number of decision-making bodies for disaster management at the Central level. In the case of a natural disaster, the Union Cabinet and the concerned ministers headed by the Prime Minister decide and review

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Educreator Research Journal

VOLUME–X, ISSUE– V SEPT – OCT 2023

Original Research Article

about the steps being taken. Funds for help are sanctioned out of the Prime Minister's Relief Fund. There is the National Management Committee under the Chairmanship of the Cabinet Secretary. This Committee appoints a Crisis Management Group under the Chairmanship of the Central Relief Commissioner with officers from the concerned Ministries and Departments to decide about measures for dealing with the natural disaster and to review contingency plans. A number of technical organizations such as Indian Meteorological Department for Earthquakes and Cyclone, Central Water Commission for Floods, Defence Research & Development Organization for Nuclear and Biological Disasters, Director General of Civil Defence, etc. provide support for coordination and management functions in case of a natural disaster.

The responsibility of managing disasters is primarily of the State Government. The role of the Central Government is to support the State Government efforts by supplementing physical and financial resources. In the event of a natural disaster in the State, a State level committee under the Chief Secretary of the State is appointed which is in overall charge of the relief operations. The State Relief Commissioner is appointed in-charge of the relief and rehabilitation measures who works under the overall direction and control of the State level committee. All States have State Relief Code which is a relief manual and the State Contingency Plan which guide them to manage various types of natural disasters.

At the district level, the District Magistrate/Collector/Commissioner carries out all government plans and activities for disaster management. A District Management Committee is set up under the District Magistrate with officials from the Health, Irrigation, Veterinary, Water and Sanitation Departments, etc. and representatives of NGOs as members of this Committee. It helps in the preparation of District Disaster Management Plan and appoints District Management Teams which are action groups trained in latest technologies of natural disasters like the health and fire services, etc.

At the Block/Taluka level, the nodal officer is the Block/Taluka Development Officer for the disaster management activities. There is the Disaster Management Committee at the Block/Taluka level under the BDO. The members of the Committee are officers from the departments of Health, Social Welfare, Rural Water and Sanitation, Police, etc., NGOs, eminent senior citizens, elected representatives, etc. This Committee helps in preparing the Block Disaster Management Plan and coordinates the activities of Disaster Management Teams. There is also the Village Disaster Management Committee at the grassroots level under the Sarpanch or Village Headman which prepares the Village Disaster Management Plan, coordinates the activities of various agencies and forms the Disaster Management Teams with the help of the village Panchayat.

Besides, there are various institutions that are involved in disaster management in the country. They are the Police, Army and Paramilitary forces, NCC, NSS, Home Guards, Fire Services, Youth organisations, NGOs, UN agencies, media, etc.

Conclusion:

No country is immune from the harmful effects of extreme weather and disasters; and no country can afford to be complacent in preparing to face them. No country should forget the old maxim: An ounce of prevention is worth a pound of cure. One dollar invested in disaster management today can save about seven dollars tomorrow

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Educreator Research Journal

VOLUME–X, ISSUE– V

SEPT – OCT 2023

Original Research Article

in relief and rehabilitation costs, besides saving millions of lives.

Countries should build "smarter and safer" disaster-resistant constructions in high-risk regions. To prevent huge loses of people and property in disaster-prone require large funds and new technologies. Toward this end, the U.N. has formed a new global partnership of governments, the World Bank, NGOs and civic groups. Besides, the World Bank's new Global Facility for Disaster Reduction and Recovery will provide funds to support the use of disaster-resilient technology, design and construction in 86 disaster-prone countries.

People must be prepared to face natural hazards. This requires a good warning and communication system and educating the people to take immediate measures to save themselves. Governments should have well-prepared evacuation plans, better land usage and environmental policies, public awareness campaigns, and emergency broadcasting systems to reduce disaster risk.

References:

Lindsey, Rebecca; Dahlman, Luann (28 June 2022). *"Climate Change: Global Temperature"*. National Oceanographic and Atmospheric Administration.

Trenberth, Kevin E. (2022). *The Changing Flow of Energy Through the Climate System* (1 ed.). Cambridge University Press. doi:10.1017/9781108979030. ISBN 978-1-108-97903-0. S2CID 247134757.

Settele, J.; Scholes, R.; Betts, R.; Bunn, S.; et al. (2014). *"Chapter 4: Terrestrial and Inland Water Systems"*. IPCC AR5 WG2 A 2014. p. 300.

Hoegh-Guldberg, O.; Jacob, D.; Taylor, M.; Bindi, M.; et al. (2018). *"Chapter 3: Impacts of 1.5ºC Global Warming on Natural and Human Systems"*. IPCC SR15 2018. pp. 212–213, 228, 252

Thomas R. Karl; Jerry M. Melillo; Thomas C. Peterson (eds.). *"Global Climate Change"*. Global Climate Change Impacts in the United States. pp. 22–24.

Glavovic, B.; Oppenheimer, M.; Abd-Elgawad, A.; Cai, R.; Cifuentes-Jara, M.; et al. (2019). *"Chapter 4: Sea Level Rise and Implications for Low Lying Islands, Coasts and Communities"* IPCC SROCC 2019. p. 362.

Barnett, Jon; Adger, W. Neil (December 2003). *"Climate Dangers and Atoll Countries"*. Climatic Change. 61 (3): 321–337.

Neslen, Arthur (21 March 2019). *"Climate change could make insurance too expensive for most people – report"*. The Guardian.

McElwee, Pamela (1 November 2021). *"Climate Change and Biodiversity Loss"*. Current History. 120 (829): 295–300.

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