Climate Change and Environmental Issues

Proceedings of National Seminar

Held on 31st January, 2023

Published by
PUBLICATION CELL, BIJNI COLLEGE, BIJNI.

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Organised by
BIJNI COLLEGE
BIJNI

In Collaboration with
District Administration, Chirang, Kajolgaon
On the occasion of
G-20/Y-20 EVENT

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Publication Cell, Bijni College, Bijni.

This is the Proceedings of National Seminar on *Climate Change and Environmental Issues* conducted on 31st January, 2023 *by* Bijni College, Bijni in Collaboration with District Administration, Chirang, Kajolgaon on the occasion of G-20/Y-20 Event. This is a compilation of the papers presented in the seminar by the participants. This compilation is jointly edited *by* Dr. Sewali Pathak *&* Abhijit Ray.

Year of Publication : 2023
Published by : Publication Cell, Bijni College, Bijni.
Price : Rs.200.00

ISBN: 978-81-962480-3-1

Printed at **Vicky Communication & Associates**
Vivekananda Path, H. No. 19, G.S. Road, Ulubari, Guwahati 781 007
Ph : +91 99541 40044

MESSAGE FROM THE PRINCIPAL, BIJNI COLLEGE, BIJNI

I am very glad to know that the Bijni College, Bijni and District Administration, Chiranghave jointly organized National Seminar on "Climate Change and Environmental Issues" to be held on 31st January, 2023 on the occasion of G-20/Y-20 Event.The organizing team plans to publish the proceedings with the precious contributionsfrom scholars and participants from different parts of the Nation. It will represent the spirit of the seminar reflecting and representing the concerns, thoughts and efforts in various fields of environmental issues and climate change. This will go a long way in augmenting united efforts of the people concerned in creating a knowledge base for the humanity.

I wish this publication a grand success.

Place: Bijni
Date: 05.08.2023

(Dr. Birhash Giri Basumatary)
Principal,
Bijni College, Bijni

From the Desk of
EDITORIAL BOARD

It is a great pleasure and a glorious achievement for Bijni College to organize a National Seminar on **"Climate Change and Environmental Issues"** in collaboration with District Administration, Chirang on the occasion of G-20/Y-20 Event. This noteworthy programme has been made possible by the kind consent and active co-operation of the resource persons from different fields, **Dr. Anjan Chakrabarti,** Professor-Director, UGC-Human Resource Development Centre, University of North Bengal and **Dr. Hemen Sarma**, Associate Professor, Head, Department of Botany, Bodoland University and the paper presenters and participants. Our hearty welcome and congratulation remain to all the above personalities throughout the seminar.

It has been well recognized that climate change and environmental issues like global warming, ozone layer depletion, acid rain, pollution, hazards, disasters, health epidemics and loss of biodiversity are not merely of national issues but are of global issues and hence must be tackled with joint efforts and co-operation across globe. Our current lifestyle will have to be re-laid if we want to stop further environmental destruction.We must find solutions that would enable sustainability of our current lifestyle without further degradation of our environment and deterioration of our life respectively. It is time for us to brain-storm, work together and chart new courses of action that will save our planet from global environmental disaster. The paper presenters have come together with their innovative ideas in favor of environment. Saving our environment means ensuring wellbeing for our future generations and giving them chance to enjoy many beautiesthat the

planet offers. We are elated to organize this seminar as we may together make efforts to find the solutions to different complex environmental issues by publishing the scholarly papers in this proceeding.

With Best Wishes

Title and Authors for Proceeding of
"Climate Change and Environmental Issues"
held on 31st January, 2023

ECOLOGICAL IMPACTS OF SACRED GROVES AMONG THE TRIBALS OF ASSAM

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Abstract

India is home to numerous tribal groups and communities, each contributing significantly to environmental conservation and biodiversity through their religious and traditional beliefs. The natural climax of vegetation, known as sacred groves, holds a special place in this context. These groves are believed to house deities, accompanied by various folklore. Trees like Banyan, sacred fig, Neem, and tamarind are revered as the dwelling places of spirits, leading to worship practices. Consequently, these sacred groves have evolved into vital hubs for conserving diverse flora and fauna on multiple levels. The author has endeavoured to explore the existence of sacred groves among Assam's diverse tribal communities, aiming to understand their impact on environmental conservation in the region.

Key words: Sacred groves, Environment, Tribals, Assam

Introduction:

Nature worship holds significant prominence worldwide, where natural resources are revered as divine beings. The historical basis for this worship lies in the spiritual faith of local communities. The diverse

ways of worshiping nature vary based on customary laws and traditional systems. In this practice, indigenous communities play a crucial role in preserving natural resources in their original states. These resources are considered sacred natural sites, encompassing mountains, hills, forests, groves, rivers, lakes, lagoons, caves, islands, and springs.

Sacred groves, defined as forest patches dedicated to local folk deities or ancestral spirits, are integral to culture, tradition, and religion. Ethnic communities believe in a divine power from nature that protects them from odd events and natural calamities. Hence, they strive to protect and preserve the forest land to appease this divine power. Consequently, the cutting of trees or plants is strictly prohibited in these areas.

These groves exist throughout the country under different names, providing various ecosystem services such as biodiversity, medicinal plants, regulating services, and a range of functions carried out by ecosystems.

Distribution of sacred groves:

Sacred groves are reported across various habitats worldwide, spanning Africa, North and South America, Asia, Europe, and Oceania, excluding Antarctica. Africa and Asia hold the highest number of sacred groves due to their ecological and cultural importance to indigenous communities (Dudley, 2010). In India, 13,720 sacred groves, anticipating an increase to 100,000 to 150,000. Himachal Pradesh leads with the most sacred groves, followed by Kerala and Chhattisgarh (Kandari, 2014). Other regions of India, including the Northeastern Himalayas, Central India, Western and Eastern Ghats, Coastal areas, and Western deserts, also safeguard numerous sacred groves. Each grove encompasses its legends, lore, and myths, forming an integral part of its identity. The dynamics of sacred grove numbers and status hinge on various factors, with ethnic diversity, taboos and local religious beliefs playing a significant role.

Objective of the study:

The cultural and ethnic diversity in India has significantly contributed to enhancing the biodiversity of various regions. While diverse forms of sacred groves exist across the country, many remain unexplored. Therefore, it is imperative to identify and document the sacred groves

that have not been inventoried yet. Northeast India stands out as a major biodiversity hotspot, where the rich ethnic diversity has played a crucial role in preserving and protecting forest patches, individual trees, and animals through a belief in nature's worship. Numerous tribes and ethnic communities in the region actively safeguard the forests and sacred groves. In the Northeastern states of Meghalaya, Manipur, Arunachal Pradesh, Sikkim, and Assam, sacred groves have been documented. Forest-dwelling tribes, such as the Bodo and Rabha in Assam, adhere to traditions of maintaining sacred groves referred to as 'Than,' alongside Vaishnav temples like 'Shankaradeva Mathas' (Malhotra, 2001).

Sacred groves in Assam

A total of 282 sacred groves protected by various ethnic communities in Assam were inventoried. Among these, 271 were associated with temples, 8 with traditional forests, and only 3 with burial grounds. The recorded sacred groves varied in size from 0.01 ha to 89 ha, totalling 672.48 ha. Temple groves covered 0.01 to 24 ha, totalling 333.75 ha. Traditional protected sacred groves ranged from 1.2 ha to 89 ha, totalling 322.63 ha, while burial groves had a combined area of 16.1 ha, ranging from 1 ha to 12.8 ha. (Baidya, 2021)

The communities linked to these sacred groves include Boro, Tiwa, Tai Phake (Buddhist), Karbi, Motok, Ahom, Sonowal Kachari, Missing, Meitie, Tea tribe (Adivasi), Rabha, Koch Rajbonshi, and non-tribal Hindu populations who speak Assamese, Bengali, Bihari, Marwari, and Nepali languages. Temple groves are referred to by various names like Ashram, Devalaya, Dham, Doul, Mandir, Kunda, Monastery, Buddha Vihar, Satra, and Than. On the other hand, burial groves are known as Maidam, and traditional protected groves are named after their geographical location. Notably, the Ahom community worships burial groves, while the Karbi tribe safeguards traditional protected groves. (Baidya, 2021)

RESULTS AND DISCUSSION

- **Sacred groves as the abode of deities:**

  The Bodo tribes regard sacred groves as the dwelling places of deities. Following the Bathou religion, which aligns closely with

Hinduism, they believe the groves symbolize the five elements of nature and the guiding principles of their faith.These virgin forests are preserved to ward off perceived divine wrath.

- **Sacred Plants and Rituals Ceremony:**

  Assam boasts a rich cultural tapestry woven with ethnic diversity, fostering the preservation of sacred groves rooted in cultural and ethical values. The varying number of these groves stems from Assam's populous ethnic mix, sustaining their existence through time.

  The indigenous people, deeply connected to nature, rely on its resources for religious and cultural beliefs. Utilizing specific plants from sacred groves in their ceremonies follows cultural norms and entails associated taboos. Sacred groves influence the nomenclature of clans and villages, offering conservation and protection to plant species intertwined with beliefs and customs.

- **Utilisation of Ethnomedicinal plants by the indigenous tribe in the Sacred Grove**

  Ethno medicinal plants play a vital role in treating various ailments such as allergies, dermatological wounds, gastrointestinal disorders, respiratory infections, and reproductive issues.

- **Variety of Floristic Species within the Sacred Groves:**

  The designation of areas as sacred groves, guided by cultural norms, significantly contributes to the conservation of undisturbed native flora. This practice aids in safeguarding the biodiversity of the region.

CONCLUSION:

Indigenous and traditional communities possess sophisticated systems of environmental ethics, manifesting through their worldviews and cosmologies. These ethical principles find expression in the geographical rootedness provided by sacred natural sites and landscapes. Therefore, the current study focused on conserving and utilizing data based on traditional knowledge, recognizing it as a priority in our national agenda. Investigating sacred groves will contribute to an in-depth research approach, employing a systematic perspective to explore wild species/varieties of medicinal plants and biodiversity

conservation.

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Study of Spider Diversity in Bijni Locality of the Chirang District, India

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Abstract

Spiders are an integral part of global biodiversity since they play an important role in ecosystem as predators and source of food for other creatures. The study of spider diversity has been made from January to October, 2022. The survey has been done in Bijni, Phulkumari, Gerukabari, Kawatika, Monakocha, Bishpani, Jharbispani and Khamarguri. The study of different species of spider has been followed pictorial method. Photographs of different species of spider have been captured using mobile camera with GPS tag. The spider webs have been observed in garden, houses, trees and then recorded. The recorded spiders have been superficially identified with the help of Google lens search based on direct observation and pictorial comparison. A total of 20 different species of spider have been observed in and around of Bijni locality. The identified species are- *Oecobius, Arinioidessclopetarius, Argiope bruennichi, Pholcusphalangiodes, Araneus diadematus, Pisaura mirabilis, Nephila pilipes, Argiope keyserlingi, Tetragnathamontana, Argiope argentata, Gasteracanthacancriformis, Metepeiralabyrinthea, Latrodectus geometricus, Argiope anasuja and Plexipuspaykuli.* Most of the spiders have been found in this area belongs to orb-weavers category. Among them *Argiope keyserlingi,* orb-weavers' species have been recorded as highest number. Few species of cob-weaver and ladder weaver have been also recorded indicating a greater diversity of spider species in this region.

Keyword: Spider, Biodiversity, Predator, Food Sources

Introduction

People think of as these small, fast and deadly creatures that hide in our baths and lurk in the dark corners, waiting to pounce. In fact, what I have just described is entirely wrong, and while they are often found in our baths, in our homes and gardens, they are may be more scared of us. People observed that spiders as these eight eyed monstrosities with sharp tangs that deliver a venomous bite. Yet you may be surprised to know that there are only about 30 kinds of spiders that are dangerous to people and rest a few of this live in India.

Spiders are actually more amazing than scary. They have different and fascinating ways to catch their prey, such as hunting, jumping, fishing and even spitting. These are even spiders that looks like crab, ants and wasps. This project report provides a detailed insight into spiders and hopefully by the end of it, you'll be in awe of these great little critters, rather than absolutely paranoid about them.

Objective

- Study of Spider diversity in Bijni locality
- Global impact of spiders.
- Economic importance of spiders
- Taxonomic evaluation of spiders

Methodology

The survey was done during the month of October. The survey has been followed through pictures of spider and identified them with the help of google lens along with their characters.

During survey, though no specific time for data collection but generally it was observed in between 9:00 am to 4:00 pm and captured the photograph of spiders in different places of study area such as nooks and corner of houses, gardens, roadside etc. The survey has been made even at night also and took some pictures of them. The data has been enlisted in Data notebook and used Android mobile

camera for photograph. Some comfortable Apps has been used like GPS map camera, Google lens, Google to analysis the spiders in details. The study area mainly has been considered the different places of Bijni locality.

Data Collection

Data Table:1

Date	Location	Name of species
22/01/2022	monakocha	Araneus ventricosus
05/10/2022	Bishpani	Olios lamarcki
16/10/2022	Gerukabari, Puran bijni,	Plexippus paykulli, Holocnemus pluchei, Oecobius navus
18/10/2022	Chirang, Phulkumari	Nephila, Argiope amoena, Argiope key selingi
19/10/2022	Phulkumari	Latrodectus geometricus
23/10/2022	Phulkumari	Argiope anasuja, Lariniodes sclopetarins
29/10/2022	Bijni	Scytodes globula, Lyniphia triangularis, Pholcus phalangioides, Palyster superciliosus
30/10/2022	khamarguri	Hexophthalma hahni
31/10/2022	Bijni	Heteropoda venatoria

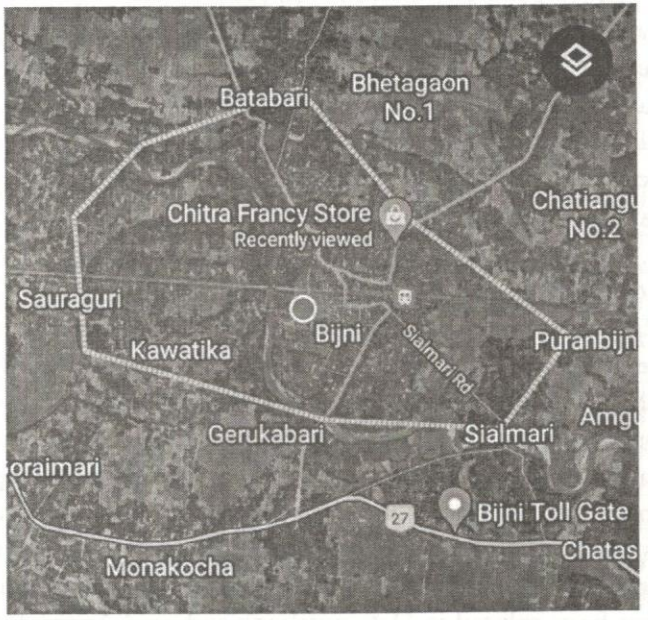


Fig. Map of Study Area (Google Earth)

Result and Discussion

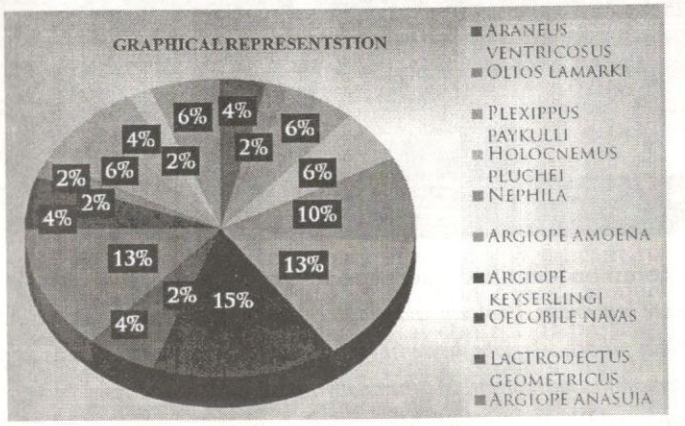
Diversity indices for spiders using Shannon-Wiener index. The following significance value has shown on diversity of Spiders in Bijni Locality. From this study, it reveals that the spider diversity is almost reach at standard level in the environment.

SHANNON-WIENNER DIVERSITY INDEX, H'="Pi(lnPi)

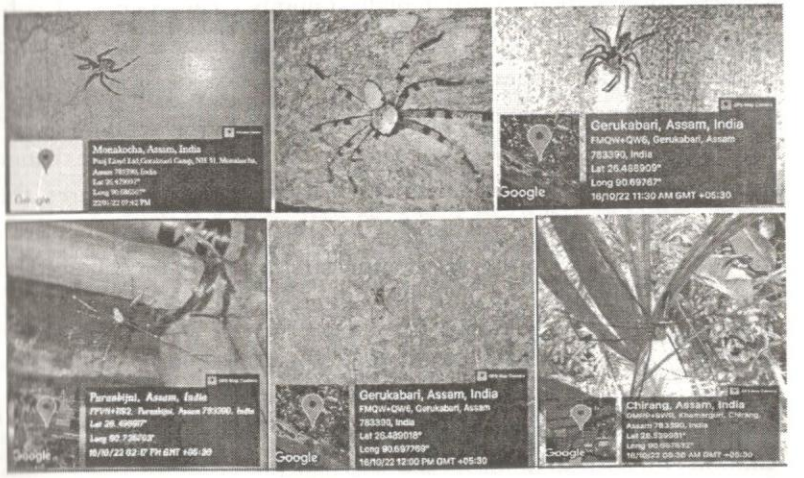
Total diversity index of spiders in Bijni locality, H'=4.36

Diversity index of spiders inside the Bijni college campus, H'=1.99

Diversity index of spiders outside the Bijni college campus, H'=2.14



Photograph of Different Spider Species in Bijni Locality



The common identified spider species are- *Oecobius, Arinioidessclopetarius, Argiope bruennichi, Pholcusphalangiodes, Araneus diadematus, Pisaura mirabilis, Nephila pilipes, Argiope keyserlingi, Tetragnathamontana, Argiope argentata, Gasteracanthacancriformis, Metepeiralabyrinthea, Latrodectus geometricus, Argiope anasuja and Plexipuspaykuli.* Most of the spider's species are belongs to orb-weavers category. Among them *Argiope keyserlingi,* and orb-weavers' species are recorded in highest number. Few species of cob-weaver and ladder weaver are also recorded indicating a greater diversity of spider species in this region. Since the spider is an indicator of environment, the diversity enrich means they are surviving in the environment in a sustainable way. Though the pollution, climate change and environmental factors effects the habitat of many creatures, the spider are still surviving but has declined their population presently in global prospects. Hence conservation strategy must be followed to remain the population of spider species as it has a taxonomic significance and many byproducts value.

