Environmental Conservation and Sustainable Development : A Pragmatic Perspective

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Environmental Conservation and Sustainable Development: A Pragmatic Perspective

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An Edited Book

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"Environmental Conservation and Sustainable Development: A Pragmatic Perspective"

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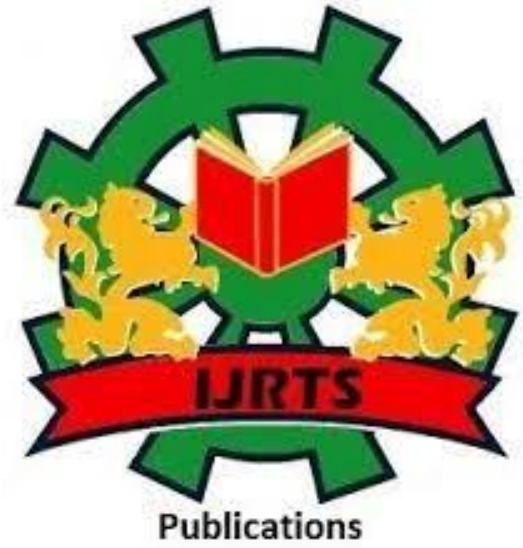

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PREFACE

Environmental Conservation and Sustainable Development are two intertwined concepts that seek to address the pressing challenges of preserving the Earth's natural resources and ecosystems while promoting human well-being and economic growth. A pragmatic perspective involves practical and balanced approaches that consider both environmental concerns and socio-economic realities.

Environmental conservation entails the protection, management, and restoration of natural resources, ecosystems, and biodiversity. It recognizes that ecosystems provide essential services like clean air, water, fertile soil, and habitat for countless species, including humans. A pragmatic approach for conservation through biodiversity protection involves preserving the diversity of plant and animal species. It is crucial for ecosystem stability and resilience. Protected areas, habitat restoration, and sustainable land-use practices help prevent species extinction. It involves resource management which can be done by implementing strategies to manage resources like water, forests, fisheries, and minerals sustainably. This includes regulations, quotas, and efficient use to prevent overexploitation and depletion. Conservation calls for pollution control measures that need to address pollution through regulations and technologies to reduce negative impacts on air, water, and soil quality. Recycling and waste reduction are key components in this respect. Conservation envisages climate change mitigation measures like reducing greenhouse gas emissions through renewable energy adoption, energy efficiency, afforestation, and sustainable transportation options.

Sustainable development aims to meet the needs of the present without compromising the ability of future generations to meet their own needs. A pragmatic approach to sustainable development entails balancing economic growth, social equity, and environmental protection. Its key principles include economic viability which encourages economic growth that creates jobs, improves living standards, and supports infrastructure while minimizing resource depletion and environmental degradation. It suggests social equity for ensuring that development benefits all segments of society, including marginalized communities. This involves access to education, healthcare, clean water, and basic services. This goal can be achieved with environmental protection by integrating environmental considerations into development planning, policies, and projects. This includes assessing environmental impacts and adopting eco-friendly practices. Community engagement ensures sustainable development as it involves local communities in decision-making processes to ensure that development projects align with their needs and values.

Lastly, a pragmatic perspective on environmental conservation and sustainable development recognizes that there might be trade-offs between environmental goals and economic growth. However, it emphasizes finding win-win solutions that promote both. Some pragmatic strategies include green technologies like Investing in and promoting technologies that reduce resource consumption, emissions, and waste while

enhancing economic productivity. Policy Integration integrates developing policies that harmonize environmental protection with economic growth, considering long-term benefits over short-term gains. Public-private partnerships like collaborations between governments, businesses, and non-governmental organizations can leverage resources and expertise for sustainable projects. Education and awareness about environmental issues and sustainable practices can lead to individual and collective behavior change. Incentive structures are very useful as it creates incentives for businesses and individuals to adopt sustainable practices, such as tax incentives, subsidies, and certifications. In a pragmatic approach to environmental conservation and sustainable development, the goal is to find realistic solutions that acknowledge the complexity of the challenges we face while ensuring a balanced and prosperous future for both people and the planet.

The primary aim of the book is to promote research and innovative ideas in the field of Geography, especially environmental management through sustainable development. The topic is very relevant for research for young researchers and scientists. It initiates scientific collaboration with recent developments in different areas of their interest. The collaborators can express their views from a Geographical point of view.

The book has been prepared by including the papers/ case studies presented by research scholars/ researchers/ scientists/ professors in the One Day National Seminar entitled "Environmental Conservation and Sustainable Development: A Pragmatic Perspective" organized by the Department of Geography, Govt. College, Hisar on dated 18-03-2023. This book contains 32 chapters. The chapters primarily focus on sustainable development daand conservation of our environment that meets the needs of the present without compromising the ability and needs of future generations.

This book would not have been possible without the permission of the Director, Higher Education, Haryana. It was further supported by the undaunted efforts of all the teachers of the Department of Geography, Govt. College, Hisar.

We are highly thankful to all the persons who directly or indirectly supported and contributed in publication of this book.

Editors

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Sh. Rajender Singh,
Dr. Balwan Singh

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Environmental Preservation and Social Responsibility in Sustainable Development: A Case Study

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Govt. PG College for Women, Rohtak

Abstract:

The Planning Commission originally studied the Tehri Dam in 1949, and it was given the go- ahead in 1972. It is planned that the outer Himalayan dam, which would be 260.5 meters tall and located in the Garhwal region of contemporary Uttarakhand, will rank as the fifth-highest dam in the world. In quest of employment, most males from the Garhwal area go to the plains, where they either join the military or work as truck drivers. Women tend to household needs, travel considerable distances to obtain water, labour on the farm, gather firewood and medicinal plants from the forests, and operate side enterprises to bolster the family's revenue. They are the guys with the abilities. The dam is situated on seismic fault region. Amongst 1816 and 1991, the area had seventeen quakes. The Tehri dam has been the subject of the most contentious public debate on seismicity and dam safety. The dam's complete socioeconomic and physical Effect, as well as its geophysical assessment, have all been studied.

Key words: Tehri Dam, Socioeconomic; Physical Effect, safety.

Introduction

Deri Dam in Tehri, the discussion of the development of the infrastructure in the northern hill states, namely the Garhwal region of Uttarakhand, is not new to controversy. The controversy has been sparked by three factors: the dam will uproot a large population and immerse several towns; this region is prone toward earthquakes, and the dam might be structurally sound flawed and reason one or, if it does not, facilitate one that could cause even greater destruction, and it determination result hundreds of thousands of persons are killed, and downstream communities are destroyed with significant spiritual significance. These worries take all sparked widespread unrest across the country and led to civic demonstrations.

Environmental concerns also add to the dispute, in addition to the human rights problem. Development and "environment and safety of the masses" have therefore been in conflict. The purpose of this essay remains toward examine the Tehri dam project cutting-edge all the situation aspects.

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Tehri Dam-A Lookback

This Dam, which is the 3rd largest dam in the Himalayan area after the Bhakhra and Pong Dams, situated on the Bhagirathi River in the district Garhwal, some eighty kilometres upriver of Rishikesh (Fig. 1).

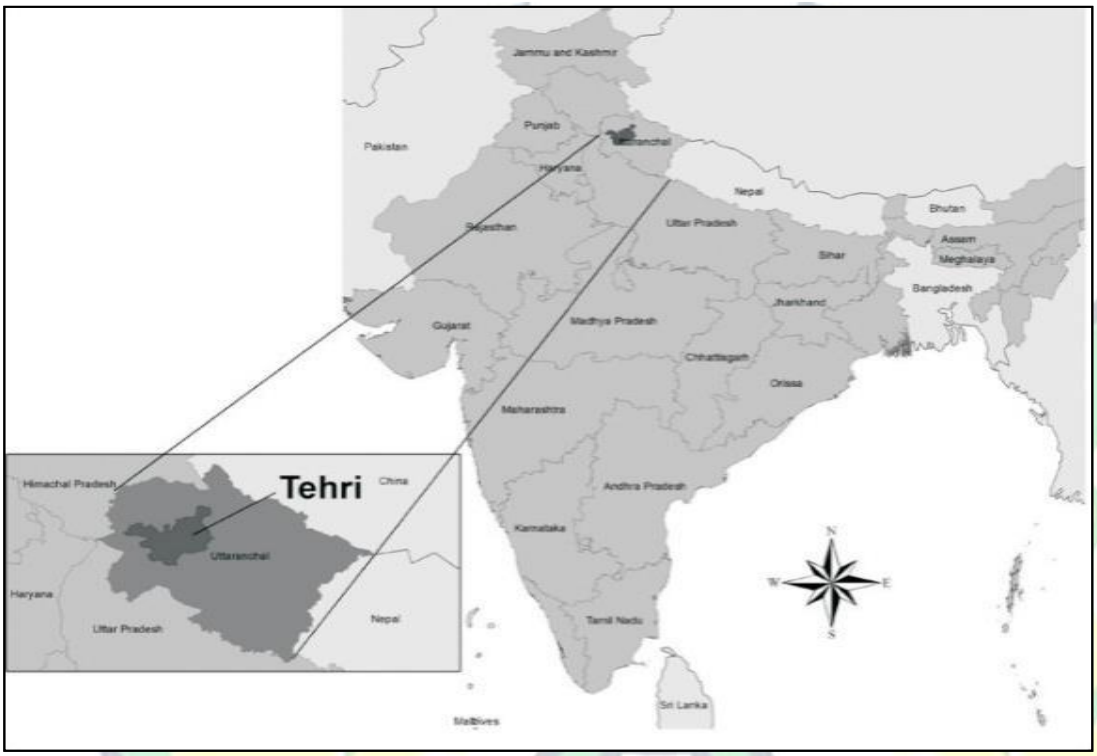

Figure 1

Even though it has enormous developmental significance for the country, widespread demonstrations have been taking place all around the country since its conception in 1949. Based on preliminary research in 1961, the project was planned and developed by a control producing volume of 600 Mega Watt in 1972. Construction on the project was begun in 1978 after a feasibility study, but owing to environmental and resettlement concerns, it had to be delayed despite continued administrative, social, and environmental operations.

In 1968, the USSR committed to help us build the dam on a turnkey basis and provided the necessary technical and fiscal support, which they subsequently extracted owing to political shifts. The construction of the dam was then planned by the Indian government using its own financial and technological resources. As the project was intended to offer more irrigation in Uttar Pradesh, the Department of Irrigation of Uttar Pradesh initially assumed the major part in its implementation. A cooperative venture between the central government and the government of Uttar Pradesh advanced

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Figure 2: Tehri Dam

the dam's further construction. Here, it was agreed that the state government of Uttar Pradesh would be responsible for funding the whole irrigation component while the central government would provide 3/4 of the equity investment in the hydropower component. When the Ministry of Forestry and Environment awarded the project a provisional license to move forward in 1990, the Dam project was altered from its initial 600Maga Watt to a new 2400 multifunctional project to be constructed in three stages. It was intended for the updated project to be developed in the subsequent phases.

The 1000 MW Tehri Dam and Hydropower Plant, which has a surface area of 42 sq km and an 830 m full reservoir level, is located directly downstream of the historic town of Tehri.

About 22 km downriver of Tehri's primary dam is the Koteshwar Dam and Hydropower Plant. (400 Maga Watt). The 1000 MW Tehri Dam and Hydropower Plant, which lifts water from the lower Koteshwar Dam to the a higher Tehri Dam mostly at non-peak times to produce 1000 MW of electricity during peak periods.

Tehri Dam amidst Protests

The government, locals, environmentalists, and other social workers have been at odds over the construction of this project. The struggle against the construction of the dam was advanced by the Tehri Bandh Virodh Sangharsh Samiti (TBVSS), which was founded in 1978 and is currently led by activist Sunderlal Bahuguna of the Chipko people (Picture 2).

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Ownable Supreme Court heard the case of the January 24, 1978-founded Tehri Bandh Virodhi Sangharsh Samiti (TBVSS). The petition was rejected by the Supreme Court. The campaign gained further traction after the Environmental Appraisal Committee (EAC) declined to approve the proposal. All in vain because the project was not stopped.

The project and design must be reviewed as a result of the 6.6 Richter earthquakes that occurred on October 20, 1991. The presence of seismic activity in the area helped to mobilize support for the initiative. However, the construction work went on. On December 14, 1991, hundreds of protesters occupied the dam site and stopped construction for 75 days in the first significant protest. As a result of Sunderlal Bahuguna's 45-day death-defying fast, the PM was forced to reassess the project and halt all blasting. With time, the protest grew weaker. The Tehri project is sometimes referred to as "Kamdhenu" by specialists since everyone involved—contractors, transporters, and politicians—benefited. Even after being called the "Himalay Bachao Aandolan," the anti-Tehri dam could not support itself for the past ten years. Additionally, it should be noted that the Tehri dam is not even mentioned once included in the World Commission on Dams report.

When a significant Dam-burst from a landslide happened in the upper watershed of the river in 1978 during the monsoon season, the opposition switched to environmental

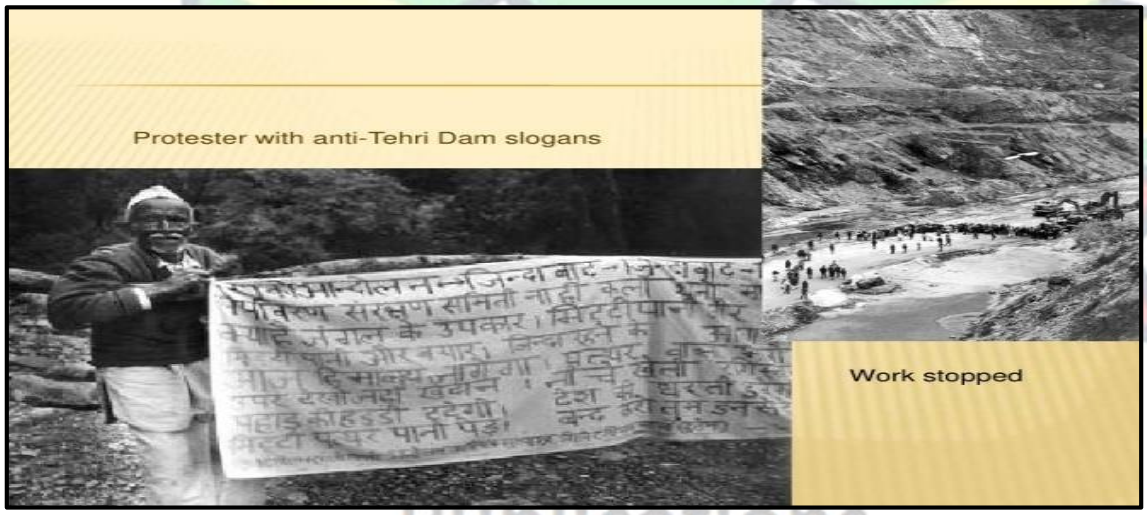

Figure 3: An activist carrying signs opposing the dam

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reasons, resulting in destructive floods that extended the dam's construction location is quite a way downstream. The region's earthquake danger was increased as a result. The issue of seismicity in the Himalayan area was emphasized in the report of the government working group. The protest's primary tenets were the need for proper restitution and relocation for the exiled people, greater tariffs of

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siltation, length of the dam's lifespan, & the seismic danger connected to huge dams.

Development-Us vs them

Inundation of human settlements and agriculturally productive land would be the first of the potential effects and differences in people's lives, followed by the uncertainty of desired compensations in terms of so-called maintenance of living standards at least at the same level as before rehabilitations. According to India's national policy, "those displaced should have living standards maintained at least at the same level, if not improved to what they were before their involuntary displacement." Uncertainties surrounding the restoration and compensation have led to strong criticism from the general populace.

EAC (The environmental Appraisal Committee) noted in its assessment that although the project's authorities had first intended to purchase forest property for rehabilitation purposes, since the Forest Conservation Act of 1980 was enacted, the project's designated forest area is no longer available. As a result, the outsees are more unclear than ever about where they will get rehabilitation. It became necessary to resolve the displacement and compensation problem through negotiated agreements. Customers should appropriately pay for Himalayan water if it is economically necessary for the plains. Making the people living upstream give up their economic interests shouldn't be attempted since that will just make the issue of relocation and compensation more difficult to resolve.

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Gender in Displacement

The gender component of the issue is included by Vandana Asthana since women play a significant role in the economic life of hillside communities. According to her, a survey done in the Garhwal area found that most males go to the plains in quest of work and are primarily hired as soldiers or lorry drivers. Its use of money orders, the women oversee organizing the family and the public. Women take care of home requirements, go a great distance to acquire water, labor on the land, gather firewood and

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herbs from the forests, and run side businesses to supplement household income. They are the able-bodied guys. The ecosystem of the hill includes women as a vital component. The backbone of Uttarakhand's mountain community is its women. Because the state has a labor-intensive and demonetized economic structure, those who were displaced are now subject to the whims of the black market and their own middlemen.

