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Special Issue on

CHALLENGES IN CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT

Special Issue Editors-in-Chief

Dr. K. SHEELA | Dr. K. VENNILA

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Dr.R. Indra, M.Sc., M.Phil., Ph.D.
Message from the Principal

Great honour and fortune is mine! I am blessed to be associated with this college and to write this message for the **Silver Jubilee Celebration (1998 – 2023)** the completion of the 25 years is not just a sense of achievement and pride but a commitment for the future passionate endeavors and achievements.

I extend very warm wishes to all the team of faculty for the National Conference on **"Challenges in Climate Change and Sustainable Development"** organized by the **Department of Economics**, Government Arts College for Women, Sivagangai on 16th February 2004. Our institution has borne the mantle of excellence, committed to ensure the students their own space to learn, grow & broaden their horizon of knowledge by indulging into diverse spheres of learning. In our endeavor to raise the standards of discourse, we continue to remain aware to meet with the changing needs of our stake holders.

This conference volume includes streams of two Parallel Sessions. The Conference was further enriched by Keynote Presentation offered by renowned scholars in the respective fields. The main program is complemented by a diverse set of high-quality academic deliberations. We are grateful to all authors who trusted us with their work; without them there would be no seminar. Special thanks are due to the Chairpersons, Resource Persons and the members of the Technical Sessions, Colleagues and to external referral team for the quality of this conference volume and their sense of responsibility and responsiveness.

Principal

EDITOR'S NOTE

A National Conference on "Challenges in Climate Change and Sustainable Development" organised by the Department of Economics, Government Arts College for Women, Sivagangai on 16th February 2024.

Human actions are to blame for climate change, which endangers life on Earth. Climate change is accelerating considerably quicker than expected due to increased greenhouse gas emissions. Its consequences can be severe, including intense and shifting weather patterns and increasing sea levels.If left uncontrolled, climate change would undermine much of the development progress accomplished in recent years. It will also cause massive migrations, which will lead to instability and conflict.To restrict global warming to 1.5°C over pre-industrial levels, emissions must be reduced by nearly half by 2030, which is just seven years away. However, we are well off course from this goal. Urgent and revolutionary action beyond mere plans and pledges is required. It involves increasing ambition, including whole economies, and transitioning to climate-resilient development, all while providing a clear route to net-zero emissions. Immediate action is required to prevent catastrophic repercussions and provide a sustainable future for future generations.

We would like to convey our heartfelt gratitude and admiration to the writers whose technical contributions are included in these proceedings. It was a huge success thanks to their exceptional contributions and hard effort during the proceedings. The presentation of research papers in this conference symbolises a significant step forward in India's climate change and sustainable development.

We sincerely thank all of our keynote speakers for their contributions in all aspects of material synthesis, as well as their diverse and varied experiences, which enabled them to offer remarkable lectures till the conclusion. We would also want to congratulate all of our seminar speakers for their serious efforts in providing engaging and great notes that satisfy the learning demands of all levels, notably students, postgraduates, research scholars, and faculty. We are particularly appreciative to our technical session Chairpersons for their efforts in organising the paper presenting session.

We express our sincere thanks to Dr. R. Indra, Principal, for her encouragement and support in the conduct of the conference and publishing the papers presented in the conference.

We would like to thank our faculty in the department for their kind co-operation they have extended to us throughout the work.

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Academic Excellence in research is sustained by promoting research support for young Scholars. Our Journal on Humanities, Arts and Science of research is motivating all aspects of encounters across disciplines and research fields in a multidisciplinary view, by assembling research groups and consequently projects, supporting publications with this inclination and organizing programmes. Internationalization of research work is the unit seeks to develop its scholarly profile in research through quality of publications. And visibility of research is creating sustainable platforms for research and publication, such as series of books; motivating dissemination of research results for people and society.

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CONTENTS

IMPACT OF CLIMATE CHANGE IN INDIA

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Abstract
In this paper, we will look at the impact and various aspects of climate change in the context of India.One of the biggest environmental threats facing the world is climate change. India faces several challenges related to climate change. Climate change impacts on various aspects of the environment, such as agriculture, water, forest & biodiversity, health & coastal management, and temperature increase. The main impact on climate change in India is the decline in agricultural productivity. Agriculture is the main source of livelihood for most of the people, whether they are directly dependent on it or not. Climate change will put pressure on the ecological & socio-economic systems which are already under a lot of strain due to the rapid industrialization, urbanization and economic growth.
Keywords*: climate change, greenhouse gas, kyoto protocol, forest, health.*

Introduction

Trace gases like carbon dioxide and methane are being released into the atmosphere, mainly due to the burning of fossil fuels. It is believed that climate change is changing the earth's climate system. According to the fourth assessment report of the Intergovernmental Panel on Climate Change (IPCC), "warming of the climate system is now unambiguous, as evidenced by increases in average global air and ocean temperature, extensive melting of snow cover and ice, and increasing global seal level." India has a lot to worry about, as a large number of people depend on climate-sensitive industries such as agriculture, forestry and fishing for their livelihoods. The impact of climate change on the country's rainfall and temperature has increased the severity of livelihood issues. Climate change would put additional strain on the ecological and socio-economic systems that are already strained due to the rapid growth of industrialization, urbanization and economic development.

India has a ton to stress over, as countless individuals rely upon environment delicate enterprises like horticulture, ranger service and looking for their jobs. The effect of environmental change on the nation's precipitation and temperature has expanded the seriousness of occupation issues. Environmental change would overburden the natural and financial frameworks that are as of now stressed because of the quick development of industrialization, urbanization and monetary turn of events. Environmental change is quite possibly of the main worldwide ecological test confronting mankind with suggestions for food creation, normal biological systems, freshwater supply, wellbeing, and so on. As per the most recent logical appraisal, the world's environment framework has obviously changed on both worldwide and territorial scales since the pre-modern time. Further, proof shows that the greater part of the warming, saw throughout recent years, is owing to human exercises. The Intergovernmental Board on Environmental Change projects that the worldwide mean temperature might increment somewhere in the range of 1.4 and 5.8 o C by 2100. This extraordinary increment is supposed to seriously affect the worldwide hydrological framework, environment, ocean level, crop creation and related processes. The effect would be especially serious in the tropical regions, which basically comprise of emerging nations, including India.

In 1992, the UN conference on Climate and Improvement at Rio de Janeiro prompted Structure Show on Environmental Change, which laid the system for the possible adjustment of ozone harming

substances in the air, perceiving the normal however separated liabilities and particular abilities, and social and monetary circumstances. The Show came into force in 1994. Consequently, the 1997 Kyoto Convention, which came into force in 2005, reasserted the significance of settling ozone depleting substance focuses in the air sticking to manageable improvement standards. The Convention spread out rules and rules with respect to the degree to which a partaking industrialized nation ought to decrease its discharges of six ozone depleting substances, viz., carbon dioxide, methane, nitrous oxide, chloro fluorocarbon, hydro fluorocarbons and per fluorocarbons. The metropolitan populace of India remained at 286 million or 27.80 percent of the absolute populace of 1.02 billion, as indicated by the Registration of India 2001. This populace is projected to ascend to 368 million continuously 2012. The metropolitan populace lives in 5,161 urban areas and towns of India, and appearances extreme water and disinfection stress. As indicated by a World Bank report, India's water economy mentions that India is quick running out of water and by 2020 it will be under serious pressure, and figures that by 2050 interest overwhelms supply. In a quickly developing monetary situation, the interest for water will undoubtedly go up. The nonstop and unabated discharge of millions of lots of carbon dioxide into the environment, regardless of whether starting principally from a couple of nations or locales, can prompt worldwide and extremely durable climatic changes with possibly grievous outcomes, for example, ascent of ocean waters and submergence of various islands and beach front regions, and a climb in encompassing temperatures prompting critical effect on editing designs and farming efficiency.

India is an enormous emerging nation with almost 700 million provincial populaces straightforwardly relying upon environment touchy areas and normal assets like water, biodiversity, mangroves, seaside zones, and prairies for their means and work. Further, the versatile limit of dry land ranchers, woodland inhabitants and roaming shepherds is extremely low. Regardless of being emblematically significant, Kyoto Convention is currently generally thought to be as a 'disappointment' since it neither has started emanation decrease universally nor it has guaranteed required further cuts in ozone harming substance outflows. Researchers have long cautioned that even 100 percent adherence to Kyoto Convention will do essentially nothing to restrict the adjustment of environment, yet very nearly 15 long years are spent worldwide in making this arrangement disappointment. Practically selective spotlight on moderation in Kyoto Convention acts against the interest of the emerging nations. Unreasonable utilization examples of the rich industrialized countries are answerable for the danger of environment; just 25 percent of the worldwide populace lives in these nations, yet they discharge in excess of 70 percent of the absolute worldwide CO_2 emanations and consume 75 to 80 percent of a large number of different assets of the world. India ought to be worried about the environmental change since it could unfavorably affect the country. Not all potential outcomes of environmental change are yet completely comprehended, however the fundamental 'classifications' of effects are those on farming, ascent in ocean level prompting submersion of beach front regions and expanded recurrence of outrageous occasions which present serious dangers to India.

Greenhouse Gas Emission from India

Climate change emerging because of the rising grouping of ozone harming substances in the air since the pre-modern times has arisen as a serious worldwide natural issue and postures dangers and difficulties to humanity. Climate change is progressively perceived as one of the expected basic variables in manageable advancement directions and there is an arising global writing that considers systemic issues and exact consequences of studies that investigate interlinkages, compromises and collaborations between the different strategies regions included. Assessments of anthropogenic ozone harming substance discharge inventories in India started in a restricted scale in 1991 which were

expanded and reconsidered, and the principal conclusive report for the base year 1990 was distributed in 1992. An exhaustive stock of the Indian discharges from all energy, modern cycles, rural exercises, land use, land use change and ranger service, and waste administration rehearses has been arranged by UNFCCC.

Agriculture and Food Security

Exceptionally environment delicate Indian horticulture, 65 percent of which is in rainfed regions, contributes almost 25 percent of Gross domestic product, utilizes 65 percent of the absolute labor force and records for 13.3 percent of complete commodities along with united exercises. A few examinations foresee that regardless of significant expansion in public foodgrain creation, the efficiency of a few significant harvests, for example, rice and wheat could decline impressively with environmental change. In India, the assessed absolute necessity for foodgrains would be in excess of 250 mt by 2010. The gross arable region is supposed to increment from 191 to 215 mha by 2010, which would require an increment of editing power to around 150 percent. Since land is a decent asset for horticulture, the requirement for more food in India can be met exclusively through better return per unit of land, water, energy and time, for example, through accuracy cultivating. Kavi Kumar and Parikh showed that even with ranch level variations, the effects of environmental change on Indian horticulture would stay huge. They assessed that with a temperature change of +2 o C and a going with precipitation change of +7 percent, ranch level all out net-income would fall by 9 percent, while with a temperature increment of +3.5 o C and precipitation change of +15 percent the fall in ranch level all out net-income would be almost 25 percent. Shopping center et al. give a fantastic audit of environmental change influence concentrates on Indian farming primarily according to actual effects point of view. The accessible proof shows critical drop in yields of significant grain crops like rice and wheat under environmental change conditions. In any case, biophysical influences on a portion of the significant harvests like sugarcane, cotton and sunflower have not been concentrated sufficiently.

Water Resources

India's rich water assets are unevenly dispersed and bring about spatial and worldly deficiencies. The interest for water has expanded enormously over the course of the years because of a rising populace, growing agribusiness, and quick industrialization which are liable for significant irregularity in the amount and nature of water assets. As per the Service of Water Assets, how much water accessible per individual in India diminished consistently from 3,450 cm in 1951 to 1,250 cm in 1999, and is supposed to decline further to 760 cm for each individual in 2050. Lower precipitation and more dissipation would have the critical result of fewer overflows, considerably changing the accessibility of freshwater in the watersheds, decline of soil dampness and expanding aridity level of hydrological zones. Constantly 2050, the normal yearly overflow in the stream Brahmaputra will decline by 14 percent. On the off chance that the ongoing warming rates are kept up with, Himalayan icy masses could rot at very quick rates, contracting from the present 5,00,000 km to 1,00,000 km by the 2030s. This is likewise a reason to worry while considering Himalayan hydropower as need might arise, as environmental change will pointedly diminish the viability of the arranged mammoth speculations.

The general effects of environmental change on water assets have been brought out by the Third Evaluation Report of the IPCC. It shows a strengthening of the worldwide hydrological cycle influencing both ground and surface water supply. Changes in the aggregate sum of precipitation, its recurrence and power have additionally been anticipated. Such changes, when on the excess side, may influence the size and timing of spillover however will make dry spell like circumstances when these are on the shortfall side. Consequently, environmental change influences will be generally extreme in the creating scene, on account of their unfortunate ability to adjust to environment

fluctuation. India additionally goes under this classification. Gosain et al. have utilized they had everyday climate information to decide the spatial-transient water accessibility in the stream framework. The underlying examination has uncovered that under the ozone harming substance situation, seriousness of dry seasons and power of floods in different pieces of the nation might get disintegrated. Be that as it may, there is an overall generally speaking decrease in the amount of the accessible spillover under the ozone harming substance situation.

Forest

Worldwide evaluation has shown that future environmental change is probably going to essentially affect backwoods biological systems. Environment is likely the main determinant of vegetation designs worldwide and affects the conveyance, construction and biology of backwoods. India is a uber biodiversity country where woodlands represent around 20 percent(64 million ha) of the topographical region. With almost 200,000 towns' delegated woodland towns, there is clearly huge reliance of networks on backwoods assets. Woodlands in India are very different and heterogeneous in nature, and grouping them into few categories is troublesome. Subsequently, the container Indian 'Different woodland' class shows the most elevated extent. The various woodland region happens under every one of the backwoods types. The other two most predominant woodlands are Shorea robusta or sal in the eastern piece of Focal India and Tecton grandis or teak, spread across Focal India and the Western Ghats in southern India.

Impact of Climate Change on Forest Types

An examination of the degree of region that is probably going to happen in every one of the woodland type under the current environment system and that under the two future environment situations uncovers the size of changes that are supposed to occur in every one of the backwoods types. The BIOME42 model was run for a sum of 10,864 matrix focuses (10 min x 10 min) situated in the Indian locale, utilizing the CRU3 10-min climatology. Because of holes in information connected with soil boundary esteems, the model could relegate vegetation types to just 10,429 of these matrix focuses. As referenced before, an examination with the FSI data set permitted us to utilize the data from 35,190 FSI frameworks. There was a sensible match between the timberlands types anticipated by BIOME4 and the woodland types doled out by FSI.

Conclusion

Climate change is expected to affect the human well being in many different ways such as capital, ecosystem, disease and migration. Irrespective of the importance of the issue, it is not clear how to compute the value with the current state of the art of economics. A meaningful development involves at least transformation from agricultural to a nonagricultural economy reducing the dependence on agriculture. Since most of the labor force about 70 percent directly and indirectly depends on the sector for livelihood and employment, it is when this sector is more productive and ensures food self-sufficiency that it will release the necessary labor and capital for the manufacturing and service sectors. In the context of the current debate about climate change, it is necessary to show, far from being inactive in India, that considerable actions in terms of policies, programs and projects are being taken. Technology transfer can speed up the modernization process and additional funds can accelerate government in energy conservation. However, policies for poverty alleviation must be given priority. Climate change should impact the human thriving in different ways like capital, natural framework, ailment and development. No matter what the meaning of the issue, it isn't clear how to enlist the value with the current status of the art of monetary perspectives. A critical improvement incorporates essentially change from plant to a nonagricultural economy diminishing the dependence on cultivating. Since most of the labor force around 70 percent clearly and indirectly depends upon the area for work and business, it is the place where this region is more valuable and ensures food autonomy that it will convey the significant work and capital for the collecting and organization

regions. With respect to the continuous conversation about climate change, it means a lot to show, far from being inactive in India, those noteworthy exercises to the extent that methodologies, tasks and endeavors are being taken. Advancement move can speed up the modernization cycle and additional resources can accelerate government in energy conservation. In any case, game plans for poverty facilitating ought to be given need.

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CONSUMERS' PERCEPTION TOWARDS ORGANIC FOOD PRODUCTS

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Abstract
In recent years, Concerns about sustainability, the environment, and one's personal health have all grown in popularity and this has led to a boom in demand for organic food products. Growing consumer awareness of lifestyle and nutritional choices has resulted from growing health concerns during the COVID-19 pandemic, with organic products noticing an increase in popularity. Thus, in light of increased awareness regarding food consumption got transformed into consuming organic food products. Our study aimed to assess the reason for changing the perception of consumers towards organic food products as well as to determine whether the COVID-19 pandemic influenced the perception of consumers of organic food products. Hence, the article focuses on Consumers' perceptions of Organic Food Products.
Keywords: *sustainability, nutritional choices, pandemic, transformation*

Introduction

The core component of the Indian economy is organicfarming. Due to the contamination of different chemicals, consumers are turning away from the natural world. It has caused a change in the consumption of organic goods. Organic food contains higher amounts of nutrients and minerals such as Vitamin C, iron, and zinc than non-organic foods which helps to improve our immunity to have a healthy life. The use of organic food products has increased dramatically recently as a result of its ability to strengthen human immunity. As a result of the pandemic, consumers started to focus more on organic food items.

Review of Literature

(Dash, 2014) The article stated that environmentalists raised their apprehension regarding the harmful effects of increasing the use of chemicals in farming, the consumers are getting conscious and selective about edible products. This increasing awareness has caused shifts in consumers' tastes and preferences which have led to the domestic as well as global rise in demand for organic products. Awareness and knowledge have become a crucial factor in changing the attitude and behavior of consumers towards organic foods, which in turn drives the growth in the organic food markets.

(Aschemann-Witzel, 2017) The article reveals that Consumer demand, however, is hindered by high prices. We review research from 2000 to 2014 on the role of perceived price, income, price knowledge, willingness to pay, and reactions to price changes in organic food. We find that price is the major perceived barrier to purchase. Income is only a partial explanatory factor and is superseded by psychographic variables. Willingness to pay a premium is around 30% (ranging from 0% to 105%) and depends on consumer segments and product categories.

(Chandrashekar, (2014).) The article stated that Consumer behavior plays a major role in the Organic food products segment. The marketers of organic foods need to be innovative and dynamic to compete with the changing purchase behavior in the Organic food products market among urban residents. The importance of organic food products was ignored for quite a long period. As a result of environmental sustainability, importance has shifted towards Organic food products rather than conventional farming.

Statement of the Problem

The pandemic urged customers to lead healthy lives to protect themselves against several illnesses. The consumers of organic food products feed a healthy diet to their families to boost their immune systems. As a result, consumers now accept naturally harvested food products.

Objectives

- To assess the reason for changing the perception of the consumers towards organic food product

Methodology

Sample Design

Primary data will be collected using with simple random sampling method and a self-administered questionnaire sent to the respondents through Google Forms. The study is based on both primary and secondary data. To carry out the Primary data collection, a self-structure questionnaire was developed based on research objectives. Secondary data required for the study undertaken were collected through Web Sites, Magazines, Reviews, Journals, etc.

Sample Size

The data were collected using the questionnaire method from 100 respondents. Since the study period is very short.

Tools for Analysis

- Factor Analysis

KMO and Bartlett's Test

Table 1

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.588
Bartlett's Test of Sphericity	Approx. Chi-Square	428.376
	Df	45
	Sig.	.000

The value of KMO should be close to 0.5 for a satisfactory factor analysis to proceed. The value of the test statistic is given in Table 1 as 0.588 which means the factor analysis for the selected variables is found to be appropriate to the data.

Bartlett's test is another indication of the strength of the relationship among variables. This test tests the null hypothesis that the correlation matrix is an identity matrix. An identity matrix is a matrix in which all of the diagonal elements are close to 0. From the Table, Bartlett's Test of Sphericity test value is 428.376 at Degrees of freedom 45. That significant level is less than 0.05. It is 0.000, i.e. the significance level is small enough to reject the null hypothesis **($p<0.05$).** This means that the correlation matrix is not an identity matrix (there exists' correlations between the variables).

Rotated Component Matrix

Table 2

	Component		
	1	2	3
Willing to buy organic food even though high demand.	.917		
Organic food products have a good grade in the society.	.765		
It is environmentally conscious products	.744		
The flavor of organic food is more tastier	.703		
Organic Food Products are not adequately available in the market.	.673		
It is difficult to identify real organic food products	.651		
Organic food products are costly		.904	
The demand for organic food products has drastically increased during the post-COVID period.		.737	
Organic food products help to improve our immunity			.915
Consumer prefers to buy organic food products only in specialty shops.			.737

The rotated component matrix (Table) shows the association between the factors and the variables taken for the study with the help of values

ascertained by the variables. These variables together constitute factor 1, which can be termed as **"Qualities of organic food products",** the variable representing factor 2, which can be termed **"Affordability",** and the variable representing factor 3, which can be termed **"Health consciousness".**

Conclusion

The demand for organic food items is rising at the moment due to increased awareness of environmental and health issues. Everyone is urged to strengthen their immune systems in the wake of the pandemic to protect themselves against numerous dangerous illnesses. Consumer attitudes and impressions, as well as their final purchasing decisions, can be influenced by knowledge and awareness of organic products. At last, reasons like price, availability, environmental concerns, health benefits, and the like are the causes for the transformation of consumers' perceptions.

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RECEDING GLACIERS-A SYMPTOM OF GLOBAL CLIMATE CHANGE

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Abstract
Climate change refers to any distinct and measureable change in the climate that lasts for a long period of time, generally decades or longer. Examples of climate change can be seen in the sustained shifts in the average global temperature, precipitation patterns, size of glaciers, sea ice coverage, and wind patterns. Causes of climate change include natural sources, like volcanic activity, shifts in the sun's energy, and or ocean circulations, as well as some naturally occurring greenhouse gases. Human activities that most scientists believe affect the Earth's climate include the burning of fossil fuels (primarily coal, petroleum oil, and natural gas) and land development (e.g., deforestation, urban development).Glaciers are massive bodies of ice that move slowly. Glaciers form on land and are composed of falling snow that has been compressed into ice over many centuries. The pull of gravity causes them to move slowly downward. The majority of the world's glaciers are found in polar regions, such as Greenland, the Canadian Arctic, and Antarctica. Glaciers can also be found in mountain regions closer to the Equator. Some of the world's largest tropical glaciers can be found in South America's Andes Mountain range. Glaciers contain about 2% of all the water on Earth. A glacier takes millennia to form and its size varies depending on how much ice it retains over time.
Keywords: *climate change, glaceries, greenhouse gases, mountain regions.*

Causes of Glacial Melting

Global warming: The concentration of carbon dioxide, methane, and other greenhouse gases (GHGs) in the atmosphere caused by industry, transportation, deforestation, and the use of fossil fuels, among other human activities, warms the planet and melts glaciers.

Ocean warming: Because the oceans absorb 90% of the Earth's heat, it affects the melting of marine glaciers, which are mostly found near the poles.

Deforestation: There is an increase in the release of carbon dioxide while less of it is absorbed by trees because their numbers are constantly decreasing due to deforestation. As a result, it hastens global warming and sea-level rise.

Rapid industrialisation: Many glaciers around the world have been rapidly melting since the early 1900s.

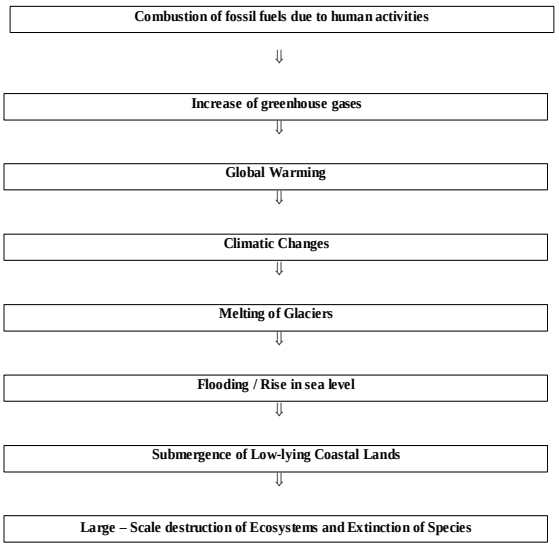

Fig - 1

Impact of Glacial Retreat

- The retreat of glaciers in the Andes and Himalayas may have an effect on water supplies.
- Climate change can cause changes in both temperature and snowfall, causing changes in glacier mass balance.

- Large glaciated regions are supported by the Himalayas and other central Asian mountain chains. Dry countries such as Mongolia, western China, Pakistan, and Afghanistan rely on these glaciers for critical water supplies. The loss of these glaciers would have a huge impact on the region's ecosystem.
- Leading scientists predict that global warming will pose a serious threat to the national and global economies, as well as the environment.
- The poor and low-lying countries will struggle to cope with the consequences of climate change and sea-level rise.

Effects of Glacial Melting

- **Sea Level Rise:** Melting glaciers contribute to rising sea levels, which increases coastal erosion and storm surge as warming air and ocean temperatures produce more frequent and intense coastal storms such as hurricanes and typhoons. The Greenland and Antarctic ice sheets, in particular, are the largest contributors to global sea level rise.
- **Weather Patterns:** Today, the Arctic is warming twice as fast as the rest of the planet, and sea ice is melting at a rate of more than 10% every ten years.
    - As this ice melts, darker patches of ocean begin to emerge, removing the effect that previously cooled the poles, resulting in warmer air temperatures and disrupting normal ocean circulation patterns.
    - The current glacial melt in Antarctica and Greenland is altering the circulation of the Atlantic Ocean and has been linked to the collapse of fisheries in the Gulf of Maine as well as more destructive storms and hurricanes around the world.
- **Humans and Wildlife:** Industries that rely on healthy fisheries will suffer as warmer waters alter where and when fish spawn.
    - As flooding becomes more common and storms become more intense, coastal communities will continue to face billion-dollar disaster recovery bills.
    - As sea ice melts in the Arctic, wildlife such as walruses lose their home, and polar bears spend more time on land, increasing conflict between humans and bears.
    - Cold runoff from glaciers affects downstream water temperatures as well. Many aquatic species require cold water temperatures to survive in mountainous environments.
    - Changes in stream habitat may also have an adverse effect on native trout and other keystone salmon species.
- **Scarcity of Fresh Water:** The loss of glaciers also means less water for the population to drink, less hydroelectric energy generation capacity, and less water available for irrigation.

Prevention of Glacial Melting

➢ **Individual Carbon Path**

- It is critical to understand how individual contributions can influence climatic conditions.
- What we do every day can help to reduce carbon pollution, such as drive as little as possible (alternatives can be bicycle, carpool, jog, or walk), Use energy-saving bulbs, While brushing your teeth, turn off the water, When not in use, turn off lights, etc.
- When done on a large scale, these seemingly insignificant details have a significant impact.
- In the long run, they contribute to reducing individual carbon paths and preventing glaciers from melting.

➢ **Renewable Infrastructure Development**

- It is critical to encourage the development of recently modern renewable energy infrastructure.
- We must ensure that we make the necessary changes that will result in the elimination or

reduction of fossil fuel subsidies, thereby advancing renewable energies.
- Anyone with the necessary resources should invest in solar panels.