Military and medical arenas: - Spider silk is made up of a protein-rich liquid, which when dried forms a solid filament that can be used to make body armour. A number of spiders can cause spider bites

that are medically important. Almost all spiders produce venom but only a few are classified as "venomous" and able to cause significant harm to humans. Two medically important spider genera have a worldwide distribution—Latrodectus and Loxosceles.

Experiments synthetic fibers: - Spider silk can be used for biomedical applications, such as tissue engineering, implantable devices, and disease models.

Components of artificial tendons and ligaments: - Synthetic material made from spider webs could soon be used to make artificial tendons and ligaments.

Guides for regrowing nerves: - Researchers have now produced double-sided spider silk fibers, which could provide damaged nerve or muscle cells with a platform for growth.

Scaffold for time growth: - Strands of spider silk have been used to make violin strings that have a unique and thrilling sound.

Spiders are beneficial predators and serve a significant role in keeping populations of many insect pests in check. Spiders are oftentimes the most important biological control of pests in and around homes, yards, gardens and crops. Spiders are primary controllers of insects. Without spiders, all of our crops would be consumed by those pests. spiders are a food source for birds and other small mammals, especially during winter and spring. they help maintain a natural balance wherever they are. As integral components of our biosphere, spiders have intrinsic existence value. Web building spiders use their webbing to ensnare; other species are hunters that actively search for their food. Thus, the presence of spiders is an ecological indicator signaling the health of natural ecosystem.

Spider-Man is a superhero appearing in American comic books published by Marvel Comics. Created by writer-editor Stan Lee and artist Steve Ditko. Spider-Man gets superhuman spider-related powers and abilities from a bite from a radioactive spider, these include clinging to surfaces, superhuman strength, speed, and agility, and detecting danger with his precognition ability called "spider-sense." He also builds wrist-mounted "web-shooter" devices that shoot artificial spider-webs of his own design that was meant to be used for shooting

and trapping his enemies, and web-swinging across the city. The lesion from spider is "work daily, work diligently and seek satisfaction with daily duty while preparing for a bigger catch". Much of life is delay gratification, and most of us find dedication to the daily grind frustrating. Wanting and waiting are life's terrible twins, torturing the placid present with the tenor of tomorrow. However, the small creature spider may give immense pleasure if do honest handling.

Conclusion

Present study updates the checklist of spiders in the selected areas of Bijni locality. This type of survey of spiders and their documentation would be useful in the future assessment of environmental conditions as well to create awareness for their conservation. In conclusion it can be said that there is an urgent need to understand more about their diversity as they are important as bio indicators of our environmental changes.

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Global warming and its impact on Human Health

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Abstract:

Global warming is the phenomenon of a gradual increase in the temperature near the earth's surface. Since the mid-19th century, human activities have increased greenhouse gases in the Earth's atmosphere that resulted in increased average temperature. Six main greenhouse gases which contribute to global warming are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and three fluorinated industrial gases: hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6). Water vapour is also considered a greenhouse gas. Natural events and human influences are believed to be top contributors towards the increase in average temperature. Human activities which cause global warming are burning of fossil fuel, mining of minerals, industrial production, cattle rearing and deforestation. The effect of rising temperature include melting of glaciers, increased risk of droughts and floods, rise in sea levels, frequent wildfires, poor air quality, animal extinction, diminishing fresh water supply, soil degradation and loss of productivity of agricultural land. The negative consequences of global warming on human health include higher rates of heat stress and heat stroke due to warmer temperature, higher rates of respiratory problems due to poor air quality, malnutrition in some countries due to the loss of food security, increased disease transmission due to insects moving towards higher altitudes and higher incidences of flooding can lead to the spread of

waterborne diseases. This paper discusses about global warming and its impact on human health.

Keywords:

Global warming, Greenhouse gases, Fossil fuel, Deforestation, Droughts.

Introduction:

Global warming is a process in which the earth's temperature keeps increasing constantly. Rising global temperatures are accompanied by changes in weather and climate. Many places have experienced changes in rainfall pattern resulting in more intense rain, as well as more frequent and severe heat waves. Global warming is a great problem for the earth and its habitants. The higher levels of greenhouse gases contribute to it. Six main greenhouse gases are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and three fluorinated industrial gases: hydrofluoro carbons(HFCs), perfluoro carbons (PFCs) and sulphur hexafluoride (SF_6). Water vapour is also considered a greenhouse gas.

Global warming has changed various life forms on the earth. Not only human, but any other form of life, be it flora or, fauna face a threat in the face of global warming. Earth's surface temperature has increased more than one degree Fahrenheit since 1900 and the amount of CO_2 in the atmosphere has risen by 50%. The year 1990 was the hottest year in the last century. Together with 1991, the years of 1983, 1987, 1988 and 1989 have been measured to be the warmest six years in the last hundred years. The year 1991 was the second warmest year of the past century.

Average global surface temperature are projected to increase by 1.5 to 5.8 degrees C by 2100 (**Houghton, 1996**). The present temperature is 0.3 – 0.6degrees C warmer than it was 100 years before (**Melillo, 2014**). Since record keeping began in 1895, the hottest year on record worldwide was 2016, according to **NOAA (National Oceanic and Atmospheric Administration)** and **NASA** data. That year earth's surface temperature was 1.78 degrees F (0.99degrees C) warmer than the average across the entire 20th century. Since the start

of the 21st century, the annual global temperature record has been broken five times (2005, 2010, 2014, 2015 and 2016).

Earth's warming trend continued in 2019, making it the second-hottest year in NOAA's 140-year climate record just behind 2016. In April 2020 the NOAA was predicting that 2020 had a 75% chance of beating that record. The latest data from the NOAA states that 2020 was the second hottest year recorded. However, NASA stated that 2020 tied with 2016 as the hottest year on record. NOAA's methodology found 2022 to be the sixth-warmest year on record since 1880 and NASA's methodology found it to be the fifth warmest tied with 2015. According to NASA, 2021 was the sixth joint hottest year, tying with 2018.

If nothing is done, scientists think global warming could exceed 4 degrees C in the future, leading to inundation of coastal cities, increasing risks for food production potentially leading to higher under and malnutrition rates, devastating heatwaves, millions losing their homes to rising sea levels, and irreversible loss of biodiversity, including coral reef systems.

Objective:

1. To study about global warming, its causes and effects.
2. To study about impact of global warming on human health.

Methodology:

The paper is completely a review paper and completely depends on the secondary data. It has been prepared by browsing internet, studying various articles published in different journals, books and magazines.

Causes of global warming:

Following are the major causes of global warming:

Natural causes of global warming:

One natural cause of global warming is greenhouse gases. Greenhouse gases such as CO_2 absorb heat (infrared radiation) emitted from earth's surface. Increase in the atmospheric concentrations of these gases cause earth to warm by trapping more of this heat.

Volcanic eruptions are another reason for global warming. A single volcanic eruption can release a great amount of CO_2 and ash to the

atmosphere.

Water vapour is a kind of greenhouse gas. As the earth's temperature increases, more water evaporation from water bodies occur and stays in the atmosphere, contributing to global warming.

Methane gas is another contributor to global warming. Methane is twenty times more effective in trapping heat in the atmosphere than CO_2. Usually, methane gas is released from many areas like animal waste, landfill, natural gas and others.

Natural forest fires, especially large scale ones over long periods, can have an impact on the global temperature. When the vegetation burns, there is release of stored carbon and an increase in greenhouse gases like CO_2 into the atmosphere. These greenhouse gases then trap solar energy inevitably leading to the warming of the atmosphere.

Changes in solar irradiance in wavelengths and other variations such as solar flares or sunspots, if larger enough, could have an unprecedented impact over global warming and atmospheric temperatures.

Man-made causes of global warming:

There are various human activities that cause global warming. Some of them are industrial production, burning of fossil fuel, mining of minerals, cattle rearing and deforestation.

Industries, transportation as cars, buses, trucks burn fuel to power the machines, which eventually, releases CO_2 and carbon monoxide (CO) from the exhaust, leading to an increase in a temperature rise of earth's atmosphere.

Another contributor is mining. During the process of mining, the methane gas trapped below the earth escapes. Rearing cattle also causes the release of methane from manure.

Deforestation is also a great contributor to global warming. Human have been cutting down trees to produce paper, wood, build houses and more. Trees can absorb CO_2 from the atmosphere and their absence can lead to the higher concentration of such gases. Thus CO_2 is most commonly produced by human activities and it is responsible for 76% of manmade global warming.

Other greenhouse gases are emitted in small quantities, but they

trap heat far more effectively than CO_2 and in some cases are thousands of times stronger. Methane is responsible for 19% of manmade global warming, nitrous oxide for 6%. Human activities such as agriculture, fuel combustion, waste water management and industrial processes are increasing the amount of N_2O in the atmosphere. One pound of N_2O warms the atmosphere about 300 times the amount that one pound of CO_2 does over a 100 year timescale.Fluorinated gases (F-gases) produce a very strong warming effect, upto 23000 times greater than CO_2. But these are released in small quantities. Industrial processes, refrigeration and the use of a variety of consumer products contribute to emissions of F-gases. F-gases are responsible for 2% of manmade global warming.

The effects of global warming:

The impact that global warming is causing on Earth is extremely serious. There are many hazardous effects that will happen in the future if global warming continues.

There are numerous effects of global warming. Some of the most significant effects of global warming are described below–

Global warming has resulted in extreme climatic conditions all over the world. Unexpected changes in monsoon patterns are being witnessed. Winters are getting colder and summers are registering higher temperatures never recorded before.

One of the most devastating effects of global warming is rising sea levels. Global average sea level has risen 8-9 inches (21-24 centimeters) since 1880. In 2021, global sea level set a new record high - 97 mm (3.8 inches) above 1993 levels. Global warming causes the thermal warming of seawater, making it expand. Also factors like melting of glaciers and ice sheets due to global warming contribute to raise sea levels.

Global warming is also results in the warming of ocean. Though the recorded growth in ocean temperature is low than the earth's surface temperature, it effects marine life to a larger extent. Many marine species are sensitive to temperature changes and ultimately die because of it. The most vulnerable ocean organism to temperature change is coral. When the ocean water temperature is raised due to

global warming, it emits oxygen rather than retaining it. Thus in turn, has disastrous effects on aquatic species which rely on the supply of oxygen, thereby resulting in a decrease in fishes, turtles etc.

Oceanic acidification is one of the major effects of global warming on oceans. Due to global warming the atmospheric concentration of greenhouse gas, CO_2 is increased. CO_2 gas dissolves in ocean water sothat carbonic acid is formed, making the ocean acidic. Oceanic acidification has negative effects on aquatic life and humans as well. Since the industrial revolution began in the early 1700s, the acidity of the oceans has increased about 25 percent, according to the EPA.

Higher temperature leads to faster evaporation of water and leads to drought in one part and heavy rainfall causes flooding in other part of the world. Higher temperatures will make wet climates much wetter and cause intense flood rain to become much more common in those areas. On the other hand, drylands will become drier as temperature increase making droughts even more severe in certain areas.

On land, higher temperatures have forced animals and plants to move to higher latitudes, many moving towards the Earth's poles, with far-reaching consequences for ecosystems. The risk of species extinction increases with every degree of warming. In the ocean, rising temperatures increase the risk of irreversible loss of marine and coastal ecosystems. Live coral reefs, for instance, have nearly halved in the past 150 years and further warming threatens to destroy almost all remaining reefs.

If global warming continues, more hurricanes, cyclonic storms, heat waves, drought and extreme rainfall will occur causing disaster to humankind.

Impact of global warming on human health:

Global warming affects human health and wellbeing in many ways:

(i) Directly, by the increased intensity and frequency of extreme weather events (such as heat waves, floods and bushfires).

(ii) Indirectly, through worsening air quality, changes in the spread of infectious diseases, threats to food and water and effects on mental health.

The poor air quality due to global warming in many areas of the world is having a detrimental effect on people's health in numerous ways. Exposure to air pollutants or airborne allergens can directly harm our respiratory and cardiovascular systems. Children, older people, persons with asthma and immunocompromised persons are most vulnerable to air quality impacts. Respiratory impacts can include asthma, respiratory allergies, and airway diseases, while cardiovascular impacts can include hypertension, coronary artery diseases, heart attack and stroke.

Long period of high temperature that cause drought related stress, decreases the productivity of crops and livestock, including fruit crops and milk yields. This will build up into a gradual shortage of supplies, leading to mass food shortage. High temperature and humidity are the perfect conditions for plant based pests to survive and even reproduce more rapidly, which leads to greater damage of crops, reducing the overall yield. Many people depend on fish as their primary protein source. Changing aquatic ecosystems are affecting fish in freshwater and saltwater areas. Thus many people are suffering from hunger and poor nutrition.

Extreme weather events, which accompany global warming, particularly affect the distribution of diseases transmitted through water or, biological vectors such as mosquitoes, a set of pathologies that are currently more frequent in tropical areas and in places with problems of access to drinking water and sanitation. Global warming affects geographical distribution and activity of the vectors. The major mosquito-borne infectious diseases that have been reported to be affected by global warming include malaria, dengue fever, Japanese encephalitis and tick-borne encephalitis. One vector- the Aedes mosquito- is responsible for the spread of some infectious diseases such as zika, chikungunya, West Nile virus and dengue fever. Dengue is a mosquito-borne viral infection that causes a flu-like illness and in severe cases can cause hospitalization and possible death. It is typically found in tropical and sub-tropical climates but has expanded globally since 1990, particularly in Latin America and the Caribbean, South Asia and sub-Saharan Africa.

Both droughts and heatwaves have direct and indirect health effects. Heat itself can make people very ill, especially the elderly, infants, pregnant women, sick people and those who have to work outside all day in order to make a living. A side effects of droughts and extreme heat, alongside wildfires is water scarcity. Certain regions will experience less precipitation than usual and for this people and animals can suffer from a lack of drinking water and a higher concentration of contaminants in water sources.

Natural disasters destroy properties and natural habitats. But they also affect human health. For example, flooding contaminates fresh water supplies, which increases the risk of water-bornediseases. It also increases the rate of reproduction for disease-carrying pests like mosquitoes. Many natural disasters affect human health directly. Floods and tsunamis can cause drowning, while earthquakes and hurricanes can cause physical injuries and disabilities.

In general, children and pregnant women, older adults, certain occupational groups, persons with disabilities and persons with chronic medical conditions are more vulnerable to health stressors, such as extreme heat, floods, poor air quality and other climate-related events. An assessment carried out the World Health Organization in 2018 concluded that climate change is expected to cause approximately 250,000 additional deaths globally per year between 2030 and 2050:38,000 due to heat exposure in elderly people, 48,000 due to diarrhea, 60,000 due to malaria and 95,000 due to childhood under nutrition.

Conclusion:

Global warming is a worldwide issue that needs to be controlled to save the earth from imminent danger. Global warming is increasing the risk of vector-borne diseases. If global warming continues without being addressed its effects on health are only expected to worsen. So, we should take steps to eliminate or at least reduce our impact on global warming.

In order to control global warming at first, we the people of this globe need to be conscious. We need to work together towards the prevention of global warming.We can try to reduce the emissions of

greenhouse gases into the atmosphere. More efforts should be made to educate about the effects of global warming on human health. People should also arrange different awareness programs among the unaware people to control global warming.

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Disaster management and India

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Abstract :

Disaster management refers to the process of timely response to any disaster. But, what is a disaster? It is when a potential danger, known as hazard, gets magnified due to several factors and starts wreaking havoc on public life; it is then that it is termed as a disaster. Disaster can be of two types-

1. Natural disaster- that occurs naturally, such as earthquake, volcano, tsunami, etc.
2. Anthropogenic disaster- where human induced factors play a major role, such as, forest fires, flash floods, droughts, etc.

Managing any such circumstance defines disaster management mechanism. India, in this regard follows the disaster Risk Reduction model as part of DMA 2005. It involves two-phased response-

1. Phase I- involving prevention, mitigation and preparedness.
2. Phase II- involving response, reconstruction and rehabilitation.

Phase-I is for pre disaster framework and Phase- II is post disaster framework.

However, disaster management also involves awareness and coordination at all levels- government, civil societies and general public. It requires sustainable development policies, ignorance of which can cause serious threat to life and economy. For instance, the recent ongoing land subsidence in Joshimath, Bengaluru floods 2015, Kerala floods 2018, Chennai floods 2015, Silchar floods 2022, frequent landslides in Uttarakhand, etc. are indicative of unsustainable growth. Therefore,

disaster management requires cumulative effort. The current G20 presidency can provide robust platform for the government to push its NDC 2070, SDG 2030, and cooperation of global South in matters of climate change, etc. via knowledge, technology exchange and international cooperation. The aim of this paper is to understand the basics of hazard and disaster and what can be done, not only at Governmental level but also at community and individual level, to reduce the loss due to disaster. The greater perspective remains to build a sustainable development strategy.

Objective:

1. To make awareness about the unsustainable growth for the unplanned human activities
2. To prepare a plane to combat with the disaster.

Key words:

Disaster, Anthropogenic disaster, sustainable development.

Introduction:

Disaster may be -Man made and natural. Man made disaster have an element of human intent, negligence or error involving a failure of man made system. Example – Bhopal gas tragedy (2nd and 3rd December 1984). It is a man made disaster. It is considered as one of the World worst industrial disaster. Recent Delhi Air Pollution is also a man made disaster. Natural disaster - say Flood. Silchar floods 2022, Sikkim flash floods on 04.10.2023. But whatever may be disaster we have to manage it if possible. The basic principle of disaster management is to reduce the Risk and this can be done by minimizing any of the three variables of the given equation - Risk = Threat x Vulnerability x Cost. We cannot control the threat, so, we should focus on vulnerability and costs.

Discussion:

Disaster management is the process to deal with the effects of the disaster. How to cop up with is? Disaster may be of the following types-

Water and climate disaster (flood, hail storm, cyclone, heat waves, cold waves etc.), Geological disaster (land slide, earthquake etc.),

Biological disaster (recent COVID-19), Industrial disaster (chemical and industrial accident), Nuclear disaster and Man -made disaster(oil spill, collapse of huge buildings). To prevent the threat of any kind of above mentioned disasters different agencies in India are- National Disaster Management Authority (NDMA) headed by Prime Minister Of India., National Executive Committee(NEC) with high profile ministers of India, State Disaster Management Authority (SDMA) headed by C.M., District Disaster Management Authority (DDMA) headed by D.C and Local Authorities with Panchayati Raj Institutions. Here I am going to discuss some examples of disaster management that India Government took as prevention.