Life of the Reservoir

The main determinant of a dam's economic performance and efficiency is its rate of sedimentation. Both the suspended matter and the divan load are involved in the sedimentation. The Himalayan Rivers transfer approximately of the largest sediment loads in the world as a result of their unique geological and climatic characteristics. Using data, scientific approaches, and procedures to oppose the development that further stated that it was based on research was a very significant and well-liked drive of the anti-dam campaigns. Not just in TBVSS, but in several other papers as well, similar issues were raised and, after examining social, technical, and ecological aspects, the life of a dam was discovered to be 61.4 years, although earlier research had predicted it to be between 30 and 50 years.

Because of this discrepancy in the Calculating the sediment load is difficult, and there isn't a reliable method for estimating the impact of a single event, significant flood event regarding the nature of sediment transfer, the calculation of the lifespan of dams in the Himalayas is essentially no dissimilar from an educated guess. The development of the sediment load is mostly influenced by other geological processes, disregarding the characteristics of the Himalayan watersheds. Any form of catchment area remediation won't be able to lessen this.

The project officials have said that the siltation in 1978 year of the significant landslide dam break in the higher catchment was exceptional, the EAC noted. This demonstrates how, in the Himalayan environment, large-scale events like landslides have a significantly greater influence on sediment creation than homogeneous soil erosion-related processes. Assumed rates of siltation have been exceeded by four to five times in other significant Himalayan dams, such as the Pong in Himachal Pradesh and the Ram Ganga in Uttar Pradesh. This approach could not be worthwhile since a large sediment load would result in a shorter economic life for the dam.

Sustainability of Mega Dams in the Himalayas, Big or Small

The dam, which is one of the biggest in the world, is essentially a clay central kind soil and rock occupied structure. The proponents of huge dams assert that because of their substantial inertia, high levels of sustainability and adaptability, these types of dams (earth and rock fill) are inherently superior

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to concrete dams in terms of earthquake resistance. Among the effects of huge dams are:

These initiatives were prepared well before the present international anxiety on satisfying rehabilitation, info exchange, ecological evaluation, catchment treatment, & other considerations. Large scale immersion and therefore displacement & a distant likelihood of suitable recovery.

Additionally, social, and environmental implications were not given much thought when projects were approved in fact, even after taking these factors into account, a lot of the paperwork still doesn't reflect reality.

Storage loss owing loss of the fertile command area owing to siltation, water logging, salinity expense, and time spillover throughout plan period, chronic irrigation underutilization, & increased likelihood of upcoming destruction in a seismically active region.

However, some who favour building large dams think that these projects will be more cost- and benefit-effectively sustainable. On the other side, other individuals place more emphasis on small to medium-sized, low-height dams because they believe that they are more sustainable and appropriate for nearby growth. This viewpoint contends that technology needs to advance significantly in order to preserve sustainability over the long term, the production of minor projects, and the cost of the dams.

Safety of Dams and the Issue of Seismicity

Seismicity and the security of dams has been the focus of the Tehri dam's most heated public discussion. Everyone is aware of and generally accepts the Himalayan plate boundary's seismic vulnerability. There has been a protest that concerns the motivation and objectives behind this project on the grounds that there is a possibility that damage to life and property might occur. The incidence of a significant quake in the higher catchment regions of the dam in 1991 has bolstered resistance on the grounds of the environment. Thus, the seismic reality would limit the possibility of achieving the Himalayan Rivers serving as a hydrological storage dream.

NGRI (The National Geophysical Research Institute) had said in a paper from 1984 that the construction of a sizable reservoir in a location that was already under significant stress may cause rock collapse and, as a result, it was not feasible to rule out the possibility of a strong earthquake with its rupture zone across the site of the dam. Along the Bhagirathi River, there are several significant landslides. The three most notable ones are Kangsali, Dobra, and a location upstream of Siyasu. Two of the initial slides match the alleged position of significant rip faults that are said to have widely sheared the bedrock. The seismicity and instability of the whole Himalayan zone are a result of the

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region's extreme geodynamic sensitivity.

There have been several earthquakes, some of extremely high magnitude, that have been caused by the Himalayas' faults and thrusts. According to geologist KS Valdiya, "the much-faulted central sector of the Himalayan Himachal, Garhwal and Kumaon have remained seismically quiet for quite for some time (20 years) with regard to higher magnitude earthquakes" and so the area, which is a seismic gap that is not ruptured by large earthquakes, gradually builds up pressure within, which, if enhanced with hydraulic pressure, may have disastrous effects. The bulk of the projects (more than 2000) that have been done, are being built, or are proposed to be developed in this Himalayan area are in the region. The earthquake- prone Tehri Dam (Himalayas) has been the target of the harshest environmental criticism.

The Tehri dam project (TDP) is fraught with several risks and uncertainties, as the examination of the potential causes of the long-lasting and broad protest has shown. In addition to the viewpoint, the project was successfully completed due to a few other factors.

The village and region have seen significant social, economic, and cultural changes a result of the building of the Tehri dam. Many of the new communities have acquired considerable infrastructural upgrades, and around of the moved inhabitants take reaped profits straight tied to their replacement.

Better access to education has clearly improved the status of women in the relocated rural areas, even if this may not be the case for all of them. The dam has started producing water and electricity, and these outputs should benefit the entire area.

Conclusion

The triangle interconnections between people, the environment, and development were brought to our attention by the Tehri dispute. The major issues raised by the discussion are those related to seismicity, sedimentation, siltation, and reservoir life span as well as rehabilitation and displacement. The Himalayan Rivers' hydrological benefits must be used economically, and the best management of water resources is required. Another crucial problem where policymakers must ensure that the displaced people's way of life remains at least as it was before is the creation of efficient economic mechanisms to compensate and rehabilitate them. Although there was not much that could be done about the dam from a developmental standpoint, some experts suggested that there could have been many smaller dams instead of a large one. This was impossible because many smaller Dams would have taken up a significant amount of space, and the loss would have been considerably greater.

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However, we would promote assessing the population effect, the inherent unpredictable nature of some hazards that may be avoided, and the least amount of disturbance to the people's ecological, social, and cultural lives, and a greater benefit to humans. When it comes to alternatives to large dams, we must be aware of their limitations. In tropical regions with little and moderate rainfall, irrigation greatly enhances the land. Due to its suitability for temperate climates where crops have modest evapotranspiration requirements, dry land technology cannot be significant land augmentation in this area.

Groundwater-based irrigation has limitations, and it is now recognized that this is more of a complimentary source of irrigation than an alternative one. Before building the large dams, alternatives in technology advancement that are the least destructive (environmentally friendly) should be considered. As we have said before, development is for the people, and everyone should profit from it, not just a select few.

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A Study on Environmental Issues and Environmental Protection Acts in India

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Abstract

The word "environment" is used to describe the whole of all the living and nonliving entities in close proximity to a particular organism or community of organisms. The word "environment" encompasses all external circumstances, components, and variables that influence an organism's growth and development. With a severe lack of education and over 1 billion people, a big part of whom are underprivileged, it is not surprise that India is becoming a bit of a mess on this front. Recent industrial expansion, inadequate or nonexistent environmental education, a virtually full infrastructure, and widespread tree cutting all contribute to the region's environmental crisis. Many laws have been passed to safeguard the environment, but they are seldom implemented owing to misuse of authority, corruption, and a lack of funding. The emission of massive quantities of carbon dioxide into the atmosphere from vehicles, aero planes, and textiles across the globe is a major contributor to global warming, one of the most significant ecological challenges.

Keywords: Deforestation, pollution, global warming, and human-caused environmental destruction are all pressing issues.

Some of India's Biggest Environmental Problems:

A variety of environmental problems are being brought on by India's fast expanding population and economy. There will likely be 1.26 billion people living in the nation by the year 2016. Degradation of forest and farmland is one of the world's most pressing environmental problems. Scarcity of essential materials causes problems. Environmental deterioration. That of public health professionals. Threats to biodiversity and the ability of the poor to make a living. Population Changes in population size, composition, and distribution are influenced by the four main demographic parameters of births, deaths, migration, and immigration, which leads to several concerns about causation. Population explosion and rapid industrialization in India are to blame for a series of devastating ecological catastrophes. This includes things like deforestation, habitat loss, and species extinction. Changing consumption habits have led to an increase in the need for energy. Water shortage, water pollution,

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and climate change are some of the consequences of air pollution and global warming.

Degradation of forest and farmland

The clearing of woodlands and farmland for development, an estimated sixty percent of arable land is threatened by soil erosion, waterlogging, and salt. The yearly loss of topsoil due to erosion is estimated to be between 4.7 and 12 billion tonnes. The average yearly per capita availability of water dropped to 1,822 cubic metres between 1947 and 2002. Haryana, Punjab, and Uttar Pradesh all have issues with groundwater overexploitation. The Indian Agricultural Research Institute has shown that for every 3 °C increase in temperature, yearly wheat yields would decrease by 15% to 20%. These are important problems for a nation with such a huge population whose economic progress is so tied to the expansion of its manufacturing sector. There are trees across 18,34% (637,000 km2) of India. Nearly half of the nation is covered by forests; nevertheless, the seven states in the northeast are losing forest cover at a faster rate than the rest of the country combined. The cutting down of trees for use as firewood and the clearing of land for farming have both contributed to a loss of forest cover. These changes, together with the increased pollution from factories and cars, have led to an increase in air temperature and a shift in precipitation patterns.

Air pollution in Indian cities is caused by both vehicular and industrial pollutants. Up to 33% of all air pollution is caused by dust from roads. In large urban centres like Bangalore, as many as half the youngsters suffer from asthma. Air pollution in India is exacerbated by the country's transportation infrastructure. It looked that the Taj Mahal was being negatively affected by the high levels of air pollution. After a legal judgement, the area's transit system and industry were both shut down. Air pollution in major cities is now 2, 3 times higher than the threshold the WHO considers safe. [The government, thankfully, seems to be aware of this enormous issue and the threats it poses to the health of the population. In 2001, the government of India issued a decree mandating the replacement of diesel with compressed gas (CPG) in all public transport vehicles (excluding railways). In India, there is a huge time lag between the creation of home waste water and its treatment, making untreated sewage discharge a major contributor to the contamination of surface and ground water. The problem in India is not only that there isn't enough treatment capacity; it's also that the sewage treatment facilities that are in place are broken and poorly maintained. Due to insufficient funding, bad management, and a lack of reliable energy, the majority of government-owned sewage treatment facilities are closed for the vast majority of the time. Typically, the waste water in these regions is absorbed by the ground or evaporates. Waste in metropolitan areas that isn't collected regularly leads to poor hygiene and surface-level pollution.

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According to a 1992 WHO assessment, just 209 of India's 3,119 cities had any sewage treatment infrastructure at all, and only 8 had comprehensive wastewater treatment. More than a hundred Indian cities send their raw sewage into the Ganges. India produces 29,000,000,000 litres of sewage per day, but only has the infrastructure to treat 6,000,000,000 litres.

India's rivers and lakes are polluted in part due to agricultural runoff and small-scale enterprises located nearby. Agricultural chemicals have been found in rivers, lakes, and even the ground water in the northwest of India. The monsoon season floods wash and move numerous sorts of solid debris and polluted soils into India's rivers and wetlands, contributing to the country's already severe water pollution issue.

Problems with Excessive Noise

Noise-induced environmental harm The Indian Supreme Court made history in 2005 when it ruled on the subject of noise pollution. Honking horns for no reason is a major source of urban noise pollution. Noise pollution is caused by political loudspeakers, as well as those used by churches and mosques. Recent legislation in India has defined maximum allowable decibel levels in both urban and rural settings. How they will be enforced and tracked is unclear.

Soil Contamination

Land contamination Corrosion, pesticides, and fertilizers all contribute to India's land pollution problem. Fly ash ponds at thermal power stations were originally blamed for a uranium poisoning outbreak in March 2009; the outbreak was said to have caused serious birth abnormalities in children in the Punjab districts of Faridkot and Bhatinda. Soil erosin and consequent land pollution are consequences of deforestation, which was initiated by the British but has accelerated in the years after the partition of India in 1947.

Protecting India's unique Biodiversity

Protecting India's Rich Flora and Fauna the Indomalaya ecozone, which includes India, is home to a wide variety of plant and animal life. It is home to 6% of all flowering plant species, 6% of all reptile species, 12% of all bird species, and 7.6% of all mammalian species. In the last several decades, human encroachment in India has been a major danger to the country's wildlife. Since its inception in 1935, the network of national parks and protected areas has grown substantially as a consequence. The Wildlife Protection Act and Project Tiger were implemented in India in 1972 to safeguard vital habitat, and other federal protections were added in the 1980s. With over 500 wildlife sanctuaries and now 14

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biosphere reserves, India is a leader in protecting its natural resources. Fifteen wetland sites have been documented by the Ramsar Convention.

Citizens of India have several legal responsibilities towards nature. Responsibilities of Indian nationals under environmental law. Article 51A, Section 2(g) 1 Every Indian has an obligation under clause (g) to care for and work to improve the natural environment, which includes forests, lakes, rivers, and wildlife.

Clause 2(g) (4) states that the Earth belongs to all living things, including humans and animals. There is no justification for us to eradicate wild inhabitants or force them out of their environment. Sarvesham Both Ahimsa paramodharma and shantir bhavatu (peace for all living creatures and the whole environment) appear in ancient Indian philosophy. Nonviolence is both the greatest obligation and the highest penance; so, Ahimsa paramo tapah. Clause 2(g) (5) states that the Environment (Protection) Act of 1986 is a significant step in this direction. The obligation to safeguard and develop the natural environment has been spelt out fairly precisely in our legislation, as shown by the scope of its provisions and the far-reaching actions that may be implemented by statutory regulations and orders made under the Act.

Legislation to save the environment

Law passed in 1986 to protect the environment Goal To save and enhance existing ecosystems. Developing regulations to curb pollution; Standards and upper limits for air, water, and soil pollution for different places and uses; a hefty fine might be imposed for breaking laws prohibiting or limiting the use of hazardous materials or the placement of industrial facilities. Anyone proven to be the cause of pollution might face jail time of up to five years or a fine of up to one million rupees (Sec 15, 16, 17). Failure to comply will result in a punishment of Rs. 5,000 each day, and up to seven years in jail if it continues for more than a year.

Increases in human population with deteriorating ecosystems

Population growth's effects on the natural world are a hotly discussed topic. Malthus, a British thinker, argued that a rising population puts pressure on agricultural land, leading to environmental deterioration and necessitating the cultivation of land of varying quality. Population growth is slowed because of environmental degradation because of its effect on agricultural output and food availability as well as on famines, illnesses, and mortality.

Due to the added demand placed on the environment's absorption capacity, population expansion is

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blamed as a primary contributor to air, water, and solid-waste pollution. Malthus argues that this leads to a stable population that has poor income and environmental quality. Malthus advocated for the elimination of poverty laws and the use of positive and preventive forms of coercive population control.

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Social Impacts of the Climatic Change in the World

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Abstract

Natural climate shifts have occurred throughout Earth's history for a variety of reasons. However, since the middle of the 20th century, human activity, notably the production of greenhouse gases, has been strongly linked to changes in weather patterns. As a result, anthropogenic causes have significantly altered precipitation patterns, sea level rise, temperature increases, intense droughts, heat waves, longer wildfire seasons, shorter frost-free seasons, and the thawing of permafrost zones. Despite the fact that the economic implications of climate change have gotten a lot of attention, the social impacts of the phenomenon have not been well addressed.

This essay's goal is to educate readers on the extensive and substantial societal effects of climate change. Every community faces the issue of disease, and declining crop yields have harmed food security. People have migrated to safer areas because of droughts, deserts, and ocean and river floods, and these factors have exacerbated social conflict over limited resources including food, water, and land. As a result of calamities, extreme weather has cost humanity a great deal of money.

Furthermore, not all individuals and groups are affected by the consequences of climate change in the same way. Social factors including gender, age, education, ethnicity, location, and language affect how adaptable and vulnerable individuals are to the consequences of climate change. Other social factors include gender, age, and geography. A few examples of vulnerable groups who require more care and assistance are the poor, women, children, indigenous people, and persons from ethnic minorities.

In order to deal with the social repercussions of climate change, humans must prioritize both adaptation and mitigation efforts. By recognizing and addressing the unique vulnerabilities of different social groups, we may more effectively mitigate the consequences of climate change and advance a more durable and sustainable future.

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Key Words: Food security, vulnerable populations, migration, and social effects of climate change.