➢ **Reducing Black Carbon Emission**
- It may be difficult to dispose of carbon dioxide from the energy cycle in developing countries. However, reducing black carbon emissions has become easier.
- This can be accomplished by upgrading diesel filters in automobiles, reducing deforestation, and replacing biomass-burning stoves with natural gas or solar energy.
- It contributes to the reduction of black carbon and the slowing of global warming, thereby preventing glacial melting.

➢ **Reduce Wastage of Water**
- Water conservation reduces carbon pollution. This is due to the fact that it takes a significant amount of your energy to heat, pump, and treat your water.
- Water waste can be reduced by taking shorter showers and turning off the water while brushing your teeth.

➢ **Alternative Energy Sources**
- Alternative energy sources are the most effective way to combat global warming.
- Solar panels contain solar cells that collect heat from the sun and convert it to energy.
- Wind turbines are also machines that use wind energy to generate electricity.
- Geothermal energy also uses heat from within the earth.
- Biofuels like ethanol can be produced in your area by combining and fermenting vegetable, grain, and fruit waste.
- Ethanol can be used to make biodiesel fuel, which is a clean-burning fuel for diesel engines.
- Electric vehicles are powered by batteries (derived from hydrogen fuel cells) rather than being entirely reliant on highly combustible engines.
- Wave and tidal power harness the great power of the sea by installing generators on the sea floor.

➢ **Afforestation**
- Forests play an important role in reducing global warming. Forest degradation and destruction exacerbate the problem by releasing carbon dioxide. This, in turn, causes the glaciers to melt.
- Tree planting can help combat global warming by removing carbon dioxide from the atmosphere.
- Planting new forests can help balance carbon dioxide levels by absorbing CO2 and producing oxygen through a process known as photosynthesis.

➢ **Recycling**
- Recycling is thought to help the environment by emitting fewer greenhouse gases and releasing less carbon dioxide.
- Paper disposed of in landfills eventually decomposes, emitting carbon dioxide into the atmosphere. However, recycling (which keeps trash out of landfills) helps to reduce these emissions and, as a result, global warming and glacial melting.

Conclusion

Glaciers act as giant mirrors, preventing global warming. They aid in the deflection of sunlight from the earth's surface and the regulation of the planet's temperature. The abnormal rate of global warming causes glaciers to melt quickly, reducing restoration. We should use alternative energy sources, invest in energy-efficient appliances, support infrastructure development, reduce our individual carbon footprints, build underwater walls, plant more trees,

recycle, and increase our energy efficiency to prevent this melt and restore the glaciers.

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IMPACT OF CLIMATE CHANGE ON AGRICULTURE SECTOR

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Abstract
This paper mainly focused the impact of climate change on agriculture sector. The food production sector is particularly vulnerable to climate change, leading to a decrease in agricultural output. Climate change results in substantial economic losses, especially affecting farmers. Farmers are enhancing their crop yields through the implementation of adaptation and mitigation measures. Greenhouse gases play a crucial role in climate change; reducing their emissions can significantly mitigate climate change, as they are the primary contributors to this phenomenon. Implementing awareness programs is an effective approach to control climate change, as it can educate individuals on the adverse effects of climate change on agriculture, health, water resources, forestry, and land use. By raising awareness, man-made activities contributing to climate change can be controlled. Effective management techniques can help mitigate the impact of climate change in the cattle industry. Additionally, the increase in pests and diseases is linked to rising temperatures, humidity levels, and other environmental factors, ultimately hindering plant growth and development. Climate change is a gradual, human-induced phenomenon, and its negative effects can be minimized by reducing human activities. By taking steps to reduce man-made activities, the planet can be safeguarded. Soil erosion and fertility can be preserved and enhanced through reforestation and deforestation efforts.
Keywords: *agriculture, climate change, production, temperature, soil.*

Introduction

The issue of climate change presents a significant environmental concern for people worldwide, particularly impacting food production and natural ecosystems. Developing countries, with limited land area and a heavy reliance on agriculture, face heightened risks due to industrialization and changing weather patterns. Climate change is a long-term transformation in global weather patterns, affecting various regions and the entire planet over time. In India, the 2001 census revealed that around 27.8% of the total population of 1.02 billion resides in urban areas, while rural communities heavily depend on water resources, coastal zones, and other natural elements for survival, making them particularly vulnerable to climate change impacts. The causes of climate change can be attributed to natural factors as well as human activities.

Volcanic eruptions have the capacity to induce climate change by influencing both the atmospheric state and temperature. Changes in solar activity can cause the climate to deviate from its optimal temperature. The Earth's orbital tilt can have either a greater or lesser tilt. A greater tilt results in hotter summers and colder winters, while a lesser tilt leads to the opposite. Global warming contributes to ozone depletion, and the levels of greenhouse gases are progressively increasing due to extensive industrialization. Deforestation releases a substantial amount of carbon dioxide into the atmosphere, disrupting the atmospheric balance and causing it to become warmer. Coal mining is linked to the depletion of natural resources and the degradation of natural habitats. The combustion of fossil fuels further amplifies the concentration of carbon dioxide in the atmosphere. Moreover, the increase in black

carbon leads to a higher amount of radioactive forcing compared to previous evaluations.

The modern interaction can have detrimental effects on the environment, leading to various ecological problems such as ecological change, depletion of natural resources, air and water pollution, and the extinction of species. Agriculture, in particular, contributes significantly to these issues, with the emission of methane gas being a major greenhouse gas. Climate change has diverse impacts on both humans and animals. These include the melting of glaciers, rising sea levels, and flooding in low-lying areas, resulting in loss of life, property damage, crop destruction, livestock loss, and deteriorating health conditions. Environmental factors also influence the migration patterns of birds. Additionally, climate change leads to various disasters such as droughts, heatwaves, storms, hurricanes, and typhoons. Prolonged summers can pose risks to animals and continuous heatwaves, and rising temperatures can negatively affect human health and disrupt microclimatic conditions. The immediate effects of climate change include physiological, phenotypic, morphological, and plant production changes. Physiological changes are evident in alterations to plant photosynthesis, respiration, nutrient uptake, and the activity of plant hormones. Phenotypic changes involve modifications in gene expression in response to environmental factors. Morphological changes include reduced internode growth, variations in leaf size and surface area, branching patterns, shoot and root growth reductions, among others. These physiological, phenotypic, and morphological changes directly impact plant productivity. Indirect impacts of climate change include changes in soil fertility, availability of irrigation, and the occurrence of floods and droughts.

Green House Effects and Global Warming

The rise in temperature is a result of increased greenhouse gas emissions. The heat from the earth's surface and atmosphere absorbs these reactive gases, particularly greenhouse gases. Ozone layer depletion is triggered by the emission of these gases, impacting agriculture directly or indirectly. With the ozone layer diminishing, humans, animals, and plants are directly exposed to ultraviolet rays, causing various illnesses. The greenhouse effect, induced by higher levels of carbon dioxide, CFCs, and other pollutants, leads to global warming, a continuous increase in the earth's atmospheric temperature.

Impact of Climate Change

In the present era, the speed at which climate change is occurring has intensified, resulting in a rise in natural disasters like floods, droughts, and cyclones. Climate change has multiple unfavorable consequences, not only for agriculture but also for humans, pests and diseases, livestock, aquatic ecosystems, the environment, and many other areas. The agriculture sector bears the brunt of climate change, with various sectors within it being significantly affected. These sectors include the impact of climate change on different crops, pests and diseases, livestock, aquatic ecosystems, fisheries production, and the overall effect on forest ecosystems.

Climate Change Impact on Agriculture Sector

Temperature, light, soil, water, and oxygen are essential elements for crop growth. Changes in temperature, rainfall, and carbon dioxide levels serve as key indicators of climate change. Agriculture responds differently to climate variations, with some changes benefiting crops while others are harmful. For example, increased carbon dioxide levels can enhance photosynthesis but also reduce transpiration rates. Soil erosion caused by floods and deforestation can lead to a loss of soil fertility, impacting plant growth. Climate change can also disrupt the soil water balance, leading to drier conditions and increased risk of drought. The plant's inability to access an adequate water supply hampers its development. Natural disasters have a significant impact on plant growth and productivity. The response of stomata to carbon dioxide growth becomes challenging to predict due to various plant and environmental factors. Periodically, crops deteriorate due to the adverse effects of high

temperatures and precipitation. The changing climate, characterized by rising temperatures, increased precipitation, and elevated carbon dioxide levels, contributes to the expansion of weed populations. This emerging issue is a direct consequence of climate change. The rise in carbon dioxide levels will eventually benefit C3 and C4 plants, which are more susceptible to carbon dioxide deficiencies. Furthermore, as carbon dioxide levels increase, the plant's ability to absorb nitrogen decreases, affecting soil fertility due to a mismatch in the C: N ratio.

World agriculture is currently facing a significant decrease in yield as a result of climate fluctuations. Over the next few years, global agricultural productivity is expected to decline by 5-10% due to these alterations. Insufficient rainfall will lead to drought, which in turn will negatively impact photosynthesis and the survival of plants. Developing countries like India, Afghanistan, Bangladesh, and Nepal have already predicted a 20-25% reduction in agricultural food production due to climate change. The Asia-Pacific region, in particular, will experience a severe impact on rice and wheat yields, potentially straining food security in South Asia, home to a population of 1.6 billion people. Regions already close to the maximum temperature tolerance for crops will be immediately affected by rising temperatures. Inadequate rainfall globally has a significant impact on crop growth, with irrigation being the primary method of management. Rising temperatures will also affect agricultural output, sea levels, and the overall agro-ecosystem. Emerging countries like India and Sri Lanka will be particularly vulnerable to these detrimental effects. On a positive note, increased atmospheric CO2 levels have benefited certain crops like rice, wheat, legumes, and oilseeds, resulting in a yield increase of 10-20%. However, the harmful consequences of temperature increase, such as decreased production in crops like wheat and mustard, have been observed at a rate of 3-7%. According to research conducted by an Indian agriculture agency, a temperature rise of 1°C can lead to a destructive loss of 4-5% million tons in wheat yield. In specific regions like Rajasthan, the yield of Pearl Millet has steadily declined by 10-20% due to increased temperatures surpassing the optimal range for plant growth. Similarly, the Soybean yield in Madhya Pradesh has experienced a 5% decrease. Climate change significantly impacts rain-dependent agriculture, with rainfed wheat yield in India increasing by 0.45 hectares on rainfed farmland for every 0.5°C rise in temperature. Changes in climate requirements are also affecting crops like chickpeas, maize, sorghum, and millet.

Adaptation and Mitigation of Climate Change in Agriculture Sector

The impact of climate change on the agriculture sector in developing countries like India has been found to be variable, as highlighted by previous studies. The rabi season, in particular, experiences more destructive consequences due to climate change. To address this issue, various measures have been adopted, including altering planting dates, utilizing different plant varieties and species, exploring alternative crops, employing drought or heat stress-resistant varieties, diversifying crops, implementing water harvesting techniques, providing loan credits to farmers, and adopting new irrigation techniques. Organic farming, natural farming, and integrated farming systems are also effective in mitigating the damaging effects of climate change. In developing nations like India, rapid industrialization leads to significant greenhouse gas emissions. Implementing mitigation strategies, such as delayed sowing, can help reduce the negative impact of rising temperatures and enhance soybean yields. It is worth noting that greenhouse gases are not only emitted by industries but also by rice cultivation, which releases substantial amounts of methane and carbon dioxide into the atmosphere. Afforestation is a crucial approach to controlling carbon dioxide levels. Other practices, such as conservation tillage and agroforestry, can also contribute to mitigation efforts. These mitigation processes have a positive impact on agriculture, benefiting farmers while minimizing gas emissions into the atmosphere.

Climate Change Impact on different Diseases of Some Crops

Pathogens are essential in agriculture, with moisture, temperature, and wind variations being critical factors that aid in their survival and proliferation, leading to increased damage in plants. Drought can exacerbate the frequency of pathogens. In Italy, certain exotic species have adapted to survive in drier conditions. Rising temperatures can disrupt growth stages and development rates due to changes in temperature and precipitation patterns. Temperature fluctuations are indicative of pathogen survival. Bacterial diseases such as Ralstonia solanaceraum and Acidovorax avena are particularly destructive to agriculture and are exacerbated by temperature increases. Climate change has led to the emergence of new diseases in previously unaffected areas. Some crops, like wheat, are negatively impacted by temperature increases, resulting in diseases like rust, while forage crops benefit from increased temperatures. Diseases like late blight, caused by temperature increases, can be controlled using fungicides.

Climate Change Impact on Live Stocks

The impact of climate change on animal reproduction is expected to be significant worldwide. Heat stress, among various environmental factors, plays a crucial role in affecting animal productivity. The effects of climate change on the health of farm animals have not been thoroughly investigated. However, it is anticipated that climate change, particularly global warming, will have a substantial impact on animal health, similar to its effects on human health. The increased pathogen continuum increases the susceptibility of animals to illnesses and enhances the pathogenicity of causative agents. Climate change can lead to various types of diseases in animals, including those transmitted by vectors, pathogens, and hosts. Diseases spread by vectors such as mosquitoes, lice, and mites are influenced by temperature and rainfall variations. For instance, temperature fluctuations in livestock have been linked to the development of severe illnesses like Foot and Mouth disease in Andhra Pradesh. In cases where a disease is more severe in older individuals, occurs frequently or endemically, and provides lifelong immunity after infection, it is considered endemic. Climate change in Africa is expected to negatively impact several significant animal diseases, including those transmitted by ticks.

Impact on Feed and Fodder Availability: India plays a crucial role in the livestock population, with crop residue, weeds, tree leaves, and open fields for grazing being major sources of feed. Climate change affects livestock productivity by altering the quantity and quality of available feed. Predictions indicate that climate change will modify grassland species composition, as well as the digestibility and nutritional value of fodder. Any deficiency in feed quantity and quality will have repercussions on the entire system. Climate change also poses challenges to male reproduction, such as decreased sperm motility, increased dead sperm count, abnormal sperm morphology, and reduced testosterone levels. Similarly, climate change impacts women's reproductive health by hindering fetal growth, reducing oxygen and water supply to embryos, stunting growth, and shortening estrus cycles. These difficulties may lead to reproductive failure in animals, resulting in insufficient production of commodities like milk. For instance, a decrease in milk production by cows can significantly impact farmers who rely solely on milk sales.

Conclusion

Agriculture is significantly impacted by climate change as farming heavily relies on weather conditions. The food production sector is particularly vulnerable to climate change, leading to a decrease in agricultural output. While various adaptation and mitigation strategies exist to mitigate these negative effects, some strategies may not be entirely effective. Climate change results in substantial economic losses, especially affecting farmers. Farmers are enhancing their crop yields through the implementation of adaptation and mitigation measures. Greenhouse gases play a crucial role in climate change; reducing their emissions can significantly mitigate climate change, as they are the

primary contributors to this phenomenon. Implementing awareness programs is an effective approach to control climate change, as it can educate individuals on the adverse effects of climate change on agriculture, health, water resources, forestry, and land use. By raising awareness, man-made activities contributing to climate change can be controlled. Fluctuations in temperature and humidity can lead to the emergence of various diseases in livestock, resulting in reduced livestock output. Effective management techniques can help mitigate the impact of climate change in the cattle industry. Additionally, the increase in pests and diseases is linked to rising temperatures, humidity levels, and other environmental factors, ultimately hindering plant growth and development. Climate change is a gradual, human-induced phenomenon, and its negative effects can be minimized by reducing human activities. By taking steps to reduce man-made activities, the planet can be safeguarded. Soil erosion and fertility can be preserved and enhanced through reforestation and deforestation efforts.

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CLIMATE CHANGE AND WATER RESOURCES

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Abstract
Climate change is dismembering downfall patterns, leading to extreme downfall events, changeable water vacuity, aggravating water failure, and contaminating water supplies. Analogous impacts can drastically affect the volume and quality of water that children need to survive. Water and climate change is primarily a water extremity. We feel its impacts through worsening cataracts, rising ocean situations, shrinking ice fields, backfires, and deaths. Still, water can fight climate change. Warmer temperatures increase the rate of evaporation of water into the atmosphere, in effect adding to the atmosphere's capacity to" hold" water. Increased evaporation may dry out some areas and fall as a spare rush on other areas. The impacts of climate change on water vacuity and water quality will affect multitudinous sectors, including energy products, structure, mortal health, husbandry, and ecosystems. Current perspectives on global climate change predicated on recent reports of the Intergovernmental Panel on Climate Change (IPCC) are presented. Impacts of a hothouse warming that are likely to affect water planning and evaluation include changes in rush and runoff patterns, ocean position rise, land use, population shifts following from these goods and changes in water demands.

***Keywords**: climate change, water quality, land use. temperature, carbon dioxide*

Introduction

Climate change is dismembering downfall patterns, leading to extreme downfall events, changeable water vacuity, aggravating water failure, and contaminating water supplies. Analogous impacts can drastically affect the volume and quality of water that children need to survive.

Water and Climate Change

Water and climate change is primarily a water extremity. We feel its impacts through worsening cataracts, rising ocean situations, shrinking ice fields, backfires, and deaths. Still, water can fight climate change. Sustainable water operation is central to erecting the rigidity of societies and ecosystems and reducing carbon emigration. Everyone has a part to play, and conduct at the existent and ménage situations is vital.

Water Cycle and Water Demand

Warmer temperatures increase the rate of evaporation of water into the atmosphere, in effect adding to the atmosphere's capacity to" hold" water. Increased evaporation may dry out some areas and fall as a spare rush on other areas. Numerous areas in the West have endured less rain over the past 50 times, as well as increases in the strictness and length of deaths.

Water Quality

Water quality could suffer in areas passing increases in downfall. Increases in heavy rush events could beget problems for the water structure, as sewer systems and water treatment shops are overwhelmed by the increased volumes of water.

Impacts of Changes in Water Resources on Other Sectors

The impacts of climate change on water vacuity and water quality will affect multitudinous sectors, including energy products, structure, mortal health, husbandry, and ecosystems.

Fresh Water Resources

Freshwater resources along the beachfront face risks from ocean position rise. As the ocean rises, salt

water moves into brackish areas. This may force water directors to seek other sources of freshwater or increase the need for desalination (or junking of tar from the water) for some coastal brackish aquifers used as drinking water force. Brackish resources on some islands, especially small islands and islands, can be limited, as force depends on shallow aquifers, which are recharged by rush. These brackish lenses float on top of the salt water, and the rising ocean position diminishes the area above the ocean position in which the lens can live.

Water and Climate Change are Inextricably Linked.

Extreme downfall events are making water scarcer, more changeable, and weaker or all three. These impacts throughout theater cycle affect sustainable development, biodiversity, and people's access to water and sanitation. Flooding and rising ocean situations can contaminate land and water resources with saltwater or feudal matter and beget damage to water and sanitation structures, analogous as water points, wells, toilets, and wastewater treatment installations. Glaciers, ice caps, and snow fields are swiftly fading. Melt water feeds multitudinous of the great sluice systems. Volatility in the cry sphere can affect the regulation of brackish resources for vast numbers of people in mesa areas. Dearth's and backfires are destabilizing communities and driving civil uneasiness and migration in multitudinous areas. Destruction of leafage and tree cover exacerbates soil erosion and reduces groundwater recharge, adding to water failure and food insecurity. Growing demand for water increases the need for energy-ferocious water pumping, transportation, and treatment, and has contributed to the decline of critical water-dependent carbon sinks analogous to peat lands. Water-ferocious husbandry for food products, particularly meat, and for growing crops used as befouls, can further complicate water failure. Innovative backing for water resource operations will be demanded to help attract investment, produce jobs, and support governments in fulfilling their water and climate pretensions.

Sustainable, Affordable, Scalable Water Results Include Meliorate carbon storage.

Peat lands store at least twice as important carbon as all of Earth's timbers. Mangrove soils can sequester up to three or four times more carbon than terrestrial soils.

Protect Natural Buffers

Coastal mangroves and wetlands are effective and affordable natural walls to flooding, extreme downfall events, and erosion, as the leafage helps regulate water flux and binds the soil in flood tide drift plains, sluice banks, and coastlands. Harvest rain water. Rainwater internee is particularly useful in regions with uneven downfall distribution to make rigidity to shocks and ensure supplies for dry periods. Adopt climate-smart Using conservation ways to meliorate organic matter to increase soil moisture retention; drip irrigation; reducing post-crop losses and food waste; and, converting waste into a source of nutrients or befouls biogas. Reuse waste water. Unconventional water resources, analogous to regulated treated wastewater, can be used for irrigation and artificial and external purposes. Safely managed wastewater is an affordable and sustainable source of water, energy, nutrients, and other recoverable paraphernalia. Harness groundwater. In multitudinous places, groundwater is- used and weakened; in other places, it's an unknown volume. Exploring, guarding, and sustainably using ground waters central to conforming to climate change and meeting the conditions of a growing population. Climate change affects the water Climate change affects the world's water in complex ways. From changeable downfall patterns to shrinking ice wastes, rising ocean situations, cataracts, and deaths. Utmost impacts of climate change come down to wat.

Impact of Climate Change on Water Resources

Impacts of climate change and climate variability on the ATER resources are likely to affect irrigated husbandry, True installed power capacity, environmental over flows in the dry season, and advanced overflows during the wet season, thereby

causing severe dearth's and cataracts in communal and pastoral areas.

Conclusion

Current perspectives on global climate change predicated on recent reports of the Intergovernmental Panel on Climate Change (IPCC) are presented. Impacts of a hothouse warming that are likely to affect water planning and evaluation include changes in rush and runoff patterns, ocean position rise, land use, population shifts following from these goods and changes in water demands. Irrigation water demands are particularly sensitive to changes in rush, temperature, and carbon dioxide situations. Despite recent advances in climate change wisdom, a great query remains as to how and when the climate will change and how these changes will affect the force and demand for water at the sluice container and watershed situations, which are of utmost interest to planners.

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CLIMATE CHANGE AND ITS IMPACT ON INDIAN AGRICULTURE

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Abstract
This paper mainly focused the climate change and its impact on Indian agriculture. Climate is the essential determinant of agrarian efficiency which straightforwardly influences food creation across the globe. The farming area is the most delicate area to climate change because the environment of a locale/country decides the nature and qualities of vegetation and harvests. Expansion in the mean occasional temperature can diminish the term of many harvests and subsequently decrease the last yield. Food creation frameworks are very delicate to climate changes like changes in temperature and precipitation, which might prompt episodes of bugs and sicknesses subsequently diminishing harvests eventually influencing the food security of the country. Likewise, there is a need to direct ranchers on the projected influence of climate change and sharpen them on plausible relief and transformation choices to limit the gamble in Agrarian areas.
Keywords: *climate change, environment, agriculture, land, temperature.*

Introduction

Climate change is any critical long-haul change in the normal examples of the normal climate of the locale (or the entire Earth) over a huge timeframe. It is about non-typical varieties of the environment, and the impacts of these minor departures from different pieces of the Earth. These progressions might require tens, hundreds, or maybe a long period. In any case, expanded anthropogenic exercises, for example, industrialization, urbanization, deforestation, farming, change in land use design, and so on prompt the emanation of greenhouse gases because of which the pace of climate change is a lot quicker. Climate change situations incorporate higher temperatures, changes in precipitation, and higher climatic CO2 fixations. There are three manners by which the Nursery Impact might be significant for farming. To begin with, expanded barometrical CO2 fixations can straightforwardly affect the development pace of harvest plants and weeds. Furthermore, CO2-actuated changes in the environment might modify levels of temperature, precipitation, and daylight which can impact plant and creature efficiency. At long last, ascents in ocean level might prompt loss of farmland by immersion and expanding saltiness of groundwater in beachfront regions.

The nursery impact is a characteristic cycle that has a significant impact on molding the world's environment. It creates a moderately warm and accommodating climate close to the world's surface where people and other living things have had the option to create and thrive. In any case, the expanded degree of ozone-harming substances, carbon dioxide, water fume, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride and so on because of anthropogenic exercises has added to a general increment of the world's temperature, prompting an unnatural weather change. The typical worldwide surface temperature has expanded by 0.74 o C since the late nineteenth Hundred years and is supposed to increment by 1.4 C - 5.8 C by 2100 Promotion with critical territorial varieties. The climatic CO2 fixation has expanded from 280 ppm to 395 ppm, CH4 focus expanded from 715 ppb to 1882 ppb, and N2O fixation from 227 ppb to 323 ppb from the year 1750 and 2012. The dangerous atmospheric deviation Potential of these gases i.e., CO2, CH4, and N2O are 1, 25, and 310 separately.

Global Scenario of Climate Change

All climate models demonstrate a climbing pattern in temperature. Precipitation design has changed with diminished precipitation over south and south-east

Asia. More extraordinary and longer dry seasons have happened since the 1970s. Interminable snow cover has declined in both regions and profundity of snow cover. Worldwide mean ocean level is projected to ascend by 0.18 to 0.59 m before the centuries over. Six of the 10 nations generally defenseless against climate change are in the Asia-Pacific. Bangladesh beat the rundown followed by India, Nepal, the Philippines, Afghanistan, and Myanmar. In Bangladesh, for instance, around one-fifth of the country's populace would be uprooted because of the farmland misfortune assessed for a 1.5 m ocean-level ascent. The Maldives Islands in the Indian Sea would have one-half of their property region immersed with a 2 m ascent in ocean level.

Indian Scenario of Climate Change

The warming might be more articulated in the northern pieces of India. The limits in greatest and least temperatures are supposed to increment under an evolving environment; scarcely any spots are supposed to get more downpours while some might stay dry. Leaving Punjab and Rajasthan in the North West and Tamil Nadu in the South, which show a slight reduction on a normal 20 percent ascend in all of India summer storm precipitation over all states is normal. Several stormy days might descend however the power is supposed to ascend all things considered of the pieces of India. Gross per capita water accessibility in India will decline from 1820 m3/yr in 2001 to as low as 1140 m 3/yr in 2050. Corals in the Indian Sea will be before long presented to summer temperatures that will surpass the warm edges seen throughout recent years. The yearly fading of corals will turn out to be very nearly a conviction from 2050. Right now the regions of Jagatsinghpur and Kendrapara in Odisha; Nellore and Nagapattinam in Tamilnadu; and Junagadh and Porbandar locale in Gujarat are the most defenseless against the effects of expanded force and recurrence of tornadoes in India. The previous perceptions on the mean ocean level along the Indian coast show a long haul (long-term) rising pattern of around 1.0 mm/year. Nonetheless, the new information proposes a rising pattern of 2.5 mm/year in ocean level along the Indian shoreline. The ocean surface temperature bordering India is probably going to heat up by around 1.5-2.0oC by the center of this long period and by around 2.5-3.5oC before the century's over. A 1-meter ocean level ascent is projected to dislodge roughly 7.1 million individuals in India and around 5764 sq km of land region will be lost, alongside 4200 km of streets. More than half of India's woodlands are probably going to encounter a shift in backwoods types, unfavorably affecting related biodiversity, territorial environment elements as well as occupations in light of timberland items. Indeed, even with a somewhat limited capacity to focus around 50 years, the majority of the timberland biomass in India is by all accounts exceptionally powerless against the extended change in the environment. Further, it is extended that by 2085, 77% and 68% of the forested networks in India are probably going to encounter a shift in wood types.