In COVID-19 period-

1. Total Lock Down 1st Phase from 24th. March to 20 th September of 2020 and the 2nd Phase from 6th. May 2021 to 5th September 2021.
2. Frequent washing of hands with soaps or to sanitize with sanitizer and washing cloths thats are exposed.
3. Wearing Mask.
4. Vaccination.

In 2022 silchor flood -

Assam government managed it with the help of Cachar District Administration along with NDRF, SDRF, Army, CRPF,BSF and other Para Military Forces and security agencies. The administration set up relief camps for the displaced people and gave relief materials.

In recent Sikkim flash flood-

Government of India under Prime Minister Sri Narendra Modi stood with the people of Sikkim. India Government closely monitored the situation in Sikkim and gave all the necessary supports to regain the normalcy.

Now currently the people in Delhi suffering from the toxic air. This is the man made disaster mainly due to the indiscriminate stubble burning by farmers in Punjab and Haryana. The city authorities have taken emergency measures to prevent the matter such as reducing road traffic, banning farm fires, activating the city smog towers to improve the air quality. But still the people are suffering from air

pollution till today as in midst of all this the people celebrate DEEPAWALI with firecrackers though the there was a strict ban on fireworks in the Capital. Sunday on 12th. November 2023 the Environment Minister of Delhi- Gopal Rai urged people not to burst firecrackers. These are from governmental level, but we the people should follow all the laws, measures to protect ourselves.

Conclusion:

Disasters are the part of life. It may be natural or man-made and may occur at any moment. We have to manage it and should work for sustainable development and should do what the situations permit.

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Review of Past, Present, and Future Projections of the Impacts of Climate Change on Human Environment

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Abstract :

Climate change is one of the most significant elements that put all life on Earth in jeopardy. Anthropogenic long-term changes, internal natural processes, external forces, or any combination of these may result in climate changes. According to data from ice cores and other sources, climate change is to blame for the acknowledged dramatic temperature changes, increase in greenhouse gas emissions, and sea level shifts that have been documented over the previous centuries and even decades. The increase in greenhouse gas emissions will have a considerable effect on important sectors of the global economy, including agriculture and manufacturing. Human welfare and healthcare services will suffer as a result, and advancement in general would be hampered. Despite the fact that many causes, such as sea level rise and a drop in temperature will render large sections of the world uninhabitable, some scientists believe that the increase in greenhouse gas concentrations has slowed down or delayed the likelihood of the start of a new ice age. We have discussed every scenario that could arise as a result of climate change, including temperature increases, greenhouse gas emissions, sea level rise, and other grave effects on every other living species of plants and animals in addition to humans.

Keywords : environmental issues, green house gas, climate change,

global warming

Introduction:

Definition and significance of climate change:

Climate change refers to long-term alterations in Earth's climate patterns, including variations in temperature, precipitation, wind patterns, and other aspects of the climate system. It is primarily driven by the increase in greenhouse gas emissions, predominantly from human activities such as burning fossil fuels, deforestation, industrial processes, and agriculture.

The significance of climate change lies in the potential threats it poses to the environment, ecosystems, and human societies worldwide. Here are some key points regarding the definition and significance of climate change:

1. Environmental Impact: Climate change leads to shifts in ecosystems, disruption of natural habitats, and loss of biodiversity. It can result in the extinction of plant and animal species, alteration of migration patterns, and disturbance in ecological balance.
2. Rising Temperatures: Increasing global temperatures have a range of consequences, including the melting of polar ice caps and glaciers, rising sea levels, and more frequent and intense heatwaves. These changes can affect weather patterns, water resources, and the availability of suitable habitats for various species.
3. Extreme Weather Events: Climate change contributes to more frequent and severe extreme weather events such as hurricanes, cyclones, floods, droughts, and wildfires. These events have devastating impacts on communities, infrastructure, agriculture, and economies.
4. Impacts on Human Health: Climate change can affect human health directly and indirectly. Heat-related illnesses, respiratory problems due to poor air quality, increased transmission of vector-borne diseases, and mental health issues are some of the health impacts associated with climate change.
5. Economic Consequences: Climate change poses significant risks to the global economy. It can disrupt supply chains, increase

production costs, damage infrastructure, and lead to economic losses in sectors such as agriculture, fisheries, tourism, and insurance.

Social and Humanitarian Challenges: Climate change exacerbates social inequalities and creates challenges for vulnerable populations. Displacement of communities due to sea-level rise or extreme weather events, food insecurity, and conflicts over dwindling resources can result from the impacts of climate change.

Global Cooperation and Mitigation: Addressing climate change requires international collaboration and mitigation efforts. The Paris Agreement, signed by almost all countries aims to limit global warming and reduce greenhouse gas emissions to mitigate the impacts of climate change.

Overall, climate change poses significant risks to the planet's ecosystems, human well-being, and sustainable development. Taking proactive measures to reduce greenhouse gas emissions, adapt to changing climate conditions, and promote sustainable practices are crucial for mitigating the impacts of climate change and securing a resilient future for generations to come.

Factors contributing to climate change:-

Several factors contribute to climate change, including both human activities and natural processes. Here are the key factors:

1. Greenhouse Gas Emissions: The primary driver of climate change is the increase in greenhouse gas (GHG) concentrations in the atmosphere. GHGs, such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases, trap heat and contribute to the greenhouse effect. Human activities, particularly the burning of fossil fuels for energy, deforestation, industrial processes, and agricultural practices, are major sources of GHG emissions.
2. Deforestation and Land Use Change: When forests are cleared for agriculture, urbanization, or other purposes, large amounts of carbon stored in trees and vegetation are released into the atmosphere as CO_2. Deforestation reduces the Earth's capacity to absorb CO_2 and contributes to increased GHG concentrations.

3. Industrial Processes: Various industrial activities release significant amounts of GHGs. These include emissions from power generation, manufacturing, cement production, chemical production, and the extraction and processing of minerals and fossil fuels.
4. Agriculture and Livestock: Agricultural practices, such as rice cultivation, livestock production, and the use of synthetic fertilizers, release GHGs, particularly methane and nitrous oxide. Additionally, changes in land use for agricultural purposes contribute to deforestation and GHG emissions.
5. Transportation: The burning of fossil fuels in vehicles, including cars, trucks, ships, and airplanes, is a major source of CO_2 emissions. The increasing global demand for transportation leads to higher emissions.
6. Energy Production: The generation of electricity from fossil fuels, such as coal, oil, and natural gas, releases substantial amounts of CO_2. Transitioning to cleaner and renewable energy sources is crucial for reducing emissions in the energy sector.
7. Natural Processes: While human activities are the primary drivers of climate change, natural processes also contribute to climate variability. Volcanic eruptions release gases and particles into the atmosphere, affecting the climate temporarily. Natural fluctuations in solar radiation and variations in Earth's orbit over long timescales can also influence climate patterns.

It is important to note that the increase in GHG concentrations due to human activities is the main factor responsible for the current acceleration of climate change. Efforts to mitigate climate change focus on reducing these human-induced emissions and transitioning to sustainable practices and cleaner energy sources.

Past Impacts of Climate Change on the Human Environment:

A. Historical evidence of temperature changes and greenhouse gas emissions:

- Analysis of ice cores, sediment cores, tree rings, and other geological records provide evidence of past temperature changes.

- Historical data also reveals a correlation between temperature changes and greenhouse gas concentrations, particularly CO_2.
- Industrialization since the 19th century has led to a significant increase in anthropogenic greenhouse gas emissions.

B. Sea level shifts and their consequences:

- Rising global temperatures have caused the melting of glaciers and ice sheets, leading to a rise in sea levels.
- This has resulted in increased coastal erosion, flooding, and saltwater intrusion into freshwater sources.
- Coastal communities and infrastructure are increasingly vulnerable to the impacts of sea level rise.

C. Effects on global economy, agriculture, and manufacturing:

- Climate change impacts various sectors of the global economy, including agriculture and manufacturing.
- Changes in temperature and precipitation patterns affect crop yields, leading to reduced agricultural productivity and food security challenges.
- Extreme weather events, such as hurricanes and droughts, disrupt manufacturing operations and supply chains, causing economic losses.

D. Impact on human welfare and healthcare services:

- Climate change has adverse effects on human welfare and quality of life.
- Increasing temperatures and heatwaves can result in heat-related illnesses and even fatalities, especially among vulnerable populations.
- Changes in precipitation patterns can affect access to clean water and lead to waterborne diseases.
- Climate change also influences the prevalence and distribution of infectious diseases, impacting healthcare systems and resources.

Overall, the past impacts of climate change on the human environment have been significant. Temperature changes, rising sea levels, economic disruptions, and impacts on human health and well-being highlight the urgency of addressing climate change to mitigate future risks. Adaptation strategies and mitigation efforts are crucial for minimizing the adverse effects of climate change on human societies

and creating a more sustainable and resilient future.

Present Impacts of Climate Change on the Human Environment:-

A. Current temperature trends and greenhouse gas emissions:

- Global temperatures are rising, with the past few decades being the warmest on record.
- Increased greenhouse gas emissions, primarily from human activities, are the main driver of this temperature rise.
- The concentration of CO_2 and other greenhouse gases in the atmosphere continues to increase, reaching unprecedented levels.

B. Rising sea levels and coastal vulnerability:

- Sea levels are rising at an accelerated rate due to the melting of ice caps and glaciers and the thermal expansion of seawater.
- Coastal areas are becoming increasingly vulnerable to storm surges, coastal erosion, and saltwater intrusion into freshwater sources.
- Low-lying islands and coastal communities are particularly at risk of displacement and increased exposure to climate-related hazards.

C. Economic consequences and sectors affected:

- Climate change has significant economic implications across various sectors.
- Agriculture and food production are affected by changing precipitation patterns, increased frequency of extreme weather events, and shifts in growing seasons.
- Infrastructure, including roads, bridges, and buildings, is exposed to increased risks from storms, floods, and heatwaves, requiring costly repairs and adaptations.
- Insurance sectors face challenges due to rising climate-related risks, leading to increased costs and reduced availability of coverage.

D. Health impacts and challenges faced by communities:

- Climate change poses risks to human health, both directly and indirectly.
- Heatwaves and extreme temperatures can lead to heat-related illnesses and deaths, particularly among vulnerable populations.
- Changes in precipitation patterns and temperatures affect the distribution of infectious diseases, such as malaria, dengue fever, and Lyme disease.
- Poor air quality resulting from increased pollution and wildfire smoke exacerbates respiratory illnesses and cardiovascular problems.
- Mental health issues, including anxiety, depression, and post-traumatic stress disorder, can arise from the impacts of climate-related disasters and disruptions.

The present impacts of climate change on the human environment demonstrate the urgent need for adaptation strategies, mitigation efforts, and international cooperation. Addressing climate change is crucial to safeguard human health, protect vulnerable communities, preserve ecosystems, and promote sustainable development for a more resilient future.

Future Projections of Climate Change Impacts on the Human Environment:

A. Predicted temperature increases and their consequences:

- Climate models project that global temperatures will continue to rise in the future.
- The Intergovernmental Panel on Climate Change (IPCC) projects a range of temperature increase scenarios, with higher emissions leading to more significant warming.
- Rising temperatures will result in more frequent and intense heatwaves, changes in precipitation patterns, and shifts in climatic zones.
- Consequences may include reduced agricultural productivity, increased water scarcity, amplified risks of wildfires, and further disruptions to ecosystems and biodiversity.

B. Anticipated rise in greenhouse gas concentrations:

- Without significant mitigation efforts, greenhouse gas concentrations are projected to continue increasing in the coming decades.
- Continued reliance on fossil fuels and deforestation contribute to these increasing emissions.

- The rise in greenhouse gases will further enhance the greenhouse effect, leading to additional warming and climate change impacts.

C. Potential expansion of uninhabitable areas:

- As temperatures rise and extreme weather events become more frequent, some regions may become increasingly inhospitable for human habitation.
- Coastal areas will face higher risks from sea-level rise and storm surges, leading to the potential displacement of populations.
- Inland regions may experience increased water scarcity, reduced agricultural productivity, and more frequent droughts, making them less suitable for human settlement.

D. Implications for biodiversity and ecosystems:

- Climate change poses a significant threat to biodiversity and ecosystems worldwide.
- Species' ability to adapt and migrate to suitable habitats may be compromised due to the rapid pace of climate change.
- Loss of habitat, altered ecosystems, and disruptions in ecological relationships can lead to species extinction, reduced ecosystem services, and ecosystem collapse.
- Climate change impacts on ecosystems can have cascading effects on human societies, including disruptions to food systems, increased vulnerability to natural disasters, and changes in disease vectors.

It is essential to recognize that the future projections of climate change impacts are based on various scenarios and uncertainties. However, the overall consensus is that continued emissions and inadequate mitigation efforts will result in significant consequences for the human environment. Urgent action to reduce greenhouse gas emissions, adapt to changing conditions, and protect biodiversity and ecosystems is crucial to mitigate the most severe impacts of climate change.

Other Species and Climate Change:-

A. Effects of climate change on plants and vegetation:

- Climate change can have profound effects on plant growth, distribution, and phenology.

- Changes in temperature and precipitation patterns can alter the timing of plant flowering, leafing, and fruiting.
- Shifts in suitable climatic conditions may lead to changes in plant species composition and migration patterns.
- Increased frequency and intensity of droughts and heatwaves can result in decreased plant productivity and increased risk of wildfires.
- Changes in plant communities can have cascading effects on other organisms dependent on them, such as pollinators and herbivores.

B. Impacts on animal species and ecosystems:

- Climate change poses significant challenges to animal species and ecosystems worldwide.
- Shifts in temperature and precipitation patterns can disrupt breeding cycles, migration routes, and hibernation patterns of animals.
- Changes in the availability of food sources can impact the survival and reproductive success of species.
- Rising sea levels and loss of coastal habitats threaten marine species, including coral reefs, mangroves, and coastal wetlands.
- Ecosystems, such as coral reefs and polar regions, are particularly vulnerable to climate change, resulting in habitat loss and reduced biodiversity.

C. Loss of biodiversity and ecosystem services:

- Climate change is a major driver of biodiversity loss worldwide.
- Species unable to adapt to changing conditions or migrate to suitable habitats may face population declines or even extinction.
- Loss of biodiversity reduces ecosystem resilience and the ability to provide essential ecosystem services, such as pollination, nutrient cycling, and carbon sequestration.
- Disruptions in ecosystem services can have far-reaching consequences for human societies, including impacts on food security, water availability, and natural resource management.

The impacts of climate change on other species and ecosystems are interconnected with human well-being and the health of the planet. Protecting biodiversity and ensuring the resilience of ecosystems are

crucial for maintaining the functioning of ecosystems and mitigating the adverse effects of climate change. Conservation efforts, habitat restoration, and sustainable management practices play a vital role in safeguarding species and ecosystems in the face of climate change.

What the world is doing to stop climate change:

The world is taking various actions to address and mitigate climate change. While the extent and effectiveness of these efforts vary across countries, there are several key initiatives and strategies being implemented globally.

1. International Agreements : The Paris Agreement, adopted in 2015, is a landmark global agreement to combat climate change. It aims to limit global temperature rise to well below 2 degrees Celsius above pre-industrial levels and pursue efforts to limit the increase to 1.5 degrees Celsius. Countries have committed to reducing their greenhouse gas emissions, regularly reporting on their progress, and enhancing climate resilience and adaptation measures.
2. Renewable Energy Transition : There is a global shift towards renewable energy sources such as solar, wind, and hydroelectric power. Governments and businesses are investing in renewable energy infrastructure, implementing supportive policies and incentives, and promoting research and development in clean energy technologies. The cost of renewables has significantly decreased in recent years, making them more economically viable.
3. Energy Efficiency Improvements : Improving energy efficiency is a key strategy to reduce greenhouse gas emissions. Countries are implementing measures to enhance energy efficiency in buildings, transportation, industry, and appliances. This includes energy-efficient building codes, promotion of electric vehicles, adoption of energy-saving technologies, and public awareness campaigns.
4. Forest Conservation and Reforestation : Protecting and restoring forests play a crucial role in mitigating climate change. Efforts are being made to curb deforestation, promote sustainable land management practices, and encourage reforestation and afforestation initiatives. Reducing deforestation helps to preserve carbon sinks and conserve biodiversity.
5. Carbon Pricing and Market Mechanisms : Many countries and regions have implemented or are considering carbon pricing mechanisms such as carbon taxes or cap-and-trade systems. These mechanisms incentivize industries to reduce emissions and promote the transition to low-carbon technologies. They create economic incentives for businesses to invest in clean energy and become more carbon-efficient.

While these initiatives represent positive steps, there is still much more to be done to effectively tackle climate change. Strengthening commitments, increasing ambition, and accelerating the implementation of climate actions are necessary to achieve the goals set out in the Paris Agreement. Continued collaboration, knowledge sharing, and global cooperation are essential to create a sustainable and low-carbon future for all.

Conclusion:

In conclusion, climate change is a pressing global issue with significant impacts on the environment, human societies, and the planet as a whole. The evidence of temperature increases, greenhouse gas emissions, rising sea levels, and other climate-related changes is well-documented. The consequences of climate change are wide-ranging and include threats to human health, disruptions to ecosystems, loss of biodiversity, economic challenges, and the exacerbation of social inequalities.

Recognizing the seriousness of the issue, the world has taken steps to address climate change through international agreements, such as the Paris Agreement, which aim to reduce greenhouse gas emissions and limit global temperature rise. Efforts are being made to transition to renewable energy sources, improve energy efficiency, conserve forests, and implement carbon pricing mechanisms. Financial support is being provided to developing countries to help them adapt to and mitigate climate change impacts. However, despite these efforts, more needs to be done. Urgent action is required to accelerate the transition to a low-carbon economy, reduce dependence on fossil fuels, and promote sustainable practices across sectors. This requires a collective

effort from governments, businesses, communities, and individuals. It is crucial to prioritize investment in research and innovation, develop and implement effective climate policies.