Introduction:

Climate change is defined as a long-term shift in the climate's state that lasts for lengthy periods of time, typically decades or more, and is marked by changes in the mean and/or variability of its features. These shifts may be caused by a variety of factors, including internal or external influences including solar cycle fluctuations, volcanic eruptions, and persistent human changes in air composition and land use. Large-scale changes in weather patterns have been caused by human-induced emissions of greenhouse gases since the middle of the 20th century. In the past, climatic shifts have been caused by natural factors including changes in the earth's orbit, oscillations in the sun, and volcanic activity. Due to human activity, precipitation patterns have drastically changed, sea levels have risen, temperatures have increased, severe droughts and heat waves have occurred, wildfire seasons have lasted longer, there have been fewer frost-free days, and permafrost areas have thawed.

The Social Impacts of Climate Change:

There are linkages between many parts of society that are impacted by climate change. Droughts may impair food production and human health, while flooding and the spread of diseases can destroy ecosystems and infrastructure. The extensive repercussions of climate change touch every aspect of our world.

Climate change is expected to have both positive and negative consequences on humanity. Changes in the following might result from the negative global effects:

Sea level rise (estimated at 30 to 60 cm by 2100) will certainly result in the displacement of about 80 million people, and as tropical waters warm, tropical storm frequency and severity would increase.

An increase in tropical illnesses like dengue and malaria, more frequent droughts (which will affect 700 million people by 2030), heat waves around the globe, prolonged wildfire seasons, and the release of greenhouse gases from permafrost thawing, such as in the Arctic Tundra. Climate change is the root cause of all of these impacts.

There are potential global benefits of climate change, despite their limitations, including • A decrease in energy consumption due to a warmer climate; • Extended growing seasons leading to more crop

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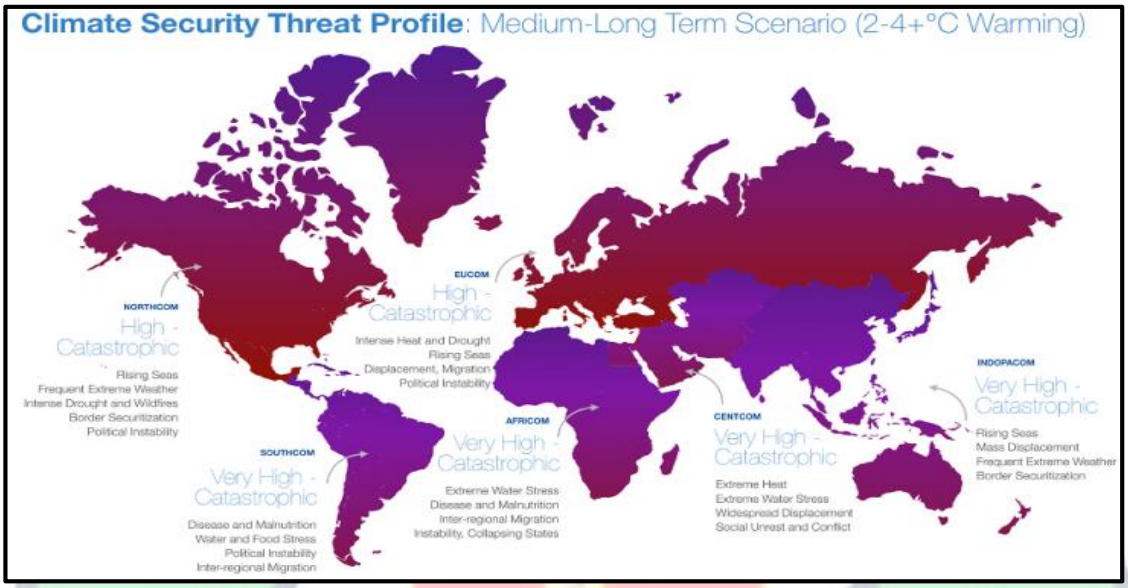
Figure 1: Threat profile for Climate Security



Source: https://climateandsecurity.org/wp-content/uploads/2020/03/a-security-threat-assessment-of-climate-change.pdf

cultivation in new areas; • The possibility of more efficient shipping routes through the Arctic devoid of ice; and • The possibility of crop growth in formerly frozen regions like Alaska due to ice melting.

The economic and environmental repercussions of climate change, notably those on ecosystems, have received more attention than the social implications, it is crucial to stress. The wide-ranging and severe socioeconomic repercussions of climate change need to be taken into account. Climate change is already having an impact on communities all around the world, and if it is not addressed, it might cause a lot more harm in the future. The following are a few societal impacts of climate change that warrant consideration and action:

Health of People.

The Sixth Assessment Report of the IPCC, which was released in 2021, states that since the start of the Industrial Revolution in 1750, human emissions of gases that trap heat have warmed the planet's temperature by almost 2 degrees Fahrenheit (1.1 degrees Celsius). The average global temperature is expected to climb by 1.5 degrees Celsius, or about 3 degrees Fahrenheit, over the course of the next few decades. The rising temperatures brought on by climate change can cause a number of health issues, including dehydration and heat stroke. With a 2-degree Celsius rise in the average global temperature, an estimated one billion people might be in danger of heat exhaustion. The record-breaking heat waves throughout Europe in the summer of 2022 resulted in thousands of fatalities.

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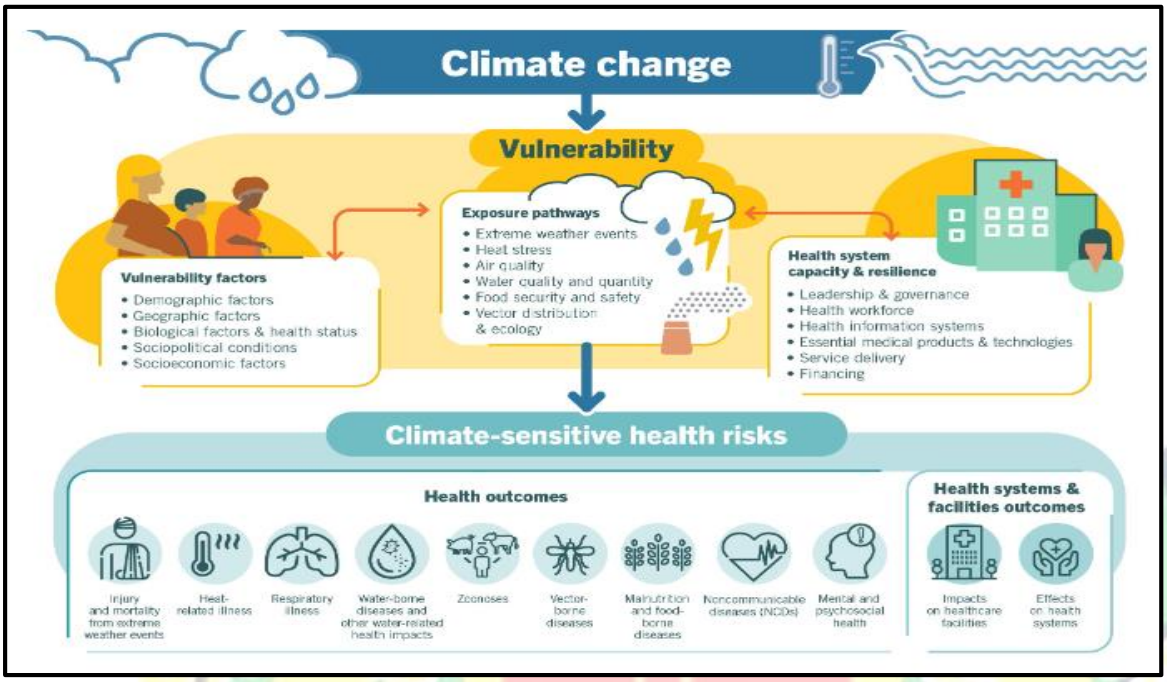
Figure 2: Climate Change and Health



Source: https://www.who.int/news-room/fact-sheets/detail

Furthermore, extreme weather events like hurricanes and floods can hasten the spread of infectious illnesses. Air pollution is a substantial health concern and is a major contributor to lung cancer, bronchitis, asthma, heart disease, and strokes. Our bodies cannot detect airborne toxins that are too tiny to injure our lungs, hearts, or brains. The generation of thermal or electrical energy from coal burning must be stopped if global warming is to be reduced and millions of lives are to be saved.

Because the expenditures connected with these health issues have a significant impact on GDP, taking care of them has a significant financial burden as well. By the years 2030 to 2050, it is predicted that climate change would cause an extra 250,000 yearly deaths from hunger, malaria, diarrhea, and heat stress. In order to safeguard public health and decrease climate change's detrimental impacts on the economy, appropriate action must be taken.

Food Security.

Climate change may have an impact on food systems, increasing food costs and limiting the availability of food. Heat waves and water shortages can slow crop growth, reduce yields, and negatively impact irrigation, soil quality, and agricultural ecology. This

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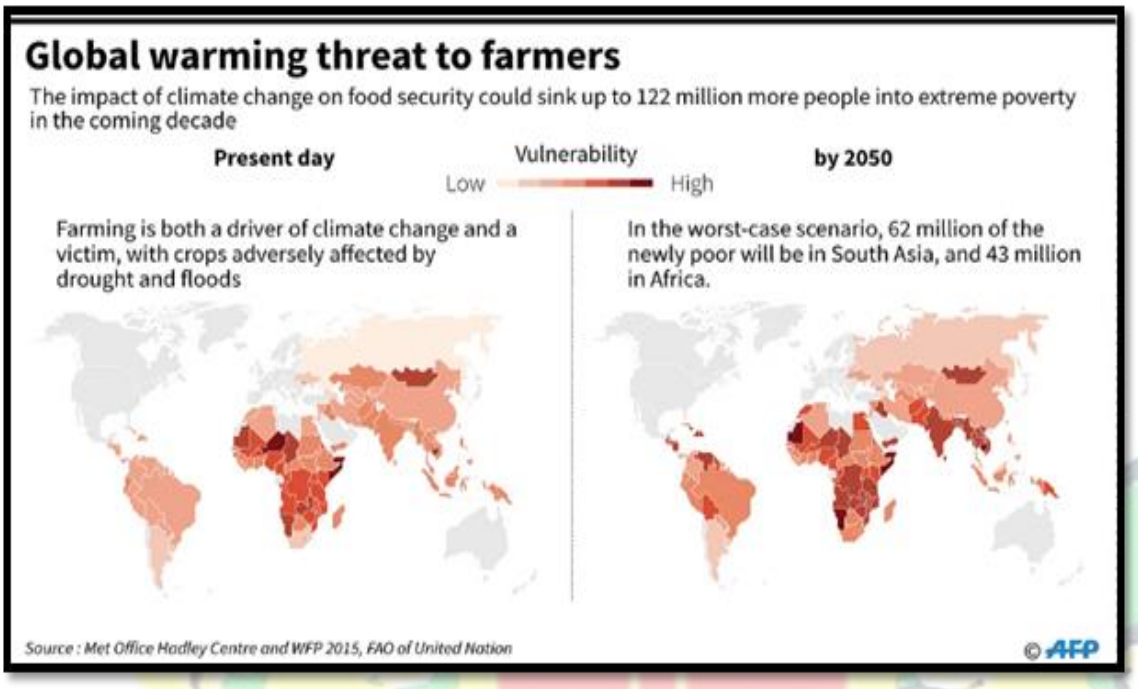
Figure 3: Threats to Global Food Security Posed by Climate Change



might lead to localized food shortages and price increases globally. As a result, climate change seriously jeopardizes food security by affecting food availability, costs, and production.

Due to rising agricultural commodity prices, 30 million more individuals in low-income countries suffered food insecurity in 2021. The regions most at risk from crop failures and famine due to climate change include Sub-Saharan Africa, South Asia, and Southeast Asia, and agricultural.

households are disproportionately poor and vulnerable in these regions. In one of these regions, where there are more risks associated with food scarcity brought on by climate change, almost 80% of the world's population resides

Migration.

As the consequences of climate change grow, more people may be compelled to leave their homes as a result of environmental threats. Events like floods, droughts, and deserts, which render certain places uninhabitable, are among these threats. Long-term migration is also probably brought on by gradual environmental deterioration and calamities with a sluggish start, such as desertification, declining soil fertility, coastal erosion, and sea level rise.

Today, 64 million people are forcefully displaced around the globe as a result of conflict, famine, persecution, and increasingly, climate change. According to UN estimates, the number of

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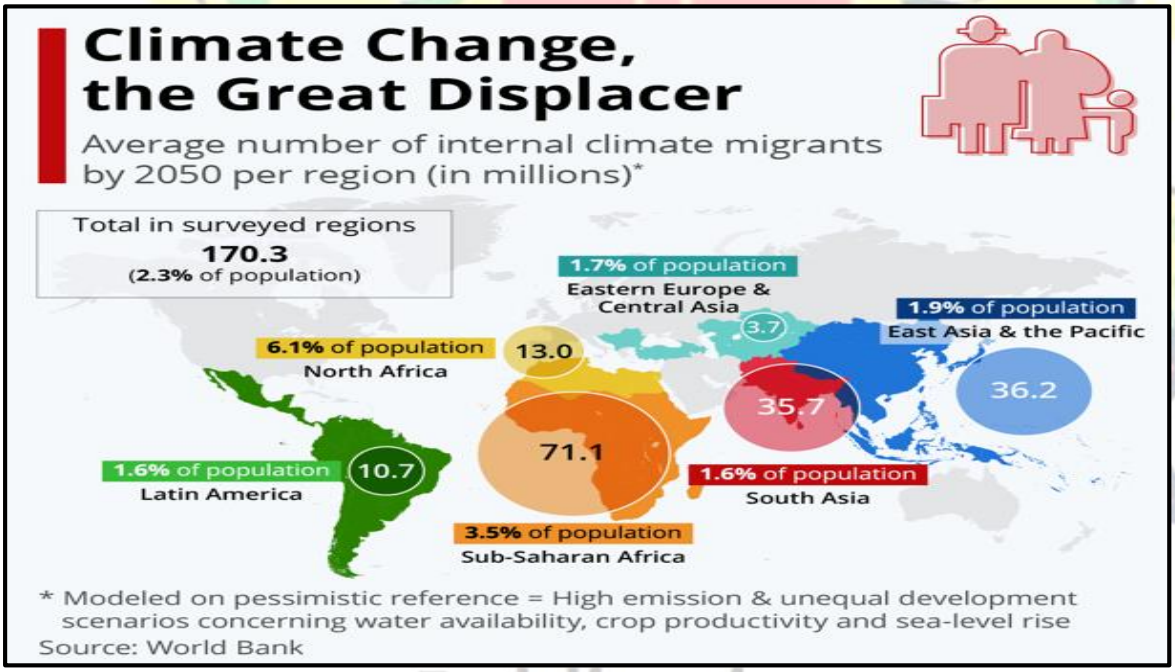
environmental migrants might be anywhere between 25 million to 1 billion by 2050. The Global Compact on Refugees of the United Nations acknowledges the rising relationship between environmental degradation, natural disasters, climate change, and refugee movements.

Again, areas with limited resources, including those experiencing political turmoil and poverty, will initially be most negatively impacted by climate-induced migration.

Social Conflict.

In areas where it is difficult to get basic resources like water and land, such as in Africa, climate change has the potential to intensify social conflicts. Lack of food or water as a result of the climate may aggravate things, which can lead to unhappiness and anxiety. Climate change-related water shortages may exacerbate conflicts over access to drinking water. Additionally, there is a chance that significant population shifts and displacements brought on by climate change would intensify current conflicts.

Figure 4: Climate change-related global migration



The "When Rain Turns to Dust" study from the International Committee of the Red Cross from 2020 illustrates how countries currently involved in conflicts are disproportionately affected by climatic unpredictability and extremes. Due to people's, institutions', and systems' limited ability for adaptation, the effects of climate change are compounded in conflict-affected areas. Climate change may not directly create conflicts, but it can increase existing tensions between countries or people.

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Economic influence

Climate change may have a considerable influence on both the local and global economies. Extreme weather events have the power to completely demolish buildings, including homes, companies, and other structures, costing billions of dollars in damages. This might lead to protracted economic slowdowns or perhaps the beginning of a recession. Although they have fewer resources, vulnerable people are more vulnerable to the consequences of climate change. This comprises residents of urban areas with low incomes, inadequate infrastructure, and limited financial means.

As a result of increased occupational health regulations and a potential decline in population health, climate change may affect the workforce's availability. Several economic sectors are also very vulnerable to climate change since they depend on stable climatic conditions. Therefore, it is anticipated that sectors including agriculture, tourism, and recreation would experience changes in production.