Impact of Climate Change on India's Agriculture

India's farming is an additional ward on rainstorms from the antiquated periods. Any adjustment of storm patterns influences agribusiness. Indeed, even the rising temperature is influencing Indian farming. In the Indo-Gangetic Plain, these premonsoon changes will essentially influence the wheat crop. In the provinces of Jharkhand, Odisha, and Chhattisgarh alone, rice creation misfortunes during extreme dry spells (around one year in five) normally around 40% of complete creation, with an expected worth of $800 million. Expansion in CO2 to 550 ppm expands yields of rice, wheat, vegetables, and oilseeds by 10-20%. A 1oC expansion in temperature might decrease yields of wheat, soybean, mustard, groundnut, and potato by 3-7%. A lot higher misfortunes at higher temperatures. The efficiency of most harvests to diminish just barely by 2020however by 10-40% by 2100 because of expansions in temperature, precipitation fluctuation, and diminishes in water system water. The significant effects of environmental change will be on downpours taken care of or un-flooded crops,

which are developed in almost 60% of cropland. A temperature climb by 0.5oC in winter temperature is projected to diminish downpours and take care of wheat yield by 0.45 tons per hectare in India. Perhaps some improvement in yields of chickpea, rabi maize, sorghum, millets; and coconut on the West Coast. Less misfortune in potatoes, mustard, and vegetables in north-western India because of decreased ice harm. Expanded dry spells and floods are probably going to increment creation fluctuation Ongoing examinations done at the Indian Rural Exploration Establishment demonstrate the chance of deficiency of 4-5 million tons in wheat creation in the future with each climb of 1oC temperature all through the developing period. Rice creation is scheduled to diminish by very nearly a ton/hectare if the temperature goes up by 2oC. In Rajasthan, a 2oC climb in temperature was assessed to decrease the creation of Pearl Millet by 10-15%. On the off chance that the greatest and least temperature climbs by 3oC and 3.5oC separately, Soyabean yields in M.P will decline by 5% contrasted with 1998. Horticulture will be most terribly impacted in the seaside locales of Gujarat and Maharashtra, as ripe regions are helpless against immersion and Stalinization.

Agricultural Productivity and Food Security

Food security is both straightforwardly and in a roundabout way connected with environmental change. Any change in the climatic boundaries, for example, temperature and mugginess which oversee crop development will straightforwardly affect the amount of food created. Backhanded linkage relates to horrendous occasions, for example, flood and dry spells which are projected to duplicate as a result of environmental change prompting colossal harvest misfortune and leaving enormous patches of arable land unsuitable for development and thus compromising food security. The net effect of food security will rely upon the openness to worldwide ecological change and the ability to adapt to and recuperate from worldwide natural change. On a worldwide level, progressively erratic weather conditions will prompt a fall in farming creation and higher food costs, prompting food frailty. Food uncertainty could be a pointer for evaluating weakness to outrageous occasions and slow-beginning changes. This effect of an unnatural weather change has huge ramifications for rural creation and exchange of non-industrial nations as well as an expanded gamble of craving. The quantity of individuals experiencing constant yearning has expanded from under 800 million in 1996 to more than 1 billion as of late. Joined Country's populace information and projections show the worldwide populace arriving at 9.1 billion by 2050, an increment of 32% from 2010. The total populace is supposed to develop by 2.2 billion in the 40 years to 2050, and a huge piece of the extra populace will be in nations that experience issues taking care of themselves. Primer evaluations for the period up to 2080 recommend a downfall of some 15-30 percent of rural efficiency in the most environmental change-uncovered non-industrial nation locales - Africa and South Asia. Indeed, even the IPCC, hardly a doomsayer, says a 0.5oC climb in winter temperature would diminish wheat yield by 0.45 tons per hectare in India. Rice and wheat have an all-out share in all-out food grain creation in India. Any adjustment of rice and wheat yields might essentially affect the food security of the country. Also, this was when Indian horticulture was driven into emergency, and 2.56 lakh ranchers ended it all starting around 1995.

As per A K Singh, representative chief general (normal asset the executives) of the Indian Board of Farming Exploration, medium-term environmental change expectations have extended the probable decrease in crop yields because of environmental change at somewhere in the range of 4.5 and 9 percent by 2039. The long-run expectations paint a more frightening picture with the harvest yields expected to fall by 25 for every or more by 2099. With 27.5% of the populace still beneath the neediness line, lessening weakness to the effects of environmental change is fundamental. Indian food creation should increase by 5 million metric tons each year to keep up with populace increment and

guarantee food security. Adapting to the effect of environmental change on farming will require cautious administration of assets like soil, water, and biodiversity. To adapt to the effects of environmental change on agribusiness and food creation, India should act at the worldwide, provincial, public, and neighborhood levels.

Climate Change – Mitigation and Adaptation in Agriculture

1. Assist farmers in coping with current climatic risks by providing value-added weather services to farmers. Farmers can adapt to climate changes to some degree by shifting planting dates, choosing varieties with different growth durations, or changing crop rotations.
2. An Early warning system should be put in place to monitor changes in pest and disease outbreaks. The overall pest control strategy should be based on integrated pest management because it takes care of multiple pests in a given climatic scenario.
3. Participatory and formal plant breeding to develop climate-resilient crop varieties that can tolerate higher temperatures, drought, and salinity.
4. Developing short-duration crop varieties that can mature before the peak heat phase sets in. 5. Selecting genotypes in crops that have a higher per day yield potential to counter yield loss from heat-induced reduction in growing periods.
5. Preventive measures for the drought include on-farm reservoirs in medium lands, growing of pulses and oilseeds instead of rice in uplands, ridges and furrow systems in cotton crops, growing of intercrops in place of pure crops in uplands, land grading and leveling, stabilization of field bunds by stone and grasses, graded line bunds, contour trenching for runoff collection, conservation furrows, mulching and more application of Farm yard manure (FYM).
6. Efficient water use such as frequent but shallow irrigation, drip, and sprinkler irrigation for high-value crops, and irrigation at critical stages.
7. Efficient fertilizer use such as optimum fertilizer dose, split application of nitrogenous and potassium fertilizers, deep placement, use of neem, Karanja products and other such nitrification inhibitors, liming of acid soils, use of micronutrients such as zinc and boron, use of sulfur in oilseed crops, integrated nutrient management.
8. Seasonal weather forecasts could be used as a supportive measure to optimize planting and irrigation patterns.
9. Provide greater coverage of weather-linked linked agriculture insurance.
10. Intensify the food production system by improving the technology and input delivery system.
11. Adopt resource conservation technologies such as no-tillage, laser land leveling, direct seeding of rice, and crop diversification which will help in reducing the global warming potential. Crop diversification can be done by growing non-paddy crops in rain-fed uplands to perform better under prolonged soil moisture stress in Kharif.
12. Develop a long-term land use plan for ensuring food security and climatic resilience.
13. National grid grain storage at the household/ community level to the district level must be established to ensure local food security and stabilize prices.
14. Provide incentives to farmers for resource conservation and efficiency by providing credit to the farmers for transition to adaptation technologies.
15. Provide technical, institutional, and financial support for the establishment of community banks of food, forage, and seed.
16. Provide more funds to strengthen research for enhancing adaptation and mitigation capacity of agriculture.

Conclusion

Climate change, the result of the "Dangerous atmospheric deviation" has now begun showing its

effects around the world. Climate is the essential determinant of agrarian efficiency which straight forwardly influences food creation across the globe. The farming area is the most delicate area to climate change because the environment of a locale/country decides the nature and qualities of vegetation and harvests. Expansion in the mean occasional temperature can diminish the term of many harvests and subsequently decrease the last yield. Food creation frameworks are very delicate to climate changes like changes in temperature and precipitation, which might prompt episodes of bugs and sicknesses subsequently diminishing harvests eventually influencing the food security of the country. The net effect of food security will rely upon the openness to worldwide natural change and the ability to adapt to and recuperate from worldwide ecological change. Adapting to the effect of climate changes on agribusiness will require cautious administration of assets like soil, water, and biodiversity. To adapt to the effect of climate changes on horticulture and food creation, India should act at the worldwide, territorial, public, and nearby levels. According to the agribusiness perspective, impacts of outrageous climate occasions on crops are to be archived on a territorial scale 26 with the goal that it will be convenient to organizers in such re-event occasions for alleviating the evil impacts. Likewise, there is a need to direct ranchers on the projected influence of climate change and sharpen them on plausible relief and transformation choices to limit the gamble in Agrarian areas.

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IMPACT OF CLIMATE CHANGE: AN ECONOMIC ANALYSIS

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Abstract
Climate change refers to the variation in the world's global climate or indigenous climate over time. The world's climate is constantly changing over time. Diverse climatologists believe that the temperature of the earth slowly fluctuates over time. From the late 14th century to the end of 19th century, the Earth endured multitudinous changes. Climate change is likely to have an important lower impact on India than other countries in similar positions, according to an assessment by the South Asia indigenous office of the UNIDO. India s dependence on reactionary powers analogous as coal and oil painting oil for energy generation and transport could lead to heavy environmental, social and nonsupervisory costs, causing a drain on the nations resources as a direct impact of Climate Change over the coming century Increase in temperature in India could be advanced than the global normal. Climate change simulation models suggest that a rise in temperature and change in humidity will negatively affect mortal health in India. A warmer and wetter India will see a rise in heat related and contagious conditions. Farther people will die due to heat swells. Heat stress could affect in heat cramps, heat exhaustion, heat stroke, and damage physiological functions, metabolic processes and vulnerable system. The goods of mortal exertion on climate change are conceded and accepted by utmost people in Tirunelveli quarter. Garrett's ranking fashion was espoused in order to identify the public opinion of climate change attesters.
Keywords: *climate change, diseases, reduction, green house gas*

Introduction

Climate change refers to the variation in the world's global climate or indigenous climate over time. The world's climate is constantly changing over time. Diverse climatologists believe that the temperature of the earth slowly fluctuates over time. From the late 14th century to the end of 19th century, the Earth endured multitudinous changes. Freezing and harsh conditions caused several crunches and expansion of glaciers. There is a saying climate is what you anticipate; downfall is what you get. We constantly confuse between downfall and climate. Weather is what is reported on the TV every night – minimum and outside different places, pall cover, wind conditions, downfall, humidity, etc. Weather describes what is passing outdoors in a given time. Climate tells us what it's generally like in the place where you live. For illustration Ahmadabad and Delhi have generally dry climate; the climate in Bangalore and Pune is said to be affable, while Koch has largely stormy climate. Global climate change is caused by the accumulation of green house feasts in the lower atmosphere. The global attention of these feasts is adding, mainly due to mortal exertion, analogous as the combustion of reactionary powers and deforestation. The atmospheric attention of carbon dioxide, the main green house gas, has increased.

Climate Change script in India

Climate change is likely to have an important lower impact on India than other countries in similar positions, according to an assessment by the South Asia indigenous office of the UNIDO. Indias dependence on reactionary powers analogous as coal and oil painting oil for energy generation and transport could lead to heavy environmental, social and nonsupervisory costs, causing a drain on the nations resources as a direct impact of Climate Change over the coming century Increase in temperature in India could be advanced than the

global normal. Swiftly changing and increasingly changeable patterns of rainstorm and rain fall. Rise in ocean situations, which could submerge coastal areas and also invest tar water into fresh water sources. According to the International Panel of Climate Change (IPCC), India will witness the topmost increase in energy and green house gas emigration in the world if it sustains eight percent periodic profitable growth or further as its primary energy demand will also multiply at least three to four times its present situations. India has a 7500 km long densely populated and low-lying bank, and an economy that is nearly tied to its natural resource base. Hence, it's extensively vulnerable to the impact of Climate Change. Change in climate could mean Extreme rush events and the possibility of farther frequent flash cataracts in part of India and failure in others. An increase in downfall is dissembled over the eastern region of India, but the northwestern punishment may see a small drop in the absolute amount of downfall. Increase in temperature and seasonal variability in rush are anticipated to affect in more rapid-fire- fire recession of Himalayan glaciers. Warmer and wetter conditions would increase the eventuality for an advanced frequency of heat related and contagious diseases. Reduction in agricultural productivity especially in areas growing wheat is anticipated. Further, yield of rice could also drop due to change in downfall pattern.

Objects of the Study

The main ideal of this disquisition is to analysis the significance of climate change in the earth with special reference to Tirunelveli District.

Methodology

In order to assay the ideal, the data about the emigration is collected from the journals and the reports. There are 80 sample attesters are named erratically for public opinion reading climate change. The study area is Tirunelveli quarter. Garrett's ranking fashion was espoused in order to identify the public opinion of climate change attesters.

Result and Discussion

Increased Temperature

Scientist from the Indian institute of technology New Delhi, formerly reports that face job temperatures over India are going up at the rate of0.4 * C per hundred times, particularly during the post rainstorm and time-out season.

Effect on Monsoon

India is heavily dependent on the rainstorm – to meet its agricultural and water conditions, and also for guarding and propagating its rich biodiversity. No significant downfall drop is anticipated during the time-out season. But the average periodic situations and rainstorm season situations of soil moisture could decline significantly in the central plains.

Effect on water resources

The onset of the summer rainstorm over central India could vary in the future. Downfall diminishment, water vacuity will drop across the country. Piecemeal from rainstorm rain fed gutters, India depends mainly on the water force from its imperishable gutters, which are continuously fed throughout the time by the Himalayan ranges.

Impact on Human Health

Climate change simulation models suggest that a rise in temperature and change in humidity will negatively affect mortal health in India. A warmer and wetter India will see a rise in heat related and contagious conditions. Farther people will die due to heat swells. Heat stress could affect in heat cramps, heat exhaustion, heat stroke, and damage physiological functions, metabolic processes and vulnerable system.

Socio profitable impact of Climate Change

Societal impact and responses to climate change will presumably vary, depending on population size and distorts, profitable and geopolitical conditions, and distribution of wealth. Possible mortal impact includes.

Public Opinion on Climate Change

The goods of mortal exertion on climate change are conceded and accepted by utmost people in Tirunelveli quarter. Garrett's ranking fashion was espoused in order to identify the public opinion of climate change attesters. The sample attesters in the study area were asked to rank the opinion by them as per priority. The rank assigned to each opinion by the attesters was converted into chance by using the following formula

$$\text{Present Position} = \frac{100(Rij - 0.5)}{Nj}$$

R_{ij} = Rank given j^{th} individual for the i^{th} factor, and

N_j =number of factors ranked by the j^{th} individual.

The chance thus attained was converted into scores by pertaining to the Garrett's ranking table. The scores of all attesters for each factor were added together and also divided by the number of attesters, for each factor passing that particular opinion. The mean scores of each factor were arranged in the descending order and the corresponding species were distributed.

Table: 1 - Opinion of the Respondents on Climate Change

Opinion	Garrett Ranking Mean Score	Rank
Increased temperature	58.14	II
Low production in Agriculture	61.29	I
Reduced water resources	57.66	III
Human health is affected	55.12	V
Failure of monsoon	56.72	IV
Reduced family Income	50.84	VI

The opinions on climate change of the respondents are given in above Table. In Tirunelveli district, 'low production in agriculture' (61.29%) was found to be the major impact of climate change by the opinion of the respondents. It is assigned the first rank and followed by 'increased temperature (58.14%), 'reduced water resources' (57.66%), 'failure of monsoon' (56.72%), 'human health is affected' (55.12%) and the last one 'reduced family income' (50.84%) was assigned second, third, fourth, fifth and sixth rank respectively.

Conclusion

By 2050, it is predicted that more than 200 million people may be forced from their native lands by rising sea levels, floods and droughts, with many more potentially facing early deaths from malnutrition and heat stress. Further the survey report shows that, in Tirunelveli district, 'low production in agriculture' was found to be the major impact of climate change by the opinion of the respondents. It is assigned the first rank and followed by 'increased temperature; in the study area.

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CLIMATE ACTION AND SUSTAINABLE DEVELOPMENT IN INDIA

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Abstract
Climate change has long-term macroeconomic effects on the economy and become an increasing concern worldwide. Sustainable development is the core of any country's development strategy. As climate change is one of the more pressing challenges facing the world, several initiatives have been taken at the global level to combat climate change and its impact. The major weather-related event in India reveals that the incidence of extreme events has increased in the last two decades, with rising average temperature levels and more volatile precipitation patterns. Empirical findings suggest that the macroeconomic impact of climate change, particularly on food inflation and certain indicators of real economic activity, has been statistically significant for India (RBI 2020). The World Bank (2022) estimates that out of the projected 80 million global job losses from heat stress-linked productivity decline, India's share would be 42.5 percent. India has taken several proactive steps to control climate change and its impact on the earth to build a more sustainable, and safer place for all. The mounting budget allotment for climate action and the progress of SDG 13 reflects the Government of India's strong commitment to sustainable development. The study aims to know the climate actions taken by India and its progress in achieving the goal of sustainable development.
Keywords: *climate change, climate action, sustainable development, sdg index.*

Introduction

Concern over climate change is growing on a global scale. The long-term weather patterns for a specific area and period of time are referred to as the climate. Climate change is generally defined as long-term deviations in the strength or frequency of weather events relative to a historic baseline (Mani et al., 2018). Human activity has a negative impact on the climate, and these changes endanger life. Climate change caused weather patterns to shift, which made storms, disasters, and hazards like shortages of food and water, rising sea levels, pollution, etc. Climate change affects key economic sectors, including agriculture, industry, labour productivity, buildings, and infrastructure The health sector is greatly impacted by climate change, which also affects mortality and morbidity rates. Heat stress, air pollution, and infectious diseases are the main health risks associated with climate change. Numerous studies also show that food security, livestock productivity, and living standards are negatively impacted by climate change.

Climate change has long-term macroeconomic impacts on the Indian economy. According to research by the Reserve Bank of India, rising temperatures, unstable precipitation, and extreme weather can all affect supply by driving up prices and decreasing overall economic production in the manufacturing, service, and agricultural sectors. India's trade balance, revenue, and capacity for economic growth are all negatively impacted by this. Changing weather patterns, and events affect customer preferences which in turn affects demand circumstances. The Reserve Bank of India (2023) reported that Agriculture, construction, and industry in India are vulnerable to labour productivity losses due to heat stress. The World Bank (2022) estimates that out of the projected 80 million global job losses from heat stress-linked productivity decline, India's share would be 42.5 percent.

Objectives

This study aims to know the climate actions taken by India and the progress in achieving the goal of sustainable development by India.

Methodology

This study mainly relies upon secondary information. The information was gathered from Books, Newspapers, Government Reports, and websites.

Sustainable Development Goals

Sustainable development is the core of any country's development strategy. The Sustainable Development Goals were framed in 2012 at the United Nations Conference on Sustainable Development to tackle the more pressing challenges facing the world. As climate change is an urgent environmental issue, Climate Action was included in the SDGs. It is the thirteenth goal out of seventeen goals. All 17 goals are interconnected, and hence several initiatives have been taken at the global level to combat climate change and its impact.

Climate Action: Indian Context

India has taken several proactive steps to control climate change and its impact on the earth in to build a more sustainable, safer, more prosperous planet for all humanity. To improve action on the country's climate priorities, the National Action Plan on Climate Change (NAPCC) was launched in 2008 and established eight National Missions with the aim of protecting all through an inclusive and sustainable development strategy.

Nationally Determined Contribution (NDC) submitted by India to UNFCCC on 02.10.2015 has planned to lower the intensity of emissions of its GDP by 33 to 35 percent below 2005 levels, enlarge forest area to create additional carbon sink equivalent to 2.5 to 3 billion tons of carbon dioxide, and achieve 40 percent of cumulative electric power installed capacity from non-fossil energy sources by the year 2030. At present, the aim of our government is to reduce the emissions intensity of its GDP by 45 percent from the 2005 level and achieve about 50 percent cumulative electric power installed capacity from non-fossil fuel sources by the year 2030.

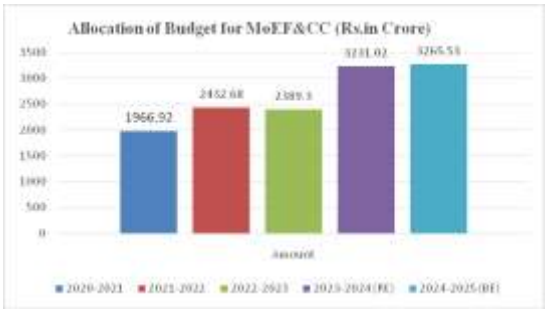
To improve the environment, Narendra Modi announced the five bold ambitious targets at the 26th Conference in Glasgow in November 2021.Of these, India's long-term goal is to reach NETZERO by 2070.The removal of emissions of carbon dioxide from the atmosphere as produced is known by the term NET ZERO.

India's four other commitments to be achieved by 2030 are i) Non-fossil energy capacity should be increased to 500 Gigawatts, ii) Total projected carbon emissions should be reduced by One billion tonnes, iii) Carbon intensity of economy should be reduced by 45 percent, and iv) 50 percent of energy requirements should be fulfilled from renewable sources. These targets reflect India's strong commitment to sustainable development.

Ministry of Environment, Forest and Climate Change

When Indira Gandhi chaired as Prime Minister of India for the first time, Environmental debates were first introduced in the national political agenda. Till 1976, the power of protecting the forests and wildlife of the country was under the State List of the Constitution and then, it came under the Concurrent List. Subsequently in 1980 the Department of Environment was created and it became the Ministry of Environment and Forests in 1985. Because of the necessity of tackling the climate change crisis, the ministry was renamed as the Ministry of Environment, Forest and Climate Change (MoEF & CC)in May 2014.

MoEF & CC is the Central Government agency for planning, coordinating, and overseeing the implementation of India's environmental and forestry policies and programmes. Survey of the flora and fauna, conservation of forests and wilderness areas, afforestation, land degradation mitigation, prevention and control of pollution, and sustainable development of the environment are the important activities undertaken by the Ministry. The total amount allocated for the Ministry of Environment, Forests and Climate Change during the financial year 2024-2025(BE) is Rs 3265.53 crore.



To achieve environmental sustainability, the Ministry of New and Renewable Energy, Ministry of Heavy Industries, and various schemes were started in addition to the Ministry of Environment, Forest and Climate Change. They have largely been the driving force behind India's effort in the direction of environmental protection and sustainable development.

India's Progress on Sustainable Development Goal 13

NITI Aayog highlighted the country's accomplishments and the way forward on its journey towards achieving the SDGs. India seized third place at the global level in expanding its forest area from 2010 to 2020. From 2011 to 2021, India's forest cover has increased by more than three percent. In 2021, India continued playing a core role in the world arena under the International Solar Alliance (ISA), Coalition for Disaster Resilient Infrastructure (CDRI), and Leadership Group for Industry Transition Group.

The NITI Aayog published the SDG India Index annually since 2018 to exhibit the progress of all states and union territories (UTs) in their journey towards achieving the Sustainable Development Goals. The Index scores range between 0–100 and Stat& Union Territories are classified based on their Index score value like Aspirant: 0–49; Performer: 50–64; Front-Runner: 65–99 and Achiever: 100. Out of 17 goals, goal 7 has been achieved (score: 100) by 15 states and 5 UTs, goal 6 has been achieved by the state Goa and Union Territory Lakshadweep, and goal 10 has been achieved by Chandigarh. But, no one achieved goal 13.

Performance of 15 major States in Climate Action

S.No.	States	Index	Status
1	Andhra Pradesh	63	Performer
2	Assam	53	Performer
3	Bihar	16	Aspirant
4	Gujarat	67	Front Runner
5	Haryana	51	Performer
6	Karnataka	62	Performer
7	Kerala	69	Front Runner
8	Madhya Pradesh	49	Aspirant
9	Maharashtra	58	Performer
10	Odisha	70	Front Runner
11	Punjab	51	Performer
12	Rajasthan	49	Aspirant
13	Tamil Nadu	61	Performer
14	Uttar Pradesh	39	Aspirant
15	West Bengal	39	Aspirant

SDG Index for Climate Action for the period 2020-2021 was presented in the above table. Odisha, Kerala, and Gujarat are Front Runners, followed by six Performers – Andhra Pradesh, Assam, Haryana, Karnataka, Maharashtra, Punjab and Tamil Nadu. Bihar has the lowest score on SDG 13 among major states.

Conclusion

Globally, several initiatives have been taken to combat climate change and improve life for future generations. The COVID-19 pandemic and the successive lockdown have created serious impediments to the attainment of the SDGs globally and India is no exception to this. However, India has taken several proactive steps vigorously to control climate change and its impact on the earth to build a more sustainable country. There is a widespread disparity among the Indian states in the performance against climate change. The study suggests that all the state governments may increase their budget allocation for environmental protection to enhance the ecological sustainability of India's development

path. Investment in green projects and environment-friendly products should be encouraged. Every citizen should be aware of climate change and its huge impact on Earth and should participate effectively in the mitigation of climate change risk. It is our moral responsibility to conserve the resources for future generations, strengthen the ecological balance, and ensure sustainable development.

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CLIMATE CHANGE AND NATURAL RESOURCES

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Abstract
Population, and leafage and fauna are at stake because of climate change. Natural resources regulate the profitable, social, and cultural lives. Water is a introductory need in everyday life, and its cycle is inextricably linked with climate change. Climate isn't the same as downfall, but the two sensations are nearly related. While downfall refers to short- term conditions that can change snappily, climate determines the long- term character of a given place, for case, whether it's temperate or tropical. The relationship between downfall and climate is vital the former is inferior to the ultimate. Solar energy in the form of radiation reaches the earth, where two- thirds of its absorbed by the earth's face. The rest is reflected in the atmosphere where hothouse feasts operate. These feasts reflect the energy to Earth where it again converts to toast this process keeps the earth inhabitable. Climate models are complex simulations of the planetary system that essay to calculate possible future climate scripts. There are multitudinous of these models and they're predicated on climate models and academic emigrations scripts, climatologists can contrive circles of global warming to the time 2100. The best- known emigrations scripts are called Representative Concentration Pathways (RCP), which show the elaboration of global warming at various academic situations of hothouse gas emigrations. Natural resources on the earth are limited. The proper operation of natural resources takes into attention long- term perspective and prevents their exploitation to the arc for short- term pretensions. Because the mortal population is adding swiftly, the demand for sources will increase day by day

***Keywords**: natural resources, climate change, global temperature*

Introduction

Population, and leafage and fauna are at stake because of climate change. Natural resources regulate the profitable, social, and cultural lives. Water is a introductory need in everyday life, and its cycle is inextricably linked with climate change. Natural resources regulate the profitable, social, and cultural lives. Water is a introductory need in everyday life, and its cycle is inextricably linked with climate change

Climate, Rainfall, and Natural Disasters

Climate isn't the same as downfall, but the two sensations are nearly related. While downfall refers to short- term conditions that can change snappily, climate determines the long- term character of a given place, for case, whether it's temperate or tropical. The relationship between downfall and climate is vital the former is inferior to the ultimate. Climate determines temperatures, downfall diversity, the traits of layoffs, downfall aggregates, as well as the nature of meteorological sensations analogous as the strictness of storms. It's due to this delicate relationship that we're facing both temperature rises and farther frequent downfall axes and natural disasters as a result of climate change.

Earth

Solar energy in the form of radiation reaches the earth, where two- thirds of it's absorbed by the earth's face. The rest is reflected in the atmosphere where hothouse feasts operate. These feasts reflect the energy to Earth where it again converts to toast this process keeps the earth inhabitable. This phenomenon is called the hothouse effect. Naturally, with the adding amount of hothouse feasts in the atmosphere, this effect intensifies, leading to global temperature rise. Devilish temperature rise due to mortal exertion is called global warming.