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Green House effect and climate change

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Abstract

Greenhouse effect is the process by which radiations from the sun are absorbed by the greenhouse gases and not reflected back into the space. The greenhouse effect is a natural phenomenon. Due to wrong human activities such as clearing forests, burning fossil fuels, releasing industrial gas in the atmosphere, etc., the emission of greenhouse gases is increasing. Thus, this has, in turn, resulted in global warming. The greenhouse effect is the way in which heat is trapped close to Earths surface by "greenhouse gases". These heat- trapping gases can be thought of as a blanket wrapped around Earth, keeping the planet toastier than it would be without them. Green house gases include carbondioxide, methane, nitrous oxides, and water vapour. Scientists have determined that carbon dioxides warming effect helps stabilize Earths atmosphere. Remove carbon dioxide, and the terrestrial green house effect would collapse.Without carbondioxide, Earths surface would be some 33 degree centigrade cooler. Greenhouse gases occur naturally and are part of our atmospheres makeup. For this reason, Earth is sometimes called the "Goldilocks" planet- its conditions are not too hot and not too cold, but just right to allow life to flourish. The level of carbon dioxide in Earths atmosphere has been rising consistently for decades and traps extra heat near Earths surface, causing temperatures to rise.

Keywords:
Green house Effect, Green house gases, Global warming,

Carbondioxide, temperature.

Introduction

The greenhouse effect helps trap heat from the sun, which keeps the temperature on earth comfortable. But people's activities are increasing the amount of heat-trapping greenhouse gases in the atmosphere, causing the earth to warmup. The earth's temperature depends on the balance between energy entering and leaving the planet's system. When sunlight reaches the earth's surface, it can either be reflected back into space or absorbed by the earth. Incoming energy that is absorbed by the earth warms the planet. Once absorbed, the planet releases some of the energy back into the atmosphere as heat (also called infrared radiation). Solar energy that is reflected back to space does not warm the earth. Certain gases in the atmosphere absorb energy, slowing or preventing the loss of heat to space. Those gases are known as "greenhouse gases." They act like a blanket, making the earth warmer than it would otherwise be. This process, commonly known as the "greenhouse effect," is natural and necessary to support life. However, the recent buildup of green house gases in the atmosphere from human activities has changed the earth's climate and resulted in dangerous effects to human health and welfare and to ecosystems.

Key Greenhouse Gases

Most of the warming since 1950 has been caused by human emissions of greenhouse gases.4 Greenhouse gases come from a variety of human activities, including burning fossil fuels for heat and energy, clearing forests, fertilizing crops, storing waste inland fills, raising livestock, and producing some kinds of industrial products.

Carbon Dioxide

Carbondioxide is the primary greenhouse gas contributing to recent climate change. Carbon dioxide enters the atmosphere through burning fossil fuels, solid waste, trees, and other biological materials, and as a result of certain chemical reactions, such as cement manufacturing. Carbondioxide is absorbed and emitted naturally as part of the carbon cycle, through plant and animal respiration, volcanic eruptions, and ocean-atmosphere exchange.

The Carbon Cycle

The carbon cycle is the process by which carbon continually moves from the atmosphere to the earth and then back to the atmosphere. On the earth, carbon is stored in rocks, sediments, the ocean, and in living organisms. Carbon is released back into the atmosphere when plants and animals die, as well as when fires burn, volcanoes erupt, and fossil fuels (such as coal, natural gas, and oil) are combusted. The carbon cycle ensures there is a balanced concentration of carbon in the different reservoirs on the planet. But a change in the amount of carbon in one reservoir affects all the others. Today, people are disturbing the carbon cycle by burning fossil fuels, which release large amounts of carbon dioxide into the atmosphere, and through land use changes that remove plants, which absorb carbon from the atmosphere.

Methane

Both natural and human activities produce methane. For example, natural wetlands, agricultural activities, and fossil fuel extraction and transport all emit methane.

Nitrous Oxide

Nitrous oxide is produced mainly through agricultural activities and natural biological processes. Fossil fuel burning and industrial processes also create nitrous oxide.

F-Gases

Chlorofluoro carbons, hydrochlorofluoro carbons, hydrofluoro carbons, perfluoro carbons, and sulfur hexafluoride, together called F-gases, are often used in coolants, foaming agents, fire extinguishers, solvents, pesticides, and aerosol propellants.

Causes of climate change

Generating power: Generating electricity and heat by burning fossil fuels causes a large chunk of global emissions. Most electricity is still generated by burning coal, oil, or gas, which produces carbon dioxide and nitrous oxide – powerful greenhouse gases that blanket the Earth and trap the sun's heat. Globally, a bit more than a quarter of electricity comes from wind, solar and other renewable sources which, as opposed to fossil fuels, emit little to no greenhouse gases or pollutants

into the air.

Manufacturing goods:

Manufacturing and industry produce emissions, mostly from burning fossil fuels to produce energy for making things like cement, iron, steel, electronics, plastics, clothes, and other goods. Mining and other industrial processes also release gases, as does the construction industry. Machines used in the manufacturing process often run on coal, oil, or gas; and some materials, like plastics, are made from chemicals sourced from fossil fuels.

The manufacturing industry is one of the largest contributors to greenhouse gas emissions worldwide.

Cutting down forests:

Cutting down forests to create farms or pastures, or for other reasons, causese missions, since trees, when they are cut, release the carbon they have been storing. Each year approximately 12 million hectares of forest are destroyed. Since forests absorb carbon dioxide, destroying them also limits nature's ability to keep emissions out of the atmosphere. Deforestation, together with agriculture and other land use changes, is responsible for roughly a quarter of global greenhouse gas emissions.

Using transportation:

Most cars, trucks, ships, and planes run on fossil fuels. That makes transportation a major contributor of green housegases, especially carbon-dioxide emissions. Road vehicles account for the largest part, due to the combustion of petroleum-based products, like gasoline, in internal combustion engines. But emissions from ships and planes continue to grow. Transport accounts for nearly one quarter of global energy-related carbon-dioxide emissions. And trends point to a significant increase in energy use for transport over the coming years.

Producing food :

Producing food causes emissions of carbon dioxide, methane, and other greenhouse gases in various ways, including through deforestation and clearing of land for agriculture and grazing, digestion by cows and sheep, the production and use of fertilizers and manure for growing crops, and the use of energy to run far me quipment or

fishing boats, usually with fossil fuels. All this makes food production a major contributor to climate change. And greenhouse gas emissions also come from packaging and distributing food.

Powering buildings:

Globally, residential and commercial buildings consume over half of all electricity. Astheycontinuetodrawoncoal, oil, andnaturalgas forheatingandcooling, they emit significant quantities ofgreenhouse gas emissions. Growing energy demand for heating and cooling, with rising air-conditioner ownership, as well as increased electricity consumption for lighting, appliances, and connected devices, has contributed to a rise in energy-related carbon-dioxide emissions from buildings in recent years.

Consuming too much:

Your home and use of power, how you move around, what you eat and how much you throw away all contribute to greenhouse gas emissions. So does the consumption of goods such as clothing, electronics, and plastics. A large chunk of global greenhouse gas emissions are linked to private households. Our lifestyles have a profound impact on our planet. The wealthiest bear the greatest responsibility: the richest 1per cent of the global population combined account for more greenhouse gas emissions than the poorest 50 per cent.

Effects of climate change

Hotter temperature: As greenhouse gas concentrations rise, so does the global surface temperature. The last decade, 2011-2020, is the warmest on record. Since the 1980s, each decade has been warmer than the previous one. Nearly all land areas are seeing more hot days and heat waves. Higher temperatures increase heat-related illnesses and make working outdoors more difficult. Wildfires start more easily and spread more rapidly when conditions are hotter. Temperatures in the Arctic have warmed at least twice as fast as the global average.

More severe storms:

Destructive storms have become more intense and more frequent in many regions. As temperatures rise, more moisture evaporates, which exacerbates extreme rainfall and flooding, causing more

destructive storms. The frequency and extent of tropical storms is also affected by the warming ocean. Cyclones, hurricanes, and typhoons feed on warm watersat the ocean surface. Such storm soften destroy homes and communities, causing deaths and huge economic losses.

Increased drought:

Climate change is changing water availability, making it scarcer in more regions. Global warming exacerbates water shortages in already water-stressed regions and is leading to an increased risk of agricultural droughts affecting crops, and ecological droughts increasing the vulnerability of ecosystems. Droughts can also stir destructives and and dust storms that can move billions of tons of sand across continents. Deserts are expanding, reducing land for growing food. Many people now face the threat of not having enough water on a regular basis.

Awarming, rising ocean:

The ocean soaks up most ofthe heat fromglobal warming. The rate at which the ocean is warming strongly increased over the past two decades, across all depths of the ocean. As the ocean warms, its volume increases since water expands as it gets warmer. Melting ice sheets also cause sea levels to rise, threatening coastal and island communities. In addition, the ocean absorbs carbon dioxide, keeping it from the atmosphere. But more carbondioxide makes the ocean more acidic, which endangers marine life and coral reefs.

Loss of species:

Climate change poses risks to the survival of species on land and in the ocean. TDNEpUTHQoQUJMHLrErGJyHg89uy71MyuHimb. Exacerbated by climate change, theworld is losing species at a rate 1,000 times greater than at anyother time in recorded human history. One million species are at risk ofbecoming extinct within the next few decades. Forest fires, extreme weather, and invasivepests and diseases are among many threats related to climate change. Some species will be able to relocate and survive, but others will not.

Not enough food :

Changes in the climate and increases in extreme weather events are among the reasons behind a globalrise in hunger and poor nutrition.

Fisheries, crops, and livestock may bedestroyed or become less productive. With the ocean becoming more acidic, marine resources that feed billions of people are at risk. Changes in snow and ice cover in many Arctic regions have disrupted food supplies from herding, hunting, and fishing. Heat stress can diminish water and grasslands for grazing, causing declining crop yields and affecting livestock.

More health risks:

Climate change is the single biggest health threat facing humanity. Climate impacts are already harming health, through air pollution, disease, extreme weather events, forced displacement, pressures on mental health, and increased hunger and poor nutrition in places where people cannot grow or find sufficient food. Every year, environmental factors take the lives of around 13 million people. Changing weather patterns are expanding diseases, and extreme weather events increase deaths and make it difficult for health care systems to keep up.

Poverty and Displacement:

Climate change increases the factors that put and keep people in poverty. Floods may sweep away urban slums, destroying homes and livelihoods. Heat can make it difficult to work in outdoor jobs. Water scarcity may affect crops. Over the past decade (2010–2019), weather-related events displaced an estimated 23.1 million people on average each year, leaving many more vulnerable to poverty. Most refugees come from countries that are most vulnerable and least ready to adapt to the impacts of climate change.

Conclusion:

The greenhouse effect makes the earth much warmer than without the atmosphere. In the form of heat it causes infrared radiation from the sun, which is lost to space after circulating in the atmosphere. The trees and plants take carbon dioxide and in exchange they release oxygen. Near the earth's surface the incremental increase of temperature is known as global warming. The largest natural contributors to global warming are volcanoes. A change in the habit of humidity and heat has occured due to global warming. From the semi harmful ultraviolet rays, the ozone layer protects the earth. In the upper region ofthe stratosphere the ozone layer is found.

Governments, businesses and civil society are connecting in climate initiatives to speed up the pace of climate action. Initiated at the 2019 Climate Action Summit held at the United Nations, the initiatives below are reducing emissions, tackling critical concerns such as jobs and gender equality, unlocking finance, building sustainable infrastructure, using nature-based solutions, and advancing adaptation and climate resilience. It is therefore necessary for all the sectors to collaborate and take actions required to tackle the climate crisis and transition to a sustainable and low carbon economy that is just and beneficial for all people.

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The E-Waste (Management) Rules, 2022

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Abstract

E-waste or electronic waste means discarded electrical or electronic devices or components. E-waste is increasing day by day due to large scale use of electrical and electronic equipment. According to the United Nations Global E-waste Monitor Report 2020, India is the third-largest producer of E-waste in the world, after China and the United States. As a result, E-waste management needs to be improved, and recycling of E-waste needs to be given more attention. Therefore, to modify the E-waste (Management) Rules, 2016, the Ministry of Environment, Forests & Climate Change of the Government of India has introduced "The E-waste (Management) Rules, 2022" on November 2, 2022 with modifications and it will come into effect from April 1, 2023. The E-waste (Management) Rules, 2022, are discussed in this article.

Keywords:

E-waste, Manufacturer, Producer, Refurbisher, Dismantler and Recycler.

Introduction

E-waste is unused electrical and electronic equipment. Any electronic or electrical component or device whose working life has expired or damaged, or no longer used by people due to technological advancements, comes under E-waste. Some of the common E-waste elements are mobile phones, computers, laptops, pen drives, hard drives, fans, microwaves, DVD, printers, lamps,

etc. E-waste is a serious issue for our environment because it releases harmful toxic chemicals from the metals due to chemical reactions and these toxic chemicals harm our environment. The management of such type of E-waste is known as E-waste management. The E-waste management is a **process to remove E-waste from the environment** in a safe and scientific way to avoid its negative damaging effects on the environment. It includes recycling, refurbishing, and reusing E-waste that has outlived its usefulness.According to the United Nations Global E-waste monitor 2020, 53.6 million tons of electronic waste were generated worldwide in 2019, of which only 17.4% was recycled and India is theworld's third E-waste producer with 3.2 million tons of E-waste generated a year, after China and the UnitedStates. Therefore, E-waste management needs to be enhanced, and recycling of E-waste needs to be given more attention. Therefore, Ministry of Environment, Forests & Climate Change of the Government of India has introduced "The E-waste (Management) Rules, 2022" on November 2, 2022 with modifications.

The E-Waste (Management) Rules, 2022

- The E-waste (Management) Rules, 2022 is applicable to all businesses and individuals involved in manufacturing, sales, transfer, purchase, refurbishing, dismantling, recycling and processing of E-waste or electrical and electronic equipment.
- It includesa total 106 items as E-waste.
- It includes all electrical devices and radiotherapy equipment, nuclear medicine equipment and accessories, Magnetic Resonance Imaging (MRI), electric toys, air conditioners, microwaves, tablets, washing machine, refrigerator, iPad and others.
- This includes electronic components, consumables, parts and spares that make the electronic products operational.
- Under this rules, manufacturers of electronic equipment are mandated to reduce the use of lead, mercury, cadmium and other others that can harm human health and environment.
- Under this rules, the Central Pollution Control Board will conduct random sampling of electrical and electronic equipment placed in the market to monitor and verify compliance of reduced use of hazardous substances.
- Under this rules, manufacturers are required to use technologies and methods that make the end product recyclable. They are also required to ensure the compatibility of components or parts developed by different manufacturers.
- Under this rules, imports or sales of new electrical and electronic equipment are allowed only if they comply with the government regulations. If the product does not comply with the rules, the manufacturer must withdraw all samples from the market.
- Under this rules, manufacturers are responsible to collect E-wastes generated during the manufacturing process and ensure that they are recycled or disposed.

Limitation of theE-waste (Management) Rules, 2022

- The E-waste (Management) Rules, 2022 is not applicable for waste batteries, which are covered under the Battery Waste Management Rules, 2022.
- It is also not applicable for packaging plastics, which are covered under the Plastic Waste Management Rules, 2016.
- It also does not apply for micro enterprises and radio-active wastes, which are covered under the Micro, Small and Medium Enterprises Development Act, 2006 and Atomic Energy Act, 1962 respectively.

Conclusion

Currently, E-waste is a burning problem for the environment and therefore its proper management is very necessary. The Government of India has been introducing several E-waste management rulestime to time in order to reduce E-waste. The latest E-waste management rule is "The E-waste (Management) Rules, 2022" and it is going to implement from April 1, 2023. The people of India should assist the Government of India to implement the "The E-waste (Management) Rules, 2022" through active participating in different activities organized by the Government. The Government also should frequently communicate with the concerned persons that involved in manufacturing, sales, transfer, purchase, refurbishing, dismantling, recycling and processing of E-waste.Moreover, International E-Waste

Day must observe on 14th October nation wise to raise awareness of proper E-waste disposal and to promote reuse, recovery, and recycling rates.This will lead to easy implementation of proper, scientific and sound management practices for E-waste with regards to collection, storage, transport, treatment and disposal.

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Evaluation of drinking water quality in Bijni town : A case study

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Abstract

Clean and safe drinking water is a basic need for the good health of human being and at the same time is a basic right of humans.Public health is at risk due to chemical contaminants in drinking water which may have immediate health consequences. The aim of our present study is to evaluate drinking water quality in the Bijni town area. Samples were collected from public and private drinking water sources covering total 10 collection spots and groundwater samples from each tube well were collected after 2 min of pumping in order to obtain deep water as the test sample. Analysis was done by sending the samples to Sub-divisional Water Analysis Laboratory, PHE Department, Bijni. It has been recorded that, drinking water at sample sites was within the acceptable range of pH (pH 6.83 $\pm$ 0.37). The iron content is with average value of 0.48 $\pm$ 1.21 mg/liter. Rest all the parameters were in shortage from the minimum permissible limit. From the study, it has been inferred that all the sources are safe source of drinking water and the recorded values of different parameters studied were within the permissible range as set by World Health Organization (WHO). The present study is a fact-finding preliminary study contributing to the importance of safe drinking water for the well-being of the people. Further large-scale study is necessary for drawing inferences about the source of drinking water (ground water).

Key words : Bijni, drinking water, permissible limit, WHO.

INTRODUCTION

Clean and safe drinking water is a basic need for the good health of human being and at the same time is a basic right of humans. Unsafe drinking water is a serious problem in many parts of the world. The quality of water is affected by an increase in anthropogenic activities and is susceptible to pollutants depending on geological conditions and agricultural, industrial and other man-made activities (Aremu et al., 2011; Akter et al., 2016).Public health is at risk due to chemical contaminants in drinking water which may have immediate health consequences. The World Health Organization estimated that upto 80% of all sickness and diseases in the world are caused by inadequate sanitation, polluted water or unavailability of water (WHO, 1997).

Bijni (26°312 N 90°402 E), the sub-divisional town in Chirang district, BTR, Assam with a population of 13257 (2011 census; Wikipedia). Till date, no drinking water supply facility is there in Bijni town, and a maximum person uses hand pumps and bore wells as a main source of drinking water. Due to agricultural field runoff, improper solid waste management, there may be chance of ground water contamination in Bijni town area. So, the aim of our present study is to evaluate drinking water quality in the Bijni town area.Hypothesis set for the present study is- The physical and chemical quality of water in the study area is within the standard range of World Health Organization (WHO) for drinking water quality. To prove the hypothesis, objectivetakenis- analysis of the collected drinking water samples to evaluate amount of different physical and chemical parameters.