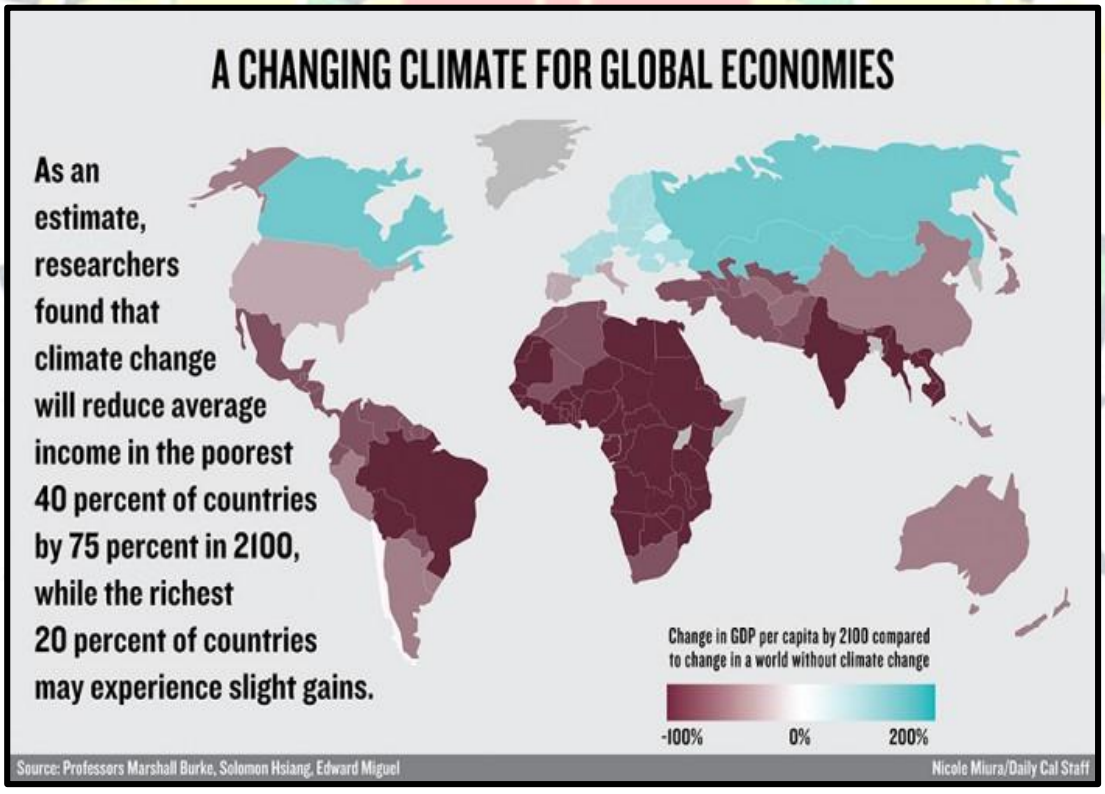

Figure 5: Effect of climate change on future’s global GDP

The cost and difficulty of getting insurance for houses, companies, or other valuable assets located in vulnerable places may increase as a result of climate change for many individuals. Rarely, it may even lead to an insurance market with no options at all.

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Economic justice.

Communities of color and those with low means, who are already at danger from environmental pollution and toxins, are disproportionately affected by climate change. If immediate action is not done, the impacts of climate change will expand inequality, placing the most vulnerable at even greater risk. Some social groups that are particularly vulnerable to climate-related crises include female-headed households, children, and people with disabilities, Indigenous Peoples, ethnic minorities, landless tenants, migrant workers, displaced people, sexual and gender minorities, older people, and other socially marginalized groups. Among the key factors contributing to their vulnerability are their geographical locations, financial, social, cultural, and gender status, as well as their access to resources, services, decision-making power, and justice.

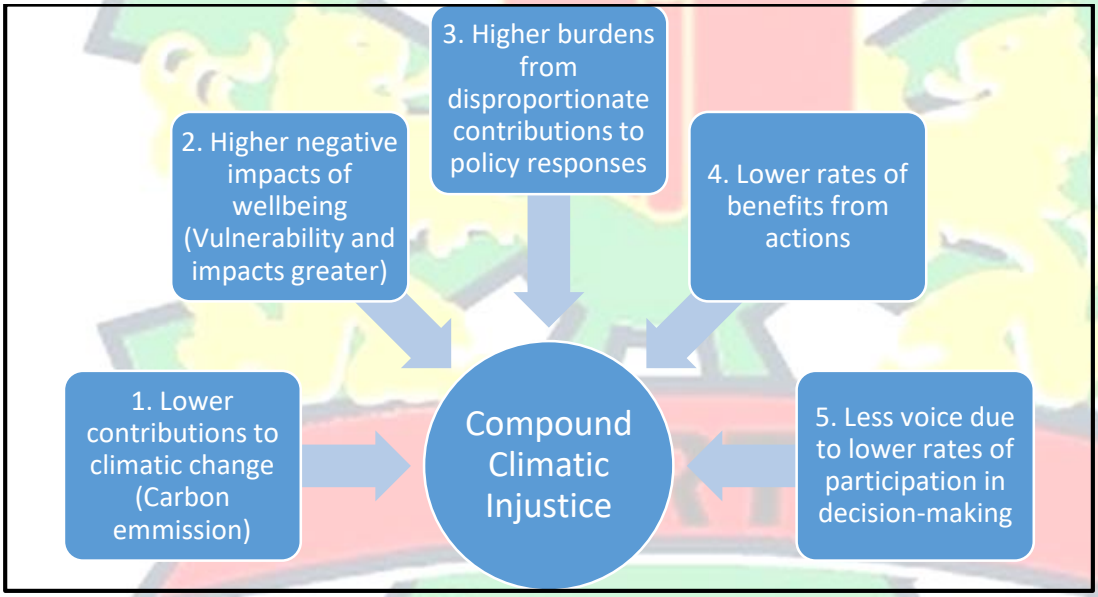

Figure 6: Social injustice resulting from Climate Change

In summary, it is evident that both human health and global food security are significantly at danger from climate change. Emerging nations, particularly those in Africa, are most affected by migration and social strife. Achieving social justice for all communities globally is becoming more and more challenging as a result of the consequences of climate change. In addition, the staggering economic losses caused in the future by this essential issue.

These are just a few examples of how climate change is affecting society. However, by doing study and raising awareness of these challenges, we can take steps to mitigate the most severe consequences of climate change and move toward a more sustainable and equitable future.

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To successfully limit global warming to below 1.5°C with a high probability of success, global greenhouse gas emissions must be net-zero by 2050, or by 2070 if aiming for a 2°C limit. To lessen the consequences of climate change, sinks that remove these gases from the atmosphere must be improved as well as greenhouse gas emissions must be decreased.

To achieve the goal of limiting global warming to 2°C, countries must significantly increase their pledges to reducing greenhouse gas emissions. According to the United Nations Environment Programme, countries should quadruple the amount of reductions they have committed to in their current Paris Agreements within the next ten years. Even greater cuts are needed if we're to stick to the 1.5°C objective.

In order to solve climate change, which involves bridging the gap between rich and developing nations, the developed world should refrain from undermining the "Common But Differentiated Responsibilities" (CBDR) principle envisioned in prior accords. Collaboration between various states and international agencies has already been initiated to combat the challenges posed by climate change and save our planet for future generations. We can hope for a safer world in the coming times.

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Sustainable Development Goals: Transforming Society for a Better Future

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Abstract:

In the pursuit of a more equitable and prosperous global future, the United Nations established the Sustainable Development Goals (SDGs) as a transformative framework. These 17 interconnected goals provide a comprehensive vision to address the pressing economic, social, and environmental challenges of our time. This abstract highlights the significance of SDGs in their quest to create a sustainable and inclusive society. The SDGs strive to eradicate poverty and hunger, promote quality education, ensure gender equality, and improve access to healthcare and clean water. They also emphasize the urgent need to address climate change, reduce inequality, foster sustainable economic growth, and promote responsible consumption and production. By tackling these complex issues simultaneously, the SDGs aim to create a harmonious balance between human development and environmental protection. Transforming society in line with the SDGs requires the collaboration and commitment of governments, businesses, civil society, and individuals alike. It demands innovative solutions, integrated approaches, and localized initiatives to cater to diverse communities' unique needs. Through partnerships and collective action, the SDGs offer a blueprint for building resilient communities, conserving ecosystems, and ensuring no one is left behind. As we approach the SDGs' target year, this abstract serves as a reminder of the immense potential these goals hold to create positive change. By aligning policies, investments, and actions with the SDGs, societies can forge a path towards a more sustainable, just, and thriving future for generations to come.

Goals of sustainable development :

The Sustainable Development Goals (SDGs) are a set of 17 interlinked global goals adopted by the United Nations in September 2015. These goals build upon the Millennium Development Goals and provide a comprehensive and integrated framework to guide countries and the international community towards achieving sustainable development by 2030. The goals cover a wide range of social, economic, and environmental issues, aiming to address the world's most pressing challenges. The 17 goals of sustainable development are as follows:

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1. **No Poverty**: End poverty in all its forms and dimensions, ensuring that all people have access to basic needs, services, and opportunities for economic advancement.
2. **Zero Hunger**: Achieve food security, improve nutrition, and promote sustainable agriculture to eradicate hunger and ensure access to nutritious food for all.
3. **Good Health and Well-being**: Ensure healthy lives and promote well-being for all at all ages, with a focus on improving healthcare, reducing maternal and child mortality, and combating communicable and non-communicable diseases.
4. **Quality Education**: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all, fostering skills and knowledge for sustainable development.
5. **Gender Equality**: Achieve gender equality and empower all women and girls, ensuring equal opportunities and ending discrimination and violence based on gender.
6. **Clean Water and Sanitation**: Ensure availability and sustainable management of water and sanitation for all, improving water quality and sanitation facilities globally.
7. **Affordable and Clean Energy**: Ensure access to affordable, reliable, sustainable, and modern energy for all, while promoting renewable energy sources and energy efficiency.
8. **Decent Work and Economic Growth**: Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.
9. **Industry, Innovation, and Infrastructure**: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.
10. **Reduced Inequality**: Reduce inequality within and among countries, addressing economic, social, and political disparities.
11. **Sustainable Cities and Communities**: Make cities and human settlements inclusive, safe, resilient, and sustainable.
12. **Responsible Consumption and Production**: Ensure sustainable consumption and production patterns, promoting resource efficiency and responsible use of natural resources.
13. **Climate Action**: Take urgent action to combat climate change and its impacts by adopting mitigation and adaptation measures.
14. **Life Below Water**: Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.
15. **Life on Land**: Protect, restore, and promote the sustainable use of terrestrial ecosystems, halt biodiversity loss, and combat desertification and land degradation.
16. **Peace, Justice, and Strong Institutions**: Promote peaceful and inclusive societies, provide access to justice for all, and build effective, accountable, and inclusive institutions.

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17. **Partnerships for the Goals**: Strengthen the means of implementation and revitalize the global partnership for sustainable development, fostering collaboration among governments, private sector, civil society, and international organizations.

These 17 goals are interconnected and mutually reinforcing, recognizing the complexity and interdependence of global challenges. Achieving the SDGs requires collective action, collaboration, and transformative change across all levels of society and governance.

Scope of Sustainable Development:

The scope of sustainable development is vast and encompasses a wide range of economic, social, and environmental dimensions. Its primary focus is to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. The concept of sustainable development seeks to create a harmonious balance between human well-being, environmental protection, and economic progress. Here are some key aspects that define the scope of sustainable development:

- Environmental Conservation: Sustainable development emphasizes the preservation and responsible use of natural resources. It seeks to protect ecosystems, reduce pollution, combat climate change, promote biodiversity, and ensure the sustainable management of land, water, and energy resources.
- Economic Sustainability: The scope of sustainable development includes promoting inclusive and sustainable economic growth. It aims to foster long-term prosperity by encouraging environmentally friendly and socially responsible business practices, promoting green technologies, and supporting equitable access to economic opportunities.
- Social Equity and Inclusion: Sustainable development seeks to address social inequalities and promote social inclusion. It focuses on ensuring equal access to basic services such as education, healthcare, and clean water, while also striving to eliminate discrimination, poverty, and hunger.
- Poverty Alleviation: One of the central goals of sustainable development is to eradicate poverty in all its forms. This involves empowering marginalized communities, providing them with economic opportunities, and improving their overall living conditions.
- Education and Awareness: The scope of sustainable development includes raising awareness and promoting education about sustainable practices. This empowers individuals,

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communities, and institutions to make informed decisions that contribute to sustainable development.

- Responsible Consumption and Production: Sustainable development aims to promote responsible consumption patterns, encouraging individuals and businesses to use resources efficiently, reduce waste, and adopt sustainable production methods.
- Global Cooperation: Achieving sustainable development requires international cooperation and partnerships among governments, businesses, civil society organizations, and individuals. Global collaboration is essential to address transboundary issues and achieve common goals.
- Urban Development: Sustainable development addresses the challenges posed by rapid urbanization. It focuses on creating sustainable cities and communities that are environmentally friendly, socially inclusive, and economically vibrant.
- Renewable Energy and Climate Action: The scope of sustainable development involves transitioning to renewable energy sources and taking urgent action to combat climate change, including setting targets to reduce greenhouse gas emissions.
- Governance and Policy: Effective governance and policy frameworks are crucial for implementing sustainable development initiatives. This includes creating laws, regulations, and incentives that support sustainable practices and discourage environmentally harmful activities.
- Disaster Preparedness and Resilience: Sustainable development emphasizes the importance of building resilience to natural and man-made disasters. This involves implementing measures to reduce vulnerability and improve disaster preparedness and response.

The scope of sustainable development is dynamic and continually evolving as new challenges and opportunities arise. It requires a holistic and integrated approach that recognizes the interconnections between environmental, social, and economic factors. By addressing these dimensions comprehensively, sustainable development aims to create a better and more sustainable future for humanity and the planet as a whole.

3 Core elements of Sustainable Development:

The concept of sustainable development is based on the integration of three core elements that must be balanced to achieve long-term well-being for society and the planet. These three core elements are often referred to as the "Three Pillars of Sustainable Development" or the "Triple Bottom Line."

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They are:

Environmental Sustainability: Environmental sustainability is the foundation of sustainable development. It emphasizes the responsible management and conservation of natural resources, ecosystems, and the biosphere as a whole. The goal is to protect the environment from degradation, pollution, and depletion, ensuring that it can continue to support current and future generations. Key aspects of environmental sustainability include promoting renewable energy sources, reducing greenhouse gas emissions, conserving biodiversity, protecting water resources, and adopting sustainable land use practices.

Social Equity and Inclusion: The second core element of sustainable development is social equity and inclusion. This pillar focuses on addressing social inequalities, promoting human rights, and ensuring that all individuals have equal access to opportunities, resources, and basic services such as education, healthcare, and clean water. Sustainable development aims to empower marginalized and vulnerable populations, eliminate poverty and hunger, promote gender equality, and create inclusive societies that respect diversity and foster social cohesion.

Economic Prosperity: The third core element of sustainable development is economic prosperity. It recognizes the importance of achieving economic growth and development to improve living standards and meet the needs of society. However, this economic growth must be sustainable and equitable, taking into account the long-term impacts on the environment and society. Sustainable economic prosperity involves promoting responsible consumption and production patterns, supporting green technologies and industries, fostering decent work and job opportunities, and ensuring fair distribution of wealth and resources.

These three core elements are interconnected and mutually reinforcing. Sustainable development requires a holistic approach that considers the interactions between environmental protection, social well-being, and economic growth. Achieving a balance among these elements is essential to secure a prosperous and resilient future for humanity while safeguarding the health of the planet. Moreover, sustainable development recognizes the intergenerational responsibility to ensure that our actions today do not compromise the ability of future generations to meet their needs and aspirations.

Principles of Sustainable Development

The principles of sustainable development provide a guiding framework for decision-making and action to achieve the goal of balancing economic, social, and environmental objectives for present and

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future generations. These principles are widely accepted and form the foundation of sustainable development strategies worldwide. Some of the key principles include:

Integration: Sustainable development requires the integration of economic, social, and environmental considerations into policies, planning, and decision-making processes. This principle emphasizes that these three dimensions are interdependent and must be addressed in a holistic manner.

Equity and Inclusivity: Sustainable development must be equitable and inclusive, ensuring that all individuals and communities have access to resources, opportunities, and benefits. It seeks to reduce disparities and ensure that no one is left behind, especially vulnerable and marginalized groups.

Precautionary Approach: This principle advocates for caution in the face of uncertainty and potential risks to the environment and human well-being. It encourages proactive measures to prevent harm and avoid irreversible damage even in the absence of complete scientific evidence.

Polluter Pays: The polluter-pays principle holds that those who cause pollution or environmental degradation should bear the cost of remediation and restoration. This principle encourages industries and individuals to internalize environmental costs and take responsibility for their environmental impacts.

Inter- and Intra-Generational Equity: Sustainable development promotes equity both among current generations and between present and future generations. It recognizes the rights and needs of future generations to inherit a healthy planet and aims to avoid depleting resources and compromising their well-being.