Burning

Archconservative powers for millions of times, the attention of hothouse feasts in the atmosphere changed only slightly; natural processes removed as multitudinous hothouse feasts from the atmosphere

as were released. Problems surfaced as we began to prize and burn reactionary powers on a large scale, thus releasing unknown amounts of CO2 into the atmosphere. The attention of CO2 has increased by nearly 50 percent since the Industrial Revolution. Since the 19th century, the earth has warmed by about A new United Nations report addresses the differing consequences of warming by 1. 5 or 2 °C. Half a degree may not sound like much, but the goods of global warming, be it a numerous tenths of a degree, may produce a dramatic difference such a change has the implicit to expose knockouts of millions of farther people around the world to dangerous heat waves, water crunches, and coastal cataracts. Half a degree may mean the difference between a world with coral reefs and Arctic summer ocean ice and a world without them.

Migclimate Models

Climate models are complex simulations of the planetary system that essay to calculate possible future climate scripts. There are multitudinous of these models and they're predicated on climate models and academic emigrations scripts, climatologists can contrive circles of global warming to the time 2100. The best- known emigrations scripts are called Representative Concentration Pathways (RCP), which show the elaboration of global warming at various academic situations of hothouse gas emigrations. To adapt to climate change. The global average temperature in 2019 was 1. 1 degree Celsius above the pre-artificial period, according to WMO. 2019 concluded a decade of exceptional global heat, retreating ice, and record ocean situations driven by hothouse feasts produced by mortal exertion.(WMO) 30 percent of the world's population is exposed to deadly heat swells further than 20 days a time. Average temperatures for the five- time(2015- 2019) and ten- time(2010 2019) periods are the topmost on record.(WMO) 2019 was the alternate hottest time on record.(WMO) In 2019, total hothouse gas emigrations, including land use change, reached a new high of 59. Igiga tonnes of carbon dioxide fellow (GtCO2e). Predicated on moment's shy global commitments to reduce climate polluting emigrations, a answer in hothouse feasts from a return to high carbon societies after the epidemic may push 2030 emigrations indeed advanced up to 60GtCO2e. Need to do to limit global warming and act on the climate emergency to help warming beyond 1. 5 °C, we need to reduce emigrations by 7. 6 every time from this time to 2030. 10 times a gone if countries had acted on this wisdom, governments would have demanded to reduce emigrations by 3. 3 each time. Every time we fail to act, the position of difficulty and cost to reduce emigrations goes up. Deep reductions in methane will be necessary to help limit global warming to 1. 5 °C or 2 °C, according to IPCC. Over 75 percent of methane emigrations could be eased with technology that exists moment and up to 40 percent at no net cost according to the International Energy Agency. Conserving and restoring natural spaces, both on land and in the water, is essential for limiting carbon emigrations furnishing one- third of the mitigation trouble demanded in the coming decade. Since over half of global GDP has a high or fairly high reliance on nature, investing in nature-predicated results won't only limit global warming but also affect in about 4 trillion bones in profit for businesses and over 100 million new jobs each time by 2030. For governments, a green COVID-19 recovery could cut 25 percent off 2030 emigrations, putting the world on track to a 2 °C pathway. Nations agreed to a fairly binding commitment in Paris to limit global temperature rise to no further than 2 °C above pre-artificial situations but also offered public pledges to cut or check their hothouse gas emigrations by 2030.

Conclusion

Natural resources on the earth are limited. The proper operation of natural resources takes into attention long- term perspective and prevents their exploitation to the arc for short- term pretensions. Because the mortal population is adding swiftly, the demand for sources will increase day by day. Conservation of natural resources is the need of future generations. We must conserve them for the future.

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CLIMATE CHANGE AND WATER RESOURCES

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Introduction

Climate change is one of the most formidable developmental challenges faced by humanity today. Climate change is due to internal and external factors. Climate change can be seasonal changes for an extended period on earth. These climatic patterns play a vital role in determining human economies, natural ecosystem and also cultures. Water is vital for all forms of life and survival. Water is a precondition to life on Earth and is essential for sustainable development. The global climate change crisis is increasing variability in the water cycle, thus reducing the predictability of water availability and demand, affecting water quality, exacerbating water scarcity and threatening sustainable development worldwide. Water and climate change are inextricably linked. Climate change affects the world's water in complex ways. From unpredictable rainfall patterns to shrinking ice sheets, rising sea levels, floods and droughts, most impacts of climate change come down to water. Water scarcity and droughts have become a large problem leading to drastic effects on the agricultural industry.

The climate is changing and will continue to change, affecting societies mainly through water. Climate change will affect the availability, quality and quantity of water for basic human needs, threatening the effective enjoyment of the human rights to water and sanitation for potentially billions of people. The alteration of the water cycle will also pose risks for energy production, food security, human health, economic development and poverty reduction.

According to IPCC, "The relationship between climate change mitigation measures and water is a reciprocal one".

Objectives

- Promote collaborations to raise awareness about climate change impacts
- Seek opportunities to develop an environmentally sustainable economy
- Maintain and add to the city's urban tree canopy and increase tree diversity within urbanized areas.
- Support protection of the Great Lakes
- To assess the impact of climate change on economic vulnerability
- To assess the climatic impact vulnerability and adaptation

The Main Causes of Climate Change:

1. Emission of greenhouse gases into the atmosphere
2. Deforestation for human settlements
3. Overutilization and exploitation of natural resources
4. Pollution caused by human activities
5. Changes in solar output which is associated with sunspot activities
6. The aerosols that reach the atmosphere after volcanic eruptions

Main Ways to Stop Climate Change

- Keep fossil fuels in the ground
- Invest in renewable energy
- Switch to sustainable transport
- Help us keep our homes cosy

- Improve farming and encourage vegan diets
- Restore nature to absorb more carbon
- Protect forests like the Amazon
- Protect the oceans
- Reduce how much people consume
- Reduce plastic

Global Climate Change, Water Resources and Drought

The ability of the earth's atmosphere to trap solar radiation and increase global temperature (the so-called "greenhouse effect") has been recognized for at least 150 years. More recently, global climate change has been a topic of intense scientific and political debate. Certain evidence is unequivocal; carbon dioxide concentrations (the most abundant greenhouse gas in the earth's atmosphere) have been increasing steadily for over a century.

Water and Climate in the Global Sustainable Development Agenda

- Over the last decade, floods, storms, heat-waves, droughts and other weather-related events have caused more than 90 per cent of major natural disasters.
- These events are expected to increase in frequency and intensity because of climate change.
- Against this background and with the aim to end all forms of poverty and hunger, fight inequalities and tackle climate change, countries adopted the Transforming our World, the 2030 Agenda for Sustainable Development in 2015.

Adapting to Climate Change

- Climate-proof infrastructure.
- Preserve and protect aquifers
- Joint management of surface water and groundwater
- Conserve, maintain or rehabilitate wetland ecosystems
- Understand water dependency and related climate risks.
- Reduce urban and rural exposure to risk and improve resilience.

Effects of Climate Change on Water Resources

- More evaporation (loss of water), droughts
- Earlier snowmelt more stream flow earlier snowmelt, more stream flow, earlier peak discharges
- Lower dissolved oxygen levels (effect on aquatic life)
- Different climate effects throughout globe
- Reduced dissolved oxygen levels
- Less dilution of pollutants during Less dilution of pollutants during droughts
- Increased pollution and sedimentation during increased rainfall

Climate Impacts on Water Resources

Water Cycle and Water Demand

A delicate balance of precipitation, evaporation, and all of the steps in between. Warmer temperatures increase the rate of evaporation of water into the atmosphere, in effect increasing the atmosphere's capacity to "hold" water.Changes in the amount of rain falling during storms provide evidence that the water cycle is already changing.

Water Supply

Demand will continue to rise as population grows. Less total annual rainfall, less water will likely be available during the summer months when demand is highest.This will make it more difficult for water managers to satisfy water demands throughout the course of the year.

Water Quality

Water quality could suffer in areas experiencing increases in rainfall. Problems for the water infrastructure, as sewer systems and water treatment plants are overwhelmed by the increased volumes of water.[

Impact of Changes in Water Resources on Other Sectors:

Climate Impacts on Agriculture and Food Supply

Impacts on Crops

Changes in temperature, atmospheric carbon dioxide (CO_2), and the frequency and intensity of extreme weather could have significant impacts on crop yields.

Impacts on Livestock

To increase under climate change, could directly threaten livestock. Over time, heat stress can increase vulnerability to disease, reduce fertility, and reduce milk production.

Impacts on Fisheries

Many fisheries already face multiple stresses, including overfishing and water pollution. Climate change may worsen these stresses. In particular, temperature changes could lead to significant impacts**.**

International Impacts

Climate change is very likely to affect food security at the global, regional, and local level. Climate change can disrupt food availability, reduce access to food, and affect food quality.

Climate Impacts on Ecosystems

Changes in the Timing of Seasonal Life Cycle Events

The climate where they live or spend part of the year influences key stages of their annual life cycle, such as migration, blooming, and reproduction. As winters have become shorter and milder, the timing of these events has changed in some parts of the country.

Food Web Disruptions

The impact of climate change on a particular species can ripple through a food web and affect a wide range of other organisms.

Temperature, Energy Demand, and Energy Supply

Increases in temperature will likely increase our energy demand, as well as change our ability to produce electricity and deliver it reliably.

Water Availability and Energy

Energy and water systems are connected. Energy is needed to pump, transport, and treat drinking water and wastewater. Cooling water is needed to run many of today's power plants.

Wind Speed, Cloud Cover, and Renewable Energy

The impacts of climate change on wind and solar power is still a developing area of research due to the challenges involved in modeling wind and cloud cover changes at the necessary spatial scales.

How Climate Change Impacts Water Access

The water cycle is part of our everyday lives, but climate change may have dire consequences for everyday water access. Climate change is already affecting water access for people around the world, causing more severe droughts and floods. Climate change impacts the water cycle by influencing when, where, and how much precipitation falls. It also leads to more severe weather events over time. Increasing global temperatures cause water to evaporate in larger amounts, which will lead to higher levels of atmospheric water vapor and more frequent, heavy, and intense rains in the coming years.

When fertilizers from farming wash into lakes and the ocean, they promote the rapid growth of algae. These resulting algal blooms clog coasts and waterways with clouds of green, blue-green, red, or brown algae. The blooms block sunlight from reaching underwater life and diminish oxygen levels within the water. Toxins from the blooms can kill off fish and other aquatic animals, make people sick, and even kill humans.

Impacts of Climate Change on Water Resources

- Climate change and freshwater resources,

- Regional expectations of future climatic and hydrological conditions and impacts of climate change on freshwater resources
- The impacts of climate change on water availability and water quality will affect many sectors, including energy production, infrastructure, human health, agriculture, and ecosystems.

Water Resources an Essential Part of the Solution to Climate Change

Water use has increased sixfold over the past century and is rising by about 1% a year. However, it is estimated that climate change, along with the increasing frequency and intensity of extreme events – storms, floods and droughts, will aggravate the situation in countries already currently experiencing 'water stress' and generate similar problems in areas that have not been severely affected. Furthermore, the report highlights the fact that poor water management tends to exacerbate the impacts of climate change, not only on water resources but on society as a whole.

The Director-General of UNESCO, Audrey Azoulay, stresses "that water does not need to be a problem – it can be part of the solution. Water can support efforts to both mitigate and adapt to climate change."

Conclusion

Climate change is having a profound impact on water resources, with serious implications for human well-being, economic development, and ecological health. Water is a precondition to life on Earth and is essential for sustainable development. Safe drinking water and sanitation are human rights. Water resources on Earth have been greatly impacted by climate change and pollution. People can change their pattern of energy production and usage in order to limit emissions of greenhouse gases and hence the magnitude of climate changes; they can wait for changes to occur and accept the losses, damage, and suffering that arise; they can adapt to actual and expected changes as much as possible; or they can seek as yet unproven "geo engineering" solutions to counteract some of the climate changes that would otherwise occur. Young people around the world are using their knowledge and innovation to offer solutions, raise awareness, protest for their rights and advocate for enhanced global action to address and combat the climate crisis and its consequences.

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CLIMATE CHANGE AND SUSTAINABLITY OF ENVIRONMENTAL DEVELOPMENT

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Abstract
Mortal development can adversely affect the normal landscape as progresses in shrewdness and advances cause natural hindrance. Still, feasible improvement endeavors to diminish the improvement affect made on the landscape and advances ways in which society can acclimatize to the issue that climate alter presents. Keeping up natural quality, in turn, is basic for economical improvement. The connect bet to connected alter and economical, endorsement stems from the reality that climate alter is a imperative to an improvement, and maintainable advancement is a key to capacities for relief and adjustment of terrain. Sound lives advance well-being for all at all ages A clean landscape is basic for ethical wellbeing and well-being. On the both d, discuss and water pollution as well as poor operation of perilous chemicals and waste contribute to undermining w Assigns. Climate alter doesn't point unmistakably inside the natural or productive arrangement program of creating nations, appearing that a few of the most unfavorable products of climate alter will be in create , tins, extremenesses are most defenseless and slightest likely to fluidly acclimatize to climate alter
Keywords*: environment, climate, sustainable, global*

Introduction

Mortal development can adversely affect the normal landscape as progresses in shrewdness and advances cause natural hindrance. Still, feasible improvement endeavors to diminish the improvement affect made on the landscape and advances ways in which society can acclimatize to the issue that climate alter presents. Effectively constraining worldwide climate alter to" secure" circumstances in the long-term is likely to bear interfacing climate alter programs to maintainable advancement techniques in both creating and industrialized nations. A disc & Nbsp; ion of the relationship between climate alter and feasible advancement from a" creating nation point of view" must begin by considering unique and inborn circumstances and approach encompasses.

Keeping up natural quality, in turn, is basic for economical improvement. The connect bet to connected alter and economical, endorsement stems from the reality that climate alter is a imperative to an improvement, and maintainable advancement is a key to capacities for relief and adjustment of terrain

Sustainable Development Objectives

No destitution A economically overseen territory is a prerequisite for financial improvement and destitution decrease. The common landscape inventories biological system products and administrations that deliver salary, back job creation, and destitution alleviation, cont, to security nets and diminish disparity.

Zero hunger End Hunger,

Accomplish nourishment security a Endings red nourishment, and advance maintainable husbandry Nature provides coordinate sources of nourishment and a arrangement of biological system administrations supporting an agrarian effort and contributing to nourishment security and nourishment.

Great Wellbeing and Well-Assured

Sound lives advance well-being for all at all ages A clean landscape is basic for ethical wellbeing and well-being. On the both d, discuss and water pollution as well as poor operation of perilous chemicals and waste contribute to undermining w Assigns.

Quality Instruction

Guarantees comprehensive and detached quality instruction and advances long lasting information openings for all Natural disasters significantly influence the instruction sigma long-listening imperative models, dismantling

Naturalness on Cycles

Driving children to drop out of school for amplified periods. Sex uniformity Accomplish sex equivalency and engage all ladies and girls Understanding the joins between sexual orientation disparity and natural decay, and taking responsive conduct, can quicken positive flow and advance economical improvement issues.

Climate Alter and Natural Maintainability

The territory is a gigantic component connected to climate alter due to the affect climate alter has on the terrain. This means that natural supportability is imperative in decreasing the impacts of effect alter. Affect of Climate Alter on Natural Feasible Advancement with r sup portability gas emigrations, climate alter is being at rates critical speedier than anticipated.

Its Impacts

Its impacts can be ruinous and include extreme and changing ruin designs and rising sea situations.

Causes and Products of Climate

Creating Control Creating Power

Alter Creating control creating power and warm by burning archconservative powers cause a huge clump of worldwide emigrations. Utmost electricity is still generated by burning coal, oil painting oil oil painting, or gas, which produces carbon dioxide and nitrous oxide – vital nursery feasts that cover the Soil and trap the sun's seat.

Manufacturing Products

Fabricating oiliness ate emigrations, considerably from burning archconservative powers to deliver vitality for making merchandise like cement, press, brands, hardware, plastics, dress, and other merchandise.

Cutting Down Timbers

To deliver granges or ranges or for other reasons, causes emigration, since trees, when they're cut, discharge the carbon they've been putting away utilizing transportation most extreme buses, trades, vessels, and planes run o other sensitive

That Makes Transport

A major donor to nursery feasts, particularly carbon--dioxide emigrations. Street vehicles are regarded for the largest part, due to the combustion of petroleum-rested items, like gasoline, in inner combustion machines. Creating nourishment causes emigrations of carbon dioxide, methane, and other nursery feasts in colorful ways, counting through deforestation an, ring of arrive for husbandry and brushing, absorption by dairy animals and blessed messenger, the item and utilize of conditions and excreta for developing crops, and the utilize of vitality to run domain furnish or angling vessels, by and large with archconservative powers.

Powering Structures Encyclopedically

Household and attractive structures expend over half of all power. As they proceed to draw on coal, oil portrays oil, and to utilize gas for warming and cooling, they transmit critical sums of nursery gas resettlement.

Devouring as well vital your domestic and utilize of control,

How you move around, what you eat, and how much you toss down each contributes to nursery gas emigrations.

So does the utilization of products comparable to experience, gadgets, and plastics. Merchandise of Climate Alter More smoking temperatures

As nursery gas consideration rises, so does the worldwide confront temperature.

The final decade, 2011 – 2020, is the hottest on record. Since the 1980s, each decade has been hotter than the previous bone.

About all arrive regions are seeing advance hot days and warm swells More severe storms Dangerous storms have gotten to be more savage and

visit in various locales. As temperatures rise, advance mugginess evaporates, extreme downfall and flooding, causing assist dangerous storms.

Conclusion

Climate alter doesn't point unmistakably inside the natural or productive arrangement program of creating nations, appearing that a few of the most unfavorable products of climate alter will be in create tins, extremenesses are most defenseless and slightest likely to fluidly acclimatize to climate alter. unborn assertions on relief and adaption beneath the Tradition will require to fête the diverse circumstances of creating nations concerning their position of beneficial improvement, their defenselessness to climate alter, and capability to acclimatize to or palliate it effortlessly beneficial develop Unborn assertionsution decrease are the fundamental priorities for creating nation policymakers, however climate alter relief can offer these nations the event to preconceive improvement procedures from a modern viewpoint. Climate alter contemplations put reestablished direness on a few choices, vitality viability, renewable vitality, and economical land-use programs, and contend for a way better understanding of the associations to other natural issues. Developing participation among universal affiliations, sponsors, and the private sector is demanded to deliver darkness nations innovations to increment the viability of the utilize of common coffers, actuate moo squander, to utilize.

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CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT

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Abstract

Mitigation of Climate Change ' is designed to give authoritative, timely information on all aspects of technologies and socio- profitable programs, including cost-effective measures to control hothouse gas (GHG) emigrations. A thorough understanding of unborn GHG emigrations and their motorists, available mitigation options, mitigation capabilities and associated costs and ancillary benefits is especially important to support accommodations on unborn reductions in global emissions. Climate programs can be more effective when constantly bedded with in broader strategies designed to make public and indigenous development paths more sustainable. This occurs because the impact of climate variability and change. Climate change impacts on development prospects have also been described in an interagency design on poverty and climate change as ' Climate Change will compound being poverty. Its adverse impacts will be most striking in the developing nations because of their dependence on natural coffers, and their limited capacity to acclimatize to a changing climate. Defining what's dangerous hindrance with the climate system is a complex task that can only be incompletely supported by wisdom, as it innately involves normative judgments. There are different approaches to defining peril, and an interpretation of Composition 2 is likely to calculate on scientific, ethical, artistic, political and/ or legal judgments. A variety of protrusions of the energy picture have been made for the coming decades. These differ in terms of their modeling structure and input hypothetical's and, in particular, on the elaboration of policy in the coming decades.

Introduction

Mitigation of Climate Change ' is designed to give authoritative, timely information on all aspects of technologies and socio- profitable programs, including cost-effective measures to control hothouse gas (GHG) emigrations. A thorough understanding of unborn GHG emigrations and their motorists, available mitigation options, mitigation capabilities and associated costs and ancillary benefits is especially important to support accommodations on unborn reductions in global emissions.

There a binary relationship between sustainable development and climate change. On the one hand, climate change influences crucial natural and mortal living conditions and thereby also the base for social and profitable development, while on the other hand, society's precedence on sustainable development influence both the GHG emigrations that are causing climate change and the vulnerability.

Climate Policies

Climate programs can be more effective when constantly bedded with in broader strategies designed to make public and indigenous development paths more sustainable. This occurs because the impact of climate variability and change, climate policy responses, and associated socio profitable development will affect the capability of countries to achieve sustainable development pretensions .Again, the pursuit of those pretensions will in turn affect the openings for, and success of, climate programs.

Climate Change

Climate change impacts on development prospects have also been described in an interagency design on poverty and climate change as ' Climate Change will compound being poverty. Its adverse impacts will be most striking in the developing nations because of their dependence on natural coffers, and their limited capacity to acclimatize to a changing climate. Within these countries, the poorest, who have the least coffers and the least capacity to acclimatize, are the most vulnerable' (African Development Bank eta., 2003).

Duel Relationship

Duel Relationship recognizing the binary relationship between SD and climate change points

to a need for the disquisition of programs that concertedly address SD and climate change. A number of transnational study programs, including the Development and Climate design (Halsnæs and pars, 2007), and an OECD development and terrain directorate program (Beg eta., 2002) explore the eventuality of SD- grounded climate change programs. Other conditioning include systems by the World coffers Institute (Blumer eta.,2002), and the PEW Centre (Heller and Shula, 2003). Likewise, the transnational literature also includes work by Cohen eta., 1998; Bani and Want, 2001 Muna singhe and Start 2000; Metz eta., 2002; Muna singhe and Smart, 2005; Schneider eta., 2000; Na jam and Rahman, 2003; Suit eta., 2001 Smart eta., 2003; and Bio banks, 2003).

Dangerous in Climate Change

Defining what's dangerous hindrance with the climate system is a complex task that can only be incompletely supported by wisdom, as it innately involves normative judgments. There are different approaches to defining peril, and an interpretation of Composition 2 is likely to calculate on scientific, ethical, artistic, political and/ or legal judgments. As similar, the agreement (s) reached among the Parties in terms of what may constitute inferior impacts on the climate system, food product, ecosystems or sustainable profitable development will represent a conflation of these different perspectives.

Over the once two decades several expert groups have sought to define situations of climate change that could be tolerable or intolerable, or which could be characterized by different situations of threat. In the late 1980s, the World Meteorological Organization (WMO) International Council of Scientific Unions (CSU) UN Environment Program (UNEP) Advisory Group on Greenhouse feasts (AGOG)linked two main temperature pointers or thresholds with different situations of threat (Fisherman and Smart,1990). Grounded on the available knowledge at the time a 2ºC increase was determined to be ' an upper limit beyond which the pitfalls of grave damage to ecosystems, and of non-linear responses, are anticipated to increase fleetly '. This early work also linked the rate of change to be of significance to determining the position of threat, a conclusion that has latterly been verified qualitatively (IPCC, 2007b, Chapters 4 and 19).More lately, others in the scientific community have reached conclusions that point in an analogous direction ' that global warming of further than 1 °C, relative to 2000, will constitute " dangerous " climate change adjudged from likely goods on ocean position and decimation of species ' (Hansen eta., 2006). Probabilistic assessments have also been made that demonstrate how scientific misgivings, different normative judgments on respectable pitfalls to different systems (Mastrandrea and Schneider, 2004) and/ or hindrance with the climate system (Harvey, 2007) affect the situations of change or hindrance set as pretensions for policy (IPCC, 2007b, Chapter 19). From a profitable perspective, the Stern Review (Stern, 2006) set up that in order to minimize the most dangerous consequences of climate change, attention would need to be stabilized below550 ppm CO2- eq. The Review further argues that any detention in reducing emigrations would be ' would been pensive and dangerous '. This ultimate conclusion is at friction with the conclusions drawn from earlier profitable analyses which support a slow ' ramp up ' of climate policy action (Normans, 2006) and, it has been argued, is a consequence of the approach taken by the Stern Review to intergenerational equity (Disrupt,2006).

The IPCC Third Assessment Report (navigator) linked five broad orders of reasons for concern that are applicable to Composition 2 (1) pitfalls to unique and hovered systems , (2) pitfalls from extreme climatic vents , (3) indigenous distribution of impacts , (4) total impacts and (5) pitfalls from large-scale discontinuities. The Fourth Assessment Report (AR4) focuses on crucial Vulnerabilities applicable to Page 1 of 2Composition 2, which are astronomically distributed into natural systems, social systems, geophysical systems, extreme events and indigenous systems (IPCC, 2007b, Chapter 19). The counteraccusations of different interpretations of dangerous anthropogenic hindrance for unborn

emigration pathways are reviewed in IPCC (2007b), Chapter 9 and also in Chapter 3 of this report. The literature confirms that climate policy can mainly reduce the threat of crossing thresholds supposed dangerous (IPCC, 2007b, SPM and Chapter 19;The counteraccusations of different interpretations of dangerous anthropogenic hindrance for unborn emigration pathways are reviewed in IPCC (2007b), Chapter 9 and also in Chapter 3 of this report.

While the workshop cited over are basically scientific (expert - led) assessments, there's also an illustration of governments seeking to define respectable situations of climate change grounded on interpretations of scientific findings. In 2005, the EU Council (25 Heads of Government of the European Union) agreed that – with a view to achieving the ultimate ideal of the Convention – the global periodic mean face temperature increase shouldn't exceed 2ºC above pre-industrial situations (CEU, 2005).

Conclusion

A variety of protrusions of the energy picture have been made for the coming decades. These differ in terms of their modeling structure and input hypothetical's and, in particular, on the elaboration of policy in the coming decades.

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CLIMATE CHANGE AND AFFECTED NATURAL RESOURCES

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Abstract
The places, population, leafage, and fauna are at stake because of climate change. Natural resources regulate the profitable, social, and cultural lives. Water is an introductory need in everyday life, and its cycle is inextricably linked with climate change. " Climate change is a broad range of global sensations created generally by burning reactionary powers, which add heat-entrapping feasts to Earth's atmosphere. These sensations include the increased temperature trends described by global warming, but also encompass changes analogous to ocean-- position rise; ice mass loss in Greenland, Antarctica, the Arctic, and mountain glaciers worldwide; shifts in flower/ plant blooming; and extreme downfall events. " Melting Ice and Rising Swell Climate change leads to the melting of ice caps and the rising of ocean situations. The climate becomes warmer as a result of climate change and this leads to the melting of ice caps which consequently increases the height of ocean situations. Rising ocean situations are also caused by the warming of ocean waters. Mortal versus Natural Causes Scientists have erected together a record of the earth's climate by assaying a number of indirect measures of climate, analogous as ice cores, tree rings, glacier lengths, pollen remains, and ocean sediments, and by studying changes in the earth's route around the sun. Natural resources regulate the profitable, social, and cultural lives. Water is an introductory need in everyday life, and its cycle is inextricably linked with climate change.
Keywords: *population, climate change, natural resources*

Introduction

The places, population, leafage, and fauna are at stake because of climate change. Natural resources regulate the profitable, social, and cultural lives. Water is an introductory need in everyday life, and its cycle is inextricably linked with climate change. Description Climate change was chased by Swedish scientist State Arrhenius in 1896 and was popularized in the 1950s as "a long-term rise in Earth's average atmospheric temperature."