METHODOLOGY

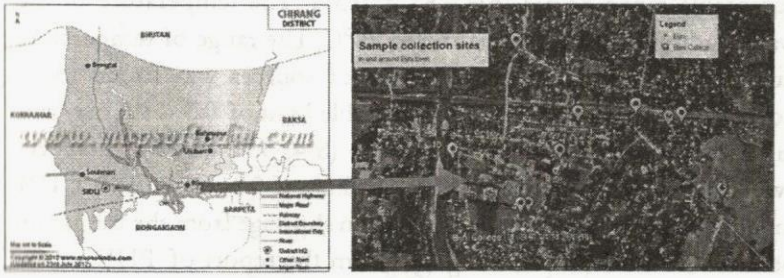
Study area

Present study was conducted in different parts of Bijni town area(26°312 N 90°402 E). Bijni is a town in Chirang district under the jurisdiction of Bodoland Territorial Region in the state of Assam. Bijni is surrounded by villages namely Kawatika, Doturi, Batabari, Bhetagaon, Chhatianguri, Lechiagaon, Amguri, Puran Bijni, Gerukabari, Saktola, Goraimari and Baghmara, Majrabari, BijniPanbari

Road(Deukurapar) (Map-1).It is customary to note that main occupation of the villagers is agriculture. For the study, samples were collected from ten (10) different areas of Bijni town (Table-1). Collections were done from public hand pumps as well as hand pumps from private households.

Table 1. Collection date and sites of sample collection

Sl.no.	Date	Site	Lat	Long	Location
1	06-02-21	S-1	26°29'30.912"	90°41'56.285"	College Road (near Hanuman mandir)
2	06-02-21	S-2	26°29'49.790"	90°42'20.819"	Ratiram Road, temple near railway station
3	06-02-21	S-3	26°29'47.436"	90°42'22.601"	Ulubari-Barobazar-Kalamati Road
4	06-02-21	S-4	26°29'30.991"	90°41'57.916"	College Road, near court
5	24-02-21	S-5	26°29'33.828"	90°42'39.164"	Sialmari Road, near Kali mandir
6	24-02-21	S-6	26°30'2.1384"	90°41'55.2516"	Near Bijni Flyover
7	24-02-21	S-7	26°29'48.1308"	90°42'30.582"	Near Railway Station
8	24-02-21	S-8	26°29'41.0352"	90°42'4.536"	College Road, Bijni
9	24-02-21	S-9	26°29'48.3684"	90°42'8.4708"	LNB Road, Bijni (Near SBI)
10	24-02-21	S-10	26°29'41.298"	90°41'41.874"	Kauatika (Near Subaijhar Road)



Map-1. Map showing study area and collection sites.

Methods used

Samples were collected from public drinking water sources covering total 10 collection spots (denoted by S1- S10). Groundwater samples from each tube well were collected after 2 min of pumping in order to obtain deep water as the test sample. The water samples were collected in 100-mL pre-washed bottles with watertight seals. The collected water samples were labeled with the identification number (S-1 to S-10).We collected samples in two phases. In first phase, we collected water samples from 04 different public tube wells, which are used by a large number person. In next phase, we collected six samples from some households. The study was carried out in the months of February, 2021. Water quality was analyzed by sending the samples to Sub-divisional Water Analysis Laboratory, PHE Department, Bijni. GPS points of each collection spot were noted with the help of GPS Camera in Window mobile handsets. Collecting sites were plotted in Google map using free version of Google Earth Pro and Chirang District Map was downloaded from Maps of India.com (Map-1). Mean and standard deviation of values were calculated and graph was made using MS Excel spreadsheet of Windows-07. WHO's Permissible range of different parameters were also collected from WHO's published materials on drinking water quality (source: Indian Standard specification for drinking water).

RESULT

The values of 10 different parameters were as seen in the table 1 along with permissible range of parameters in the drinking water. It has been recorded that, drinking water at sample sites was within the acceptable range of pH (pH 6.83 $\pm$ 0.37). The temperature of the water samples ranged from 15°C to 28°C. The range of temperature due to seasonal variation and different sources was found to be normal.The iron content is in permissible limit of 0.3 – 1.0 mg/liter in all the sites but exceeds in one site (S-4; 3.92 mg/lt) , however average value is within the permissible limit of 0.3 to 1.0 (0.48 $\pm$ 1.21 mg/liter). Rest all the parameters were in shortage from the minimum permissible limit (Table-2; Fig. 1). From the report of PHE, in the entire sample site the water is safe for drinking. Total dissolved solids

represent the total concentration of dissolved inorganic salts and small amount of organic matter. Common inorganic salts that can be found in water include calcium, magnesium, potassium, sodium etc.

Table 1.

Recorded values of different parameters in drinking water samples collected in the study area (S= sites; TDS= Total Dissolved Solids).

Parameters	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10
Iron	0.12	0.14	0.04	3.92	0.14	0.10	0.07	0.08	0.09	0.05
Alkalinity	97	77	110	99	100	69	90	95	90	67
Turbidity	2	2	2	5	2	2	2	2	2	2
TDS	75	110	100	140	177	85	130	75	99	100
Chloride	75	60	40	120	40	75	40	20	25	60
Fluoride	0	0	0	0	0	0	0	0	0	0
Total hardness	125	80	120	133	70	125	75	100	125	69
Residual chlorine	0	0	0	0.1	0	0	0	0	0	0
Nitrate	1.6	2.9	1.4	4.7	1.1	0.3	0.4	1.7	2.9	0.9
PH	7.4	7.3	7.2	7	6.5	6.5	6.6	6.8	6.5	6.5
Dissolve oxygen										

Table 2.

Average values calculated with standard deviation and permissible range (after WHO) of some chemical and physical parameters of drinking water.

Parameters	Mean of recorded values	Standard deviation	WHO Permissible range (mg/lt)	Desirable minimum
Iron	0.48	1.21	0.3- 1.0	0.3
Alkalinity	89.40	14.10	200-600	200
Turbidity	2.30	0.95	5 - 10	5
TDS	109.10	31.93	500- 2000	500
Chloride	55.50	29.58	250- 1000	250
Fluoride	0.00	0.00	1- 1.5	1
Total hardness	102.20	26.25	300- 600	300

Residual chlorine	0.01	0.03	0.2	0.2
Nitrate	1.79	1.36	45	45
PH	6.83	0.37	6.5- 8.5	6.5

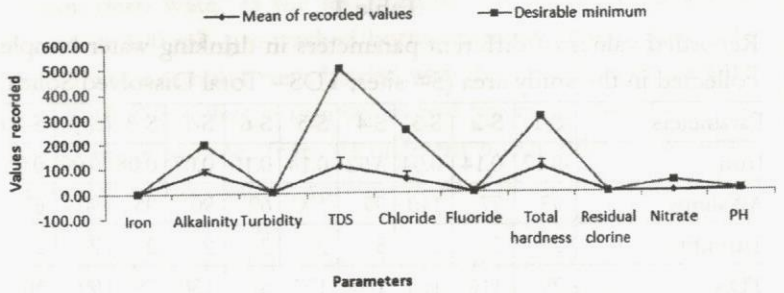


Fig. 1 Average recorded value of different parameters and desirable minimum value according to Indian standard of drinking water.

DISCUSSION

From the study, it has been inferred that all the sources of drinking water studied are safe source of drinking water and the recorded values of different parameters studied are within the permissible range as set by World Health Organization. A rise in temperature of the water leads to the spreading up of the chemical reactions in water, reducing the solubility of gases and amplifies the taste and odour (Murugesan et al. 2004). The study finding revealed that, the drinking water is slightly acidic, as the ideal pH for human consumption is stated to be 7.4 (Parker, 2013). Water with low pH is corrosive in nature. A controlled pH of water is suggested in WHO guideline to reduce the corrosion and contamination of drinking water having health consequences. Water pH is influenced by a number of factors including rock and soil composition and the presence of organic materials or other chemicals. Moreover, a low concentration of TDS (Total dissolved solids) actually means high quality water but it may have a flat taste. Higher iron content in ground water may cause some health-related problems as found in one case.Fluoride is not present in any of the sample, making the water safe for drinking.

Assessment of drinking water quality is a timely requirement amid emerging public health problems in this context where availability of

safe water is at risk due to natural and man-made activities. The present study is a fact-finding preliminary study contributing to the importance of safe drinking water for the well-being of the people. Further large-scale study is necessary for drawing inferences about the source of drinking water (ground water). Awareness rising on chemical contents in drinking water at household level is required to improve public health. Bacteriological study of drinking water is also essential for public health is awaited in this study.

Fig.1. Photographs taken during sample collection

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The Greenhouse Effect: Understanding Climate Change

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Abstract:

The greenhouse effect is like a big blanket of gases that keeps Earth warm by trapping heat close to its surface. These gases, including carbon dioxide, methane, ozone, nitrous oxide, chlorofluorocarbons, and water vapor, control how warm our planet stays. Water vapor, one of these gases, acts like a 'feedback' and makes temperature changes stronger. Scientists say that carbon dioxide is super important. If we took it away, the greenhouse effect would collapse, and Earth would get much colder—like a 33°C (59°F) drop in temperature. Earth's conditions, often called 'Goldilocks' conditions, are just right for life—not too hot and not too cold—thanks to these gases. However, people doing things like burning fossil fuels mess with this balance. This releases more carbon dioxide and other gases into the air, messing up how Earth keeps its energy. The amount of carbon dioxide in the air has been going up a lot, making the greenhouse effect stronger. This traps more heat near the surface, making the planet warmer. This paper talks about how the greenhouse effect works, why it's important for Earth, and what happens when people cause problems with it.

Keywords:

Goldilocks, Carbon dioxide, Methane, Ozone, nitrous oxide, chlorofluorocarbons, fossil fuels, Energy equilibrium.

Introduction:

The greenhouse effect is a natural phenomenon that regulates Earth's temperature, making our planet suitable for life as we know it. However, human activities, specifically the implications of the Industrial Revolution, have significantly increased the concentration of these greenhouse gases, increasing the greenhouse effect and contributing to Climate Change. In this paper, we're going to dig into its impact on Climate Change, human activities resulting in an enhanced greenhouse effect, Global warming, the measures and strategies to sustain the habitable climatic conditions and reduce the concentration of the greenhouse effect.

Impact on climate change:

The effects of the greenhouse effect on climate change are really important and touch many parts of our world. From rising sea levels which cause floods in the coastal areas to the more extreme weather events, like really strong storms or very hot days. This changing climate disrupts nature, affecting plants and animals in ways that can be harmful. When ice caps melt and the usual weather patterns change, it shows us that people have had a big impact on the natural way our planet works. This is a reminder that we need to do something about the things we're doing that make the Earth warmer. It's important to act quickly to tackle the human-made parts of the greenhouse effect and make sure we're taking care of our home.

Human Activities enhancing the Greenhouse Effect:

Human activities significantly contribute to enhancing the greenhouse effect, causing changes in the Earth's climate. The primary culprits are the burning of fossil fuels, deforestation, and certain industrial practices. Here's a breakdown:

1. **Burning Fossil Fuels:** The combustion of fossil fuels, such as coal, oil, and natural gas for energy production, is a major contributor. When these fuels burn, they release carbon dioxide (CO2) and other greenhouse gases into the atmosphere. This is a significant source of the enhanced greenhouse effect.
2. **Deforestation:** Clearing large areas of forests for agriculture or development reduces the number of trees that can absorb CO2 through photosynthesis. Trees act as carbon sinks, and when they are removed, the stored carbon is released back into the atmosphere. This contributes to the increase in greenhouse gas concentrations.
3. **Industrial Processes:** Certain industrial activities release potent greenhouse gases. For example, the production of cement releases carbon dioxide, and some manufacturing processes emit other gases like methane and nitrous oxide. These gases, though released in smaller quantities, have a higher warming potential than carbon dioxide.

Mitigation practices or measurements:

To address and fix the enhanced greenhouse effect, we need to take measures to reduce the amount of heat-trapping gases in the atmosphere. Here are some steps we can take, often referred to as mitigation measures:

1. **Transition to Clean Energy:** Switching from fossil fuels (like coal and oil) to cleaner energy sources (such as solar, wind, and hydropower) helps reduce the amount of carbon dioxide released into the air. Clean energy is a crucial step in lessening our impact on the greenhouse effect.
2. **Energy Efficiency:** Using energy more efficiently in our homes, businesses, and industries can significantly decrease the overall demand for energy. This reduces the need for burning fossil fuels, ultimately lowering greenhouse gas emissions.
3. **Afforestation and Reforestation:** Planting more trees and restoring forests can act as natural carbon sinks. Trees absorb carbon dioxide during photosynthesis, helping to counteract the increase in greenhouse gases in the atmosphere.
4. **Sustainable Agriculture:** Implementing practices that reduce emissions from agriculture, such as using more efficient fertilizers and managing livestock more effectively, can contribute to mitigating the greenhouse effect.
5. **Waste Management:** Proper waste management, including recycling and reducing waste, helps decrease the release of methane, a potent greenhouse gas, from landfills.

6. **International Cooperation:** Climate change is a global issue, and collaboration among countries is essential. International agreements and efforts to reduce emissions on a global scale play a crucial role in addressing the greenhouse effect.
7. **Research and Innovation:** Investing in research and development of new technologies can lead to innovative solutions for mitigating the greenhouse effect. This includes advancements in renewable energy, carbon capture, and other climate-friendly technologies.

By implementing these mitigation measures, we can work towards fixing the greenhouse effect and creating a more sustainable and balanced relationship with our environment.

Conclusion:

In conclusion, we've explored how human activities are messing with the Earth's climate through the greenhouse effect. The results are clear: rising seas, crazy weather, and disruptions in nature.

But, we've got ways to fix it. Using cleaner energy, being smart about energy use, planting more trees, and handling waste better are steps in the right direction. It's not just about being good; it's a scientific need.

We're in this together globally, and as we keep learning and trying new ideas, we can make a real difference. Understanding the greenhouse effect and taking action is not just about saving the environment; it's about keeping our home, Earth, healthy and balanced for the future.

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ICHTHYO-FAUNAL DIVERSITY OF BAGARI TARI BEEL OF LOWER REACHES OF BRAHMAPUTRA RIVER IN BARPETA DISTRICT, ASSAM AND ITS CONSERVATION

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ABSTRACT:

Barpeta district is located at 26°192 22.55// N and 91°00'22.75// E covering geographical area of 2,282 sq.kms (approximately) having population 16,93,622 (as per 2011 census). The present investigation was carried out in the Bagari Tari beel during the year 2021-22 to document the ichththyo-faunal diversity and conservation status of the fishes. The study reveals the presence of 28 species belonging to 13 families, 5 orders and 20 genera. The predominant orders of fishes in the beel were Cypriniformes, Perciformes and Siluriformes. The conservation status of the fishes were also evaluated based on the IUCN. Among the identified species of fishes, 23 species were found as least concern (LC), 1 species was found as nearly threatened (NT), 2 species were found as data deficient (DD) and endangered (EN) and not evaluated (NE) categories were represented by 1 fish species each. The natural impact i.e. flood, eutrophication, siltation and anthropogenic factors like illegal fishing, over fishing, destruction of breeding ground are taking place in the beel. The authors suggest some measures for sustainable development of the aquatic ecosystem.

Keywords: Barpeta, ichthyo-faunal diversity, conservation,

anthropogenic factors, sustainable development.

I. INTRODUCTION

North east India, comprising eight states, namely, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura provide unique ecological variations since past. Assam is one of the richest fresh water resources states in the country along with 3.91 lakh hectares of surface water (Brahmaputra and Barak river system) (Economic survey Assam, 2010). Total area of beels associated with river Brahmaputra and Barak along with its tributaries is estimated at 92000 ha. and 8000 ha. respectively (CIFRI, 2000)(Malakar *et al.*, 2017). The district of Barpeta holds 195 small wetlands (<2.25 ha), river/stream occupies 93.22% of wetlands. Scientific exploration from fisheries point of view has not been carried out in all the aqua bodies of the district except the larger beels. Keeping the view the present work was carried out in the Bagari Tari beel of lower Brahmaputra basin to document the fish diversity, its abundance, feeding habit and conservation status.

II. MATERIALS AND METHOD

2.1. Study area

Bagari Tari is a seasonal beel located at Barpeta District near Brahmaputra river, Assam lies in latitude 26.3284° N and longitude 91.2434° E covering an area of 36.54 ha.(fig:1). In the east of the beel there is a Barghopa and Potlarkur, in the west there is a Barbil Pathar and Kamalabari, Bagari Tari, in the north, there is a Chengdi and Khudra Chinadi and in the south, there is a Gadeshali and Chatala.

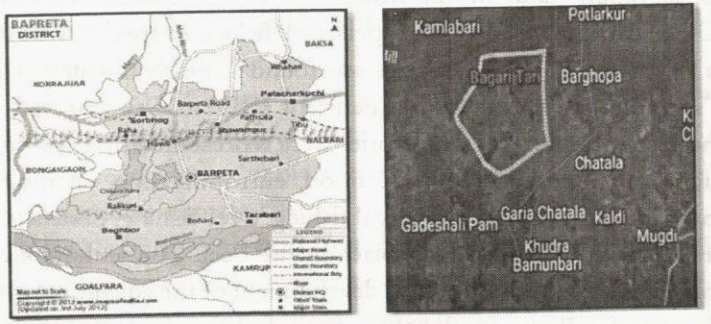

Fig.1: Locational map of study area (source: Google map).

III. RESULTS AND DISCUSSION

During the study period (2021-22), 28 fish species were recorded from the beel belonging to 5 orders, 13 families and 20 genera (table.1). The recorded 5 orders comprised of Osteoglossiformes, Cypriniformes, Siluriformes, Synbranchiformes, and Perciformes. The order Perciformes contributed 4 families (31%), 6 genera (30%) and 10 Species (37%). The order Cypriniformes contributed 2 families (15%), 6 genera (30%) and 8 species (30%). With 4 families (31%), 4 genera (20%) and 5 species (31%), the order Siluriformes contributed to the total number and percentage composition of the beel followed by Synbranchiformes with 2 families (15%), 2 genera (10%), 2 species (7%) and the order Osteoglossiformes was represented by 1 families (8%), 2 genera (10%) and 2 species (7%) each.

Among 13 families recorded from the beel, the Cyprinidae family was found to be dominant with 8 species (29%) followed by Channidae with 4 species (14%), Osphronemidae with 3 (11%), Notopteridae with 2 species (7%), Bagridae with 2 species (7%), Ambassidae with 2 species (7%) each and Botiidae, Siluridae, Clarridae, Heteropneustidae, Synbranchidae, Mastacembalidae, Anabantidae with 1 species (4%) from each group.

The conservation status of the ichthyofauna from the present study revealed that 23 species (82%) were under least concern (LC), 2 fish species (7%) were data deficient (DD), and near threatened (NT), endangered (EN) and not evaluated(NE) categories were represented by 1 fish species (4%) each as per IUCN list of threatened species (2017).