Participatory Decision-Making: Sustainable development emphasizes the importance of involving all stakeholders, including local communities, civil society, and indigenous peoples, in decision-making processes. Participation fosters ownership and ensures that decisions reflect diverse perspectives and local knowledge.

Conservation of Biodiversity and Ecosystems: Sustainable development recognizes the value of biodiversity and ecosystems and advocates for their conservation and sustainable use. It aims to protect and restore natural habitats to maintain ecosystem services vital for human well-being.

Subsidiarity: The principle of subsidiarity suggests that decisions should be made at the lowest appropriate level of governance, empowering local communities to play an active role in shaping their sustainable development pathways.

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Interdependence and Global Responsibility: Sustainable development acknowledges the interconnectedness of countries and their shared responsibility for global challenges. International cooperation and collaboration are vital to address transboundary issues such as climate change and resource depletion.

Economic Efficiency: Sustainable development seeks to promote economic efficiency in resource use, production, and consumption. It encourages innovative and resource-efficient technologies and practices that minimize waste and pollution.

These principles guide policymakers, businesses, organizations, and individuals in their efforts to implement sustainable development initiatives that lead to a more resilient, inclusive, and environmentally conscious future. By adhering to these principles, societies can work towards achieving a harmonious balance between human development and environmental protection.

Examples to Achieve Sustainable Development:

Sustainable development encompasses a wide range of practices and initiatives that aim to balance economic, social, and environmental objectives. Here are some examples of sustainable development initiatives and practices from various sectors:

Renewable Energy: The transition from fossil fuels to renewable energy sources, such as solar, wind, hydroelectric, and geothermal power, is a prominent example of sustainable development. These sources of energy are renewable, produce minimal greenhouse gas emissions, and have a lower impact on the environment compared to traditional fossil fuels.

Green Building and Infrastructure: Sustainable construction and green building practices focus on designing and constructing buildings and infrastructure with minimal environmental impact. It involves using energy-efficient materials, optimizing water usage, and incorporating renewable energy solutions to reduce the ecological footprint of buildings.

Sustainable Agriculture: Practices such as organic farming, agroforestry, and permaculture prioritize ecological balance and resource conservation in agriculture. Sustainable agriculture aims to enhance soil fertility, protect biodiversity, and reduce the use of chemical inputs, promoting long-term food security and environmental health.

Eco-Tourism: Eco-tourism promotes responsible travel that supports conservation efforts and benefits local communities. It seeks to minimize the negative impact of tourism on natural environments and cultural heritage while contributing to local economies and social well-being.

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Waste Management and Recycling: Sustainable waste management involves reducing waste generation, promoting recycling and reuse, and adopting circular economy principles. By minimizing waste sent to landfills and incineration, sustainable waste practices conserve resources and reduce pollution.

Sustainable Transportation: Encouraging public transportation, cycling, and walking, and promoting the use of electric vehicles are examples of sustainable transportation initiatives. These efforts reduce greenhouse gas emissions, improve air quality, and decrease traffic congestion.

Access to Clean Water and Sanitation: Ensuring access to clean and safe drinking water and proper sanitation facilities is a critical aspect of sustainable development. It improves public health, reduces waterborne diseases, and enhances overall quality of life.

Gender Equality and Women's Empowerment: Promoting gender equality and empowering women are essential components of sustainable development. Gender equality improves social cohesion, enhances economic productivity, and leads to more inclusive and sustainable societies.

Forest Conservation and Reforestation: Protecting existing forests and implementing reforestation initiatives help sequester carbon, conserve biodiversity, and support local livelihoods, contributing to climate change mitigation and sustainable development.

Sustainable Fisheries Management: Implementing sustainable fishing practices, such as catch quotas and protected marine areas, ensures the long-term viability of fish stocks and marine ecosystems while supporting the livelihoods of fishing communities.

These are just a few examples of sustainable development practices and initiatives. Across various sectors, individuals, communities, businesses, and governments are taking actions to create a more sustainable future, emphasizing the interdependence of economic, social, and environmental well-being.

Steps to Achieve Sustainable Development Goals:

Achieving the 17 Sustainable Development Goals (SDGs) requires collective effort and commitment from governments, businesses, civil society organizations, and individuals worldwide. While each goal addresses specific challenges, there are some overarching strategies and actions that can contribute to their achievement. Here are some key steps to work towards fulfilling the SDGs:

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- Policy Alignment: Governments must integrate the SDGs into their national policies and development plans. They should align their laws, regulations, and budgetary allocations to support sustainable practices and initiatives.
- International Cooperation: Addressing global challenges requires collaboration among countries. International partnerships, knowledge-sharing, and financial support can facilitate the implementation of SDGs, particularly in developing nations.
- Data Collection and Monitoring: Regular data collection and monitoring are crucial to track progress and identify areas that need more attention. Governments and organizations should invest in reliable data systems and indicators to assess the impact of SDG initiatives.
- Empowerment and Participation: Empower local communities, women, youth, and marginalized groups to actively participate in decision-making processes and the implementation of SDG initiatives. Inclusion fosters ownership and ensures that solutions are contextually relevant.
- Education and Awareness: Promote awareness and education about the SDGs at all levels of society. This will create a sense of responsibility and inspire individuals and organizations to take action.
- Sustainable Business Practices: Private sector engagement is essential for achieving the SDGs. Businesses can contribute by adopting sustainable practices, investing in renewable energy, promoting responsible supply chains, and adhering to ethical standards.
- Investment in Infrastructure: Governments and international institutions should invest in sustainable infrastructure, including renewable energy projects, eco-friendly transportation, and resilient urban development.
- Climate Change Mitigation and Adaptation: Take urgent action to combat climate change by implementing strategies for greenhouse gas reduction, supporting climate-resilient practices, and promoting clean energy solutions.
- Poverty Alleviation and Social Protection: Address poverty through targeted social protection programs, economic empowerment, and equitable distribution of resources.
- Responsible Consumption and Production: Encourage responsible consumption patterns by promoting circular economy approaches, reducing waste, and embracing sustainable production methods.

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- Protecting Biodiversity and Ecosystems: Prioritize conservation efforts to protect biodiversity and promote the sustainable use of ecosystems, including forests, oceans, and freshwater resources.
- Universal Healthcare and Education: Ensure access to quality healthcare and education for all, addressing health disparities and promoting lifelong learning opportunities.
- Gender Equality and Women's Empowerment: Promote gender equality by eliminating discrimination and violence against women and girls, providing equal opportunities, and ensuring women's participation in decision-making.
- Access to Clean Water and Sanitation: Implement measures to provide universal access to clean water and sanitation facilities, addressing water scarcity and pollution.
- Peace, Justice, and Strong Institutions: Strengthen institutions, promote the rule of law, combat corruption, and ensure access to justice and human rights for all.
- Responsible Consumption and Production: Encourage responsible consumption patterns by promoting circular economy approaches, reducing waste, and embracing sustainable production methods.
- Global Partnerships: Foster international cooperation, public-private partnerships, and financial support to mobilize resources and expertise for sustainable development initiatives.

Achieving the SDGs is an ongoing process that requires commitment, collaboration, and innovation. By working together and taking concrete actions towards sustainable development, we can build a more inclusive, resilient, and sustainable future for all.

Conclusion:

In conclusion, the achievement of the 17 Sustainable Development Goals (SDGs) represents a shared global responsibility to address pressing challenges and pave the way for a sustainable and equitable future. The SDGs encompass a wide spectrum of objectives that span economic, social, and environmental dimensions, emphasizing the interconnectedness of our actions and their impact on the planet and its inhabitants. To successfully accomplish the SDGs, a multi-faceted approach is necessary. Governments must take the lead by integrating the goals into national policies, enacting supportive legislation, and allocating adequate resources. International cooperation is vital, fostering partnerships, knowledge-sharing, and financial assistance to assist developing nations in their pursuit of sustainable development. At the heart of the SDGs lies the principle of inclusivity and empowerment. To achieve meaningful progress, it is imperative to involve all stakeholders, including local communities, women,

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youth, and marginalized groups. Their active participation ensures that solutions are contextually relevant, equitable, and sustainable. Education and awareness are essential catalysts for change. By promoting a deep understanding of the SDGs, we can inspire a collective sense of responsibility and encourage individuals, businesses, and civil society organizations to contribute to the goals' realization. Sustainable development is a dynamic and continuous journey, requiring ongoing data collection, monitoring, and adaptation. Regular assessment of progress is crucial to identify areas needing attention and to celebrate successes, thus fostering a culture of accountability and learning. In the pursuit of the SDGs, each goal reinforces and complements the others, demonstrating that no single objective can be achieved in isolation. Embracing the holistic nature of sustainable development will lead to transformative change, ensuring a world where prosperity, social inclusion, and environmental preservation coexist harmoniously. The realization of the 17 SDGs is an ambitious yet essential endeavor that can shape a brighter future for generations to come. By embracing the principles of sustainable development and working together with determination and commitment, we can create a world that is prosperous, resilient, and environmentally conscious, leaving no one behind on this journey towards a sustainable and thriving global society.

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Importance of Livestock Sector in Social and Economic Development of India

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ABSTRACT

The practice of selective breeding and cattle rearing form animal husbandry. Managing and caring for animals develops their genetic makeup and behavior for profit. The Indian economy is powered by livestock. It plays important role for Indian population especially in rural families to earn more income, eat nutritional food, and create more employment opportunities. Livestock is becoming more important to India's social and economic development. After independence, animal products including milk, meat, wool, and eggs have grown significantly, but there are more opportunities available here to increase the output. This chapter studies the role and relevance of livestock social and economic development and eliminates livestock sector problems in India for the improvement of the sector with help of tables and diagrams prepared with help of reports published by concerned government departments. Major challenges faced by this sectors and some measures and government's initiatives are also discussed in this chapter. In fact, Sustainability of the sector may improve food security, employment, rural economic independence, social security, gender equality, and status of female decreasing the discrimination against them. 28% of livestock workers are found in small to medium farmers. Thus the large proportion of the socially and economically backward section of the Indian society is directly dependent on livestock for their livelihood.

Key words: Livestock, Development, Employment, Food Security, Manure, Agriculture

Introduction

Livestock is play a big role for most of rural families to increase income, nutritional security, and employment in India. It is becoming more important to India's social and economic development. Livestock industry is backbone of Indian food system and helps impoverished people generate income. India raises a large cattle population for various uses in diverse climates. Farmers, industries that import animal products, sellers, and purchasers make up the livestock industry. About 20.5 million people survive off cattle. Livestock made 16% of small farmer households' revenue and 14% of rural households. Thus, livestock is a big and vital resource in India (Table 1 and Figure 1). India is home to 56.7% of buffalo population as well as 12.5% of all cattle, 2.4% of all camels, and 3.1% of all chickens of the world.

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Most of Indo-Gangetic states are benefitted from huge population of the cattle found in this area. Milk, meat, eggs, wool, leather, costumes, and energy from dung and muscle power of cattle support Indian economy in many ways. In 2015-2016, it contributed around 26.2% of the GVA in the agriculture and allied sectors. It increased up to 30.1% in 2020-21.

Role of livestock in social and economic development

Livestock is contributing consistently to national GDP in recent few years, even when 17.4% in 2017-18. However, livestock contributed about 4 % to GDP over the same period and share of livestock in total agricultural GDP has grown steadily.

Table: 1 Production of major livestock production in India (2017-18)

Sr. No.	Product	Quantity (million tons)	Ranking in World Production
1	Milk	176.3	First
2	Eggs	95217	Third
3	Meat	7.7	NA
4	Wool	41.5	NA
5	Fish	12.61	Second

Source: Annual Report 2018-19 (Department of Animal Husbandry, Dairying and Fisheries Ministry of Agriculture & Farmers Welfare Government of India)

Most of agricultural families in India earn a livelihood by diversifying their income with animal farming. Livestock numbers influence their rural social position among society. Thus the products and supports of livestock sector are one of most economic supports among the population dependent on this sector. It generates about 5% of the GDP and employs 80 million dairy farmers during 2018-19. India ranks first, third, and second in milk, egg, and fish production respectively, according to the 2018-19 annual report.

To optimize efficiency of agriculture resources, Indian farmers adopt mixed agricultural systems in which crop and livestock products are supplied for other sectors of the economy. Livestock sector affects the Indian economy in following different ways:-

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1. Generation of sources for family income and profit:

Many Indian households, particularly landless ones, depend on livestock for their income in India The livestock sector has played a major part in achieving the aim of doubling farmers' income, as well as attaining an agro-exports goals of US$ 60 by 2022 and a target of US$100 billion by 2028.. Milk production of cows and buffaloes help livestock rearing farmers and other population for making their life easy. Sheep and goats provide cash income for emergencies like weddings, medical treatment, children education, housing repairs, etc. Owners of the cattle use animals as moving banks and assets for financial security in India.

A total of 30.5 million people are dependent on livestock for a living. Livestock generates 26% of small farmer family income, compared to an average of 24% for all rural families. Livestock provides a living for two-thirds of the rural population. India has an abundance of cattle. According to SAAH data the livestock sector accounts for 4.11% of GDP and 29.41% of overall Agriculture GDP.

About 20.5 million people survive off cattle. Small farm families earned 16% from livestock, compared to 14% for rural households. Livestock supports two-thirds of rural communities. Government National Accounts Statistics-2022, Central Statistical

Table 2: Livestock Population in India, 2019

Sr. No.	Species	19thLivestock Census 2012 (no. in millions)	20thLivestock Census 2019 (no. in millions)	Growth Rate (%) 2012-19
1	Cattle	190.9	193.46	1.34
2	Buffalo	108.7	109.85	1.06
3	Yaks	0.08	0.06	-24.9
4	Mithun	0.3	0.39	29.52
Total Bovines		299.98	303.76	1.26
5	Sheep	65.07	74.26	14.13
6	Goat	135.17	148.88	10.14
7	Pigs	10.29	9.06	-12.03
8	Other animals	1.54	0.79	-48.7
Total Livestock		512.06	536.76	4.82
9	Poultry	729.21	851.81	16.81

Source: 20th livestock census, 2019 (National Dairy Development Board)

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Table 3 : Income from Animal Husbandry as % of Total Farm Income

States	Financial Year	
	2012-13	2018-19
Meghalaya	9.22	3.84
Chhattisgarh	0	10.78
Telangana	8.13	12.25
Mizoram	15.93	16.76
Karnataka	10.85	19.57
Odisha	48.29	20.96
Kerala	14	22.4
Madhya Pradesh	15.42	23.11
West Bengal	18.69	23.11
Maharashtra	12.26	24.49
Tripura	10.09	24.79
Sikkim	36.62	25.29
Assam	15.95	25.56
Punjab	13.24	26.13
Uttar Pradesh	15.98	29.32
Haryana	25.16	30.66
Uttarakhand	25.1	38.42
Rajasthan	23.56	38.71
Bihar	13.99	38.83
Himachal Pradesh	26.69	41.51
Andhra Pradesh	34.71	42.8
Jharkhand	45.12	42.87
Tamil Nadu	36.46	43.09
Gujarat	39.69	44.61
Arunachal Pradesh	16.46	44.63
Manipur	34.83	44.9
Jammu & Kashmir	20.73	53.48
Nagaland	30.11	65.41
ALL-INDIA	19.85	29.41

Source: SAAH reports for 2012-13 (NSS 70th Round) and 2018-19 (77th Round)

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Organization. In 2020-21, 6.2% of agricultural families in India relied on livestock raising for their income. According to SAAH data, animal husbandry revenue as a proportion of farm income grew from 19.85 to 29.41 from 2012-13 to 2018-19.

2. Generation of employment opportunities

A huge percentage of illiterate and unskilled population of India dependent on agriculture. Agriculture is seasonal and can only provide employment for approximately for the period of half year. According to the NSSO's 68th Round Survey on Employment and Unemployment, 16.44 million people worked in livestock, mixed, fishing, and aquaculture.

The land less people rely on livestock for work during non-agricultural season. Around 18.8% of India's population relied on livestock raising for employment.

3. Food Security for population:

The section of Indian population who owns cattle in their households and dependent on livestock rearing population for livestock products get essential amount of protein through milk, meat, and eggs. The livestock owners' families depend on production of milk, meat, and eggs for sustenance also.