Climate Change According to NASA

"Climate change is a broad range of global sensations created generally by burning reactionary powers, which add heat-entrapping feasts to Earth's atmosphere. These sensations include the increased temperature trends described by global warming, but also encompass changes analogous to ocean--position rise; ice mass loss in Greenland, Antarctica, the Arctic, and mountain glaciers worldwide; shifts in flower/ plant blooming; and extreme downfall events. "

Causes of Climate Change

Natural Causes Anthropogenic Causes

1. Natural Causes

According to NASA, "These natural causes are still in play moment, but their influence is too small, or they do too slowly to explain the rapid-fire- fire warming seen in recent decades rather, it's extremely likely (> 95) that mortal exertion has been the main cause of climate change

1. Solar Radiation There is variation in the amount of energy released by solar radiation that reaches the Earth's face and this influences the Earth's climatic patterns causing climate change.
2. Plate Tectonics and Stormy Eruptions Plate tectonics is the movement of flat large jewels under the earth's face by molten jewels. Plate tectonics has been the reason for the creation and the gradual movement of the landmass.

3. Changes in Ocean Currents are responsible for the distribution of heat around the globe. When the ocean is toast by solar radiation, the water patches come lighter and are easily transported by wind (ocean currents) to cooler waters or vice versa. This helps in the temperance of the temperature of the earth.

Anthropogenic Causes These are the main causes of climate change as they are the causes that have drawn the attention of the public towards climate change. These causes have caused global warming which also leads to climate change.

1. Increase in Greenhouse Gas Emigrations Hothouse feasts are feasts that reduce the amount of heat that is being transported back to space thereby conditioning the Earth. These feasts include carbon dioxide (CO2), methane (CH4) nitrous oxide (NOX), fluorinated feasts, and water vapor. Water vapor is the most abundant hothouse gas, but it stays in the atmosphere for just a numerous day while CO2 stays in the atmosphere much longer, contributing to longer periods of warming.
2. Deforestation is the cutting down of trees. Deforestation occurs as a result of urbanization. But this causes climate change as trees take in carbon dioxide which is a major agent in warming the earth and use them for their survival reducing the amount of carbon dioxide in the atmosphere.
3. Agriculture Though husbandry has been truly salutary to man furnishing food for our survival, agricultural practices beget global warming which results in climate change.

Goods of Climate Change

1. Melting Ice and Rising Swell Climate change leads to the melting of ice caps and the rising of ocean situations. The climate becomes warmer as a result of climate change and this leads to the melting of ice caps which consequently increases the height of ocean situations. Rising ocean situations are also caused by the warming of ocean waters.
2. Coastal Region Displacement As a result of climate change causing rising ocean situations, coastal regions are swamped which displaces coastal inhabitants. This would be of a truly high impact since important of the world's population live in coastal regions. It also leads to the migration of people to these coastal regions.
3. Changes in Ocean Current As abysms store a large amount of heat, indeed small changes in ocean currents can have a large effect on the global climate. In particular, increases in ocean face temperature can increase the amount of atmospheric water vapor over the abysms, adding the volume of hothouse gas.

Climate Change Affects

Our Life Food Climate change causes extreme conditions like cataracts and dearths to destroy estate yield by water and heat singly. The funny thing also is that cataracts and failure can be to a particular region in a time or a short period.

Health No matter how rich a person is, if your health is gone, there is no farther expedient to a poor person than you. With that being said, it's important to note that health is of prone significance to us. Climate change also affects our health through the spread of complaints and complaint vectors.

People can also be affected by the spread of conditions by flooding. Migration Climate change causes the rising of ocean situations due to the melting of ice caps and the warming of abysms. This not only causes the flooding but also causes the land in the coastal region to be wormed displacing people that live in coastal areas and causing them to migrate.

Impact Climate Change in a Positive Way

1. Use of Renewable powers the first way we can impact climate change is to move down from reactionary powers. Renewable powers like solar, wind, biomass, and geothermal are better druthers that help reduce global warming.
2. Energy & Water Efficiency Producing clean energy is essential, but reducing our consumption of energy and water by using further effective bias(e.g. LED light bulbs,

innovative shower systems) is less precious and equally important.

3. Sustainable Transportation Reducing air passages, promoting public transportation, carpooling, but also electric and hydrogen mobility can surely help reduce CO2 emigrations and thus fight global warming. Also, using effective machines can help reduce CO2 emigration.

Climate Change Affects the Frugality World Economy

Is set to lose up to 18 GDP from climate change if no action is taken, reveals Swiss Re Institute's stress-test analysis anticipated global GDP impact by 2050 under different scripts compared. our Life Food Climate change causes extreme conditions like cataracts and crunches to destroy estate yield by water and heat singly. The funny thing also's that cataracts and failure can be to a particular region in a time or a short period. Health No matter how rich a person is, if your health is gone, there is farther judicious to a poor person than you. With that being said, it's important to note that health is of prone significance to us. Climate change also affects our health through the spread of complaint and complaint vectors. People can also be affected by the spread of conditions by flooding. Migration Climate change causes the rising of ocean situations due to the melting of ice caps and the warming of abysms. This not only causes the flooding but also causes the land in the coastal region to be wormed displacing people that live in coastal areas and causing them to migrate.

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Climate Change Affects

Frugality World economy set to lose up to 18 GDP from climate change if no action taken, reveals Swiss Re Institute's stress- test analysis anticipated global GDP impact by 2050 under different scripts compared to a world without climate change 18 if no mitigating conduct are taken(3.2 °C increase); 14 if some mitigating conduct are taken(2.6 °C increase); 11 if further mollifying conduct are taken(2 °C increase); 4 if Paris Agreement targets are met (below 2 °C increase). The economy will also be affected by complaint spread as a result of climate change.

Causes of Climate Change

Mortal versus Natural Causes Scientists have erected together a record of the earth's climate by assaying a number of indirect measures of climate, analogous as ice cores, tree rings, glacier lengths, pollen remains, and ocean sediments, and by studying changes in the earth's route around the sun. Hothouse feasts attention of the hothouse have all increased since the Industrial Revolution due to mortal exertion. Carbon dioxide, methane, and nitrous oxide attention are now more abundant in the earth's atmosphere than any time in the last 800,000 times.

Conclusion

The places, population, and leafage and fauna are at stake because of climate change. Natural resources regulate the profitable, social, and cultural lives. Water is an introductory need in everyday life, and its cycle is inextricably linked with climate change. The main concern is the changing script of the water resources and the factors supporting the condition of water failure. Timber resources have a truly high

value as an outside of the public population, and the whole racial community is dependent on the timber resources. These goods can, in turn, lead to significant changes in indigenous climate, climate pattern, and mortal migration.

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CHALLENGE FOR SUSTAINABLE DEVELOPMENT AND CLIMATE CHANGE

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Abstract
A major handicap to progress as we know its climate change. Still, decades of progress trouble being undone and current sweats to end poverty rendered ineffective, if nations are unfit to unite productively to help global warming and successfully manage the goods of climate change. In numerous individualizes could be forced into extreme poverty as a result of climate change, which poses the topmost pitfall to sustainable development. One of the pretensions of sustainable development is to end poverty, but this is no easy task and cannot be done without addressing a number of other issues that contribute to poverty. Climate change poses a significant challenge to sustainable development, affecting people worldwide. Sustainable development is concentrated on the broader and longer-term impacts of development enterprise, with the thing of balancing colliding demands while counting for profitable, social, and environmental limits.
Keywords: *climate change, sustainable development, global warming*

Introduction

A major handicap to progress as we know its climate change. Still, decades of progress trouble being undone and current sweats to end poverty rendered ineffective, if nations are unfit to unite productively to help global warming and successfully manage the goods of climate change. In numerous individualizes could be forced into extreme poverty as a result of climate change, which poses the topmost pitfall to sustainable development. Contemporaneously, we retain lower knowledge and coffers than ever ahead in order to help the disaster and give chances for people far and wide to live more lives. Being a long - term problem, climate change is further than that. For policymakers trying to fester the future, it presents query because it's passing right now.

Sustainable Development

In simple terms sustainable development is a guiding principle that focuses on sustaining natural coffers and the world's ecosystems in line with mortal development. Climate change is presently a major, global issue that impacts the terrain and society in several ways and sustainable development aims to reduce the impacts of climate change that affect the terrain and society.

Sustainable Development Pretensions

A vital aspect of sustainable development is icing that the development conditions of unborn generations are met. For illustration, introducing sustainable energy enterprise so that archconservative energy use is reduced which helps keep current coffers whilst reducing carbon emigrations. A challenge of Sustainable Development is commodity that can help the entire world's population, and it helps force security for unborn generations, but it isn't without its challenges. There are multitudinous challenges that need to be met if we're to achieve a better future.

Governmental Issues

Other issues relate to what enterprise Governments may want to subscribe up to, and how keen they're on sustainable development. Utmost governments subscribe up to issues girding global warming and other climate issues, but not always. In some cases, there's a political action to reject environmental issues and sustainable development pretensions to rather address the immediate conditions of their country or populous.

Poverty & Severance

One of the pretensions of sustainable development is to end poverty, but this is no easy task and cannot be done without addressing a number of other issues that contribute to poverty.

Future of Sustainable Development

The Plastic Collaborative is an association that also supports sustainable development enterprises in developing nations through the exercise of waste plastic. In these communities where The Plastic Collaborative is rested, waste plastics are viewed as a precious recyclable resource. This resource can be used as the base material in sustainable plastic recycling micro-enterprises, which are designed to help support original communities and reduce both poverty and plastic waste.

Attention to Both Climate Change and Sustainable Development

It has been more current in recent times, with a primary emphasis on technology results as well as the goods on the terrain and frugality. This strategy hasn't worked. This essay demonstrates how social and political issues are at the core of the climate change problem. Understanding the causes, goods, and essential countermeasures to climate change in an indifferent manner depend heavily on social factors, which include the politics of transformative change.

Climate Change is a Social and a Political Issue

As environmental hazards grow in volume and harshness as well as in socioeconomic exposure and vulnerability, there's a corresponding rise in the pitfalls associated with climate change. For case, as urbanization processes pick up speed, further and further people are settling in low-lying and littoral locales that are regularly exposed to storms and flooding. Main challenges of sustainable development

The challenges of sustainable development are as follows

- Political insecurity between nations, that occurs due to conflicts.
- Poverty.
- Severance.
- Structure institutions that follow strong governance.
- Climate change.

Pillars of Life

In order to meet current conditions without risking the vacuity of coffers for unborn generations, environmental sustainability refers to the capacity to maintain and guard the natural terrain throughout time through suitable practices and regulations. Multiple factors impacting the ecological balance and the earth's capacity to support life can significantly affect environmental sustainability. • Air, water and soil pollution;

- Climate change, caused by the devilish quantum of hothouse feasts released into the atmosphere due to mortal exertion;
- The loss of biodiversity;
- The overexploitation of natural coffers;
- Profitable models that involve unsustainable consumption.

Social Sustainability

The process of developing successful, long-lasting surroundings that enhance good by taking into account what people bear from their homes and workplaces is known as social sustainability. Together with profitable and environmental sustainability, it's one of the three pillars of sustainability. Relating and Managing Business Impacts on People Human Rights as the foundation Specific Groups and Issues Strategic way for Social Sustainability ECONOMIC SUSTAINABILITY

Practices that promote a country's or company's long-term profitable growth while contemporaneously securing its social, artistic, and environmental factors are appertained to as profitable sustainability. It all comes down to striking a balance between prudent resource operation and profitable growth. Long-Term Stability The capability of profitable systems to persist over time without consuming coffers or inflicting detriment is known

as profitable sustainability. Severity using sustainable practices helps prepare for profitable shocks like changes in the stock request or natural disasters. Social Well-Being A robust frugality raises community morals of living and improves access to healthcare, education, and other services. Environmental Protection By reducing adverse goods on the terrain, sustainable provident styles cover natural coffers for coming generations.

Conclusion

Climate change poses a significant challenge to sustainable development, affecting people worldwide. Sustainable development is concentrated on the broader and longer-term impacts of development enterprise, with the thing of balancing colliding demands while counting for profitable, social, and environmental limits.

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ENVIRONMENTAL CHALLENGES AND SUSTAINABLE DEVELOPMENT

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Introduction

The word environment is derived from the French word "environment" meaning" around". Biologist Jacob Van Erkul is believed to have introduced this concept in the early 1900s. The environment or conditions in which people, animals or plants live or move are called environment. Climate, soil, water, sunlight, air and other living things are examples of these changes. In ecology, the terms "ecosystem", "biome" and "habitat" refer to concepts related to the characteristics of the environment. br> An environment that provides services for production. It includes renewable and non-renewable resources. Renewable resources are still in stock, iron ore etc.

Sustainable Living

The environment includes sunlight, soil, water and air, which are essential for human life. It sustains life by ensuring genetic and biological diversity. Both production and consumption activities produce waste. This usually comes in the form of waste. The environment helps eliminate waste by diluting, dispersing and removing waste through chemical or biological processes. People appreciate the beauty of nature such as rivers, mountains and deserts. The concept thas implications for the world and future generations.

Since the environment provides people with renewable and non-renewable resources to improve their quality of life, when using the environment we must ensure that these resources are available for future generations. However, unfortunately, as the world population continues to increase, the demand for natural resources also increases, causing environmental damage and poor practices. This article focuses on important environmental issues and the importance of sustainable climate change

Climate change is one of the biggest environmental problems facing the world today. Climate change refers to long-term changes in the temperature pattern of a region. The main reason for this is the increase in greenhouse gases such as carbon dioxide due to human activities such as deforestation and burning of fossil fuels for energy and industry.

Climate change aggravates existing social, economic and environmental problems and poses a serious threat to sustainable development. For example, global warming can cause devastating events such as hurricanes, floods and droughts, negatively affecting economies, social changes and capital. According to projections by the Intergovernmental Panel on Climate Change (IPCC), global temperatures should increase by 2030. Arise of 1.5°C above the pre-economic level will lead to disasters such as sea level rise, extreme weather conditions and reduced biodiversity.

Ways to Combat Climate Change and Promote Sustainable Development

Mitigation measures to reduce domestic carbon emissions by switching to renewable energy, increasing energy efficiency, determining carbon footprint and strengthening stable land use. It aims to combat climate change, protect ecosystems that act as buffers for climate change, and incorporate climate change into urban planning and projects. Nature reduces the risk of further damage from the effects of climate change.

International Initiatives and Agreements

Through agreements such as the United Nations Framework Convention on Climate Change and the Paris Agreement, the international community has recognized the importance of addressing the climate

change headwind in the context of sustainable development. The Paris Agreement aims to limit global warming to 2 degrees Celsius above pre-industrial levels, while trying to limit temperature increases to 1.5 degrees Celsius. Additionally, initiatives such as the United Nations Sustainable Development Goals (SDGs) provide a broad framework for equitably promoting sustainable development, including ecological awareness. The Sustainable Development Goals (SDGs) include a variety of interrelated targets related to poverty eradication, health, education, gender equality, access to clean water, affordable energy, sustainable cities and security.

Deforestation

Another important environmental problem affecting the whole world is deforestation. Forests are important in mitigating the effects of climate change because they absorb carbon dioxide from the atmosphere, provide habitat for wildlife and balance ecosystems. But logging, urbanization and agriculture are destroying forests at an alarming rate. The act of clearing or removing forests or trees from land, usually for the purpose of business, industry or urban development, is called deforestation. Significant environmental impacts include land degradation, increased greenhouse gas emissions that contribute to climate change, loss of biodiversity and destruction of ecosystems.

The Food and Agriculture Organization of the United Nations (FAO) estimates that approximately 10 million hectares of forest are lost every year, an area equivalent to 27 football fields per minute. The effects of forest damage and deforestation are reduced. Agro forestry: Planting trees in agriculture helps improve soil health and preserve biodiversity, among other benefits.

Sustainable Land Use Planning

Establishing laws that support sustainable land use planning can help balance environmental protection and development needs. Community participation: Involving local communities in land use decision-making can lead to better outcomes.

Biodiversity. Eco systems must function properly and provide ecosystem services such as clean air, water and food. According to the World Wildlife Fund (WWF), populations of fish, amphibians, reptiles, mammals and birds have decreased by 68% since 1970. The impact is quite serious. It could worsen climate change by reducing the Earth's ability to absorb carbon dioxide from the atmosphere.

Bio diversity is central to sustainable development as it supports important ecosystems such as pollination, water purification and soil formation. On the other hand, sustainable development can contribute to the preservation of biodiversity by ensuring the use of natural resources in an environmentally friendly and sustainable way. It was designed to preserve the biodiversity of life forms on our planet. The Convention on Biological Diversity is an international treaty that has been ratified by 196 parties since it was adopted at the Earth Summit in Rio de Janeiro in 1992. It is good and very important for sustainable development.

Our main objectives of the Diversity Promise are

Preservation of cultural diversity Sustainable use of products component Equality and equality of genetic material Benefits of coming To achieve these objectives CBD It identifies several key areas of action, including: Create and monitor protected areas to protect biodiversity Conserve, control and eliminate invasive alien species Effective: Promote the use of biodiversity in current and future biodiversity to ensure it meets needs Distribution and access: Ensure fair and equitable distribution of benefits from genetic material Biosecurity: Ensuring handling, handling and use remain unchanged. Species at risk Given the impact of climate change on biodiversity Using resources: mobilizing resources to help achieve the objectives of the Convention on Biological Diversity Improving the ability to achieve CBD targets at regional and national levels Monitoring and evaluation: Monitor progress towards achieving CBD targets and measure biodiversity of standards.

Sustainable Development

The concept of sustainable development is important to solve environmental problems. It refers to progress that meets the needs of the present without compromising the ability of future generations to meet their needs. Ensuring that resources are used efficiently and sustainably requires integrating economic, social and environmental considerations into the decision-making process. This is called sustainable development. Sustainability indicators are tools used to measure and evaluate progress towards development goals. These indicators provide insight into the environmental, social and financial dimensions of sustainability. They support communities, governments and organization stomonitor their performance, identify areas for improvement and make sound decisions that promote sustainability. The United Nations Sustainable Development Goals (SDGs) provide a roadmap to achieve sustainable development by 2030. The Sustainable

Conclusion

To sum up, environmental issues like deforestation, climate change, and biodiversity loss have a big impact on the earth and the next generation. By encouraging resource efficiency and making sure that development serves the needs of both current and future generations, sustainable development is a crucial idea in solving these issues. We can all benefit from a better, more sustainable and just future if we work together to develop sustainable policies and practices

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CLIMATE CHANGE: ENVIRONMENTAL CHALLENGES AND SUSTAINABLE DEVELOPMENT

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Abstract

Climate change does not yet feature prominently within the environmental or economic policy agendas of developing countries. Yet evidence shows that some of the most adverse effects of climate change will be in developing countries, where populations are most vulnerable and least likely to easily adapt to climate change, and that climate change will affect the potential for development in these countries. Some synergies already exist between climate change policies and the sustainable development agenda in developing countries, such as energy efficiency, renewable energy, transport and sustainable land-use policies. Despite limited attention from policy-makers to date, climate change policies could have significant ancillary benefits for the local environment. ***The distributional impacts*** *of such policies are an important determinant of their feasibility and need to be considered up-front. It follows that future agreements on mitigation and adaptation under the convention will need to recognise the diverse situations of developing countries with respect to their level of economic development, their vulnerability to climate change and their ability to adapt or mitigate. Recognition of how climate change is likely to influence other development priorities may be a first step toward building cost-effective strategies and integrated, institutional capacity in developing countries to respond to climate change.*

Keywords: *climate change sustainable development developing countries economic and social development energy forestry, institutional change, capacity building, cdm, ghg mitigation polices, climate change impact, biodiversity and climate change.*

Introduction

Climate change is the most significant challenge to achieving sustainable development, and it threatens to drag millions of people into grinding poverty. At the same time, we have never had better know-how and solutions available to avert the crisis and create opportunities for a better life for people all over the world. Climate change is not just a long-term issue. It is happening today, and it entails uncertainties for policy makers trying to shape the future.

The impacts of climate change include rising temperatures, rising sea levels and extreme weather (droughts, flooding, storms.) These impacts can lead to negative effects on the environment and society, such as land degradation, disease, death, and mental health issues.

Economic, Social and Environmental Dimensions of Sustainable Development The concept of sustainable development is based on the definition given in 'Caring for the Earth, sustainable development is explained as people-centered, its aim is to improve the quality of human life, and it is conservation based that is conditioned by the need to respect nature's capacity to provide resources and life-supporting services. In this perspective sustainable development means 'improving the quality of human life while living within the carrying capacity of supporting ecosystems'. This definition analyses three basic components – the economic, the social and the environmental – that constitute the basis of sustainable development.

The economic component of sustainability requires that societies pursue economic growth paths that generate an increase in true income, not short-term policies that lead to long-term impoverishment and where manmade capital, human capital and natural capital are substitutable and remain complementary. It requires a differentiated approach to growth so that many developing areas need to increase their productive capacity and at the same time the industrialized societies need to reduce their consumption of natural resources and use them more efficiently. The social dimension of sustainable development is built on the premise that equity and

interdependence are basic requirements of an acceptable quality of life, which is the ultimate aim of development.

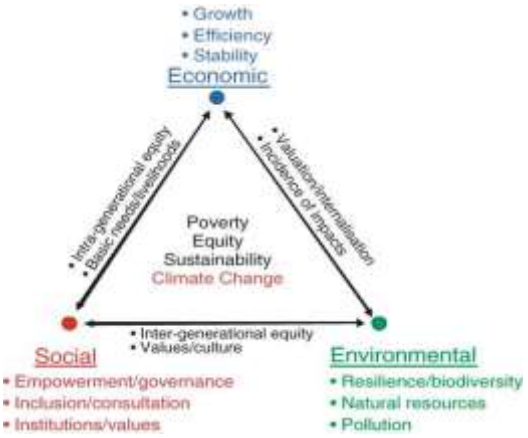
Concept of Sustainable Development Encompasses these Features:

1. Help for the very poor, because they are left with no options but to destroy their environment;
2. The idea of self-reliant development, within natural resource constraints;
3. Cost-effective development using non-traditional economic criteria;
4. The issues of health, appropriate technology, food, self-reliance, clean water and shelter for all;

Sustainable development seeks to respond to five broad requirements: (1) integration of conservation and development, (2) satisfaction of basic human needs, (3) achievement of equity and social justice, (4) provision of social self-determination and cultural diversity and (5) maintenance of ecological integrity. In contrast, the currently popular definition of sustainable development – the one adopted by the World Commission on Environment and Development – is quite brief: 'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. While the WCED's statement of the fundamental objectives of sustainable development is brief, the commission is much more elaborate about the operational objectives of sustainable development.

Economic, Social, and Environmental Threats

The economic collapse is the most urgent and visible global problem (Figure 1). An asset 'bubble' driven by investors' greed rapidly inflated the value of financial instruments well beyond the true value of the underlying economic resource base. The collapse of this bubble in 2008 caused the global recessions.



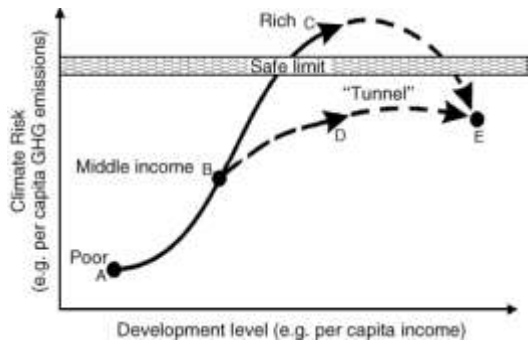
We need to transcend conventional boundaries imposed by values, discipline, space, time, stakeholder viewpoints, and values. It is essential to replace unsustainable values like greed with sound ethical principles—this is a long-term task involving education, communication, and leadership, especially focusing on the young. Transdisciplinary analysis is needed to find innovative solutions to complex problems of sustainable development and climate change that cut across conventional disciplines. Spatial analysis must range from the local to the global, typically from the community to the transboundary river basin and planetary scales. The time horizon needs to extend to decades or centuries. Cross-stakeholder data sharing, transparency, and cooperation (especially civil society and business working with government) need to be strengthened, by promoting inclusion, empowerment, and participation.

Finally, the sustainomics framework uses a variety of practical full cycle tools—both new

methods and conventional ones. They are applied innovatively to encompass the full operational cycle from initial data gathering to practical policy implementation, monitoring, and feedback. Furthermore, life cycle analysis of the entire value chain is required, from raw material extraction to consumer end use and disposal, based on economic, social, and environmental perspectives (see Section below on integrating consumer and producer responses). This will help identify areas where innovation can improve production sustainability, reform pricing, and reduce carbon emissions because of business activities. It will not only identify the most desirable 'win-win' policies that simultaneously yield economically, environmentally, and socially sustainable paths, but also resolve trade-offs among conflicting goals.

Reaching a Global Consensus

The MDMS approach of sustainomics helps to outline a long-term consensus that would reconcile climate policy and development aspirations (Figure 4). On this stylized curve of environmental risk against a country's level of development, poor nations are at point A [low GHG emissions and low gross national product (GNP) per capita], rich nations are at point C (high GHG emissions and high GNP per capita), and intermediate countries are at point B.



Concluding Remarks

The sustainomics framework helps us to take the first steps toward MDMS, which will transform the risky 'business-as-usual' scenario into a safer future. The process showed us how to clearly identify the issues and threats (see section on *Risks to Current Development Prospects), define a fresh vision*, and transform our values (see section on *Long-term Vision for a Brighter Future*). Next, the paper briefly described a practical approach involving core principles, metrics (economic, social, and environmental indicators), analytical tools, and policy instruments (economic and noneconomic) (see section on *Sustainomics—A Practical Framework for Integration*). A growing number of practical applications of the approach are available at the global, national, sectoral, and project/local levels, and several illustrative examples were summarized in sections *Global Level Integration, National Level Integration,* and *Sectoral and Project Level Integration*.

MDMS requires us to first identify win-win options where improvements in all the three dimensions (economic, social, and environmental) are possible. Next, more complex trade-offs among the three objectives need to be analyzed and resolved in a way that simultaneously manages both development and climate risks.

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CLIMATE CHANGE AND NATURAL RESOURCES

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Abstract
Climate change presents multifaceted challenges to agriculture, natural resources, and rural communities globally. Rural areas, home to a substantial portion of the world's impoverished population, heavily rely on agriculture and natural resources for sustenance. However, these livelihoods are increasingly threatened by rising temperatures, erratic weather patterns, and extreme events such as droughts, heat waves, and floods, which undermine food security and economic stability. Additionally, the agricultural sector contributes to climate change through greenhouse gas emissions, exacerbating the problem. Consequently, the sector faces the dual challenge of adapting to climate change while mitigating its own environmental impact. Moreover, climate change alters landscapes and ecosystems, affecting soil erosion, water resources, and biodiversity. The spread of pests and diseases further endangers crops and livestock, potentially leading to widespread food shortages. Addressing these challenges requires sustainable agricultural practices, efficient water management, and biodiversity conservation. Adaptation and mitigation strategies are essential to bolster the resilience and sustainability of agricultural systems in the face of climate change. In conclusion, urgent action is needed to develop holistic approaches that consider the complex interplay between environmental, economic, and social factors in tackling the challenges posed by climate change to agriculture, natural resources, and rural livelihoods
Keywords: *water resources, forest, sea level rise, biodiversity, conservation, sustainable development.*

Introduction

Climate change poses urgent challenges to Earth's natural systems and affects natural resources essential to life. Greenhouse gases caused by human activities, such as fossil fuel use and deforestation, cause irreversible changes and disrupt ecosystems and resource availability. Natural resources—water, soil, forests, biodiversity, and energy—are essential to life and the economy, providing services such as food, climate regulation, and cultural enrichment. However, climate change threatens their balance and sustainability, which affects the well-being and sustainability of people. Understanding this complex relationship is critical to effective strategies. Natural resources provide maintenance, regulation, support, and cultural services that are critical for human survival and well-being. However, unsustainable practices and climate change threaten ecosystems, increase inequality, and hinder the achievement of sustainable development goals.