Talukdar and Rajbongshi (2018) have carried out work on ichthyofaunal diversity of Puthimari beel of Barpeta district and recorded 46 indigenous fish species belonging to 37 genera, 8 orders and 19 families. Among these 5 species were nearly threatened (NT), 01 species vulnerable (VU), 39 species least concern (LC) and 2 data deficient (DD). According to Imtiaz *et al* (2022), Ichthyofaunal diversity of Jaluguti beel was found a total of 46 fish species belonging to 33 genera, 19 families and 7 orders were recorded during the study period. The Perciformes was the most dominant order, with 6 families

(31.58%), 7 genera (20%) and 9 species (19.57%) contributing to the total and among the family was the Cyprinidae with 12 genera (36.36%) and 17 species (36.96%). According to Pathak and Goswami (2021), Chandubi wetland was found a total of 73 species which belong to 47 genera under 21 families and 9 orders.

During the period of investigation in the beel, a number of threatening factors to fish diversity in the beel were observed including natural and anthropogenic. The natural factors were noted down as massive flood, eutrophication, siltation and anthropogenic factors like illegal fishing, over fishing, destruction of breeding ground were recorded.

Table. 1: Fish fauna, feeding habits, abundance and conservation status of fish species of Bagari Tari beel.

Sl no.	Order	Family	Scientific name	Distribution (within NE)	Food habit	Abundance	IUCN conservation status
1	Osteoglossiformes	Notopteridae	*Chitala chitala* (Hamilton, 1822)	Wide	C	L	LC
2			*Notopterus notopterus* (Pallas, 1769)	Wide	O	L	LC
3	Cypriniformes	Cyprinidae	*Amblypharyngodon mola* (Hamilton, 1822)	Wide	H	M	LC
4			*Catla catla* (Hamilton, 1822)	Wide	O	H	LC
5			*Cirrhinus mrigala* (Hamilton, 1822)	Mn	O	H	LC
6			*Labeo gonius* (Hamilton, 1822)	Wide	H	M	LC
7			*Labeo rohita* (Hamilton, 1822)	Wide	H	M	LC
8			*Puntius sarana* (Hamilton, 1822)	Wide	C	M	LC
9			*Puntius sophore* (Hamilton, 1822)	Wide	C	M	LC
10			*Puntius javanicus* (Bleeker, 1855)	Mn, Tr	C	L	LC
11		Botiidae	Botia dario (Hamilton, 1822)	Wide	C	L	LC
12	Siluriformes	Bagridae	*Mystus vittatus* (Bloch, 1794)	Wide	C	H	LC
13			*Mystus tengara* (Hamilton, 1822)	Wide	C	M	LC
14		Siluridae	*Wallago attu* (Bloch and Schneider, 1801)	Wide	C	L	NT
15		Clariidae	*Clarias magur* (Linnaeus,1758)	Wide	C	M	EN
16		Heteropneustidae	*Heteropneustes fossilis* (Bloch, 1794)	Wide	O	L	LC
17	Synbranchiformes	Synbranchidae	*Monopterus cuchia* (Hamilton, 1822)	Wide	C	M	LC

18		Mastacembalidae	*Mastacembalus armatus* (Lacepede, 1800)	Wide	C	M	LC
19	Perciformes	Ambassidae	*Chanda nama* (Hamilton, 1822)	Wide	C	M	LC
20			*Parambassis ranga* (Hamilton, 1822)	Wide	C	L	LC
21		Channidae	*Channa gachua* (Hamilton, 1822)	Mn	C	H	LC
22			*Channa marulius* (Hamilton, 1822)	Wide	C	L	LC
23			*Channa punctatus* (Bloch, 1793)	Mn	C	H	LC
24			*Channa striatus* (Bloch, 1793)	As	C	L	LC
25		Anabantidae	*Anabas testudineus* (Bloch, 1793)	As	C	M	DD
26		Osphronemidae	*Trichogaster lalius* (Bloch and Schneider, 1801)	As, Mn, Ng, Tr	C	L	DD
27			*Trichogaster fasiata* (Bloch and Schneider, 1801)	Wide	C	M	NE
28			*Osphronemidae goramy* (Lacepede, 1801)	Wide	O	L	LC

Note: Conservation status: LC: Least Concern, DD: Data Deficient, NT: Near Threatened, EN: Endangered, NE: Not Evaluated, As: Assam, Mn: Manipur, Ng: Nagaland, Tr. Tripura, L: Low, M: Medium, H: High, C: Carnivorous, H: Herbivorous, O: Omnivorous.

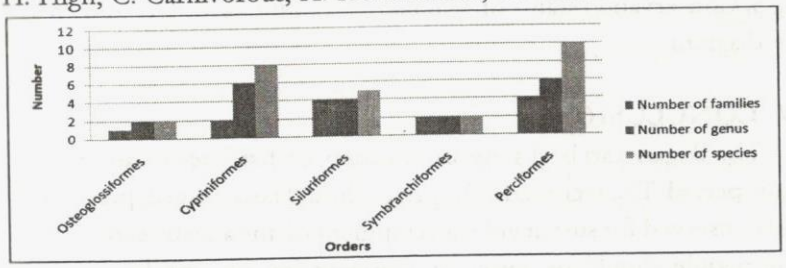

Fig.2. Numbers of fish families, genera and species under different orders from the study area.

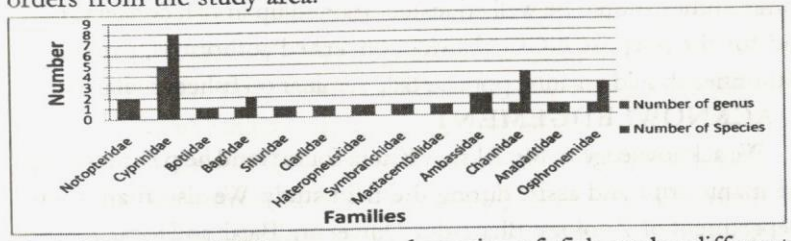

Fig.3. Number of fish genera and species of fish under different

families from the study area.

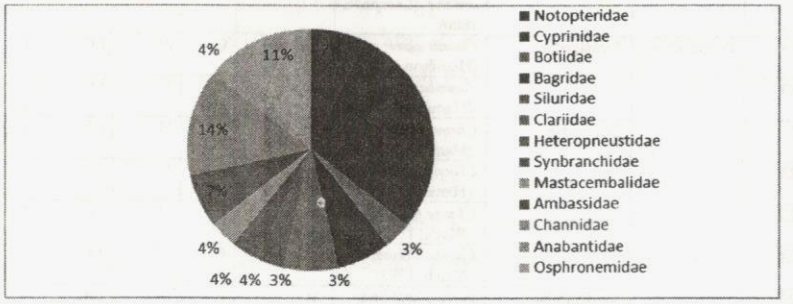

Fig.4. Percentage composition of fish genera under different families from the study area.

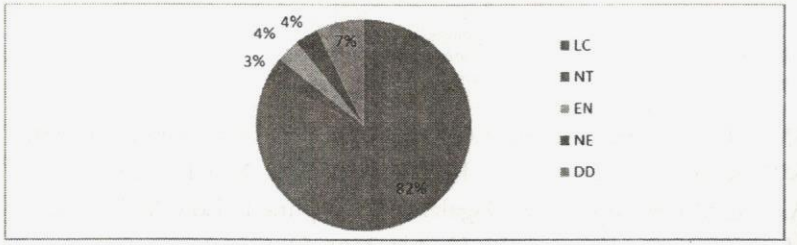

Fig.5. Conservation status of fish fauna from the study area shown in pie diagram.

IV. CONCLUSION

The Bagari Tari beel supports a variety of fish species during the study period. The recorded fish species should be managed, preserved and conserved for sustainable development of the aquatic ecosystem. The people should be aware of conservation process for further growth and sustainable development of the fisheries. The fishermen communities should be well educated, trained up in fish conservation and for the purpose NGO, district concerned authorities, panchayat authorities should organise popular talk, seminar on fisheries vital issues.

V. ACKNOWLEDGEMENT

We acknowledge to Mr. Akshay Kalita for his kind help in preparing the manuscript and assist during the field study. We also thankful to Department of Zoology, Bhattadev University, Bajali and local people, fish farmer for their selfless help in the field work.

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Sustainable Agriculture for food: A Challenge of Environment

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Abstract

Sustainable agriculture is the way which fulfils the needs without compromising the ability for current or future generations. Sustainable agriculture benefited in protection of public health, prevents pollution, prevents soil erosion, and also economic importance. However sustainable agriculture is good for the current or future generations and good environment it is unsuitable for mass production, minimises the use of machine, take long time to recover soil fertility. Here we report direct analysis of sustainable agriculture and discussed about our local agriculture and how can we do better in organic farming which makes sustainable agriculture. Fertilisers and pesticides boost crop yields but excessive usage of it the soil reduced fertility, strengthen insecticides, polluted air, water, soil and increased greenhouse gases. Thus, the living entity are facing threat at different level including various health issues and environmental risks. It is the right timeto understand that organic farming is healthier and environment friendly. So sustainable agriculture is the only way which ensure every generation wealthy and eco-friendly.

Key words: Agriculture, Organic farming, Eco-friendly Environment, Public Health

Introduction

Sustainable agriculture is farming in sustainable ways meeting

society present food and textile needs, without compromising the ability for current or future generations to meet their needs. It is a balanced management system of renewable resources including soil, wildlife, forests, crops, fish, livestock, plant genetic resources and ecosystems without degradation and to provide food, livelihood for current and future generations maintaining and ecosystem services of these resources.

The physical aspects of sustainability are partly understood. Practices that can cause long-term damage to soil include excessive tillage (leading to erosion) and irrigation without adequate drainage (leading to accumulation of salt in the soil). Long- term experiments provide some of the best data on how various practices affect soil properties essential to sustainability.

Although air and sunlight are available everywhere on Earth, crops also depend on soil nutrients and the availability of water. When farmers grow and harvest crops, they remove some of these nutrients from the soil. Without replenishment, the land would suffer from nutrient depletion and be unusable for further farming. Sustainable agriculture depends on replenishing the soil while minimizing the use of non-renewable resources, such as natural gas (used in converting atmospheric nitrogen into synthetic fertilizer), or mineral ores (e.g., phosphate). Possible sources of nitrogen that would, in principle, be available indefinitely, include:

1. Recycling crop waste and livestock or human manure
2. Growing legume crops and forages such as, peanuts, or alfalfa that form symbioses with nitrogen-fixing bacteria called rhizobia
3. Industrial production of nitrogen by the Haber Process uses hydrogen, which is currently derived from natural gas, (but this hydrogen could instead be made by electrolysis of water using electricity (perhaps from solar cells or windmills)) or
4. Genetically engineering (non-legume) crops to form nitrogen-fixing symbioses or fix nitrogen without microbial symbionts.

Goals of Sustainable Agriculture

1. The main intention of sustainable agriculture is to satisfy human needs in clothing and food products.

2. The raw materials such as cotton, silk, leather, wool, etc., used for clothing should have high quality and durability to ensure the comforts of humans.
3. The usage of nonrenewable resources in a well-organised manner.
4. Protect and improve the environment and natural resources.
5. To maintain soil health, minimize water usage and control pollution.
6. Crops that are grown by using sustainable agriculture methods promote farmer wellbeing and are environmentally friendly.
7. Making use of natural and biological resources to control pests and diseases.

Methods of Sustainable Agriculture

1. **Crop Rotation:** The practice in which different types of crops such as leguminous crops and non-leguminous crops are grown alternately in the same field or soil is called crop rotation.

a. Growing different crops in succession on land to avoid exhausting nutrients in the soil. It also controls pests and diseases.

b. In crop rotation, the cereal crops like wheat, maize, paddy and millets are grown alternatively with leguminous crops like pulses, peas, beans, groundnut and clover, etc., in the same field. Rotation of crops saves a lot of nitrogenous fertiliser.

c. This is because the leguminous crops grown during the rotation of crops can fix atmospheric nitrogen with the help of their nitrogen-fixing bacteria, and there is no need to add nitrogenous fertiliser to the soil.

2. **Organic Farming:** It is a natural method of agriculture that sustains the health of the soil ecosystem and microorganisms present in the soil. In this method, bio fertilizers, bio pesticides are used during agriculture, which means farming is done in a natural way without the use of chemicals. It improves and maintains the natural landscape and agro-ecosystem and avoids overexploitation and pollution of natural resources.
3. **Soil Enrichment:** Soil is an essential element of agricultural

ecosystems. Healthy soil is full of life, which can often be killed by the overuse of pesticides. Good soil can expand yields as well as help create more strong crops. It is possible to sustain and enhance the quality of the soil in many ways. Some examples involve leaving crop residue in the field after a harvest and the use of composted plant material or animal manure.

4. **Integrated Pest Management (IPM):** A scope of methodology, including mechanical and biological controls, can be applied systematically to keep pest populations under control while decreasing the use of chemical pesticides.
5. **Cover Crops:** Most of the farmers choose to have crops planted in a field at all times and never leave it barren land as this can cause accidental consequences. Cover crops can be broadly classified as any non-cash crop grown in addition to the primary cash crop. The use of cover crops also decreases the need for chemical fertilizers. Cover crop method mainly increases the organic matter, soil fertility and decreases the pest and diseases.
6. **Agroforestry:** By mixing trees or shrubs into their operations, farmers can provide shade and shelter to protect plants, animals, and water resources, while also potentially offers additional income.
7. **Mixed Cropping:** Growing one or more crops in the same field is called mixed cropping. This technique is most commonly used in rain-fed areas. The main objective of this cropping system is to reduce the loss of crops due to rain.
8. **Natural Pest Predators:** In order to maintain effective control over pests, it is essential to view the farm as an ecosystem as opposed to a factory. For instance, various birds and other animals are, in fact, natural predators of agricultural pests.

Benefits of sustainable agriculture

Protection of public health

Since sustainable crop farms avoid hazardous pesticides, they are able to grow fruits and vegetables that are safer for consumers, workers and surrounding communities.

It prevents pollution

Sustainable agriculture can enhance air quality by absorbing agriculture residue into the soil and employing appropriate amounts of tillage. Planting wind breaks, cover crops or strips of native perennial grasses can also help prevent dust.

Prevents soil erosion

By eliminating tillage, managing irrigation systems to reduce runoff, anf planting more plants or much, it can help prevent erosion.

Economic benefits- Reduces cost :Instead of using pesticides and chemicals, all need are manure and organic waste that can be turn into fertilizers.

Disadvantage of sustainable agriculture

Limited land use-one of the significant drawbacks of sustainable agriculture is the limited use of land, making it unsuitable for mass production.

Labour intensive- Sustainable agriculture minimize the use of machine, but that can toll on production, need more people to help to take care of crop of the plants. Thus, it slows down the production.

Reviving fertility- it takes long time before the soil recovers its fertility. Thus, the farmer has to wait to make some profits again.

Effects of using fertilizer and pesticides

- Fertilizer boost crop yields, but their excessive usage has hardened the soil, reduced fertility, strengthened insecticides, polluted air and water, and emitted greenhouse gases, creating health and environmental risks.
- By limiting the role of nitrogen fixing bacteria, synthetic fertilizer application starts the destruction of soil biodiversity.
- Soil, water and air pollution, as well as damage to non-target creatures such as plants, birds, mammals' fish and crops are the main environmental problems associated with pesticides.

For this reason, the organic farming is more accepted than inorganic farming. organic farming lowers the risk of environmental pollution and reduce green housed effect.

Agriculture in our locality

As we are living in india where 65% of the people are engaged in

Agriculture. Also, our Bijni locality is more engaged in Agriculture but all the cultivation are in small scale. That's why cultivators are not needed to use much more pesticides, Artificial fertilizers. And mainly parts of Bijni falls under rural area where everyhouse wants to their needed crops and vegetable as in home. People are used mainly cowdung as manure and organic wastes. But the use of fertilizer increasing day by day as the damage of crops using. Our area cultivates paddy, mustard, potato, wheat, etc.

What We Each Can Do to Support Sustainable Agriculture:

Choose regionally grown and made products that originate in your bio-region. They use less fuel to be transported and come straight from a source in your watershed.

Buy as local as you can from area farmers whenever possible and at restaurants that feature local-grown foods. Consider joining a CSA –community supported agriculture – program that ensures local food crops and field systems stay in production.

Eat more organic fruits and vegetables – their production is much better for the environment, they create fresh air, do not pollute the water and soil, generate millions of tons less greenhouse gases than animal products, and are a delicious, flavorful, healthy source of vitamins and minerals. They also sequester more carbon in the soil than conventionally farmed products.

If you buy imported foods from other countries, choose **Fair Trade and Organic** to ensure safe agricultural practices and healthy village and forest communities.

Slow Down. Enjoy your meal and turn food into an experience that increases quality of life. Find out about Slow Foods, Locavore, and other food movements.

Grow your OWN food – in a pot, on a deck, in your backyard, at a community garden. Tastes great and ties you into the sustainable agriculture movement, directly.

Support schools and community gardens to promote healthy living and smart thinking for all ages and abilities\

Vote to support sustainable agriculture, to protect rural farm systems, and to grow local agriculture as an economic and lifestyle

choice that is smart AND sustainable.

Conclusion

Plants and Animals grow healthy when we practice biological or organic agriculture. Agriculture plays a vital role in India. India is the second-largest producer of staple food. Planting various crops in sequence in the agriculture fields instead of the self-same type of crops can have many benefits, including healthier soil and improved pest control. Cover crops, such as clover or hairy vetch, are planted in the course of off seasons when soils might otherwise be left bare.

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Health and Hygiene: A major Challenge of Environment

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Abstract

Microbial world currently poses as a serious threat to global health all around the living sphere. Unhealthy environment certainly causes health epidemics to common people anywhere. Health-hygiene is the most sensitive matter of common people to maintain a healthy lifestyle. Health-hygiene issues are extremely necessary to understand by the public just like the norms of living criteria. The factors of environmental pollution enhance airborne diseases and such other contaminated microbial diseases which is a major concern of environment. Mostly the common people of rural areas are often found victims of health epidemics. Health awareness activities and extensive study on different health issues could mitigate the problems to some extent. Open discussion on maintenance of health-hygiene and proper demonstration at different level could be the effective measures. The key question is how to minimize the adverse effect of pollution to sustain healthy life across the globe.