Table: 4 : Share of Agriculture & Allied Sectors and Livestock Sectors

Year	GVA (Total)	GVA (Agriculture & Allied)		GVA (Livestock Sector)	
		Amount	% Share to total GVA	Amount	% Share to total GVA
2011-12	81,06,946	15,01,947	18.5	3,27,334	4
2012-13	92,02,692	16,75,107	18.2	3,68,823	4
2013-14	1,03,63,153	19,26,372	18.6	4,22,733	4.1
2014-15	1,15,04,279	20,93,612	18.2	5,10,411	4.4
2015-16	1,25,74,499	22,27,533	17.7	5,82,410	4.6
2016-17	1,39,65,200	25,18,662	18	6,72,611	4.8
2017-18	1,55,05,665	28,29,826	18.3	7,85,683	5.1
2018-19	171,75,128	30,29,925	17.6	8,82,009	5.3
2019-20	183,55,109	33,58,364	18.3	9,77,730	5.2
2020-21	180,57,810	36,09,494	20	11,14,249	6.2

Source: National Accounts Statistics-2022, Central Statistical Organization, GOI

According on the January 2022 estimates published by the National Statistical Office, the gross value added (GVA) of the livestock sector during the financial year 2020-21 is at Rs. 1114249 crores based

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on current prices. This figure represents about 30.87% of the GVA for the Agricultural and Allied sector, and approximately 6.17% of the Total GVA.

Livestock sub-sector is essential to Indian economy and socio-economic development of millions of rural families. The main source of draught power in rural regions is livestock, which supplies milk, meat, eggs, wool, hides and skins, manure, and fuel. The livestock industry feeds India with milk, milk derivatives, meat, eggs, etc.

World's biggest milk production is India. The government has taken steps to boost animal productivity, which has increased milk output. In 2020-21 and 2021-22, milk output is 209.96 million tons and 221.06 million tons, growing 5.29% annually. Per capita milk availability in 2021-22 is 444 grams/day.

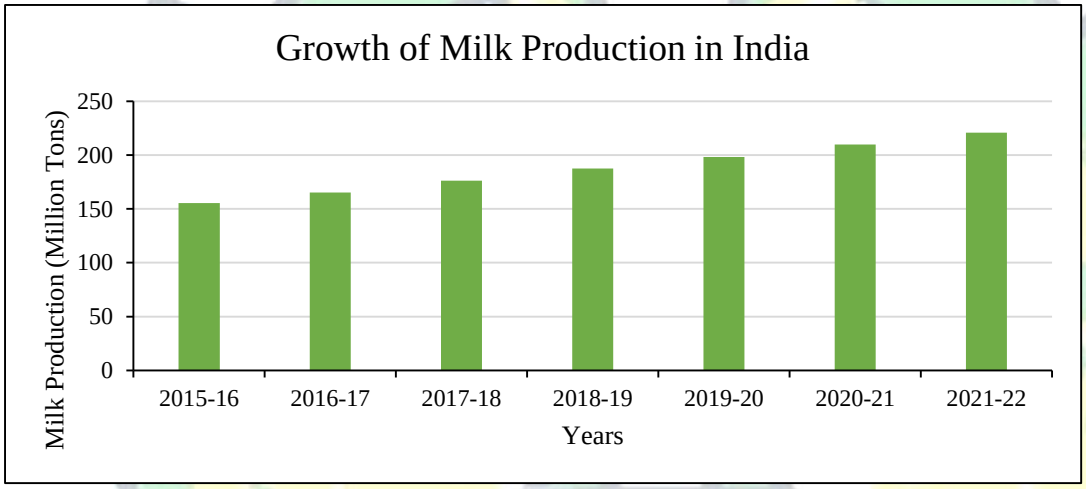

Figure: 1 (Source: Annual Report, 2022-23, Department of Animal Husbandry, Dairying and Fisheries, Government of India)

In the past 40 years, chicken industry in India has gone from primitive farming to commercial production using cutting-edge technology. The 20th Livestock Census reported 851.81 million poultry

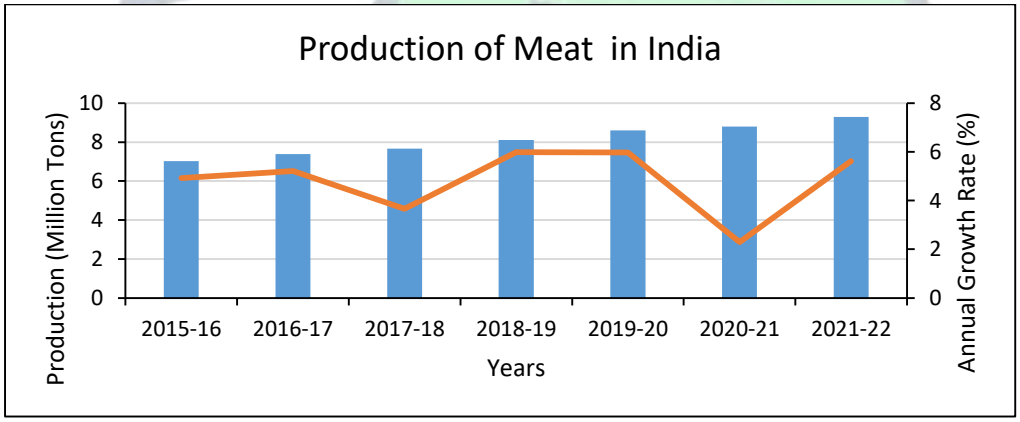

Figure: 2 (Source: Annual Report, 2022-23, Department of Animal Husbandry, Dairying and Fisheries, Government of India)

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in our nation, and egg output was 129.60 billion in 2021-22. Per capita egg availability in 2021-22 is 95. Egg output rose 6.19 percent in 2021-22.

The production of meat products grew from 6.69 million tons in 2014-15 to 9.29 million tons in 2021-22 in India. The growth rate of this production was 62% in 2021-22 in comparative to previous years.

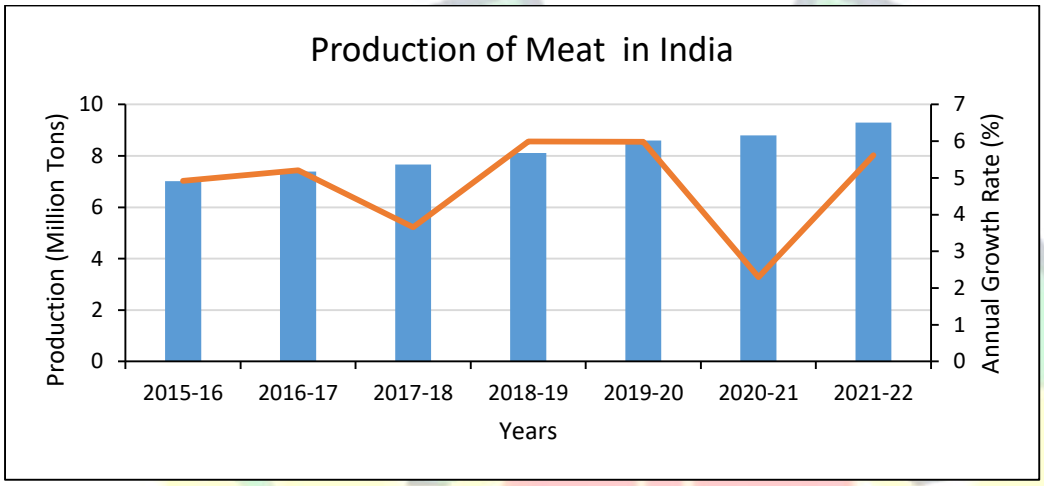

Figure: 3 (Source: Annual Report, 2022-23, Department of Animal Husbandry, Dairying and Fisheries, Government of India)

4. Pillar of Social security:

The social status of people engaged in livestock sector is secured by their animals. The cattle are integral part of Indian culture due to many religious and social uses of animals. Animal-owning households, particularly landless ones, are using livestock as economic and social source of prestige. People often gift animals during nuptials. Indian culture includes animal husbandry in different sections of the nation. Cows for housewarming celebrations, rams, bucks, and fowl for festive sacrifices, and bulls and cows for religious rites are used in allover the India. Thus many pet owners bond with their pets and use them as source of social security.

5. Booster of Gender equality:

Animal husbandry supports gender equality. Women provide about three-quarters of livestock production labour. In Punjab and Haryana, where dairying and stall-feeding are very common part of economy, 90% of livestock workers are consisted of female population. Rearing and caring animals and major role in these activities promotes gender equality. Over 75% of livestock production is done by women. However, men and women have complimentary roles in animal husbandry, therefore it is impossible to classify their tasks but role of women for feeding, milking, and caring of animals is

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bigger. Women are leading the dairy cooperative movement under Operation Flood and the government's Integrated Dairy Development Programme in different parts of India. In the poultry industry, rural poultry is an income-supplementing initiative largely run by women with priority training.

In breed conservation initiatives, sheep, goat, and small ruminant conservation are aimed to attract women in these fields. The animal husbandry and dairy industry employs more than 50% women of the country directly and indirectly.

6. Contribution to woolen and leather Industries

Wool production in India was 46.05 million Kg in 2012-13, rose to 48.14 million Kg in 2014-15, and fell to 33.04 million Kg in 2021-22. Wool production fell down 10.53 percent in 2021-22 comparatively but has important share in Indian economy.

Leather, leather products, and footwear industries have also important role in Indian economy. This industry is well-known for its consistent high export revenues and is one of the country's top 10 foreign currency earners. India is the world's fifth biggest exporter of leather products and accessories. During 2021-22, India's exports of leather and its products reached $4.87 billion. The sector has an abundance of raw materials since India has 20% of the world's cow and buffalo population and 11% of the world's goat and sheep population. Added to this are the advantages of competent labour, advanced technology, increased industrial acceptance of international environmental standards, and the consistent assistance of related industries. The leather industry is a high-employment sector, employing over 4.42 million people, the majority of whom come from lower-income families. Women make up around 30% of the workforce in the leather goods industry.

7. Best form of Insurance for rural India

Livestock is the greatest insurance against hunger, drought, and other natural disasters and during emergencies. The most of livestock is owned by marginal and small farmers and landless population. Livestock also provide organic manure to Indian agriculture. Many cattle species provide food and economic security during natural and artificial calamities and prove best form of insurance for the owners of livestock.

8. Important role in agricultural activities

Despite advances in mechanical power in Indian agriculture, rural farmers still employ bullocks for numerous tasks of farming. The bullocks save a lot of energy doing these tasks. Along with bullocks, camels, horses, donkeys, ponies, mules, and others are utilized to carry products throughout the nation.

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Mules and ponies are the only way to deliver items in mountainous terrain. In high-altitude places, the army relies on these animals to move supplies of goods.

9. Asset for landless agriculture labour

Because of the utility of livestock in emergency disposal, it is called moving banks for the owners of cattle. Many time it proved main asset and capital source for landless agricultural labourers and poor farmers in India and worldwide. It is asset that guarantee their loans taken from local lenders during emergency.

10. Companion animals

Since ancient times, dogs have been loyal friends. When nuclear families grow and senior parents are forced to live alone, dogs and cats support them and they feel very comfortable with their pets. They aid people in daily life and provide security at home. In recent years the rearing and breeding of dogs and cats is formed as good business in India.

11. Cattle dung as energy source

Biogas or dung cakes may replace charcoal and wood. Mixed farming provide livestock to eat crop remnants and other waste. Dung is used for dung cakes, manure, and plastering in rural regions. The spread of biogas technology has supported the Indian farmers directly and indirectly to complete the need of manure and energy. The 2018 budget allocates Rs. 10,000 crore under the GOBAR-Dhan initiative for 500 new ‘waste to wealth’ plants to expedite India's renewable energy transformation.

Biogas production in India is 1,108 TWh, according to the Indian Biogas Association. This labor-intensive industry may provide employment to huge skilled and unskilled popultion.

The Indian Biogas Association reports approximately 4,120,000 biogas units working in country and the government’s focus on organic farming and sustainable energy will boost industry in the coming years.

Although the usage of dung cakes causes severe home air pollution. However, this is used to produce biogas, decreasing reliance on petrol/diesel and fossil fuels, and tapping into an existing supply inside the agricultural system to preserve energy.

12. Replacement of Chemical Fertilizer by Manure and Vermicompost

Manure in form livestock waste is a good fertilizer with 8 kilogram nitrogen, 4 kg phosphorus, and 16 kg potassium per tons. It increases soil structure and water retention capacity while fertilizing it. Vermicomposting dung may help rural Indian farmers to set up it as business and to increase their family income. It increases soil fertility and agricultural yield. It can employ millions of rural Indians and improve their social and economic standards. The use of animal waste as manure will help the country to be Organic India which is the need of day.

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Problems faced by the Livestock Sector in India

1. Although the livestock sector of India is playing significant role for economic and social development, but it is struggling with many problems. The following are important issues:
2. Farm animal milk output in India is poor. Milk output must rise to boost livestock. Improving farm animal production is a serious problem. Indian cattle produce half the world average of 1172 kg of milk per year.
3. Foot and Mouth Diseases, Black Quarter infection, influenza, and other diseases are common in Indian climate and harm cattle and negatively affect the production.
4. India's large cattle population emits greenhouse emissions and is promoting global warming and air pollution. Reduction of greenhouse emissions through government programmes is very difficult task.
5. Crossbreeding indigenous species with foreign populations to improve genetic potential has had little success. Rural locations have limited Artificial Insemination services because to a lack of quality germplasm, infrastructure, and technical staff and low conception rates.
6. The agriculture and related sectors got just 12% of total funding of India and excessively low as compared to its contribution in GDP of India. Banks and other financial organizations have ignored this sector.
7. The slaughtering facilities in India are inadequate as compared to other countries. Unregistered slaughterhouses produce half of the meat production in India. Marketing and transaction expenses of animal goods are 15-20% of the selling price. Meat production in India is hampered by mismanagement and a lack of infrastructure.
8. Landless agriculture labors and small farmers need to fund for healthy and high no. of livestock in their homes. Without funds, they cannot buy high-yield cattle, improve health facilities, or boost the production of milk, meat, wool, eggs, and other animal products. Thus, they contribute less to social and economic growth than they might with greater funding.

Measures to solve the challenges of livestock sector

With a swelling population, rising food prices, rising farmer suicides, and most Indians working in agriculture, animal husbandry is no longer a choice but a necessity. Its effective, lasting, and skillful execution will improve lower-class society's socioeconomic status and make India as a nutritional

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powerhouse. The problems of Indian livestock sector may be minimized with help of following measures:

- Providing sufficient feed and drinking water is crucial for boosting milch and cow output in arid and semi-arid settings.
- Effective trade policies, including marketing, are needed to promote animal goods like eggs, fish, and milk and ensure fair prices for farmers by reducing middleman influence.
- Farmers seeking supplemental income from livestock husbandry need training and support.
- The government should priorities R&D in the cattle sector to increase production and aid small and marginal farmers.
- Increase Veterinary Ambulance Service and Mandatory Cattle Vaccination: Provide prompt primary treatment for wounded animals via enhanced ambulance services in veterinary facilities.
- Ensure timely veterinarian monitoring and required basic livestock immunization.

Government of India and state government policies and programmes are being launched to improve and develop the livestock. Below are some important programmes:

- **Rashtriya Gokul Mission**

The Rashtriya Gokul Mission was launched in 2014 to create and conserve indigenous bovine breeds. The programme is focused on bovine milk output and productivity to satisfy rising milk demand and make livestock sector more profitable for rural farmers. It will boost production and benefit all Indian cattle and buffaloes, particularly marginal and small farmers. This project will assist women for engagement in this sector. The scheme has brought genomic selection to indigenous cattle and buffalo breeds for the first time.

- **National Livestock Mission**

This Mission aims to support livestock sector growth by boosting supply of fodder and feed, k coverage of risks, extension of loan facility and support of livestock farmer organization.

The programme aims to enhance meat, goat milk, egg, and wool production by creating jobs, fostering entrepreneurship, and increasing animal productivity.

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- **National Dairy Development Programme**

The NPDD programme helps to enhance the quality of milk and facilitates the efficient purchase of milk. The programme aims to enhance the quality of milk testing tools and primary chilled plants for various organizations, including State Cooperatives Dairy Federations, District Cooperative Milk Producers' organizations, dairies operated by Self-Help Groups, Milk Producer Firms, and milk Producer Groups of farmers. The countrywide project is scheduled to commence in the financial year 2021-22 and conclude in the financial year 2025.

- **Dairy processing & Infrastructure Development Fund**

In December 2017, Department of Animal Husbandry and Dairying has launched DIDF to generate and modernize milk processing, chilling, and value-added infrastructure for Dairy Co-operatives, Multi State Dairy Cooperatives, Milk Producer Companies (MPCs), and NDDB subsidiaries. This initiative aims to give subsidized loans @6.5% to capital-stressed milk cooperatives to replace their decades-old chilling and processing units and build value-added product factories.

- **Supporting Dairy Cooperatives and Farmer Producer Organizations Engaged in Dairy Activities**

The 2017-18 National Dairy Development Board is implementing the plan. The initiative provides soft working capital loans to dairy cooperatives and farmer producer organizations to help them weather market downturns and natural disasters. Milk producer units can get capital loans a minimum 2% annual interest under this plan to increase their capacity and production.