Addressing these challenges requires an interdisciplinary approach that combines science, policy, and community engagement. Promoting stewardship, ecosystem-based adaptation, and the transition to renewable energy can increase resilience and promote equity.

Our project examines how climate change affects key natural resources such as water, agriculture, biodiversity, and energy, and examines impacts, vulnerabilities, and adaptation options. By deepening our understanding, we can act to secure resources, mitigate climate risks, and promote resilience in a changing world

Objectives

1. **Mitigation of Climate Change**: This involves efforts to reduce the emission of greenhouse gases (GHGs) into the atmosphere, primarily

carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O).

- Transitioning to renewable energy sources such as solar, wind, and hydroelectric power.
- Implementing energy efficiency measures in industries, transportation, and buildings.
- Promoting sustainable agriculture and land use practices to reduce deforestation and minimize GHG emissions from agriculture.
- Encouraging the use of cleaner technologies and Carbon Capture and Storage (CCS) methods.

2. **Adaptation to Climate Change**: As climate change impacts become more apparent, adaptation strategies are essential to cope with its effects.
   - Enhancing the resilience of communities, infrastructure, and ecosystems to extreme weather events such as storms, floods, and droughts.
   - Developing climate-resilient agricultural practices to ensure food security.
   - Implementing coastal protection measures to address sea-level rise and erosion.
   - Investing in water management infrastructure to address changing precipitation patterns.
3. **Conservation and Sustainable Management of Natural Resources:** The conservation and sustainable management of natural resources are critical for maintaining ecological balance and supporting human well-being.
   - Protecting biodiversity and ecosystems through the establishment of protected areas and conservation measures.
   - Promoting sustainable forestry practices to prevent deforestation and maintain forest ecosystems.
   - Managing water resources sustainably to ensure equitable access and minimize pollution.
   - Encouraging sustainable fishing practices to prevent overfishing and preserve marine ecosystems.
4. **Promotion of Green Technologies and Innovation**: Innovation plays a crucial role in addressing climate change and natural resource management. Objectives include:
   - Supporting research and development of clean energy technologies and low-carbon solutions.
   - Fostering the adoption of innovative practices and technologies that reduce resource consumption and environmental impact.
   - Encouraging investment in green infrastructure and sustainable urban development.
5. **International Cooperation and Policy Frameworks**: Climate change and natural resource management are global challenges that require international cooperation and coordinated action.
   - Strengthening international agreements such as the Paris Agreement to limit global temperature rise.
   - Supporting developing countries in their efforts to address climate change and build resilience to its impacts.
   - Promoting knowledge sharing and capacity building to facilitate the implementation of effective climate and resource management strategies worldwide.

Impact of the Climate Change and Natural Resources

Water Resources: Climate change alters precipitation patterns, leading to changes in the availability of freshwater resources. This affects not only drinking water supplies but also agriculture, industry, and ecosystems dependent on water.

Food Security: Changes in temperature and precipitation patterns can disrupt agricultural systems, affecting crop yields and food production. This can lead to food shortages and increased food

prices, particularly in regions already vulnerable to food insecurity.

Biodiversity Loss: Climate change threatens the habitats of many plant and animal species, leading to habitat loss, shifts in species distributions, and in some cases, extinction. This loss of biodiversity can have far-reaching ecological consequences, affecting ecosystem stability and resilience.

Sea Level Rise: Rising global temperatures cause thermal expansion of seawater and the melting of glaciers and ice sheets, contributing to sea level rise. This poses a significant threat to coastal communities, infrastructure, and ecosystems, increasing the risk of flooding and erosion.

Extreme Weather Events: Climate change is linked to an increase in the frequency and intensity of extreme weather events such as hurricanes, heatwaves, floods, and droughts. These events can cause widespread damage to infrastructure, disrupt economies, and result in loss of life.

Health Impacts: Climate change can exacerbate certain health risks, such as heat-related illnesses, respiratory problems from air pollution, and the spread of vector-borne diseases like malaria and dengue fever.

Economic Disruptions: The impacts of climate change on natural resources can have significant economic consequences, affecting industries such as agriculture, fishing, tourism, and insurance. The costs of adapting to and mitigating climate change can also be substantial.

Remedial Measures

Governments around the world have implemented various measures to fight climate change and conserve natural resources. Some common remedial measures include:

Policy Frameworks: Governments develop and implement policies to reduce greenhouse gas emissions, promote the use of renewable energy sources, and conserve natural resources. This may include setting emission reduction targets, establishing carbon pricing mechanisms such as carbon taxes or cap-and-trade schemes, and encouraging renewable energy production and energy efficiency.

International Agreements: Governments participate in international agreements, such as the Paris Agreement, to coordinate efforts to mitigate climate change worldwide. These agreements set emission reduction targets and promote cooperation between countries to jointly combat climate change.

Investments in renewable energy: Governments invest in the research, development, and deployment of renewable energy technologies such as solar, wind, and hydropower. Subsidies and incentives are often offered to promote the adoption of renewable energy sources and reduce dependence on fossil fuels.

Promote energy efficiency: Governments implement policies and programs to promote energy efficiency in buildings, transport, industry, and other sectors. This may include establishing energy efficiency standards for equipment and vehicles, incentives for energy-efficient technologies, and promoting energy-saving practices.

Conservation of Ecosystems and Biodiversity: Governments establish protected areas, nature reserves, and conservation programs to preserve ecosystems and biodiversity. These measures protect natural habitats, endangered species, and ecosystem services important to human well-being.

Adaptation strategies: Governments develop and implement strategies to adapt to the effects of climate change, such as rising sea levels, extreme weather events, and changing precipitation. This can include infrastructure improvements, land use planning, and initiatives to improve the resilience of vulnerable communities.

Public awareness and education: Governments organize information campaigns and educational programs to inform citizens about the effects of climate change and the importance of conserving natural resources. This helps build public support for remedial action and encourages people to take action to reduce their carbon footprint.

Regulatory Actions: Governments establish regulations to limit pollution, protect air and water

quality, and reduce the environmental impact of industrial activity. This may include environmental impact assessments, pollution control standards, and enforcement mechanisms to ensure compliance with environmental regulations.

Research and innovation: Governments fund research and innovation in areas such as clean energy technologies, sustainable agriculture, and climate modeling to improve understanding of the effects of climate change and develop solutions to mitigate its effects.

International Aid and Cooperation: Developing countries provide financial and technical assistance to developing countries to support their efforts to combat climate change and increase resilience to its effects. International cooperation is essential to achieve global climate goals and to ensure the participation of all countries in the transition to a low-carbon economy.

Conclusion

Climate change and its effects on natural resources require coordinated efforts at both global and local levels, including initiatives to reduce greenhouse gas emissions and adaptation strategies to increase resilience to changes already underway. The conclusion of linked political changes, climate change, and natural resources is sobering but hopeful. Climate change poses significant threats to our planet and ecosystems, biodiversity, and human communities, exacerbating extreme weather events, raising sea levels, and disrupting agricultural practices. Natural resources such as water, forests, and farmland are under enormous pressure due to climate change. However, there is hope. By adopting sustainable practices, investing in renewable energy sources, and implementing policies that reduce greenhouse gas emissions, we can further mitigate the worst effects of climate change and preserve our natural resources for future generations. International cooperation, technological innovations, and individual actions play a crucial role in meeting these challenges. We must act quickly and decisively to protect our planet and ensure a sustainable future for all.

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CLIMATE CHANGE: IMPACT ON AGRICULTURE AND ALLIED SECTORS WITH SPECIAL REFERENCE IN INDIA

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Abstract
Agriculture is pivotal for icing food, nutrition and livelihood securities for India. Indian husbandry had made a significant progress in the history, but presently it's facing numerous challenges. Stagnating net sown area, plateauing yield situations, deterioration of soil quality, reduction in per capita land vacuity and the adverse effect of climate change are the major challenges for Indian husbandry. On the other hand, the increased rate of population is pressurizing the agrarian sector for enhanced food product. The task is veritably grueling because about 60 of the net cultivated area is rain fed and exposed to biotic and a biotic stresses arising from climatic variability and climate change. The substantiation of changing climate from compliances has grown significantly during recent times. At the same time bettered ways of characterizing and quantifying query have stressed the challenges that remain silent for developing long- term global and indigenous climate quality data records. Climate change goods on husbandry are likely to be ubiquitous, both in terms of direct and circular impacts. Maintaining factory health across the earth, in turn, is a crucial demand for climate change mitigation

Introduction

Agriculture is pivotal for icing food, nutrition and livelihood securities for India. Indian husbandry had made a significant progress in the history, but presently it's facing numerous challenges. Stagnating net sown area, plateauing yield situations, deterioration of soil quality, reduction in per capita land vacuity and the adverse effect of climate change are the major challenges for Indian husbandry. On the other hand, the increased rate of population is pressurizing the agrarian sector for enhanced food product. The task is veritably grueling because about 60 of the net cultivated area is rain fed and exposed to biotic and a biotic stresses arising from climatic variability and climate change. further than 80 of Indian growers are borderline and small with poor managing capacity. likewise, the Indian growers are miscellaneous and unorganized. Climate change and variability are likely to aggravate the problem of unborn food security by putting pressure on husbandry affecting its sustainability. The global climate change may lead to melting and/ or dwindling glaciers, rise in ocean position and increase in the attention of hothouse feasts. still, the most prominent environmental issue is the global warming, caused by increase in the attention of atmospheric hothouse feasts(GHGs) i.e., carbon dioxide(CO2), methane(CH4) and nitrous oxide(N2 O).

Climate Change in Indian Environment

The substantiation of changing climate from compliances has grown significantly during recent times. At the same time bettered ways of characterizing and quantifying query have stressed the challenges that remain silent for developing long-term global and indigenous climate quality data records. The encyclopedically equaled concerted land and ocean face temperature data as calculated by a direct trend, show a warming of0.85(0.65 to1.06) °C, over the period 1880 – 2012, when multiple singly produced datasets live and about0.72 °C(0.49 °C to0.89 °C) over the period 1951 – 2012. The total increase between the normal of the 1850 – 1900 period and the 2003 – 2012 period is0.78(0.72 to0.85) °C and the total increase between the normal of the 1850 – 1900 period and the reference period for protuberance 1986 ” 2005 is0.61(0.55 to0.67) °C. This is grounded on the single longest dataset available. Equaled over the

mid-latitude land areas of the Northern semicircle, rush has likely to be increased since 1901(medium confidence before and high confidence after 1951). For other latitudinal zones area- equaled long- term positive or negative trends have low confidence due to data quality, data absoluteness or disagreement amongst available estimates. It's veritably likely that the figures of cold days and nights have dropped and the figures of warm days and nights have increased encyclopedically

Impacts of Climate Change on Indian Husbandry

Indian husbandry is largely prone to the pitfalls due to climate change; especially to failure, because 2/ 3rd of the agrarian land in India is rainfed and indeed the irrigated system is dependent on thunderstorm rain. Flood is also a major problem in numerous corridor of the country, especially in eastern part, where frequent flood tide events take place. In addition, frost in north- west, heat swells in central and northern corridor and cyclone in eastern seacoast also beget annihilation. In recent times, the frequence of these climatic axes are getting further due to the increased atmospheric temperature, performing in increased pitfalls with substantial loss of agrarian product. A significant increase in runoff is projected in the wet season that may lead to increase in frequency and duration of cataracts and also soil erosion. still, the spare water can be gathered for future use by expanding storage structure.

State of the Art of Research on Climate Change and Agriculture

Implicit adaptation strategies to deal with the impact of climate change are developing cultivars tolerant to heat and saltiness stresses and resistant to flood tide drift and failure, modifying crop operation practices, perfecting water operation, espousing new estate ways analogous as resource conserving technologies (RCTs), crop diversification, perfecting pest operation, better downfall vaticinations and crop insurance and employing the indigenous technical knowledge of farmers. Some of these strategies are mooted below. Development of new crop kinds with advanced yield eventuality and resistant to multiple stresses (failure, flood tide drift, saltiness) will be the key to maintain yield stability. improvement of germplasm of important crops for heat forbearance should be one of the targets of lineage programmes. also, it's essential to develop forbearance to multiple abiotic stresses as they do in nature. In addition, it's important to meliorate the root effectiveness for the uptake of water and nutrients from soil. heritable engineering could play a vital part for ‘ gene massing ’to pool all desirable traits in a plant to get the ‘ ideal plant type ’ which may also be ‘ adverse climate tolerant ’ genotype. Effective use of natural resources analogous as water is largely critical for adaptation to climate change.

Conclusion

Climate change goods on husbandry are likely to be ubiquitous, both in terms of direct and circular impacts. Maintaining factory health across the earth, in turn, is a crucial demand for climate change mitigation, as well as the conservation of biodiversity and the provision of ecosystem services under global change. Information gathered so far has been disintegrated and a comprehensive analysis of climate change impacts on husbandry is needed. Experimental exploration on a different range of crop and biotic and abiotic systems is necessary to ameliorate appreciation of climate change impacts on husbandry. To maintain ecosystem health and services under variable, changeable or unknown conditions, we need further flexible systems, decentralization, participatory exploration and breeding networks. At the same time, increased involvement of the numerous stakeholders and scientists from outside factory pathology shows the significance of considering trade- offs with other objects. adding diversity would be in favour of a land- sharing approach, but may be applicable also to land- sparing scripts(e.g. at the periphery of fields), depending on the spatial and temporal scale and the type of diversity(inheritable, species, species development, ecosystem) considered.

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THE EFFECTS OF CLIMATE CHAMNGE ON THE ENVIRONMENT

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Abstract
Long-term changes in weather patterns and temperatures are referred to as climate change. These changes may occur naturally as a result of significant volcanic eruptions or variations in the sun's activity. However, since the 1800s, human activity has been the primary cause of climate change, mostly as a result of burning fossil fuels like coal, oil, and gas. The combustion of fossil fuels releases greenhouse gases into the atmosphere, which encircle the planet like a blanket and retain solar heat, causing temperatures to rise. Methane and carbon dioxide are the primary greenhouse gases responsible for climate change. These result from, for instance, burning coal to heat a building or using petrol to operate a vehicle. Carbon dioxide can also be released by forest clearing and land clearing. Methane emissions are mostly produced by the oil and gas industry and agriculture. Land use, buildings, transportation, energy, and agriculture are some of the primary industries producing greenhouse gases. This paper outlines the reasons for climate change as well as its effects on the ecosystem.

Keywords: *environment, climate change*

Climate change, driven primarily by human activities, is one of the most critical challenges facing our planet. It affects not only the environment but also our lives, economies, and future generations. In this article, we'll explore the causes, effects, and potential solutions related to climate change.

Understanding Climate Change

Causes of Climate Change

Greenhouse gases (GHGs) are released into the atmosphere during the combustion of fossil fuels, such as coal, oil, and natural gas. Global temperatures rise as a result of these gases' ability to trap heat.

Deforestation: Cutting down on forests lowers the planet's ability to absorb CO2, which fuels globalwarming.

Industrial Processes: GHGs are released by land use changes, agriculture, and industrial operations.

Natural Factors: Variations in solar radiation and volcanic eruptions also affect climate

Impact of Climate Change on the Environment

From the poles to the tropics, climate change is disrupting ecosystems. Even a seemingly slight shift in temperature can cause dramatic changes that ripple through food webs and the environment.

Melting Sea Ice

The poles, which are the coldest places on Earth, are where the effects of climate change are most noticeable. The Arctic is warming twice as quickly as any other region on Earth, which is causing the northern ice sheets and glaciers, which store enormous amounts of water, to melt quickly. A positive feedback loop accelerates the melting process when sea ice melts because it exposes darker ocean waters that take in more sunlight. The Arctic may have no summer ice at all in only 15 years**.**

Sea Level Rise

In the event that we don't reduce emissions, scientists estimate that sea levels might rise by as much as 3.61 feet by the end of the century due to melting sea ice and glaciers as well as the fact that warmer water expands in volume. Low-lying areas, including island nations and heavily populated coastal cities like New York City and Mumbai, would be destroyed by the scope (and speed) of this transformation**.**

Even at much lower levels, however, sea level rise is costly, hazardous, and disruptive. The United States will experience a foot rise in sea level by 2050, according to the National Ocean Service's 2022 Sea Level Rise Technical Report. This will frequently cause damage to infrastructure, including sewage treatment facilities, power plants, and highways. By century's end, beaches that families have grown up going to might disappear. The environment is also harmed by sea level rise because invading seawater can destroy coastal ecosystems and contaminate freshwater inland aquifers, which are essential for human consumption and agriculture. In countries like Bangladesh, where 25% of the land is below sea level, saltwater encroachment is already changing the way people live.

Flooding

Climate change affects not only the coastal flooding brought on by sea level rise but also the inland and urban flooding produced by heavy rain and snowmelt. Our country's floodplains are predicted to expand by roughly 45% by 2100 as a result of global warming's continued exacerbation of extreme weather and sea level rise. A third of Pakistan was submerged with deadly flooding in 2022 as a result of a combination of snowmelt, melting glaciers, and excessive rains.

Warmer Ocean Waters and Marine Heat Waves

Our climate catastrophe is primarily affecting the oceans. Over 70% of the earth's surface is made up of oceans, which also absorb up to 30% of carbon dioxide emissions from burning fossil fuels and 93% of all heat trapped by greenhouse gases. Fish and other marine creatures that are temperature-sensitive are already shifting their migration patterns in search of cooler, deeper waters in order to survive, upsetting food webs and significant commercial fisheries. Furthermore, a third or more more oceanic heat waves now occur. Marine mammals and plankton are dying in large numbers as a result of these rises.

The situation is exacerbated by the fact that the ocean's increased uptake of carbon dioxide causes a slow acidification of the water, changing its basic chemical composition and endangering marine species that has adapted to exist in a specific pH range. Since acidity interferes with the calcification process needed to form their shells, animals like corals, oysters, and mussels will probably experience these impacts first.

Ecosystem Stressors

Ecosystems on land, such as tropical rainforests, savannahs, and old-growth forests, are not doing any better. In forests, outbreaks of invasive species, disease infections, and pests are expected to rise with climate change. It is altering the kind of flora that can grow in a certain area and upsetting the wildlife's life cycles, all of which are causing ecosystems to become less resilient to stresses and change in composition. While ecosystems have the capacity to adapt, many are reaching the hard limits of their natural capacity. There will be more effects as the temperature rises.

It seems that ecological changes are being triggered by climate change in a cascading manner that we are unable to entirely forecast or, once they get sufficient pace, completely stop. The destabilisation of an ecosystem could be particularly noticeable in cases where keystone species play a significant role in maintaining the structure of the ecosystem.

Rising Global Temperatures

Since the start of the preindustrial era 250 years ago, the world has already warmed by 1.1 degrees Celsius (1.9 degrees Fahrenheit). There are important ramifications for this seemingly little rise. With more frequent and severe heat waves, summers are getting progressively hotter. Challenges arise for housing and infrastructure in areas unprepared for this level of heat.

Extreme Weather Events

Weather systems are disrupted by climate change, which makes occurrences more intense and unpredictable. Hurricanes, floods, and droughts are occurring more frequently. Events that were once in a lifetime are becoming more often. Different areas

are affected differently; one may experience extreme drought while another experiences increasing flooding.

Impact on Nature and Wildlife

Animal populations and ecosystems are impacted by rising temperatures and shifting weather patterns. Disrupted food chains, altered migration patterns, and habitat degradation pose issues for many species.

There is a threat to forests, coral reefs, and other natural areas.

Human Societies and Settlements

Communities that are vulnerable suffer the most. The problems already present in the world's poorest nations are made worse by climate change.

In the US, communities of colour and those with lower incomes are frequently most affected by the effects of climate change.

The interrelated issues of rising inequality and climate change necessitate action and climate justice.

Health Impacts

Insect-transmitted infections, illnesses brought on by the heat, and respiratory issues are becoming more common. Children and the elderly are among the vulnerable demographics that are more vulnerable.

Economic Consequences

Crop failures, disrupted supply chains, and damage to infrastructure lead to economic losses.

The cost of inaction far outweighs the investment needed for climate solutions.

Conclusion

Ultimately, protecting the environment is not only our duty but also a necessity for the existence of coming generations. The quality of our lives and the health of all living things is greatly influenced by our surroundings. Many different species can be found in the environment, and they all have a part in maintaining the delicate balance of ecosystems. Stability and resilience are guaranteed by biodiversity. Essential services including clean air, filtered water, pollination, and climate management are provided by natural ecosystems. The life of humans depends on these services. Deforestation and the use of fossil fuels are two human-caused factors in global warming. Sea levels, weather patterns, and habitats are all impacted by climate change. The environment is harmed by pollution from industrial activities, agriculture, and waste disposal. Pollution of the air, water, and soil affects both animal and human health. Forests are being cleared for logging, urbanisation, and agriculture, which threaten species, disturb ecosystems, and decreases carbon sequestration. A healthy ecosystem necessitates actions to preserve natural areas, save endangered species, and advance sustainable lifestyles. By cutting back on waste, preserving resources, and supporting environmental laws, each individual can make a difference. Everyone must contribute to building a peaceful and sustainable planet.

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CLIMATE CHANGE AND ITS CONSEQUENCES OF GLOBAL WARMING

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Abstract
Climate change, which refers to modifications in the entirety of characteristics that characterise climate, is a more widespread phenomenon that is associated with global warming. Climate change includes variations in air temperature as well as variations in winds, ocean currents, precipitation patterns, and other climate indicators. Generally speaking, several natural processes acting on different timescales can be combined to cause climate change. Ever since the emergence of human civilization, there has been a "anthropogenic," or solely human-caused, component to climate change. This anthropogenic component has grown in significance over the previous two centuries during the industrial era. Any warming of the near-surface air that has occurred during the previous 200 years and may be linked to human activity is particularly referred to as "global warming. The purpose of this paper is to examine the reasons and effects of global warming.
Keywords: *climate change, temperature, global warming*

Global warming and climate change acknowledges that Earth's climate has changed over a wide range of periods, from a single human lifetime to billions of years. Usually, "regimes" or "epochs" are used to categorise this changeable climate history. For example, there were significant fluctuations in the global area of ice sheets and glaciers during the Pleistocene glacial epoch, which lasted from 2,600,000 to 11,700 years ago. Changes in the distribution of solar energy across the Earth's surface caused these variations, which occurred over tens to hundreds of millennia. The geometry of Earth's orbit around the Sun and the tilt or orientation of Earth's axis with respect to the Sun's direct rays both have a significant impact on the distribution of solar radiation, also referred to as the insolation pattern.

The global culmination of the most recent glacial period, or ice age, occurred approximately 21,000 years ago and is commonly referred to as the Last Glacial Maximum. Continental ice sheets covered a large portion of Europe and North America's central latitudes during this period, extending as far south as modern-day London and New York City. The average annual global temperature seems to have been 4–5 °C (7–9 °F) lower than it was at the middle of the 20th century. It's critical to keep in mind that these numbers represent the global average In actuality, Earth's climate at the height of this most recent ice age was characterised by comparatively minimal cooling over a significant portion of the tropical waters (near the Equator) and greater cooling at higher latitudes, or towards the poles. The Holocene Epoch, a comparatively ice-free period that followed the abrupt end of this glacial interval approximately 11,700 years ago. It is generally accepted that the Holocene epoch encompasses the current era of Earth history. In contrast, other scientists contend that the Holocene Epoch ended quite recently and that we are currently living in a climatic interval that is appropriately referred to as the Anthropocene Epoch—that is, a time when humans have had a significant impact on climate.

Life on Earth has evolved in an interconnected ecology determined by weather patterns, movements of global tectonic plates, and the dynamic surface chemistry of oceans and land. The creatures on Earth—all the humans, animals, plants, bacteria, fungi, and viruses—are dependent on each another as well as on this enveloping ecosystem. Since the Earth is an integrated system, significant changes in any internal component or in external influences

induce movement toward a new equilibrium. Throughout the history of the Earth there have been long periods of cooling leading to growth of massive continental ice sheets, interspersed with warm intervals. While the causes of these ice ages are not fully understood, the principal contributing factors have been identified. The composition of the atmosphere, particularly the concentration of carbon dioxide and methane, is important. Also changes in the Earth's orbit around the sun, changes in the tilt in the Earth's axis, impacts of large meteorites, and eruptions of super volcanoes. The latter two phenomena can both put massive amounts of particulate matter and carbon dioxide into the atmosphere.

In two instances, biological phenomena have disrupted the composition of the atmosphere with global consequences. One was the Great Oxidation Event or the Oxidation Catastrophe, around 2.45 billion years ago. This occurred after a bacterial species, an ancestor of contemporary cyanobacteria, evolved the ability to produce oxygen as a byproduct of photosynthesis. This event had extraordinary consequences for ocean chemistry and eventually for the slow accumulation of atmospheric oxygen to contemporary levels over an interval of several million years. The newly oxygenated atmosphere was toxic to virtually all the anaerobic organisms that then populated the earth. These organisms died and were replaced by creatures that could thrive in the new oxygenated atmosphere. Now, the current human-induced increase in atmospheric CO_2 is the second biological disruption of atmospheric composition that is producing global warming with credible predictions of ever more dire consequences in coming decades. Consequences we are already seeing include:

In recent decades, the scientific community has sounded the alarm about **global warming**, a phenomenon characterized by increasing average air temperatures near the Earth's surface. Let us delve into the causes, effects, and potential solutions related to this critical issue.

Causes of Global Warming

1. Greenhouse Gas Emissions

The role of greenhouse gas emissions is crucial in the escalating global warming crisis. These emissions result from human activities and significantly impact our planet's climate. Human activities, particularly the burning of greenhouse gases (GHGs) are released into the atmosphere in large quantities by fossil fuels, including coal, oil, and natural gas. As these GHGs, including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2 O), absorb heat and causes the earth to warm, much like a blanket.

Impact of Greenhouse Gases:

- **Blanket Effect**: Greenhouse gases act like a thermal blanket, trapping heat within the Earth's atmosphere. This trapped heat leads to rising temperatures.
- **Warming Trends**: The Intergovernmental Panel on Climate Change (IPCC) estimates that global average surface temperature has increased by approximately 1.07°C (1.9°F) between 1850 and 2019.
- **Consequences**: Melting glaciers, extreme weather events, ocean acidification, and shifts in ecosystems are some of the consequences of global warming.