Key words:

Health-Hygiene, Environment, Pollution, Diseases

Introduction

Health could be defined as a state of complete physical, mental and social well-being. Hygiene could be defined as the promote of desirable personal behavior e.g., hand washing with soap before eating and after using toilet, taking regular bath and maintaining body

cleanliness. Hygiene promoting health through prevention of human contact with the hazards of wastes like physical, microbiological, biological or chemical agents of disease. Hygiene and sanitation cover personal, premises, equipment, production materials, containers and environment. Health-Hygiene issues are creating burning problems especially in the rural areas of different countries. The news report and data of health issues by World Health Organization (WHO) is giving announcement on time to alert such health epidemics. Currently, the Covid-19 and Omicron including the Delta variant causes severe disease or death worldwide. Corona virus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. Whereas, Omicron has several mutations and easily spreads person to person causing illness. The number of people testing positive has risen in areas of South Africa affected by this variant, but epidemiologic studies are underway to understand if it is because of Omicron or other factors. Contemporarily, people are most vulnerable by other diseases like trans-fat leading to heart diseases, chronic hepatitis C virus (HCV), tuberculosis and contaminated medicines causing harmful to children. Hence the study is introduced here some diseases and disease-causing factors in relation to environmental pollution. Report by "World health statistics 2022 on monitoring health for the SDGs, sustainable development goals" compel us to became more concern on health issues and thus prevention is always significant for the security of life and living earth.

Objective

The aim and objectives of the present study is to create awareness on health and hygiene among the common people. Identify the major causes of health issues and role of environmental factors related to health-hygiene issues. Role of traditional practice and food habit to maintain the health issue in rural area. Menstrual hygiene management in rural area.

Methodology

During the study of Health-Hygiene issues, the data were taken from news report, health organization and public domain. Besides awareness rally and community visit was made on health-hygiene issues

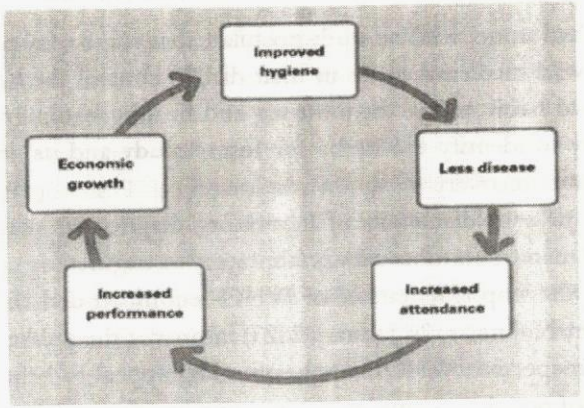
locally to understand the actual picture of health-hygiene and role of environmental factors. The study was a part of research work. According to work plan the priority was given to conduct awareness workshops with accessory activities among school children and community people. The information about their lifestyle, livelihood, education, health-hygiene, traditional practices and food habits etc. were collected by interacting among them. Certainly, it could be considered as excellent tool of data collection. The data analysis was done following simple statistics to assumed hypothetically. Photographs were taken for documentation during field activities.

Result and Discussion

The study reveals that health-hygiene issues are the major concern of common people for sustaining healthy life. The research work also highlights the impact of environmental pollution and climate change. The airborne diseases rapidly spread from person to person causing severe illness to human health. Other contaminated diseases are found as the causing agent of health disorder. The use of pesticides, weedicides and chemical fertilizers in the agriculture causes threat to human health. Industrial effluences, detergents, metallic compound and clinical waste pollutes environment and thus causes health disorder of common people. The health disorder and mortality rate are generally high among rural community because of poor health-hygiene. Malnutrition is also another factor of health issues particularly lower age group and females who are falling below poverty line everywhere. The study also reveals that mostly common people are unaware about their proper sanitation and personal hygiene. Such people follow only the traditional hygiene method to maintain their health instead of scientific safety measures. Many literate persons were found to be careless attitude on their health-related issues which really a fatal outlook to healthy environment. Both negligence and ill-practice of common people were identified as the root causes of unhealthy environment. The challenge of healthy society are lack of awareness about health-hygiene, inauspicious habituate, superstitious lifestyle, malnutrition and poor infrastructure facility. Majority of common people are not trained enough to maintain their health issues though many Governments

scheme had launched. The study postulate that some rural people use various wild medicinal herbs in their diet to control the health risk. Such food habit makes them strong and healthy naturally and it is necessary to identify the herbs for future study and its' impact on health issues recovery.

The present discovery of laboratory diagnostics method like practical manual on tuberculosis laboratory strengthening updated to support the implementation of WHO-recommended diagnostics (Departmental news, 24 January 2023) improves the public health in global prospective. WHO launches funding appeal to help a record number of people in complex, intersecting health emergencies(News release, 23 January 2023) to support healthy and sustainable life. WHO urges action to protect children from contaminated medicines (Statement, 23 January 2023) for the safety of human generation. Recent study has estimated that about five billion people unprotected from trans-fat leading to heart disease (News release, 23 January 2023) across globe. Chronic hepatitis C virus (HCV) infection is a major global public health problem and a cause of liver disease, with the highest burden in low-and middle-income countries (LMICs). In 2016, WHO launched the "Global Health Sector Strategy for Viral Hepatitis" which was renewed in 2022, with a goal of ending the epidemics of viral hepatitis B and C by 2030. World Hand Hygiene Day, 5 May 2022, is focused on recognizing that we can add to a facility's climate or culture of safety and quality through cleaning our hands but also that a strong quality and safety culture will encourage people to clean hands at the right times and with the right products. Menstrual Hygiene Day 2022 is: making menstruation a normal fact of life by 2030. The overarching goal is to build a world where no one is held back because they based on its review of the determinants of health, of the forces in the community that can influence them, and of community experience with performance monitoring, the committee finds that a community health improvement process that includes performance monitoring, as outlined in this report, can be an effective tool for developing a shared vision and supporting a planned and integrated approach to improve community health.



Conclusion

Health-hygiene maintenance definitely promote good health, prevent sickness, reduce disease transmission. It helps to mitigate with climate change and environment for sustainable healthy life. Health awareness activities among common people and public health infrastructure should be developed. Mitigate climate change and invest in environmental justice to reduce poverty which may improve economic stability along with sustainable healthy life. The notable health regulation factors are nutrition, physical activity, stress reduction, sleep, maintaining healthy weight, water intake, limiting excess consumption and preventive care. The people should pay attention on health regulatory factor to make them fit in this living earth.

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A Critical Analysis on the Environment based Policies & Programmes of the Union Government of India: Since 2014

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Abstract

India, the largest democracy of the world witnessed a new phase of not just the electioneering in 2014 but also a new style or approach of the governance henceforth. The retrospective analysis even on the campaigns run by various parties for the general elections 2014 largely covered topics related to environment, one of which is "**Pehle Shauchalaya, Phir Devalaya**" led by Shri Narendra Modi who then ran the campaign for Prime Minister. The slogan mentioned ringed the bell across the nation as the leader spoke about building toilets prior to building temples or the place of worship. For a country that is largely based on the foundations of the religious principles and parties influenced the religious organizations, it was but a challenging step to even make environment topic a standalone interest for a national campaign. Shri Narendra Modi and the party Bharatiya Janata Party won the general elections 2014 and started working on innovative and eye brow moving programmes like Swachh Bharat Abhigyan, Namami Gange, Green Skill Development, Toilets before Temples, and Compensatory Afforestation Fund Act (CAMPA).

The Union Government of India allocated INR 3030 Cr to the Environment Ministry for 2022 - 2023 which is about 16% more as compared to previous financial year's allocation. Since 2014, the Union Government of India achieved a few phenomenal milestones like

1% rise in the total forest area covering an area about 650 sq. kms, 32 states have been declared zero open defecation, and multiple initiatives ongoing to revive the river, Ganga. Also, the combined efforts of global institutions like UN and Government of India resulted in programmes like Mahatma Gandhi NREGA which not only focuses in conserving the local environment resources but is also the largest cash for work programmes in the world.

The paper attempts to critically analyze but not limit, to five most recent environment based initiatives led by the Modi Government. It also explores the scope to suggest and inform a new thinking or a new approach for the Government in local context and how enabling citizens for the same may reflect for the future of Assam, and India. The paper is a qualitative piece, literature review of which has been extracted from the Government handbooks and other reputed research journals.

Introduction

Policies in simplest terms could be defined as guidelines for the future, it is a framework based on which the future agenda is carried forward. And environment policies simply mean the framework that inspire, inform, and enable citizens and institutions like government and agencies to improve their quality of life without compromising the future generations. In India, the latest environment policy we can refer is that of the National Environment Policy 2006 which aims to empower stakeholders, including communities, to care for their own environments by providing opportunities to share in managing their local resources and the right to participate in decision-making.

Shri Narendra Modi led Union Government of India since 2014 have shown positive concern on the environmental issues; and that's reflected even in the recent commitment which aims at making India a Net Zero Emissions by 2070. Though the globe was negatively affected by the Covid-19 pandemic and witnessed high rate of inflation, India witnessed V-shaped economic growth in the immediate post-pandemic cycle despite various challenges and kept the focus on environmental challenges as the priority which is reflected in the

fact the Union Government of India raised the allocations for the Ministry concerned by about INR 500 Cr.

Objectives

The major objectives of the paper are –

1. To critically analyze five Union Government policies/ programmes based on environment, between 2014 – 2022.
2. To suggest & recommend a set of polished policy frameworks in the local context, Assam.

Methodology

The paper is a qualitative piece, discussion based on the excerpts of the literature reviews or the critical articles on few of the most talked about policies and programmes based on environment and launched during the first & ongoing tenure of the Prime Minister of India Shri Narendra Modi. The data have been collected from both primary and secondary sources like government reports, news articles and alike.

Analysis:

The paper in the brief shall now critically analyze the five most recent environment-based initiatives during the Narendra Modi led Government:

Toilets Before Temples

Shri Narendra Modi ji for the first time in the history of India made **"cleanliness drive"** a central campaign for Prime Minister campaign. Not just cleanliness but also went ahead challenging the conventional buzz by placing the importance of toilets before the topic of temple, he sent a bold statement in the Global Citizen Festival by calling for installation of toilets to 65% of the rural India who supposedly lacked toilets.

WHAT WENT RIGHT	WHAT WERE / ARE THE CHALLENGES
Global attention to address a local issue through PM campaign – helped build India a better brand story of transparency and cater better socio-impact policies.	Campaign challenges the list of previously existing policies or programmes, hence beating the brand essence of then party in ruling in the global stage.
Sources then claimed India to have lacked toilets in 65% of rural regions, it pulled traction of interest of number of global organizations to join hands in initiatives to save & improvise the ecosystem of the rural India.	The staggering data as claimed during the campaigns seemed way above then Government data; and this have lead to a kind of confusion in implementation & allocation of resources received for the programmes followed.

Swachh Bharat Abhigyan/Mission

As per the official data, the INR 60,000 Cr has been spent on the programme until 2022, and it does have positive implication but evidently have also failed in attaining the expected performance. The **"Build first, & get reimbursed later"** model have reflected in debt burden as huge chunk of stakeholders had to borrow money from institutions which are majorly the informal sources. The idea was to raise the level of ownership among the people but the result seemed to have benefitted only the informal lenders to a large extent.

32 states have been declared zero open defecation until 2022; and about 500 million people supposedly have stopped defecating in the open since the launch of the programme. The Government statistics claim that over 5.4 lacs villages across 615 districts have received about 9 Cr toilets. Interestingly the World Health Organization supports the claims of the Government and further adds that the Swachh Bharat Mission have influenced and saved the lives of about 300,000 lives and does impact 150,000 annually. Multiple reports produced by WHO and Union Government of India claims that the programme have created a positive ripple effect in the Indian rural and even the urban, and have led the savings of average 50,000 rupees per household by eradicating illness and related issues due to open defecation.

However, the most interesting fact is here that the programme as such is not a new one and there has been multiple programmes with the similar intention or the objectives during the previous governments. Also, the previously existing programmes have all been clubbed under the Swachh Bharat Mission as on date which gives a scope to the critics that the programme though has far reaching positive implications, it is but the re-nomenclature of the previously implemented programmes. e.g., National Urban Sanitation Policy (NUSP), Jawaharlal Nehru National Urban Renewal Scheme (JNNURM), Nirmal Bharat Abhigyan (NBA) and few others.

WHAT WENT RIGHT	WHAT WERE / ARE THE CHALLENGES
Central funding mechanism works well in the implementation, considering the fact the state level funding often seems to lag in following the timeline.	Enforcement of the program seemed to have been limited to only a particular section of the political activist or the ones who desire to make career in the line.
Political cum Government level interest have raised the popularity & acceptability of the program hence creating a mass social change in the attitude and approach of the mass.	The cadres of the political party in ruling have left a thin line of difference between the style of party work and government. Often Government premises also have been seen impacted by the political activism.
Impacted 500+ million people directly.	Impact cannot be quantified, hence claims of the impact level of the Government or the agencies involved as the implementing partner of the program fails here.
Self-conscious level financial involvement hence creating the feeling of ownership for the mass.	Build first, reimbursed later model of work have forced a section of people to take to informal lending hence creating a rift in the socio-economic status of the people.

Namami Gange Programme

With allocation of INR 20,000 Cr the programme aims to conserve and rejuvenate the Ganga River by involving people living on the banks of the river helping them not in attaining the sustainable livelihoods but also sending a message so they feel the impact first-hand. The implementation of the programme involved grassroot level institutions like Panchayati Raj System and the Urban Local Bodies. About 750 industrial setups beside the river Ganga directly liberates the wastes on the river or the river bank affecting the ecosystem around the river; and about 1600-gram panchayats uses the river flow as the natural sewage system. With the rampant growth in the open defecation around the river Ganga since decades it has become a matter of concern to keep a check on the after effect of the same. Second major reason is the religious practices of the followers of a religious group who practices open cremation beside the banks of the river especially in the Varanasi and the Haridwar side. And that the flowers and other religious artefacts thrown at the river as a practice of religious rituals is also behind the rising pollution in the river ecosystem.

WHAT WENT RIGHT	WHAT WERE / ARE THE CHALLENGES
Rejuvenation of River Ecosystem & Livelihood around ganga – "Ganga" brand established in the global arena as a center of attraction for socio-scientific innovation; which went beyond the religious importance.	Sustainability of the programmes or initiatives due to religious challenges – open cremation and littering of flowers and other objects in the name of religion shall remain due to the interest of the largest religious group's interest and therefore there shall always be a gap or scope to innovate new methods of even religious practices.

Green Skill Development Programme

The Green Skill Development Programme is an initiative for skill development in the environment and forest sector to enable India's youth to get gainful employment and or self. Launched in 2017 by the Union Environment Ministry, the programme aims to train over 5.5 lacs youth in 30 courses by 2021 which got hit by the Covid-19 pandemic and the completion of the programme is yet to be reached.

The courses under the programme are divided into two major sections - one that will help the trainees get meaningful employment; and one that will help the trainees be green entrepreneurs in the area of forestry and environment. In the context of the Assam state, establishment of a community seed bank and wild bee keeping seems to have drawn a lot of attention of the former armed group cadres too besides unemployed youths. However, the major challenge in this programme is that the centralized version of the programme seems to fail by the time the delivery comes to the district level because of two major reasons - there is lack of master trainers in the locality where the programme could have been most impactful; and the other reason is the language connect with the master trainers and the trainee and this has been the major reason for the failure of various skill development programmes.

The programme ultimately aims at educating the youth to not only gain meaningful livelihood but to inform and inspire to take custody of the local forest resources and the environment in the responsible manner.

WHAT WENT RIGHT	WHAT WERE / ARE THE CHALLENGES
Engagement of youths in tune with the conservation of environment besides livelihood generating activities.	Centralized style of program delivery and course content often seems to mismatch with the local context which cause less retention of trainees in the program.
Scope to entrepreneurial aspects – direct contribution to not just GDP but employment generation within locality.	Lack of financial aids for the like green entrepreneurs, even programmes like Stand-Up Startup India is often seen failing to back up the entrepreneurs.

Compensatory Afforestation Fund Management and Planning Authority (CAMPA)

The act mandates that any company diverting forest land must provide alternative land to take up compensatory afforestation.

Additionally, the company need to bear the cost of planting trees in the alternative land provided to the state and the loss of forest ecosystem must also be paid by paying in terms of the net present value (NPV).

The programme is accused of not performing as expected, and the Supreme Court observed in the year 2019 that the funds were under-utilized under the CAMPA initiative. Figures as claimed by the Union Ministry of Forest shows 84.67% rise in the rate of funding but only 2.42% increase in the cover of the forest. Also, it is accused of providing a scope to the companies to allocate lands in the un-cultivable for unsuitable non forest lands in exchange of the clearing of the forests. Hence, the objective of the Union Government to conserve and increase the forest land have failed to a large extent and this calls for a review of the policy in the center. There have been several reports produced by reputed NGOs which claims the failure of the programme and causing even more disaster in the ground.

WHAT WENT RIGHT	WHAT WERE / ARE THE CHALLENGES
Compensatory of the forest & its resources (exploited) in the Net Present Value.	Compensatory in terms of monetary requirements is at the ease for large corporations, hence lay open enroute to forestland ecosystem.
Policy level – exchange of the destroyed forest land with afforestation programme.	Implementation level failure due to provisions which do not mandate quality of the land/soil in the exchanged venue.

Suggestions / Recommendations - Action Plan in Context of Assam

1. Swachh Bharat Mission in the context of Assam should be involved in the school level education especially in the primary level of education which will not only inspire and inform the upcoming citizens of the state but will also create a scope to nudge the society from the roots. The topic maybe involved in the Environment Studies paper in all levels of education and not just as the academic part but as the practical assignment. The objective is to make it a culture of youth. Government of Assam could brand the initiative through music festival to connect deeper with youth, just like Winter Carnival.

2. CAMPA kind of policies is likely to fail in the context of Assam due to the nature that there is lack of open forest land which could otherwise be used as exchange in liue of using the forest lands. Hence the Government of Assam in coordination with the Union Government will have to device new alternative policy around the mines and river ecosystem. There may be a new programme for generating sustainable livelihood around the Brahmaputra River which should not only focus on the rehabilitation post floods but throughout the year.
3. As far the concern for open defecation is taken up, Assam is generally a conscious state where defecation had always been below the national average and therefore the same could be implemented in different approach. The paper suggest that the Government of Assam implement policies which promotes toilets as brand or lifestyle standard rather than medical need.