- **Livestock Disease Control and Health**

The Livestock Health & Disease Control scheme is launched to improve health of cattle through prophylactic vaccination programmes, capacity building, and surveillance of disease and improvement of veterinary infrastructure. The scheme is expected to prevent and control diseases, increase access to veterinary services, boost animal productivity, increase trade in livestock and poultry products, and improve livestock and poultry farmers' socioeconomic status.

- **Nationwide Artificial Insemination Program**

This programme started in 2019 in 605 districts with less than 50% artificial insemination coverage. Quality Artificial Insemination is free at farmers' doorsteps under the plan. The scheme has covered 4.41 crore animals, done 5.44 crore artificial inseminations, and benefited 2.93 crore farmers. It aims

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to inseminate 3 crore animals in 592 districts by 2023-2024.

- **National Animal Disease Control Program**

To combat Foot & Mouth Disease and Brucellosis, the Indian government vaccinated 100% of cattle, buffalo, sheep, goat, and pig populations and 100% of bovine female calves aged 4-8 months. This plan aims to vaccinate and eradicate Foot & Mouth Disease by 2025 and 2030. This will boost milk and livestock exports and local production.

- **National Kamdhenu Breeding Centre**

The northern and southern regions have National Kamdhenu Breeding Centres to store indigenous breeds. This centre supplies approved germplasm to farmers raising indigenous breeds and expanding their stock. The Southern Region National Kamdhenu Breeding Centre in Andhra Pradesh located in Chintladevi, Nellore District. Narmadapuram District, Kiratpur, Madhya Pradesh, hosts Northern Region NKBC.

- **Farmer Awareness programme**

Funds have been allocated to states to organize fertility camps to raise farmer awareness. States have been given fund to increase farmer awareness about livestock sector schemes and Government programs to gain more benefit under the Nationwide Programme.

- **Animal Infrastructure Development Fund**

Animal Husbandry Infrastructure Development Fund was established with Rs. 15000 crore under Atmanirbhar Bharat Abhiyan. “The scheme's goals are to increase milk and meat processing capacity and product diversification, giving unorganized rural producers greater access to the organized market, price realization, quality milk and meat products for domestic consumers, generating entrepreneurs, promoting exports, quality and cheap animal feeds, and quality protein-rich food to the cattle”.

- **Milk Producer Companies and Milk Cooperative Dairy Farmers Get Kisan Credit Cards (KCC)**

In 2019, the Indian government granted KCC to animal husbandry and dairy farmers for the first time. This Department organized a special effort to provide these card to cooperative societies and dairy farmers from 01.06.20 to 31.12.20 as part of the Atmanirbhar Package. This provided facility of low-interest loan to landless dairy farmers.

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- **Veterinary mobile units**

Under Livestock Health & Disease Control Programme, States/UTs get money for Mobile Veterinary Units to provide veterinary services to farmers. One MVU per lakh cattle is supplied. Mobile Veterinary Units will be customized transport facility for veterinary healthcare with equipment for diagnosis, treatment, minor surgery, audio-visual aids, and other basic needs of animal treatment. 34 states and UTs received Rs.682.37 Crore to buy 4340 Mobile Veterinary Units, and 16 states/UTs inaugurated 1528 units of this type. .

Conclusion

In sum, livestock sector is playing important role in socio-economic development of India through its manifold contribution. It provides food security for marginal and small farmers directly and other population indirectly. Around 18.8% of India's population are employed in livestock sector and very helpful in their livelihood and provide essential amount of protein through milk, meat, and eggs and other products. Many Indian households, particularly landless ones, depend on livestock for their income. Leather, leather products, footwear products and woolen items producing industries have also important role in Indian economy. The use of animal waste as manure will help the country to be Organic India. In emergency times, cattle proved main asset and capital source for farmers in rural area. It employ millions of rural Indians and improve their social and economic standards. Although this sector has some issues but Governments of state and India have launched many programs and schemes to eradication these problems to improve and enhance the production of livestock goods.

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Issues and Challenges of vegetables Growers in Haryana

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Abstract: The present study aims to analyse the issues and challenges of some selected vegetables growers in Haryana. A sample of 80 vegetable growers for each vegetable and total sample of 240 vegetable growers are selected for vegetables. The problems faced by the vegetable growers are classified as pre-harvest and post-harvest problems, for pre-harvest problems 17 statements were framed and measured on five point scale (Most affected 5- Least affected 1, Ranks 5 to 1). Similarly, post-harvest problems were measured by 11 statements from most to least. the author found that selected vegetables growers in Haryana faced many problems during pre and post-harvest i,e financial, quality of seed, soil & water for irrigation, timely availability of fertilizers and other inputs, selling price, storage facilities and other marketing related issues.

Key Words: Vegetables Growers, Pre and Post-Harvesting, Vegetable Selling Price

Introduction:

Vegetables have a significant role in human diet which provides vitamins and minerals essential for human health and growth. Along with this, vegetables play an important role in the household nutritional security, employment generation and alleviation of poverty and hunger. More than 70 types of vegetables are grown in India. Higher emphasis is given to more popular vegetables like tomato, potatoes, onion, brinjal, cauliflower, cabbage, peas, chilli, and few common cucurbits and leafy vegetables. Besides, a large number of minor vegetables are also grown in different parts of country. These minor vegetables possess high export potential and could fetch very high price in many overseas markets (Singh 2002).

At present, among the different groups of horticulture crops, vegetables crops is a largest sub sector, sharing about 41.4 percent of the total area and 59.3 percent of total production under horticulture. India is the second largest producer of vegetables next only to China, producing 169.1 million tonnes of total vegetables (14.5 percent of total world production) from an area of 10.1 million hectares (16.5 percent of total world area under vegetables). In 1995-96 total area under vegetables was only 5.3 million hectares which was 38 .7 per cent of total area under horticulture. In these two decade from

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1995-96 to 2015-16, it ranged between 38 to 41 per cent to total area under horticulture. But in absolute terms it increased almost double from 5.3 million hectares to 10.3 million hectares. On the other hand, total vegetable production has increased more than double. And productivity of vegetables has increased from 13.4 tonnes per hectare in 1995-1996 to 15.5 tonnes in 2005-06 and further increased to 17 tonnes in 2016-17. While in Haryana, more than 80 percent of area and production of horticulture crops is contributed by vegetables. Area and production of vegetables in Haryana has continuously increased over time.

In this regard, this paper is an attempt to analyze the various issues and problems of some selected vegetables growers in Haryana.

Research Methodology: Analysis of this study is based on the primary survey which is collected by using a pre- tested structured schedule from selected sample. Multistage proportionate random sampling technique will be used to select the sample. On the basis of convenience the state Haryana will be selected for the study. Further vegetables are selected on the basis of highest area under cultivation in total area under horticulture crops in the state. On the basis of highest area under cultivation among different vegetables three vegetable namely Potato, Tomato and Onion will be selected for this study. There are 22 districts in Haryana. Out of these districts, those districts will be selected on the basis of highest area under cultivation for each selected vegetable. On the basis of available information in 2015-2016, area under cultivation of these three selected vegetables, Kurukshtra district has highest cultivated area under potato (25.2 per cent) and Mewat district has highest area under tomato (16.4 per cent) and onion (24.1 per cent) among all 22 districts of Haryana. So these two districts will be selected for this study. Further, from each district two blocks on the basis of highest area under selected vegetables will be selected for each selected vegetable crop and further from each block, four villages will be selected on the basis of highest area under selected vegetable. Thus for each vegetable crop, total 8 villages will be selected. From each village, sample of 10 vegetable growers for each vegetable will be selected randomly. A sample of 80 vegetable growers for each vegetable and total sample of 240 vegetable growers will be selected for all three vegetables. The problems faced by the vegetable growers can be classified as pre-harvest and post-harvest problems, for pre-harvest problems 17 statements were framed and measured on five point scale (Most affected 5- Least affected 1, Ranks 5 to 1). Similarly, post-harvest problems were measured by 11 statements from most to least.

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Result and Discussion

Problems faced by Potato growers of Kurukshetra district

The problems faced by potato growers were measured on five point scales from most to least and on the basis of mean values they were ranked and evacuated.

Table-1: Pre harvest problems faced by Potato producers

	N	Mean	RankRank RanksRA
Problems about the quality of land and soil	80	2.42	17
Problem about farm size.	80	4.15	5
Availability of quality seeds	80	4.28	8
High price of quality seed	80	4.3	2
Availability of skilled labor in study area	80	4	9
If availability, than wage rate are very high	80	3.95	10
Problem about availability of Irrigation facilities	80	4.05	6
If irrigation facilities is available at time, than quality of water is not good	80	2.55	15
Problems about availability of fertilizers	80	4.05	7
Availability of plant protection material	80	2.5	16
Financial institutions are not available in study area	80	3.55	14
High dominance of non-institutional sources of credit in area	80	3.95	11
High rate of interest	80	4.17	4
Non availability of finance/credit at time	80	4.53	1
Non availability of modern method of Harvesting	80	3.65	13
Problem about the availability of latest technical knowledge	80	3.85	12
Problem about the lack of information of new agricultural research in the field of vegetable production	80	4.1	3
Valid N (listwise)	80		

Source: Field Survey, 2020

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Table-1 revealed about constraints faced by potato growers in Kurukshetra districts at production level. Majority of farmers having issue of "Non availability of finance/credit at time, High price of quality

Table-2: Post- harvest problems faced by Potato producers

	N	Mean	Ranks
Problems about the availability of skilled labors for harvesting, assembling and packing	80	2.75	10
Problems about weighing	80	2.35	11
Good grading system is not available	80	2.80	9
Non availability transporting facilities	80	3.35	5
No connectivity of roads from farm to market place	80	4.48	3
Low prices in market	80	4.50	2
Post-harvest credit facilities	80	4.65	1
Lack of storage facilities	80	3.05	6
Problems about the malpractices	80	3.45	4
Non-cooperation of marketing official	80	2.95	8
Lack of information about timely latest marketing information	80	3.00	7
Valid N (listwise)	80		

Source: Field Survey, 2020

seed and Problem about the lack of information of new agricultural research in the field of vegetable production" ranked as 1, 2 and 3 on the basis of mean values. Their mean score were respectively 4.53, 4.30 and 4.10. Similarly, less effective constraints for potato cultivation were "If irrigation facilities is available at time, than quality of water is not good, Availability of plant protection material and Problems about the quality of land and soil" with mean values of 2.55, 2.50 and 2.42" respectively.

Table 2 represented the problems faced by potato growers in Kurukshetra districts at marketing level. They were also termed as post-harvest problems. Majority of farmers having issue of "Post-harvest credit facilities" with a mean value of 4.65, followed by "Low prices in market" with a mean score of

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4.50. The less effective constraints for potato cultivation were “Problems about the availability of

Table-3: Pre Harvest Problems faced by Onion producers

Problems	N	Mean	Ranks
Problems about the quality of land and soil	80	4.02	6
Problem about farm size.	80	4.15	4
Availability of quality seeds	80	3.75	12
High price of quality seed	80	4.00	7
Availability of skilled labor in study area	80	2.55	14
If availability, than wage rate are very high	80	3.90	9
Problem about availability of Irrigation facilities	80	4.35	2
If irrigation facilities is available at time, than quality of water is not good	80	3.85	10
Problems about availability of fertilizers	80	4.05	5
Availability of plant protection material	80	2.45	16
Financial institutions are not available in study area	80	2.60	13
High dominance of non-institutional sources of credit in area	80	4.55	1
High rate of interest	80	3.95	8
Non availability of finance/credit at time	80	4.25	3
Non availability of modern method of Harvesting	80	2.50	15
Problem about the availability of latest technical knowledge	80	3.80	11
Problem about the lack of information of new agricultural research in the field of vegetable production	80	2.30	17
Valid N (listwise)	80		

Source: Field Survey, 2020

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skilled labors for harvesting, assembling and packing and Problems about weighing", with mean values of 2.75 and 2.35 respectively.

Problems faced by Onion growers of Mewat district

The problems faced by onion growers were measured on five point scale from most to least and on the basis of mean values they were ranked and evacuated.

Table-3 revealed about constraints faced by onion growers in Mewat districts at production level. Majority of farmers having issue of "High dominance of non-institutional sources of credit in area, Problem about availability of Irrigation facilities and Non availability of finance/credit at time" ranked as 1, 2 and 3 on the basis of mean values. Their mean score were respectively 4.55, 4.35 and 4.25. Similarly, less effective constraints for onion cultivation were "Non availability of modern method of Harvesting, Availability of plant protection material and Problem about the lack of information of new agricultural research in the field of vegetable production" with mean values of 2.50, 2.45 and 2.30" respectively.

Table-4: Post-Harvest Problems faced by Onion producers

	N	Mean	Ranks
Problems about the availability of skilled labors for harvesting, assembling and packing	80	2.75	10
Problems about weighing	80	2.35	11
Good grading system is not available	80	2.80	9
Non availability transporting facilities	80	4.55	2
No connectivity of roads from farm to market place	80	4.50	3
Low prices in market	80	3.30	5
Post-harvest credit facilities	80	4.60	1
Lack of storage facilities	80	3.05	6
Problems about the malpractices	80	3.40	4
Non-cooperation of marketing official	80	2.95	8
Lack of information about timely latest marketing information	80	3.00	7
Valid N (listwise)	80		

Source: Field Survey, 2020

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The above given table represented the problems faced by onion growers in Mewat districts at marketing level. They were also termed as post-harvest problems. Majority of farmers were facing issue of "Post-harvest credit facilities" with a mean value of 4.60, followed by "Non availability transporting facilities" with a mean score of 4.55. The less effective constraints for onion cultivation were "Problems about the availability of skilled labors for harvesting, assembling and packing and Problems about weighing", with mean values of 2.75 and 2.35 respectively.

Problems faced by Tomato growers of Mewat district

The problems faced by tomato growers were measured on five point scale from most to least and on.

Table-5: Pre harvest problems faced by Tomato producers

	N	Mean	Ranks
Problems about the quality of land and soil	80	4.6	2
Problem about farm size.	80	2.25	17
Availability of quality seeds	80	4.3	5
High price of quality seed	80	4.45	3
Availability of skilled labor in study area	80	2.5	15
If availability, than wage rate are very high	80	2.4	16
Problem about availability of Irrigation facilities	80	4.4	4
If irrigation facilities is available at time, than quality of water is not good	80	2.55	13
Problems about availability of fertilizers	80	4.05	7
Availability of plant protection material	80	2.5	14
Financial institutions are not available in study area	80	2.55	12
High dominance of non-institutional sources of credit in area	80	3.95	9
High rate of interest	80	4	8
Non availability of finance/credit at time	80	4.65	1
Non availability of modern method of Harvesting	80	4.1	6
Problem about the availability of latest technical knowledge	80	3.85	10
Problem about the lack of information of new agricultural research in the field of vegetable production	80	2.6	11
Valid N (listwise)	80		

Source: Field Survey, 2020

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the basis of mean values they were ranked and evacuated .

Above table depicted about constraints faced by tomato growers in Mewat districts at production level. Majority of farmers having issue of "Non availability of finance/credit at time, Problems about the quality of land and soil and High price of quality seed" ranked as 1, 2 and 3 on the basis of mean values. Their mean score were respectively 4.65, 4.60 and 4.45. Similarly, less effective constraints for onion cultivation were "Availability of skilled labor in study area, If availability, than wage rate are very high and Problem about farm size." with mean values of 2.50, 2.40 and 2.25" respectively.

The above given table represented the problems faced by tomato growers in Mewat districts at marketing level. They were also termed as post-harvest problems. Majority of farmers were facing issue of "Post-harvest credit facilities" with a mean value of 4.70 followed by "Low prices in market" with a mean score of 4.60. The less effective constraints for tomato cultivation were "Non-cooperation of marketing official and problems about weighing", with mean values of 2.40 and 2.35 respectively.

Table-6: Post harvest problems faced by Tomato producers

	N	Mean	Ranks
Problems about the availability of skilled labors for harvesting, assembling and packing	80	3.45	6
Problems about weighing	80	2.35	11
Good grading system is not available	80	2.8	9
Non availability transporting facilities	80	2.9	8
No connectivity of roads from farm to market place	80	4.5	3
Low prices in market	80	4.6	2
Post-harvest credit facilities	80	4.45	4
Lack of storage facilities	80	4.7	1
Problems about the malpractices	80	3.8	5
Non-cooperation of marketing official	80	2.4	10
Lack of information about timely latest marketing information	80	3.05	7
Valid N (list wise)	80		

Source: Field Survey, 2020

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Conclusion:

To sum up, Haryana state has great potential in horticulture sector to overcome the problem of farmer's income. This problem will be solved when other issues and problems related to the farmers will be studied. On the basis of above analysis, the author found that selected vegetables growers in Haryana faced many problems during pre and post-harvest i,e financial, quality of seed, soil & water for irrigation, timely availability of fertilizers and other inputs, selling price, storage facilities and other marketing related issues.