2. Deforestation

Deforestation, the purposeful clearing of forested land, has significantly altered landscapes around the world. Deforestation involves the removal of a forest or a stand of trees from land, which is then converted to non-forest use. This transformation can include turning forested areas into farms, ranches, or urban spaces. The destruction of forests reduces the Earth's capacity to absorb CO_2. In order to sequester carbon, trees are essential., and their loss contributes to the greenhouse effect.

Approximately 31% of Earth's land surface is covered by forests today, which is one-third less than the forest cover before the expansion of agriculture. Half of this loss occurred in the last century.

Each year, between 15 million to 18 million hectares of forest (an area the size of Bangladesh) are

destroyed, equating to an average of 2,400 trees cut down every minute.

Causes and Impact:

Agriculture: The overwhelming direct cause of deforestation is agriculture. More than 80% of deforestation is attributed to agricultural activities, including the conversion of forests into plantations for coffee, tea, palm oil, rice, rubber, and other popular products.

Industrial Processes: Logging, economic development (such as urbanization), and mining also contribute to deforestation.

Climate Change: The effects of climate change, including an increased risk of wildfires, exacerbate deforestation.

Consequences: Deforestation results in habitat damage, biodiversity loss, aridity, and soil erosion. It also reduces the biosequestration of atmospheric carbon dioxide, contributing to global warming.

Human Food Systems: Forests play a crucial role in capturing and storing carbon, which is essential to make sure there is food security and to lessen climate change.

3. Industrial Processes

The intricate relationship between industrial processes and climate change warrants our attention. Industrial activities, transportation, and energy production emit pollutants that intensify global warming. These include not only CO_2 but also other GHGs.

Manufacturing Industry and Carbon Emissions

A major role is played by the manufacturing industry in global carbon emissions. Almost 25% of the direct carbon emissions in the US come from the manufacturing

Greenhouse Gas Emissions: Manufacturing processes release greenhouse gases (GHGs) such as carbon dioxide (CO_2) and methane (CH_4). These emissions contribute to the greenhouse effect, trapping heat in the Earth's atmosphere.

Historical Context: Industrial Revolution and Global Warming

The Industrial Revolution marked a turning point in human history. It brought about rapid industrialization, technological advancements, and increased energy consumption.

Mass Burning of Fossil Fuels: During this period, the mass burning of fossil fuels (coal, oil, and gas) became widespread. This release of CO_2 into the atmosphere significantly contributed to global warming

Consequences of Global Warming

1. **Rising Temperatures**: The most evident consequence is the overall increase in temperatures. The IPCC, or Intergovernmental Panel on Climate Change, has estimated that global average surface temperature has risen by approximately 1.07°C (1.9°F) between 1850 and 2019. This warming trend affects ecosystems, weather patterns, and sea levels.
2. **Melting Glaciers and Ice Sheets**: As temperatures rise, ice sheets and glaciers melt, causing sea levels to rise as well. This puts a threat to coastal communities and ecosystems.
3. **Extreme Weather Events**: Global warming intensifies extreme weather events such as heatwaves, hurricanes, droughts, and heavy rainfall. The effects of these occurrences on human life are catastrophic in agriculture, and infrastructure.
4. **Ocean Acidification**: Increased CO_2 levels lead to ocean acidification, affecting marine life, coral reefs, and fisheries.
5. **Shifts in Ecosystems**: Species distribution and habitats are changing due to altered temperatures. Some species may struggle to adapt, leading to biodiversity loss.
6. **Health Risks**: Heat-related illnesses, vector-borne diseases, and air pollution-related health issues become more prevalent in a warmer world.

Mitigation and Solutions

1. **Reducing Emissions**: Transitioning to cleaner energy sources, promoting energy efficiency, and implementing policies to limit emissions are crucial steps.
2. **Afforestation and Reforestation**: Protecting existing forests and planting new trees help sequester carbon.
3. **Renewable Energy**: Investing in solar, wind, and other renewable energy technologies reduces reliance on fossil fuels.
4. **International Cooperation**: Global efforts are essential to combat climate change. Agreements like the Paris Agreement aim to keep the increase in global warming considerably below 2°C over preindustrial levels.
5. In conclusion, addressing global warming requires collective action, informed policies, and a commitment to safeguarding our planet for future generations.

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CLIMATE CHANGE AND HEALTH HAZARDS OF HUMAN

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Human health is impacted by climate change both directly and indirectly. Severe heat waves, sea level rise, altered precipitation leading to droughts and floods, and powerful hurricanes can all directly result in harm, disease, or even death. Changes in the environment caused by climate change might also have an indirect impact on health. For instance, respiratory and cardiovascular disorders may be negatively impacted by rising air pollution levels. Rainfall and temperature variations can affect the survival, dispersal, and behaviour of insects and other animals, which can have an impact on the evolution of infectious illnesses. An increase in storm surge, precipitation, and sea temperature might result in an increase in illnesses associated to water. In addition to posing a risk to human health, climate change can taint food, leading to foodborne illnesses. Furthermore, the effects of climate change on mental health and wellbeing

Climate change has the potential to impact human health by altering the intensity, length, or frequency of health issues as well as by posing new risks to public health in areas or populations where they have never before existed. Although there are health risks associated with climate change for everyone, not everyone suffers the same consequences. Because of their increased exposure to climate-related hazards, heightened sensitivity to the effects of climate stressors, current state of health and wellbeing, or lack of resources to cope or protect themselves from harm, individuals may be more vulnerable to the health effects of climate change. Preventing diseases and injuries and improving public health preparedness in general depend on an efficient public health response to reduce the hazards associated with climate change

Climate Change and Health Risks

There are numerous ways in which climate change puts human health at serious risk. Extreme Weather Events: Increasing frequency due to climate change and intense weather events such as heatwaves, storms, and floods. These events can cause injury, mental health issues, and increased risk of infections.

Disruption of Food Systems: Changes in climate patterns affect agriculture and food production. Crop failures, food shortages, and malnutrition become more common, posing a direct threat to health.

Vector-Borne Diseases: Rising temperatures and altered ecosystems create favorable conditions for disease-carrying vectors like mosquitoes and ticks. Lyme disease, dengue fever, and malaria are among the illnesses that spread more quickly.

Waterborne Diseases: Changes in precipitation patterns can lead to flooding and water contamination, increasing the risk of diseases like diarrhoea and cholera.

Mental Health: Trauma and stress brought on by severe weather, eviction, and loss of employment are factors in mental health problems. Post-traumatic stress disorder (PTSD), anxiety, and depression are prevalent conditions.

Health Infrastructure: Climate change affects health systems, reducing their capacity to provide universal health coverage. Disruptions in infrastructure due to extreme weather events hinder access to healthcare.

Environmental Degradation: Climate shocks degrade air quality, water sources, and soil, impacting overall health. Clean air, water, and food systems are essential for well-being.

Threats from climate change increase already-existing health issues and potentially reversing decades of progress. Urgent action to mitigate climate change is crucial to safeguard human health and uphold the right to health for all.

Food Safety and Nutritional Impacts on Human Health

The circumstances and procedures in place across the food system that guarantee food is fit for human consumption are referred to as "food safety." Over 420,000 people die and one in ten people worldwide contract a foodborne illness each year.

Temperature variations in the air and water can alter the seasonal and geographical distribution of chemical pollutants as well as bacteria, viruses, parasites, fungi, and pests. Elevated temperatures have the potential to augment the count of pathogens already existing on fruit and seafood. Additionally, bacterial populations may proliferate during food storage, which might potentially escalate food spoiling rates contingent on temperature and duration.

While 76% of the world's population obtains the majority of its daily nutrition from plants, 800 million people are undernourished, according to the Food and Agriculture Organisation of the United Nations. Climate change-related droughts and flooding may have an effect on the staple crops that these populations depend on for survival. Although everyone is susceptible to the effects of climate change on food systems, certain populations are more so than others. Malnutrition is particularly common in low-income groups, women, children, elderly people, Indigenous Peoples, and small-scale food producers.

Extreme Weather Events Can Affect Human Health

Extreme weather events can have immediate negative effects on people's health, such as exposure to the elements, mental health issues, injuries sustained while trying to flee, and even fatalities from the weather event itself, such drowning in a flood. The National Climate Assessment by the U.S. Global Change Research Programme states that extreme weather events can also raise exposure to additional environmental factors that are harmful to health: Projectiles and debris produced by hurricanes and coastal storms have the potential to injure people. They may also make it more likely that dangerous substances, as well as vector- and water-borne infections, will proliferate across the environment and in communities as a result of storm surges, flooding, and facility damage.

Sea level rise and floods can contaminate water with dangerous germs and viruses that lead to illnesses from contaminated food and drink.Mould development and deteriorated indoor air quality are more likely to occur when floodwaters leave indoor areas. Mould spore exposure can irritate the eyes, nose, and throat in addition to causing headaches. Mould exposure raises the incidence of lung infections and exacerbates lung conditions like asthma. in immune compromised individuals.

Given its long-range nature, wildfire smoke has the ability to expose people to a variety of respiratory irritants who are nearby and far from the fire." Smoke from wildfires can damage the lungs and heart when they burn vegetation, such as trees. Burning houses and other structures, wildfires release harmful toxins into the surrounding air as they spread into residential areas. Stagnation, cramps, heat stroke, and heat-related mortality are all possible outcomes of excessive heat. A higher risk of heat-related problems or death exists in people with chronic heart or lung diseases, among other ailments.

Certain populations may be more sensitive than others, even though everyone is susceptible to the negative health effects of extreme weather occurrences. Individuals with disabilities or pre-existing health conditions, elderly folks, pregnant women, outdoor workers, and children may be disproportionately affected. Furthermore, groups living close to industrial regions or toxic waste sites, impoverished people, and rural areas with underdeveloped health systems may be particularly vulnerable to the effects of harsh weather.

The disruption of vital infrastructure, including roads, electricity, wastewater and drinking supplies, and medical facilities, exacerbates the health effects of extreme weather. A disruption or failure in one of these systems can lead to the failure of others because many of these systems are interdependent.

The water supply of a community may be impacted by a storm that destroys its electrical grid.

Human Health

Air quality is worsened by climate change. It raises our exposure to dangerous wildfire smoke and ozone smog caused by warmer weather, both of which are bad for our health, especially for people who already have heart disease or asthma.

Due to the ability of their carriers to live in more areas or for longer seasons, insect-borne diseases like malaria and Zika become more common as the planet warms. The U.S. Environmental Protection Agency (EPA) reports that within the last 30 years, the frequency of Lyme disease carried by ticks has almost doubled across the country. More frequent or strong extreme weather occurrences result in thousands of injuries, illnesses, and fatalities annually. One billion people are predicted to be at danger of heat stress with a 2-degree Celsius increase in the world average temperature. Heat waves that broke records across Europe claimed thousands of lives just in the summer of 2022. A few weeks later, record-breaking urban floods in South Korea and the United States claimed the lives of hundreds of people; in Pakistan, the flooding that resulted in stagnant water and unhygienic conditions threatened even more lives. Over 1,500 people died in the disaster.

The consequences of climate change have a substantial negative impact on mental health, as does the threat posed by what lies ahead. Ten thousand young people from ten different nations were questioned for a 2021 study on climate fear that was published in the journal Nature. Fifty-five percent of the participants stated that their emotions on climate change, ranging from helplessness to fury, had an effect on their day-to-day existence. Climate-related risks can vary in terms of time, place, population, and intensity and might involve biological, chemical, or physical stressors. We call these channels of exposure. These dangers may materialise at the same time, exacerbating the effects on health. Longer-term changes in resilience and health may result from the accumulation of climate change challenges.

Effects of Climate Change on Humans

In the end, humankind is impacted by how climate change affects the weather, the ecosystem, animals, and agriculture. However, there's more. All around the world, very stable climates have shaped the way we live, from the businesses that support our economies to the methods we obtain our food. Global warming threatens to upend this foundation and change society as a whole. In the worst case scenario, this might result in widespread sickness, famine, conflict, injuries, and fatalities. This dire prediction has already come true for a large number of people worldwide.

Numerous direct and indirect effects of climate change are being felt on our global food system, posing new risks to human health and food safety. The distribution and viability of bacteria that cause foodborne diseases can be impacted by variations in temperature and precipitation. Severe droughts or flooding can be brought on by climatic changes. Toxins and pathogens may be affected by these occurrences, which could then harm crops. Foodborne diseases like salmonellosis and norovirus infections can arise from consuming contaminated food.

The quality of food is expected to be impacted by climate change as well. The nutritional value of staple crops may be impacted by the rise in atmospheric carbon dioxide linked to climate change, which may further worsen malnutrition by lowering the amount of protein and important minerals. Thus, all human life is threatened existentially by climate change.

Worsening Inequity

Pre-existing disparities are made worse by the climate issue. The majority of past greenhouse gas emissions have come from wealthier countries like the United States, but emerging nations may not have the capacity to adapt, therefore they will suddenly be the ones most affected by the climate problem. Low-lying island nations, such as many in the Pacific,

may disappear under some circumstances before developed economies significantly cut their carbon emissions.

The gap between those wealthy enough to protect themselves from the effects of climate change and those who cannot will only widen, even within wealthier countries. Wars over food and water will not drive the wealthy from their homes—at least not immediately. When a hurricane is approaching, they will be able to quickly flee their homes and enjoy cold air in their homes during heat waves. They will have access to care for respiratory ailments brought on by smoke from wildfires and be able to purchase progressively more expensive food. For the climate pollution that they did not cause, billions of people are unable to do so and are paying the biggest price.

Displacement

The effects of climate change, such as shortages of food and water, rising sea levels, and unstable economies, will cause displacement. As of right now, it is. "Climate, environmental degradation and disasters increasingly interact with the drivers of refugee movements," according to the United Nations Global Compact on Refugees. Once more, the most vulnerable communities—those experiencing poverty and political unrest, for example—will be the first to suffer the most severe consequences.

Economic impacts

The 2018 National Climate Assessment estimates that by the end of the century, climate change could cost the American economy up to $500 billion annually if nothing is done. Not to mention the significant effects it has on human health. Whole local industries, including the ones that support the economy, including commercial fishing, tourism, and husbandry, run the risk of failing.

Every year, the cost of recovering from the devastation caused by extreme weather events like hurricanes, flash floods, and wildfires rises. The cost of weather-related disasters in the United States came to $145 billion in 2021, making it the third most expensive year ever. Several of these incidents were weather-related billion-dollar events.

Opportunities for Public Health Improvement

Preparation, adaption, and mitigation measures can lessen adverse health effects and infrastructure disruption during and after an extreme weather event, according to research funded by NIEHS and others.

Developing evacuation plans to safeguard vulnerable people, planning expansion and development away from high-risk locations like flood zones, and putting early warning systems into place are a few examples of preparations.

Building coastal walls to prevent flooding and storm surges, managing forests to contain or delay wildfires, collecting rainfall to preserve water supplies during dry spells and weatherproofing energy systems to resist strong winds or extremely cold temperatures are a few examples of adaptation.

Reducing the effects of climate change by lowering greenhouse gas emissions is one kind of mitigation. These tactics may include installing energy-efficient retrofits in homes and buildings and utilising eco-friendly modes of mobility like electric cars or bicycles**.**

Conclusion

Climate change transcends beyond the realm of the environment.; it profoundly impacts human health. From extreme weather events to disruptions in food systems, vector-borne diseases, and mental health challenges, the effects are far-reaching. Vulnerable populations bear the brunt, and long-term resilience becomes critical. Urgent global action is essential to mitigate climate change and protect our well-being.

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A STUDY ON IMPACT OF CLIMATE CHANGE ON AGRICULTURE IN INDIA

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Abstract

Climate change is one the common issue in all over world. Climate is changing naturally at its own pace, since the beginning of the evolution of earth, 4–5 billion years ago, but presently, it has gained momentum due to inadvertent anthropogenic disturbances. These changes may culminate in adverse Impact on human health and the biosphere on which we depend. The multi-faceted interactions among the humans, microbes and the rest of the biosphere have started reflecting an increase in the concentration of greenhouse gases (GHGs) i.e. CO_2, CH_4 and N_2O, causing warming across the globe along with other cascading consequences in the form of shift in rainfall pattern, melting of ice, rise in sea level etc. The above multifarious interactions among atmospheric composition, climate change and human, plant and animal health need to be scrutinized and probable solutions to the undesirable changes may be sought. Analysis of the food grains production/productivity data for the last few decades reveals a tremendous increase in yield, but it appears that negative impact of vagaries of monsoon has been large throughout the period. In this context, a number of questions need to be addressed as to determine the nature of variability of important weather events; particularly the rainfall received in a season/year as well its distribution within the season. These observations need to be coupled to management practices, which are tailored to the climate variability of the region, such as optimal time of sowing, level of pesticides and fertilizer application. Tamil Nadu is one of the most urbanized and industrialized states in India and only 22percent of its income comes from the agriculture and allied sectors, and the share is indicating a declining trend over the years. This study is based on the theoretical framework.

Keywords: *climate change, food grains pattern, rainfall conditions, agriculture status in india.*

Introduction

The Indian government is cognizant of how climate change affects agriculture and the livelihoods of farmers. The network centers spread around the nation conducted extensive field and simulation investigations in agriculture. Using the crop simulation models, the expected climates for 2050 and 2080 were incorporated into the assessment of the impact of climate change. If adaptation measures are not used, it is anticipated that the yields of rice that are rainfed in India would decrease by 20% in 2050 and 47% in 2080, while the yields of rice that are irrigated will decrease by 3.5% in 2050 and 5% in 2080 scenarios. Wheat yield is predicted to decrease by 19.3% in 2050 and 40% in 2080 scenarios due to climate change, with notable regional and temporal variability, by the end of the century. In 2050 and 2080 scenarios, respectively, maize yields are expected to decrease by 18 and 23% due to climate change. Crop yields are decreased by climate change, and product has lesser nutritional value. Droughts and other extreme weather patterns have an influence on farmers as well as the consumption of food and nutrients.

India places a great importance on mitigating the effects of climate change and vulnerability on agriculture, since projections indicate that the effects would be severe and broad. It is vitally crucial to acquire the capacity to predict with confidence how climate change will affect agriculture. If successful, it may offer the worldwide data required to assist farmers in creating their own long-term climate

change strategies. Thankfully, we are extremely close to achieving this capacity; but, it could take five to seven years to assess the consequences for agriculture and significantly enhance the resolution and accuracy of the climate model.

The last several decades have seen a rise in atmospheric chemistry changes as a result of increased anthropogenic activity. Long-term international negotiations to bring greenhouse gas emissions down to 1990 levels are underway, but the likelihood of these efforts succeeding now is diminished since the main players in the emissions are becoming less willing to make the necessary changes. The earth's surface and atmosphere will probably get warmer as a result of this and other increases in greenhouse gasses.

The degree to which a system is vulnerable to, or incapable of enduring, the negative consequences of climate change, particularly its extremes and unpredictability, is known as its vulnerability. A system's vulnerability is determined by the kind, speed, and extent of climatic change and fluctuation to which it is exposed, in addition to its sensitivity and ability to adapt. Different areas, industries, and social groupings are more or less vulnerable to climate change. To create effective and focused adaptation activities, it is vital to comprehend the local and regional aspects of vulnerability. At the same time, such efforts must recognize that climate change impacts will not be felt in isolation, but in the context of multiple stresses. In particular, the dramatic economic and social changes associated with globalization themselves present new risks as well as opportunities.

Indian Agriculture and Climate Change

The agricultural sector accounts for 23% of India's Gross National Product (GNP) and plays a pivotal role in the country's development, maintaining a crucial position in the national economy. Presently, agriculture supports the livelihoods of nearly 45% of the population. It's evident that any substantial global climate change will impact local agriculture, thus affecting the global food supply. Numerous studies have explored the potential impact of climate change on farming across different regions, yet uncertainties persist, particularly regarding the extent and distribution of temperature increases and corresponding changes in precipitation patterns. These variables influence water supply to crops and the evaporative demand in a carbon dioxide-enriched atmosphere.

Predicting the future of agriculture amidst global change is challenging due to the intricate nature of natural agricultural systems and the socio-economic factors shaping food supply and demand. Climatologists predict significant global warming in the upcoming decades due to rising greenhouse gas levels. This forecast includes major alterations in hydrological regimes, such as changes in temperature, solar radiation, and precipitation, impacting crop productivity and livestock agriculture. Climate change will also have economic repercussions on agriculture, altering farm profitability, prices, supply, demand, trade, and regional competitive advantages.

The scale and distribution of climate-induced changes may hinder our ability to expand food production areas to accommodate a projected population of over 10 billion by the middle of the next century. Agriculture is sensitive to short-term weather changes as well as seasonal, annual, and long-term climate variations. Moderate variations in climate averages can be accommodated, but extreme shifts may necessitate changes in cultivation practices, crop types, technological advancements, infrastructure improvements, or even land use conversion.

Crop yield is influenced by a multitude of factors, including meteorological parameters which, although transient, significantly impact agricultural systems. Other factors such as soil characteristics, seed genetics, pest and disease management, and agronomic practices also affect crop yields. Pests and diseases pose a significant threat to food production, with their development and distribution heavily influenced by temperature, rainfall, humidity, and seasonal patterns.

Winter temperatures are particularly crucial for pest survival, and rising temperatures accelerate pest development. The interaction between pests and crops is further influenced by rising CO2 levels, altering host plant attributes. Understanding and accounting for these fluctuations are essential in planning agricultural operations effectively. Key climate elements affecting plant growth and overall agriculture include carbon dioxide concentration, temperature, radiation, precipitation, and humidity. Analysis of the food grains production/productivity data for the last few decades reveals a tremendous increase in yield, but it appears that negative impact of vagaries of monsoon has been large throughout the period. In this context, a number of questions need to be addressed as to determine the nature of variability of important weather events; particularly the rainfall received in a season/year as well its distribution within the season. These observations need to be coupled to management practices, which are tailored to the climate variability of the region, such as optimal time of sowing, level of pesticides and fertilizer application.

The projected changes in mean temperature and rainfall patterns in India are significant, with forecasts indicating increases in temperature ranging from 0.1–0.3°C during kharif (August to October) and 0.3–0.7°C in rabi (June to August) by 2010, escalating to 0.4–2.0°C during kharif and 1.1–4.5°C in rabi by 2070. Simultaneously, mean rainfall is anticipated to remain stable by 2010 but could see an uptick of up to 10% during kharif and rabi by 2070. However, alongside these shifts, there's a heightened risk of climate extremes such as altered monsoon onset, increased drought intensities, and more frequent floods.

The escalation in greenhouse gas (GHG) concentrations primarily stems from human and industrial activities. Agricultural practices and organic waste management also contribute to methane and nitrous oxide buildup in the atmosphere. Despite these contributions, Indian agriculture's role in global climatic change is relatively minor, as indicated by GHG emission levels. India's total methane emission is modest at 18.5Tg per year, with agriculture (primarily rice, paddy, and ruminant animal production) accounting for 68% of this emission.

Continuously flooded rice fields are a significant methane source due to favorable conditions for methanogenesis. While estimations initially attributed a substantial portion of methane emissions to Indian rice paddies, newer assessments suggest a lower contribution of 4.2 Tg/year to the global methane budget. This reduction is attributed to factors like low organic carbon content in major rice-growing soils and intermittent flooding practices.

Nitrous oxide (N2O) emissions are rising steadily, with an atmospheric concentration increase of 0.22±0.02% per year. N2O's long atmospheric lifetime and higher global warming potential compared to CO2 make it a concern despite its lower concentration. Indian agriculture contributes relatively low total nitrous oxide emissions due to lower soil fertility and fertilizer usage compared to Western countries. However, CO2 fixation in Indian agriculture remains vital, with an estimated annual fixation of 320 Tg of C or 1000 Tg of CO2, demonstrating the sector's significant role in carbon sequestration.

Global Level

Climate change is undeniably a pressing global environmental issue, stemming from the accumulation of Greenhouse Gases (GHG) in the atmosphere. The rise in carbon dioxide concentration globally is chiefly attributed to fossil fuel consumption and land use alterations, whereas methane and nitrous oxide increases are primarily linked to agricultural activities. Global Warming, a subset of Climate Change, denotes the observable uptick in average air and ocean temperatures near the Earth's surface over recent decades. This warming trend, especially impacting developing nations, presents adverse challenges as their capabilities and resources to address such complexities are constrained.

Tamil Nadu Level

Tamil Nadu stands out as one of India's most urbanized and industrialized states, with only 22% of its income attributed to agriculture and allied sectors, a share that has been on a declining trajectory over the years. Despite this decline, approximately 40% of the state's population still relies on this sector for their livelihoods. Therefore, fostering agricultural growth is not only crucial for ensuring food security but also for enhancing living standards.

The agricultural sector in Tamil Nadu faces numerous challenges, including frequent hydro-meteorological events like droughts, heavy rainfall, and cyclones that adversely affect crops. Additionally, factors like reduced water availability, shrinking cropped areas (declining from 33% to 31% of total land area), small landholdings, soil health deterioration, decreased cropping intensity, labor shortages, reluctance to work in agriculture, and poor adoption of crop management practices contribute to the sector's pressures.

Climate change could exacerbate these challenges, potentially limiting agricultural production further. However, the state also sees opportunities for livelihood diversification in sectors like animal husbandry and fisheries, which together account for a significant portion of agriculture and allied activities' Gross State Domestic Product (GSDP).

The interconnectedness of agriculture and allied sectors means that any impact on these sectors would have cascading effects on secondary and tertiary sectors. While there's currently no systematic study assessing the direct and indirect impacts of climate change on these sectors, developing a sectoral plan would help Tamil Nadu evaluate its vulnerability to climate risks, prioritize research and development initiatives, and make informed decisions to mitigate risks through adaptation strategies.

Impacts of Climate change on India

In the past two decades, India has faced increasingly acute environmental challenges, with climate change emerging as a significant concern. This global phenomenon is affecting natural ecosystems and is anticipated to have substantial adverse effects in India, particularly impacting agriculture, which still supports 58% of the population's livelihoods. Other critical areas of concern include water storage in the Himalayan glaciers, which serve as the source for major rivers and groundwater recharge, as well as sea-level rise posing threats to the extensive coastline and human habitations.

The repercussions of climate change are multifaceted, with increased frequencies of extreme events such as floods and droughts projected. These events, in turn, will exacerbate India's existing food security issues and water security concerns, amplifying the challenges faced by the nation. Addressing these environmental challenges necessitates comprehensive strategies focusing on climate resilience, sustainable agriculture practices, water management, and coastal protection measures to safeguard livelihoods and ecosystems across the country.

Objectives of the Study

- To describe the socio-economic conditions of agriculturists in India.
- To analyse the food gran pattern and agricultural status in India.
- To study the impact of environmental, climate change on the area coverage, production and productivity of these crops.

Agriculture

Agriculture is the major occupation in Tamil Nadu. The total cultivated area in the State was 56.10 million hectares in 2007-08. The principal food crops include paddy, millets and pulses. Commercial crops include sugarcane, cotton, sunflower, coconut, cashew, chillies, gingelly and groundnut. Plantation crops are tea, coffee, cardamom and rubber. Major forest produces are timber, sandalwood, pulp wood and fuel wood. Tamil Nadu occupies a premier position in the production and extensive application of bio-fertilizers. Efforts are on to improve farming technologies so as to increase yields in the low rainfall areas of the State. Annual food grains production in the year 2007-08 was 100.35 lakh mt.