Conclusion & Findings

The paper attempted to briefly discuss, and criticaly analyse the validity of the five most recent environment-based policies or programmes of the Modi led Government, post 2014. Limited to the level of qualitative research or the literature review, the paper concludes with the following points -

1. Programmes like Swachh Bharat Mission have created a positive ripple effect in the society, especially in the neo-urban societies.
2. Huge finance-based projects like Namami Gange Programme evidently failed due to the reasons which are industrial and religious. The Government will need to address the issues in a very localized way and provide alternative which comply with the religious needs of the majority section of the people; and at the same time satisfy the gaps to urbanize the India's rural colonies around it.
3. It is observed that programmes that involved large share of private players failed due to the political and monetary involvement. The Government will need to ensure the policies like CAMPA are re-modified in the manner the environmental aspect is prioritized and followed by the financial component.

4. Shri Narendra Modi ji have not only established a new era of governance but have placed a benchmark of governance by implementing innovative programs with far reaching implications which are majorly positive in nature.

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Aquarium Plants in Wetlands of Assam

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Abstract:

There are various plants in wetlands of Assam. In this review article 16 aquarium plants are reported. Various methods of cultivation of aquarium plants are discussed. The importance of aquarium plants is immense for oxygen supply of the aquarium, food for some fishes, buffer which helps in water quality management, control the growth of blue green algae and also act as substrate for spawning of aquarium fishes.

Keywords : Aquarium plants, ornamental fish, wetlands

Assam is endowed with a vast expanse of open inland waters in the form of riverine fisheries and beels. In Assam, a great variety of ornamental indigenous plants exists in different types of water bodies, mostly in beels, which need to identify the species for commercial purposes. Plants are essential in aquarium for biological reasons which also beautify the aesthetic view and create a natural surrounding for the fishes. Techniques of propagation of aquatic plants in captivity make it easy to cultivate in controlled condition. In aquarium apart from decoration aquatic plants are also used in various ways. They act as oxygen producer in water, food for some fishes, buffer which helps in water quality management, control the growth of blue green algae and also act as substrate for spawning of aquarium fishes. But if these plants are not managed properly then they become health hazard

for the reared fish and other animals. The most important indigenous aquatic ornamental plants that decorate aquaria are submerged aquatic plants. The important submerged indigenous ornamental plants that have ornamental value are *Chara vulgaris, Aponogeto*n sp, *Hydrilla verticillata, Ottelia alismoides, Vallisnaria spiralis, Najas major, Potamogeton gayi, Ceratophyllum demersum* and *Myriophyllum* spp. Among these *Chara vulgaris, Ottelia alismoides, Najas minor, Potamogeton gayi and Myriophyllum* are annual plant while *Aponogeton spp, Hydrilla verticillata, Vallisnaria spiralis and Ceratophylum demersum* are perennial ones. Most of the submerged plants are lentic in nature however, *Vallisnaria* spp, *Potamogeton* spp, *Hydrilla verticillata* are also found in very slow moving water bodies. *Hydrilla verticillata, Ceratophyllum demersum and Vallisnaria* spp. are dominant in many beels of Assam.

Types of aquarium plants

Most of the ornamental plants sold fall into one of three categories; bunch, floating or rooted. There is a great variety of aquatic plants in the natural water bodies of Assam, but all are not suitable for aquarium. Among the aquarium plants available in the natural water bodies like beels in Assam some ferns, mosses and flowering plants are important. The important criteria for selection of a plant for aquaria are beauty, utility, ease of propagation etc. It is found that many aquatic plants that are not suitable for fish ponds are very good aquarium plants.

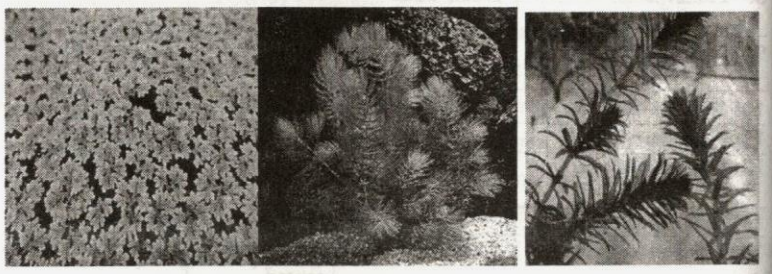
Aquarium plants found in Assam

Sl No.	Species	Common name	Nature	Family
1.	*Aponogeton echinatus*	-	Submerged/ rooted	Apogetonechinatus
2.	*Azolla caroliniana*	Water velvet	Floating	Azollaceae
3.	*Chara sp*	Fairy moss	Submerged/ rooted	Characeae
4.	*Ceratophyllum demersum*	Stone wart	Submerged	Ceratophyllaceae
5.	*Hydrilla verticillata*	Hornwort	Submerged	Ceratophyllacaea
6.	*Ipomea sp*	Hydrilla	Marginal	Convolvulaceae
7.	*Lemna sp.*	Water spinach	Floating	Lemnaceae
8.	*Ludiwigia sp.*	Duck weed	Submerged/ rooted	Onagraceae
9.	*Najas sp.*	-	Submerged/ rooted	Najadaceae
10.	*Nelumbo sp.*	Water nymph	Emergent	Nymphaceae
11.	*Nymphaea lotus*	Lotus	Emergent	Nymphaceae
12.	*Ottelia alismoides*	White water lily	Submerged/ rooted	Hydrovharitaceae
13.	*Pistia stratiotes*	-	Floating	Aracaceae
14.	*Potamogeton gayi*	Water lettuce	Submerged/ rooted	Potamogetonaceae
15.	*Vallisnaria spp.*	Eel grass tapewood	Submerged/ rooted	Hydrocharitaceae
16.	*Myriophyllum spp.*	Watermilfoil	Submerged/ rooted	Hallorrhagaceae

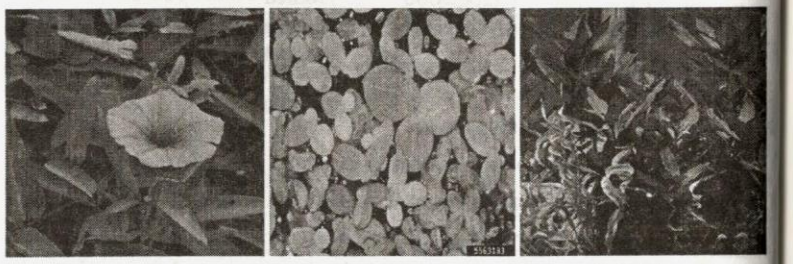
Aquarium plant cultivation:

Aquarium plant propagation in present day context is one of the powerful and growing industry in aquarium trade. Basically there are three types of plant propagation methods practised all over the world.

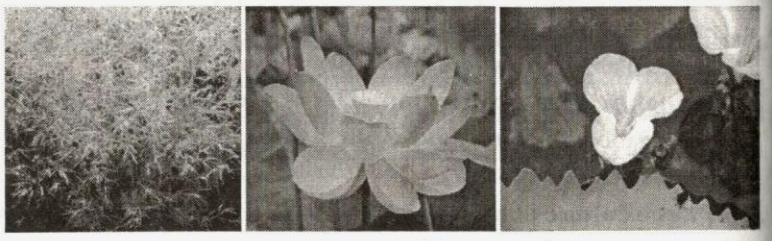
1. **Vegetative propagation**: This is the most widely used method and easiest and cheapest too. The plant is propagated by using part of the plant itself either through a stem cutting or other part of the plant from where a new plant is grown.
2. **Sexual or seed production**: This is the traditional means of propagation. This method is used when a new plant is grown from a seed or spore.
3. **Tissue culture or micropropagation**: In this method, the plants are propagated in a sterile environment using just part of the plant like the meristematic region. Plants are generally grown in plastic or glass containers under controlled lighting and temperature. Nutrients are provided to plants through sterile agar medium and at times antibiotics, hormones etc are also used to control the plants growth. Once the plants have reached a suitable size they are taken out of the container and hardened in greenhouse conditions.



Azolla caroliniana *Ceratophyllum demersum* *Hydrilla verticillata*



Ipomea sp Lemna sp Ludiwigia sp



Najas sp Nelumbo Sp *Ottelia alismoides*

Some Aquarium plants found in Assam

Conclusion

Aquatic plants are plants whose photosyntically active parts are permanently or at least for several months each year submerged in water or float on the surface of water. Fresh water macrophytes play a very important role in aquatic ecosystems. They provide directly or indirectly food, shelter and variety of habitats for a large number of organisms including windfowl and economically important fish. Many

other aquatic plants are also of use to men as food, raw materials for industrial processes and manure in agriculture. Conservation of aquarium plants is necessary

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Water Pollution as an Environmental Global Issue

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Environmental pollution is a notable global problem. It is a big challenge for all living beings on the earth. Environmental pollution means damage of the natural elements through natural changes and human activities. Water pollution is one of them different environmental pollution. The soul of every living being lies on the water on the earth. So, we can't imagine our existence on the earth without water. Various reasons lead to the water pollution like dumping solid, toxic waste from industries and refineries, dead human body, animals, fuels, plastics and chemicals which can't be dissolved by the water. Fertilizers and pesticides use in agriculture to increase the production easily get washed by rain water. This is drained in the water bodies which contributes in algal blooming. Fishes and other aquatic water creatures are part of our diet. But with this harmful chemicals in them, their consumption deteriorates our health. 97% water of earth is available in the ocean which is too salty and only 3% is fresh. So, we have to be very responsible to make possible reuse of waste materials instead of polluting water through our misdoing. Our individual efforts along with the governmental initiatives to put up strict rules help to reduce water pollution from our world.

Key wards : Water Pollution, Toxic Waste, fertilizer, chemicals.

Introduction :

Pollution is a global environmental issue. Environmental Pollution is the greatest threat to our mother earth. Pollution means damage of

the natural elements through natural changes and human activities. The soul of every living being lies on the water on the earth. Air, water, soil and noise pollution are the major forms of environmental pollution. Water pollution is one of the major threat to our life. When harmful substances like chemicals or toxic wastes degrade the quality of water then it becomes polluted. With the changing time demand of fresh water has grown as we know that less than 1% water is drinkable out of 3% fresh water and 97% is salty ocean water is not useful. Therefore Individual effort is important to safe fresh water for living being instead of polluting water through our misdoing.

Main Body:

Environmental pollution is not a new phenomenon. Water is one of the important source of our life; without water our existence is impossible. Water resource has so many sources, like river, sea, ocean, glacier, pond, lake. All of these natural water bodies provide water for every living being.Water pollution may be different types, which can be chemical, Groundwater, microbiological, nutrient, oxygen depletion and surface water pollution.

Water is the major source of agriculture, and Fertilizers and pesticides are used in agriculture to grow plants more speedy and these ingredients cover lots of Chemicals and that are carried by the water to the underground and leads to underwater pollution. Another thing is water source of well, pond is found in underground level. If groundwater becomes polluted than it will be harmful for human and animal consumption. Microorganism such as bacteria, virus, protozoa can infiltrate water supplies and leads to different diseas like belhazia and cholera etc. Some anaerobic microorganism produces ammonia sulphides and other toxics which makes the water dangerous for animal and human. ground water becomes polluted than it well not be useful for consumption of human and animal.

Major causes of watter pollution :

Water pollution occurs due to various natural changes, human activities and other accidental incidents. Sometimes, Underground sources lead to the oil and natural gas leakage into sea, ocean, lakes etc

and Changes its color, smell of water and destroy the actual quality of water. Mining and drilling contributes to the pollution of rivers and streams near coal mines. As a result aquatic like fish and other microorganism can't able to be servive. Another major causes of water pollution is domestic waste dumping into water bodies. people discharge domestic sewage into river which pollute water, directly. Usually people throw plastics, Rubber, toxic materials, solid wastes, garbage, dead human body, animals, fuels. All these easily are not dissolved by water. People discharge. sewage into water which gives chance to generate pathogenic and non pathogenic microorganism and this kind of organism responsible for several water borne deases ,like diarrhoea, typhoid, cholera etc. Acid mine drainage helps remove coal from rocks and washed acid into streams and rivers and releases chemicals rocks and sand. Sulfuré acid is also toxic for people and animal too. Water is polluted by the accidentally through spills Natural calamity, like flood and other intentional negligency leds to the water pollution.

Human activities are also major factors responsible for the generation of water pollution. Use of fertilizers and pesticides in agriculture for speedy growth of plants usually contains large amount of nitrogen and phosphorus. Rain water get wash all the element into stream, lake, river and other sources of water which gets polluted.

Presence of combination of nitrogen and phosphorus leads to the algal blooming and it depletes the oxygen level in water and leads threat to the life of aquatic creatures. On the other hand when chamicals are consumed by the fish and other water living creatures and we eat them as food the it becomes probability to being sick.So Polluted water becomes harmful for us Consumption and leds to the different health issues not only for people but also animal. Water pollution destroy our ecosystem and food chain.

Recommendations

Therefore we need to follow some rules individually and mutually for our own safty and well being. Personally if we start from our home responsibility. we shouldn't throw our waste into the water body and make possible to resure waste materials.Government should

impose strict rule for us as Punishment must be applied for misdoing. Government should collect garbage and waste products from every corner of the area to clean and safe fresh water every day. Every month and year should be worked together for cleaniless.

Conclusion :

Water is our source of life. So, we have to be play our role in our life as a responsible gurdain of our mother earth. Then we will get pollution free world and make our world as a better place to live.

ENVIRONMENTAL IMPACT ASSESSMENT

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Abstract

The Environmental Impact Assessment (EIA) process is a multi-step, interdisciplinary process to ensure that environmental considerations are incorporated into decisions about projects that may have environmental impacts.This paper discusses about the concept of EIA, its objectives, steps of EIA process and brief overview of EIA under Indian laws. The 2006 notification on EIA process to dissolved the Environmental Clearnce has been discussed in this paper.

Introduction:

The process of assessing a projector developmentpotential of environmental effects while accounting for interrelated positive and negative effects on human health, culture, and socioeconomic status is known as Environmental Impact Assessment (EIA). Before making a decision, a project's environmental, social, and economic implications are determined through the Environmental Impact Assessment (EIA), according to UNEP. It seeks to anticipate environmental effects early in the planning and design process, identify strategies to mitigate negative effects, mould projects to fit the local environment and provide options and projections to decision-makers.In India, EIA was first started in 1976-77 when the Planning Commission asked the Department of Science and Technology to study about the river valley projects in context of environment. The Environment Protection Act, 1986, which includes several sections on the EIA procedure and methodology, provides legal support for environmental impact assessments in India.

Objectives:

Following are the objectives of this article-

1. To highlight the objectives of EIA
2. To describe the process of EIA
3. To discuss about the EIA under Indian laws and 2006 notification of EIA

Methodology:

This article is prepared with the help of secondary data collected from secondary sources like research journal, books etc.

Discussion:

The objectives of Environmental Impact Assessment:

1. Identification, prediction and evaluation of economic, environmental and social impacts of progress of activities or project.
2. Provision of important information of environmental consequences for decision making.
3. Promotion of environmentally healthy and appropriate advancement by alternative ways and mitigation measures.

Processes of EIA : EIA process is a cyclic process which interacts with various steps as described below-

a. Identifying and Defining the Project : This step describes the project or activity, its objectives, nature including relevant information about management, control etc.

b. Screening : The project plan is screened to determine the amount of investment, the nature and location of development, and whether statutory clearance is required for the project.

c. Scoping : It lists the principal environmental concerns that an EIA must address.It gives public and environmental organisations and institutions a chance to learn about the project and, if necessary, voice their opinions. The EIA team determines the main problems to be addressed during scoping.

d. Preparing Terms of Reference : Given that it covers the problems and potential environmental effects of the project, it is a crucial procedure. Public review and discussion on a draft Terms of

Reference may be allowed, offering a crucial chance to guarantee that the EIA is appropriately worded and that community concerns are appropriately addressed.

e. Draft EIA: depending on the terms of reference, EIA draft is prepared as per the standard laws and regulations of a country where project is going to be initiated.

f. Public hearing: Engagement of public at various steps of EIA is one of the best practices of EIA. Once the EIA report is completed, public and environmental groups living close to project site may be informed and consulted.

g. Decision making: The impact assessment authority, together with experts, consults with the consultant responsible for the project, taking into account the EIA and the Environmental Management Plan (EMP) to make the final decision.

h. Monitoring and implementation of environmental management plan: : Subject to compliance with all legal regulations and conditions, the various steps of implementation of the project are monitored.

i. Assessment of Alternatives, Delineation of Mitigation Measures and Environmental Impact Assessment Report: For every project, possible alternatives should be identified, and environmental attributes compared. Alternatives should cover both project location and process technologies.

j. Monitoring: Monitoring serves three purposes:

1. Ensuring that required mitigation measures are being implemented;
2. Evaluating whether mitigation measures are working effectively; and
3. Validating the accuracy of models or projections that were used during the impact assessment process

Once alternatives have been reviewed, a mitigation plan should be drawn up for the selected option and is supplemented with an Environmental Management Plan (EMP) to guide the proponent towards environmental improvements.

EIA under Indian law

When the Planning Commission directed the Department of

Science and Technology to assess the river valley project giving importance on environment, India first started EIA in 1976-77. With the start of river valley project, EIA was then extended to other projects like mining, thermal power, industry, atomic power, rail, highways, airports, communications etc. As all these projects required approval from Public Investment Board, in 1986, the Govt. of India passed the Environment Protection Act. The other laws were also made in this regard like Wildlife (Protection) Act(1972), the Water Act (1974), the Air (Prevention and Control of Pollution) Act (1981), and the Biological Diversity Act (2002).To collect, organise, storing, retrieving and broadcasting information on environment area, in 1982 Environmental Information System (ENVIS) was established by Ministry of Environment, Forest and Climate Change.Under the Environmental (Protection) Act 1986, on 27 January 1994, then then Union Ministry of Environment and Forest circulated an EIA notification on Environmental Clearance (EC) compulsory for expansion of any project or for setting of new projects.

2006 Notification to EIA:

In 2006, the Ministry of Environment, Forest and Climate Change (MoEFCC) notified new EIA legislation. The salient features of this notification are

a. 2006 notification of EIA has resolved the EnvironmentalClearance (EC) and categorise the development of projects into two: Category A, a national level appraisal and Category B, a state level appraisal.

b. Category A projects are assessed by Impact Assessment Agency (IAA) and Expert Appraisal Committee (EAC) and Category B projects are assessed at state level.

c. For the assessment of state level projects, State level Environment Impact assessment Authority (SEIAA) and State Level Expert Appraisal Committee (SEAC) are constituted to provide clearance to category B.

Conclusion:

EIA plays a crucial role in the projectsdevelopments those are related to the environmental issues. EIA process is required in building

anticipatory and preventive for the development, protection and development of environment. EIA assures the projects and its planning will not affect the environment. To successfully implement the environment protection and sustainable development as preserved in 21 agenda, Rio declaration and various environmental Protection Acts in India, the EIA process should be implemented fully.

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