Irrigation

Important irrigation schemes and modernisation of existing Periyar Vaigai System, Palar Basin System and Parambikulam-Aliyar System besides the minor system in Vellar, Pennayar, Araniyar, Amaravathi, Chithar basins totaling, an extent of six lakh acres of existing ayacut in Tamil Nadu have been benefited by implementing the 'System Improvement and Farmers Turnover Projects' executed with assistance from World Bank. The major irrigation system covering one-third of irrigated extent in Tamil Nadu, namely tank irrigation system has been given due regard for development under WRCP, and 620 tanks maintained by Public Works Department falling under Palar, Vaigai, and Tamaraparani Basins have been taken up for rehabilitation and improvement. The State has become the pioneer State to implement the system of 'River basin management' by an individual body consisting of officials and farmers besides various representatives of the basin. To start with, Basin Management Boards have been formed for Palar and Tamaraparani basins.

Rainfall

Even with advanced sophisticated production techniques, there is an inescapable natural rhythm of events in farming. Output is influenced so greatly by climatic condition and uncontrollable biological phenomena that a large degree of variability and therefore risk always exists. Climate change plays havoc with the agricultural sector and wreak havoc on crops.

The average annual rainfall 2010-2011 worked out to 1165.mm which was higher by 28.2 percent over the normal rainfall and excess of 2.9 per cent over actual rainfall of 937.8mm during 2009-2010.Quantum of rainfall was excess in 22 district and normal in 10 districts.

The quantum of rainfall received was adequate enough to undertake agricultural activities during 2010-2011.All the districts without exception received enough rainfall as required number of farmers to take up farming operations successfully.

Food Grains Production in Tamil Nadu

The production of food grains in Tamil Nadu during the period from 1990 to 2010 is depicted in table 1.

Food Grains Production in Tamil Nadu during the Period of1990-2010

(in 000 tonnes)

S.No	Year	Food grains	Rice	Percent of Rice Production to Food grains Production
1.	1990-91	7438.1	5782.4	77.79
2.	1991-92	8245.3	6596.3	80.00
3.	1992-93	8358.0	6805.7	81.43
4.	1993-94	8257.5	6749.8	81.74
5.	1994-95	9088.0	7562.8	83.21
6.	1995-96	6405.3	5290.0	82.58
7.	1996-97	6930.0	5805.3	83.77
8.	1997-98	8103.8	6893.7	85.06
9.	1998-99	9418.7	8141.4	86.43
10.	1999-00	8968.8	7532.1	83.98
11.	2000-01	8616.9	7366.3	85.48
12.	2001-02	7731.9	6584.0	85.15
13.	2002-03	4442.1	3577.1	80.52
14.	2003-04	4406.6	3222.8	73.13
15.	2004-05	6175.8	5062.2	82.61
16.	2005-06	6127.2	5220.0	85.19

17.	2006-07	8263.0	6610.6	80.00
18.	2007-08	6582.3	5040.2	76.57
19.	2008-09	7102.3	5182.7	72.97
20.	2009-10	8034.8	5916.9	73.64

Source: *Agricultural Statistics at a Glance, Ministry of Agriculture, GOI*

As per the table, the production of food grains in Tamil Nadu has increased from 7438.1 thousand tonnes in 1990-1991 to 9088 thousand tonnes in 1994-1995. There was set back during 1995-1996 and 1996-1997 .Again during 1997-1998 the food grain production started increasing and the trend continued up to 2000-2001.From 2001-2002 onwards it again started diminishing touching 4406.6 thousand tonnes during 2003-2004.There were ups and downs in the matter of food grain production and finally is stood at 8034.8 thousand tonnes during 2009-2010.

Rice is the major food grains in Tamil Nadu. Among the Food grains, rice production occupied a major share. For example rice production was 77.79 percent during 1990-1991. This percentage witnessed an increasing trend up to1998-1999 figuring about 86.43 percent the total food grain production in Tamil Nadu. From 1999-2000 on wards the production of rice witnessed a slippery trend up to 2009-2010. It was only 73.64 percent of the total food grains production during 2009-2010.

Conclusion

Climate change significantly impacts agro-ecosystems, posing risks to the socio-economic stability of farming communities. Understanding this vulnerability requires detailed assessments of climate impacts at regional scales. This study delved into India's diverse landscape, focusing on Agro-climatic Zones (ACZs) and examining the sensitivity of major kharif and rabi crop yields to climate shifts. The analysis revealed notable changes in temperature and rainfall patterns over time. Between 1966 and 2011, mean maximum and minimum temperatures increased, with more pronounced shifts in mean minimum temperatures across ACZs. Rainfall exhibited an annual decline in the Himalayan and Gangetic Plains regions but increased in Coastal, Plateau and Hills, and Western Dry Regions. This variability influenced the area coverage, production, and productivity of food grains, with paddy dominating the trends. In Tamil Nadu, food grain production, particularly rice, showed significant growth during 2004-2005. However, the study highlighted a decrease in area coverage, production, and productivity from 2005-2012, especially for crops like jowar, bajra, maize, and others reliant on rain-fed farming. The findings underscore the need for substantial investments in India's farming sector, focusing on enhancing farmers' capacity. An integrated approach is crucial for assessing farmers' perceptions, adapting to changing climatic conditions, and guiding policymaking to ensure food security and farmers' well-being.

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CLIMATE CHANGE IMPACT MITIGATION AND ADAPTATIONS

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Abstract
In substance, adaptation can be understood as the process of conforming to the current and future goods of climate change. Mitigation means preventing or reducing the emigration of hothouse feasts(GHG) into the atmosphere to make the impacts of climate change less severe. The Assessment Report published by the IPCC in 2001 countries,' there's new and stronger evidence that ultimate of the warming observed over the last 50 times is attributable to mortal exertion '.
Keywords: *climate change, mitigation, adaptation, global warming, emission trading.*

Introduction

In substance, adaptation can be understood as the process of conforming to the current and future goods of climate change. Mitigation means preventing or reducing the emigration of hothouse feasts (GHG) into the atmosphere to make the impacts of climate change less severe.

Adaptation Means

Anticipating the adverse goods of climate change and taking applicable action to help or minimize the damage they can beget, or taking advantage of openings that may arise. Samples of adaptation measures include large- scale structure changes, analogous to erecting defenses to cover against ocean-- position rise, as well behavioral shifts, analogous to individualizes reducing their food waste. In substance, adaptation can be understood as the process of conforming to the current and future goods of climate change. Mitigation means preventing or reducing the emigration of hothouse feasts (GHG) into the atmosphere to make the impacts of climate change less severe.

Mitigation is achieved either by reducing the sources of these feasts —e.g. by adding the share of renewable powers, or establishing a cleaner mobility system — or by enhancing the storage of these feasts —e.g. by adding the size of timbers. In short, mitigation is a mortal intervention that reduces the sources of GHG emigration and/ or enhances the cesspools.

The term" mitigation" has a long history of use in the environmental or natural disaster fields, where it constantly refers to remedial conduct to reduce the impact of an event. It's constantly confused with" climate adaptation. " Mitigation in climate wisdom is more visionary than reactive, observed warming from 2010 to 2019(relative to 1850 – 1900) is compared to contributions from both criterion and radioactive forcing studies in the Intergovernmental Panel on Climate Change's(IPCC) Climate Change 2021report.

Mitigation

Mollifying the trouble of climate change through reductions of GHG emigration involves a variety of strategies including, reducing the use of energy rested on archconservative powers, levee and sequestering GHGs and other climate pollutants like black carbon before they reach the atmosphere Exploring styles for lodging and sequestering CO2 from the atmosphere. Federal, state, and indeed some original governments, as well as private sector realities, have developed public policy or association-specific guidelines that direct or produce impulses to reduce GHG emigrations. Effective

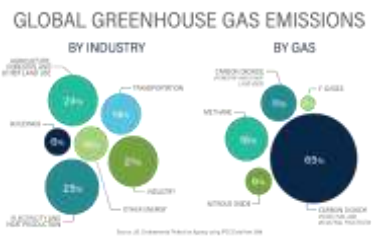
performance of these strategies constantly involves thorough monitoring and account to ensure that the pretensions established fortified.

Causes and goods of climate change

Fossil powers – coal, oil painting oil oil painting oil painting oil, and gas – are by further the largest contributor to global climate change, counting for over 75 percent of global hothouse gas emigrations and nearly 90 percent of all carbon dioxide emigrations. As hothouse gas emigrations blanket the Earth, they trap the sun's heat. This leads to global warming and climate change. The world is now warming faster than at any point in recorded history." The magnitude and rate of climate change and associated risks depend strongly on near- term mitigation and adaptation conduct, and projected adverse impacts and related losses and damages escalate with every proliferation of global warming."

Eventuality for Mortal Exertion

The eventuality for mortal exertion to beget global warming has been recognized for well over 200 times. Still, the added frequency, duration, and intensity of extreme downfall and climate events associated with that warming has led to wider recognition of the direct goods that climate change is having on our terrain and structure, including increased conservation, docked life cycles, and paragliding capital and emergency response budgets. Addressing climate change and its impacts generally requires conduct that can be grouped into two orders — adaption's. Mitigation. This allowed the leadership post to explore the two conducts and note several EA cases in point in addressing these complex challenges.



Due to their significant donation to radioactive forcing, reducing CO2 emigrations and short- lived climate pollutants is the primary thing of climate mitigation. CO2 sources vary, but their emigration is dominated by the use of archconservative powers. The most obvious result for multitudinous guests is to reduce their use of archconservative powers through energy effectiveness, which yields the fresh benefit of reducing energy- combined charges. Switching from coal to lower carbon ferocious powers like natural gas or, more yet, renewable energy sources.

Climate Change Adaptation Strategies

Climate change adaptation strategies vary greatly depending on region and trouble, and constantly several must be combined to address specific enterprises. Changes in other aspects of climate and downfall — longer and farther violent heat swells, longer summers and shorter layoffs, and further extreme swings in summer and fall storms are also forcing adaptation in cooperative design, transportation systems, operation of the energy grid, and nearly every other element of quotidian life. Conclusion

The Assessment Report published by the IPCC in 2001 countries,' there's new and stronger evidence that ultimate of the warming observed over the last 50 times is attributable to mortal exertion '. Hence, it's possible to palliate climate change and GHG emigration to a certain position, though not completely, by mortal beings.

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THE IMPACT OF CLIMATE CHANGE ON FINANCIAL SECTOR-AN OVERVIEW

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Introduction

Central banks and financial regulators are the affected by climate change Climate change is result environmental pollution. Evermore-ferocious cyclones and extended droughts lead to the destruction of infrastructure and the disruption of livelihoods and contribute to mass migration. Actions to combat climate change, people should be awakened to the need for renewable sources of energy and automakers accelerate investments in green vehicles. We can estimate the immediate costs of changing weather patterns and more frequent and intense natural disasters, but most of the calculative costs lie beyond the horizon of the typical economic analysis. The economic impact of climate change will likely accelerate, though not smoothly. Crucially for the coming generations, the extent of the damage will depend on policy choices that we make today. Policymakers and investors increasingly recognize that climate change's important implications for the financial sector.

Objectives

1. To know the physical risks, arising from damage to property, infrastructure and land.
2. To identify the transition risk, results from changes in climate policy,
3. To study the technology, and consumer and market sentiment during the adjustment to a lower-carbon economy.

Methodology

Secondary data was collected to know the impact of climate change on financial sector.

Scope of the Study

Climate change makes significant impact in financial sector. It helps to bring about awareness on climate change carbon neutrality low concentration of GHG specifically financing the development of new technologies. Mitigation of climate change would lead to benefits not only to the individual but also for the community as whole through collective Action for Sustainable development.

Efforts to predict climate-related risks into regulatory frameworks face important challenges,

Climate change affect the value of bonds shares and securities and decrease the profit of corporate companies. People are started making move from vulnerable area to normal one because of this migration financial conditions are affected worsely. Underwriting losses Lowervalue of stranded assets Asset destruction Credit losses (residential and corporate loans) Reconstruction/ replacement Operational risk (including liability risk) Increase in energy prices with dislocations affect the middle-income economies. They are typically more vulnerable to physical risks.

For financial institutions, physical risks can materialize directly, through their exposures to corporations, households, and countries that experience climate shocks, or indirectly, through the effects of climate change on the wider economy and feedback effects within the financial system.

There is evidence that losses from natural disasters are already increasing., insurance and premium charges more expensive or even unavailable in at-risk prone areas of the globe.

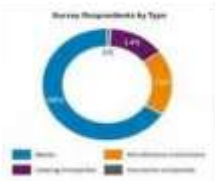
Carbon pricing and other fiscal policies have a primary role in reducing emissions and mobilizing revenues but the financial sector has an important complementary role.

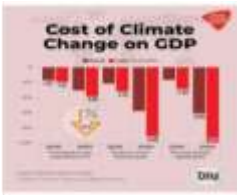
Financial institutions and markets already provide financial protection through insurance and

other risk sharing mechanisms catastrophe bonds, has been introduced to partly absorb the cost of disasters. But the financial system mobilize the resources for mitigating the greenhouse gases to comb at the climate change and carbon neutrality.

Several measures have been adopted to reduce the carbonmonoxide. Banks are asked to sanction the loan for purchasing ecofriendly vehicles.

In other words, if policymakers implement policies to price in externalities and provide incentives for the transition to a low-carbon economy, the financial system can help in achieving these goals to ensure the smooth functioning of. financial institutions.





i. The investors are asked to invest only in sustainable and ecofriendly projects

ii. The international monetary fund asses the various physical risk and operational risk while extending the financial aid to member countries.

iii. Climate change is a major threat to financial system. International Monetary Fund is taking necessary effort to assess the macro-economic implications. through stress testing programme. Measures are to taken to reduce the disasters; IMF advises the member countries to adapt the low carbon strategy.

1. Climate change affects the house owners adversely they will. Have problem in mortgaging their destructed property.

- Financial institutions incur the losses in lending because of heavy Insurance cost. Most of the banks and financial institutions a reseverely affected by the climate shocks.
- These firms could see their earnings decline, businesses disrupted, and funding costs increase because of policy action, technological change, and consumer and investor demands for alignment with policies to tackle climate change.
- Banks are recommended that to follow the changing terms and conditions to sanction the loans and advances to the corporate companies. and giving discounts on loans for sustainable projects.
  - o Central banks should revise the frame works for their refinancing operations to incorporate climate risk analytics, possibly applying larger haircuts to assets
  - o Banks are also beginning to adjust their lending policies to control the effects of climate change

Suggestions

- Sustainable finance can contribute to climate change mitigation by providing incentives for firms to adopt less carbon-intensive technologies.
- Channels through which investors can achieve this goal include engaging with company management, advocating for low-carbon strategies as investor activists materially exposed to physical or transition risks.
- The IMF has recently joined the non-government financial institutions and is collaborating with its members to develop an analytical framework for assessing climate-related risks.
- Greater standardization would also improve the comparability of information in financial statements on climate risks
- Finance will have to play an important role in managing carbon taxes and energy- saving measures that reduce the emission of greenhouse gases will drive the creation of new technologies.

Conclusion

Finally, climate change poses a major and serious complicated and expanding collection of dangers to the financial business. Banks must identify and manage these risks proactively to maintain their long-term financial health and resilience. This

involves factoring climate risk into lending and investing decisions, implementing sustainable practices, and remaining current on evolving regulations and industry best practices to

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CLIMATE CHANGE AND ITS IMPACTS IN TAMIL NADU

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Abstract
This research paper analyzed the climate change and its impacts on Tamil Nadu. Tamil Nadu will likely face more challenging environmental conditions by the latter part of the century, potentially making the environment less suitable for ecosystems and crop growth. Additionally, the changing climate could lead to more frequent heat waves and health risks. Moreover, the chance of experiencing rainfall over a day is higher than over a week, suggesting that the duration of extreme weather events will likely shorten but their intensity will increase. It was also found that the El Nino Southern Oscillation plays a role in the North East Monsoon rainfall in the coastal areas of Tamil Nadu. These changes will have significant effects on agriculture, health, water resources, and coastal and economic activities. The anticipated results of the planned initiatives under the Tamil Nadu Climate Change Mission include: Focusing on sectors within districts that are at risk from climate change, Developing detailed plans for adaptation and reduction of greenhouse gas emissions, Safeguarding coastal areas, minimizing soil erosion, managing salt levels, and enhancing biodiversity, Improved coordination, efficient monitoring, and oversight of climate-related projects. These demonstration projects will highlight key strategies for making culturally and heritage-rich buildings more resilient to climate change.
Keywords: *climate change, monsoon, biodiversity, environmental, tamil nadu.*

Introduction

Tamil Nadu relies heavily on the monsoon season for replenishing its water supplies, and any failure in the monsoon results in a severe shortage of water and a prolonged drought. Over the thirty-year period from 1989 to 2018, the state received an average annual rainfall of about 898 millimeters, with 48 percent coming from the North East monsoon and 35 percent from the South West monsoon. However, there have been several instances of intense rainfall over the years, recording more than the average. The summer temperatures in Tamil Nadu rarely exceed 45 degrees Celsius, and the winter temperatures rarely drop below 18 degrees Celsius. Studies have shown a significant trend in extreme weather conditions compared to the period from 1970 to 2000, with a notable increase in minimum temperatures and a rise in the number of days reaching 40 degrees Celsius in the summer. Research on temperature and rainfall across various districts in Tamil Nadu, including Chennai, Kancheepuram, Kolli hills, Cuddalore, and Thanjavur, has revealed a range of variations in these weather patterns. The rising temperatures and shifts in rainfall patterns in Tamil Nadu are expected to have a more profound impact on the state's diverse ecosystems and certain vulnerable communities, highlighting the complexity of these issues. The effects of climate change on the environment and the livelihoods of people could lead to impacts on health, agriculture, forests, water resources, coastal regions, wildlife, and natural habitats. It is crucial to understand how climate change affects vulnerable populations and to develop targeted strategies for preserving the state's diverse ecosystems while ensuring inclusive and sustainable growth.

Data from the PRECIS regional climate model, which is based on scientific research, suggests that the highest temperatures in Tamil Nadu could rise by approximately 3.1 degrees Celsius, with a general increase ranging from 3.3 to 3.5 degrees Celsius. On the other hand, the lowest temperatures are expected to increase by about 3.5 degrees Celsius. The projections for the lowest temperatures consistently show higher values compared to the highest temperatures, with a difference of anywhere from 0.2 to 0.5 degrees Celsius. There is no significant change expected in rainfall by the end of the century across the entire state of Tamil Nadu. However, there is a slight uptick in rainfall during the northeast monsoon season. The rainfall and temperature forecasts from

PRECIS were analyzed against actual data from 1970 to 2000 in Tamil Nadu. Tamil Nadu is recognized as a state that is particularly vulnerable to extreme weather events, experiencing frequent cyclones and droughts. Future projections clearly show a higher likelihood of extreme temperature events, which could have severe health impacts on the public. The study suggests that daytime temperatures could increase by 3.30 degrees Celsius and nighttime temperatures by 3.55 degrees Celsius, while there could be a decrease in rainfall by 3.24% by the end of the century. The forecast for the highest daytime temperatures during the summer months is expected to rise significantly. These findings indicate that Tamil Nadu will likely face more challenging environmental conditions by the latter part of the century, potentially making the environment less suitable for ecosystems and crop growth. Additionally, the changing climate could lead to more frequent heatwaves and health risks. As a coastal state, Tamil Nadu is at risk of rising sea levels. It has been estimated that the average sea level rise for the study area could range from 7.12 to 36.98 centimeters under the Representative Concentration Pathways (RCP) 2.6 scenario; from 7.39 to 50.01 centimeters under RCP 4.5; from 7.18 to 51.91 centimeters under RCP 6.0; and from 7.40 to 78.15 centimeters under RCP 8.5 by the year 2100. Regarding extreme rainfall, there is a general upward trend, increasing the risk of storm and flash floods in the 2080s. Moreover, the chance of experiencing rainfall over a day is higher than over a week, suggesting that the duration of extreme weather events will likely shorten but their intensity will increase. It was also found that the El Nino Southern Oscillation (ENSO) plays a role in the North East Monsoon rainfall in the coastal areas of Tamil Nadu. These changes will have significant effects on agriculture, health, water resources, and coastal and economic activities.

Water Resources

A study on the effects of climate change in Chennai, a rapidly expanding economic hub in South India, reveals that rising temperatures, unpredictable rainfall, higher sea levels, and extreme weather conditions will impact crucial areas like water supply, infrastructure, public health, natural ecosystems, energy, and transportation. The research on how climate change influences river flooding in the Adyar area suggests that during a 100-year flood event, the maximum flow rate is expected to rise by 34.3% to 91.9% under future climate conditions, compared to the current climate. Additionally, the forecasts indicate that the area prone to flooding could expand by 12.6% to 26.4% according to Global Climate Models (GCMs). Further analysis of how climate change affects the ability of storm drains to handle floods under both current and future climates led to the identification of areas at high risk of flooding. Recommendations for flood prevention strategies were made to lessen the risk of flooding in these areas, which are expected to worsen in the coming years. The loss of green spaces, shifts in how land is used, population growth, and alterations in the climate are all factors contributing to the development of Chennai's infrastructure, including the implementation of climate-friendly policies and the building of the city's resilience.

Agriculture

Tamil Nadu, known for its agricultural activities, is at risk from the effects of climate change on various agricultural and related sectors. A study of projects in Kancheepuram district shows a downward trend in soil moisture levels from 2040 to 2070. This shift could lead to changes in farming practices, reduced crop yields, and an increase in pest and insect infestations, posing a threat to the state's agricultural biodiversity and food security. According to projections for Chengalpattu district in Tamil Nadu, there could be anywhere from 3 to 23% more days of drought in certain areas of the district's south-east region. This situation highlights the need to integrate drought-resistant strategies into development plans to improve the resilience of agriculture and water management. The analysis of climate change's projected effects on agriculture and water management shows that under the RCP 4.5 scenario,

there could be significant drops in the yields of major crops like C3 and C4 crops along Tamil Nadu's coastlines, impacting local food security and the livelihoods of farmers. Strategies tailored to the agricultural sector and those that are directly experienced by farmers at the local level show potential for success in adaptation.

Coastal Areas

Lined with a 1,076-kilometer stretch of coastline, Tamil Nadu is particularly at risk from the combined effects of rising sea levels and shifts in other climate factors such as temperature and precipitation. The susceptibility of coastal regions in the Vellar-Coleroon estuarine area of Tamil Nadu's shoreline to flooding, based on sea-level rise projections of 0.5 meters and 1 meter, has been calculated. It was found that approximately 1,770 hectares of land would be permanently flooded at 0.5 meters and 2,407 hectares at 1 meter. This has also led to the loss of three key coastal natural assets: coastal farming, mangroves, and fish farming. It has been noted that six communities' settlements, which rely on these assets, are at significant risk and vulnerability to a 0.5-meter sea-level rise, and 12 communities to a 1-meter rise. An examination of rainfall records at Pichavaram mangroves in Cuddalore district, Tamil Nadu, indicates a slight upward trend in the average annual total rainfall and a clear increase in the mean maximum temperature (MMaxT) and mean annual temperature (MAT), which could both present challenges and opportunities for the flourishing of the diverse mangrove ecosystem in the face of future climate change. Research along Tamil Nadu and Puducherry's coasts has shown that the expected average sea-level rise for these areas could range from 77.39 centimeters to 50.01 centimeters under RCP 4.5, which would pose significant threats to coastal ecosystems, infrastructure, populations, livelihoods, and other coastal resources.

Urban Areas

Over time, it has been observed that in cities like Chennai, discomfort from high temperatures, known as the Thermal Heat Index (THI), is most pronounced in the months of May and June, followed by July, August, April, and September. It is anticipated that in the coming decades, there will be a 2.0°C rise in THI during the winter and after the rainy season in the middle of the century. Research on sustainable living in urban areas of Chennai also looked into the levels of water pollution, particulate matter, and the prevalence of diseases spread by insects and water. With increasing awareness of climate risks, a detailed analysis of these risks and their effects on achieving sustainable development goals (SDGs) in Tamil Nadu has been conducted. This analysis highlighted the districts most at risk, with Ariyalur being identified as the most vulnerable due to its high sensitivity to climate risks and limited ability to adapt. Other at-risk districts include Nagapattinam, Ramanathapuram, Thiruvarur, Thiruvallur, Thanjavur, Perambalur, Pudukottai, and Thiruvannamalai. The findings of this study serve as a warning sign of concerning socio-economic and infrastructure conditions in these districts and can guide planners in focusing on building climate resilience.

In line with the Tamil Nadu Climate Change initiative, the Tamil Nadu State Government is incorporating climate considerations into local development strategies to make districts and villages more resilient to climate change. To achieve this, the Environment, Climate Change, and Forest Department has launched a unique program. This program establishes District Climate Change Missions to enhance the state's climate resilience. The District Collectors are appointed as the Directors of these missions, while the District Forest Officers are appointed as the Climate Officers. The District Climate Change Mission will develop and implement specific strategies and action plans tailored to each district's needs for adaptation and mitigation. Additionally, officials from all departments within the districts will receive training on managing climate-related risks and will be educated on the importance of proactive measures to address the climate emergency. Each project in a district will

undergo a climate change assessment by the District Climate Change Mission. The state has allocated a budget of 3.80 crores for 38 districts, with each district receiving Rs. 10 lakhs to support climate action at the local level.

Conclusion

Tamil Nadu will likely face more challenging environmental conditions by the latter part of the century, potentially making the environment less suitable for ecosystems and crop growth. Additionally, the changing climate could lead to more frequent heatwaves and health risks. Moreover, the chance of experiencing rainfall over a day is higher than over a week, suggesting that the duration of extreme weather events will likely shorten but their intensity will increase. It was also found that the El Nino Southern Oscillation plays a role in the North East Monsoon rainfall in the coastal areas of Tamil Nadu. These changes will have significant effects on agriculture, health, water resources, and coastal and economic activities. The anticipated results of the planned initiatives under the Tamil Nadu Climate Change Mission include: Focusing on sectors within districts that are at risk from climate change. Developing detailed plans for adaptation and reduction of greenhouse gas emissions. Safeguarding coastal areas, minimizing soil erosion, managing salt levels, and enhancing biodiversity. The cultivation of Palmyrah and cashew trees offers strategies to withstand drought and serve as barriers against erosion. The planting of mangroves strengthens coastal defense. Identifying areas that are both vulnerable and environmentally sensitive along Tamil Nadu's coastlines will ensure the long-term protection of these areas. Enhanced absorption of carbon from the soil. The restoration of soil organic carbon, increased ability to retain water, and greater availability of nutrients, all of which are advantageous for plant growth and the health of microorganisms, as well as the recovery of land following bio mining. The adoption of more energy-efficient technologies will lead to a reduction in greenhouse gas emissions. Educating service providers on the use of energy-efficient technologies in construction. The development of a strategy to establish and enforce policies that promote energy efficiency in buildings. A deeper understanding of the climate risks will foster local support for policy decisions. The incorporation of adaptation strategies for climate variability in water management, forestry, agriculture, and related sectors, along with the adoption of resilient agricultural practices. The implementation of energy-efficient measures and the increase in forested areas within Tamil Nadu's villages. Improved coordination, efficient monitoring, and oversight of climate-related projects. These demonstration projects will highlight key strategies for making culturally and heritage-rich buildings more resilient to climate change.

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