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ROLE OF SOCIETY IN ENVIRONMENT CONSERVATION

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Abstract

The role of society in environment saving and how individual can participate in this movement of cleaning and purring the environment. What steps should we have to be taken to prevent our environment polluted? Every second that goes by results in more pollution. Pollution affects every living and non-living thing, and it's like a nightmare that's destroying not just the environment but also our ecology and life cycle. We should also learn from martyrdom of Amrita Devi of Rajasthan to save environment who scarify her life along with her two daughters. On that day total 363 Bishnois became martyrs to save the trees of their region in 1730 A.D.

KEYWORDS: ENVIRONMENT, ECOSYSTEM, POLLUTION, CHIPKO

1. Introduction

What environment conservation is and role of society to protect the environment to save earth. How people can help and participate in environment saving movement to save this planet from destruction and also discuss the Guru Jambheshwar (founder of Bishnoi community of nature worshippers) principles for saving the environment to his followers in 16th century.

2. What is Environment Conservation?

All the things around us like houses, building, water, air, mountains, soil, vegetation, light, land, animals and other living and nonliving things are environment. The living things not only exists but also changes and interact to each other in a some conditions. Every living and nonliving things thing need some condition to grow or change its state for their existence. If they do not meet their suitable conditions then their existence can be disappeared so these things required conservation.

Our environment is also required conservation as industrial revaluation grown up the environment start polluted in the form of air, noise, water pollutions. Due to this increasing in deforestation, civilization and disappeared many species of animals and birds. So, it needed to be protected. For the benefit of both the natural environment and people, environment conservation is the practice of safeguarding the environment at the individual, organizational, and governmental levels.

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3. Role of Society in Environment Protection:

Environment is totally connected with society in direct or indirect way. Society can play a big role for saving the earth and its environment. Every second that goes by sees a daily increase in pollution. Pollution affects every living and non-living thing, and it's like a nightmare that's controlling our ecology and life cycle as well as ruining our environment. Due to the overgrowth of pollution, we have recently seen significant changes in our environment. If this pollution keeps increasing at the same rate, there won't be any more fresh air available for us to breathe. Most individuals excuse themselves from their responsibility to protect the environment by asking, "What can we do? Government's responsibility. If not, are we really safeguarding our environment or are we simply deluding ourselves? No, protecting the environment is not only the responsibility of the government; we all have a duty to do it. Government can only safeguard the environment to a 50% extent; thus, each person must contribute their own 50%. We can all do a great deal to safeguard the environment. Imagine if everyone in the world fulfilled their 10% environmental responsibilities. Pollution levels may be cut by up to 50%. According to a study, 74% of individuals believe that protecting the environment is their moral obligation and that they should be assisted in lowering pollution. This post is for everybody who appreciates nature and wants to lessen pollution; thus we humbly ask that everyone who reads this document plant a tree.

4. How does food chain affect Ecosystem?

A functioning food chain aids in the regulation of an ecosystem. Even while predators can't always directly affect the size of their prey, they may improve the relative health of the population by eliminating sick or otherwise damaged individuals. According to the mesopredator release theory, an ecosystem's midlevel or mesopredators grow in number and power when the apex predators who formerly kept them in check are gone. The food chain may be significantly impacted by this. A few years ago in Surat(Gujarat) was facing problem of stray dogs .To get rid from these dogs a decision was made by Deputy Commissioner of Surat, to kill these stray dogs all over the city. Due to this the population of rates increased rapidly and that was the reason for plague outbreak at Surat and other parts of India. Similarly, I am also taking an example of cockroach to whom we all hatred but actually it is our friend. Cockroaches have an important ecological function, despite the fact that most of us consider them to be pests. Cockroaches are expert recyclers who eat almost everything, including animal waste, dead plants and animals, and faeces. They consume organic materials that is

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decomposing because it holds a lot of nitrogen.When cockroaches eat, they release nitrogen into their faeces, which is subsequently absorbed by the soil and used by plants. In other words, cockroach extinction would negatively affect the health of the forest and, in turn, indirectly affect all of the species that dwell there.

5. Guru Jambheshwar's Principles and martyrdom of Amrita Devi:

Guru Jambheshwar was a great saint of 16th century of Pipasar of Nokha District at Rajasthan. He is the founder of Bishnoi community (sect) worshipper of nature. He had laid down 29 principles to be followed by the sect. Some of his 29 principles says to save environment and wild animals like:-

• Use filtered water, milk, and well cleaned fuel or firewood instead of felling green trees. to remove all germs from the milk and water. To prevent environmental pollution from burning insects, etc. with the fuel while using firewood

• Avoiding meat and other non-vegetarian foods (to prevent the murder of animals and birds by erecting a market barrier).

Bishnois have a deep affinity towards wild creatures. In spite of the fact that the State of Rajasthan, where the Bishnois live primarily, suffers from severe water shortage and their crops barely manage to grow with the scant rains that the area receives, deer and antelope (such as blue bulls, black bucks, chinkaras, and chowsinghas) are seen grazing peacefully in their fields because of their protection. How miserable the condition of the crops may be, no Bishnoi will ever mind the loss of the standing crops inflicted by the grazing animals. Their emotions for the deer are so strong and passionate that a national daily carried a report with a picture of a Bishnoi woman feeding on her breast a newly born deer-calf who had supposedly lost its mother. Strong protests have been started by the Bishnoi community over the slaughter of black deer by Bollywood actor Salman Khan and former Indian cricketer Mansur Ali Khan of Pataudi.

The Bishnoi's are responsible for the Chipko movement's beginnings. Amrita Devi, a Bishnoi woman, was at her home with her three daughters (Asu, Ratni, and Bhagu bai) on a Tuesday in the year 1730 A.D. when she learned that a number of people had descended on their otherwise sleepy village of Khejarli. Since these trees were common in the area, the name Khejarli was formed from "Khejri". The individuals were a group of men dispatched by Abhay Singh, the ruler of the Marwar region's kingdom of Jodhpur, to cut down green Khejri trees so that lime could be burned to build the Maharaja's new palace. Even in the heart of the Thar Desert, there was a lot of greenery in the Bishnoi villages, so the monarch instructed his troops to chop down Khejri trees in order to get wood. Amrita

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Devi objected to the Maharaja's troops because they were trying to chop down green trees, which was against Bishnoi ethics. She was informed by the evil feudal party that she would need to pay them with money in order for them to spare the trees. She rebuffed their request, telling them that she would see it as an affront to her religious beliefs and that she would rather give up her life in order to safeguard the lush trees. When she reached that point, she spoke the following: "If a tree is saved, even at the cost of one's head, it is worth it." She extended her head after saying these words. Her skull was severed by the axes that were used to chop down the trees. Unfazed, the three little ladies Asu, Ratni, and Bhagu also offered their heads. The information circulated quickly. In order to deliberate on the next course of action, the Bishnois of Khejrali convened and extended invitations to their brethren in 83 nearby Bishnoi villages. The decision was made that one Bishnoi volunteer would give their life in exchange for each green tree that was chopped down since the ultimate sacrifice made by Amrita Devi and her daughters had not pleased the royal party. As in the 20th-century Chipko Movement, aged people first began holding the trees that will be chopped in an embrace on their own initiative. The Hakim (the head of the royal party), Girdhar Das Bhandari, mocked the Bishnois by saying that they were providing undesired elderly people despite many brave old people giving their life. Soon, young men, women (including some who had just married), and kids began offering comparable sacrifices of themselves. There was a lot of commotion. The group that was felling trees was quite disturbed. With their task unfinished, they drove to Jodhpur and informed the Maharaja of what had transpired. As soon as he was made aware of it, he issued an order to halt tree cutting. Three hundred sixty-three (363) Bishnois, whether male and female, married or single, wealthy or impoverished, had already attained martyrdom at that point. Maharaja Abhay Singh, honouring the fortitude of the Bishnoi community, apologised for the oversight made by his officials and issued a royal proclamation ordering the following: • All tree-cutting and animal hunting within the revenue boundaries of Bishnoi villages was strictly prohibited.

• It was also mandated that anybody who unintentionally disobeyed this order would face harsh punishment and prosecution by the state.

• No one would hunt animals in or close to Bishnoi communities, not even members of the royal family.

Despite the fact that Bishnois paid a steep price to save a few trees, this episode has motivated many people to fight for the preservation of forests and wildlife, and it will continue to do so in the future.

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6. Tips of Environment Saving for individual:

There are some important tips for individuals which will help the society as well as Government to reduce pollution

- Individual should Plant a tree on his/her birthday.
- Using vehicles efficiently (Total pollution's 47.5% vehicle's pollution)
- Throw waste item in proper place for recycling.
- Use electricity wisely and effectively.
- For saving energy ,every person should use LPG gas efficiently.
- Individual should use water properly and efficiently in kitchen as well as bathroom.
- Everyone should use jute bag for carrying items instead of polythene.

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Assessment of Environmental Impact for the Conservation of Environment and Sustainable Development

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Abstract:

In a nutshell, environmental degradation is the most important challenge to long-term sustainability. In this chapter, we look at how environmental deterioration threatens long-term progress. Environmental degradation, low agricultural production, significant post-harvest losses, weak market linkages, energy poverty, a lack of educational and non-agricultural prospects, hunger, and thirst force millions of people in need to leave rural areas every year and head for the cities. They move to the city, only to discover that it is not much better than the country. In addition to land-based environmental degradation, the increasing depletion of marine fisheries due to rising fish demand poses a significant threat to marine habitats and biodiversity. This is mainly because fishmeal, a component of feed that may be replaced by insects, is typically made from wild fish supplies.

But India has a long way to go before its environmental quality is on par with that of developed countries. India still has a significant opportunity and challenge associated with pollution. Degradation of the natural environment is a major cause of illness and distress in India, as well as a source of long-term consequences for the country's standard of living.

Keywords: environmental degradation, pollution, poor education, lack of energy.

Introduction:

When we talk about the environment, we are talking about the environment all of the Earth's natural resources. Each and every living thing imaginable is here. When we talk about the environment, we're talking about all of the Earth's natural resources. Each and every living thing imaginable is here. (NCERT, 2022-23) Degradation of the environment is a worldwide issue that calls for international action. Agenda 21 and Local Agenda 21 programs, which emphasize local action to solve local concerns as a starting point for reacting to greater, regional, and national difficulties, served as the impetus for these remedies. (Enviropedia) 2020. Using up all of a country's natural resources too quickly is a major contributor to environmental degradation (Thakur, 2010). Deterioration of the natural world has risen to the level of "common concern" among people in recent decades.

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To a greater extent than in the past, human activity is now at the root of our environmental problems (Rashwet, 2019). The principal reasons of the problem are the industrial revolution, the population explosion, and the rising everyday need for luxury items. A lack of environmental education, knowledge, understanding, and attitude among people has led to the current state of nature and its resources. As a result, many countries view sustainable development as a blueprint for their eventual demise. For the sake of environmental sustainability and security, it is critical that we implement a comprehensive environmental education system.

Sustainable development necessitates the joint effort of international organizations, national governments, non-governmental organizations, local communities, and the general public to address environmental degradation and to resolve cross-cutting, complex, and difficult issues at different levels (Surampalli et al., 2020). For some of these problems, we'll need to develop brand-new technologies (like smart farming). Although many of these technologies rely on critical minerals that are likewise in short supply, they are increasingly important, especially for renewable energy. In order to provide people with the quality of ecosystem services they require, it will take significant efforts in both mitigation (the reduction of carbon emissions) and adaptation (the modification of behaviors, consumption patterns, resource management, and so on).

Biological communities all across the world maintain the Earth's air, water, and soil. The unique and beneficial barrier they produce against climate change and extreme weather is unmatched. Strong biological systems are crucial to the sustainable development of industries including agriculture, range management, fisheries, and tourism. They have a large number of available positions. (Rajiv, 2016)

India's top Environmental Concerns for the Year 2023 :-

1. Air pollution

Undoubtedly, air pollution is one of India's most pressing environmental issues. According to the 2021 World Air Quality Report, 63 of the 100 most polluted cities are located in India, with New Delhi being the capital of the world with the poorest air quality. The survey also found that concentrations of PM 2.5 (airborne particles with a length of 2.5 micrometers or less) are more than 10 times the WHO air quality guideline threshold in 48% of the nation's cities. The government instituted a lengthy lockdown in March of 2020 to prevent the spread of Covid-19, and all human activity ceased at that time.

It comes as no surprise that this greatly affected the quality of air across the country. When looking at the Air Quality Index (AQI) data for both 2019 and 2020, it is clear that while the daily average AQI

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was 656 in March and April of 2019, it dropped significantly to 306 in the same months of 2020.

2. Water Pollution

One of India's most pressing environmental issues is water pollution. The Asian country has experienced unprecedented rates of urbanization and economic growth in recent years. However, doing so has serious ecological repercussions. The country's waterways are just as polluted as its air, with as much as 70 percent of its surface water considered unfit for human consumption. The illicit dumping of raw sewage, silts, and rubbish into rivers and lakes in India has caused severe pollution and ecological harm to the country's waterways. Water pollution and deforestation are only two of the many environmental problems that urban areas confront; other problems include a growth in slums, inadequate transportation alternatives, and industrial pollutants. Finally, we take a look at the current state of environmental legislation and offer recommendations for both policy and action to help spread environmental consciousness (Jyoti, 2009).

3. Scarcity of Food and Water

According to the Intergovernmental Panel on climatic Change (IPCC), India will suffer the most from the climatic catastrophe. Prolonged heat waves and droughts drain water resources and threaten agriculture, and the country is also vulnerable to flash floods and massive wildfires.

4. Disposal of Garbage

The use of plastic has caused one of the world's largest environmental disasters in India. The Central Pollution Control Board (CPCB) estimates that each day India generates about 25,000 tonnes of plastic waste, or around 6% of the world's total solid rubbish. India is second among the world's top 20 nations for its contribution to riverine plastic emissions, according to both national and international percentages. Highways of plastic flows describes the Indus, Brahmaputra, and Ganges rivers, which carry and dump the most of the country's plastic trash. They contribute to over 90% of all plastic that ends up in the ocean, along with the top 10 most polluted rivers in the world.

In 2020, the government announced plans to ban the manufacture, sale, distribution, and use of all single-use plastic products beginning July 1, 2022. Also on the agenda is the transformation of one hundred Indian cities into "smart cities."

5. Declining Biodiversity

The loss of biodiversity ranks last among India's environmental concerns. The Himalayas, the Western Ghats, the Sundaland region (including the Nicobar Islands), and the Indo-Burma region are the four most important biodiversity hotspots in India. These areas include extremely high densities of endangered animal and plant species. According to a report by the Centre for Science and Environment

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(CSE) in 2021, India has lost more than 90% of the land beneath the four hotspots, with the latter region being the most severely affected.

Actions taken by the Government to Prevent Environmental Decay

Even while everyone in the country must work together to protect the environment, governments have a key role to play in finding solutions to the difficulties? The government of India has taken several measures to save the planet. Here are just a few examples:

1. Protecting our Forests

The National Afforestation Programme (NAP) is the primary initiative of the Ministry of Environment, Forests, and Climate Change. The India State of Forest Report-2013 estimated that the country was home to a total forest cover of 697,898 square kilometers, or 21.23 percent of the country's total land area. India is one of the few countries in which forest coverage is really expanding. The Ministry of Environment and Forests' National Afforestation Programme (NAP) is a nationwide initiative to restore degraded forests and their surrounding communities through reforestation and ecological redevelopment.

2. National Greens Tribunal

On October 18th, in compliance with the National Green Tribunal Act of 2010, the NGT officially came into being. In order to protect the environment, preserve forests and other natural resources, enforce legal rights related to the environment, and provide relief and compensation for damages to people and property, this court was established. It is a specialized organization with the knowledge and experience to resolve environmental conflicts that span multiple disciplines.

3. Renewable Solar Power

As part of its LED initiative, the government is replacing the country's lighting infrastructure with LEDs. This fiscally responsible action would result in annual savings for consumers of around 40,000 crore rupees on power bills, equivalent to a reduction in carbon dioxide emissions of 80 million metric tons. India is trying to shift its economy so that it relies less on the generation of thermal electricity and more on renewable sources of power. By combining all of India's renewable energy sources, including its enormous hydro projects, the country may have 225 GW of renewable and clean energy by 2022, up from the original 20 GW objective for the solar power plan.

4. Purifying the air on a national scale

Air pollution is becoming a major cause for concern. Air pollution has far-reaching consequences for the well-being of humans, plants, and animals, and not just in terms of human health. The Green Skill

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Development Programme (GSDP) is a new initiative from the Ministry of Environment, Forest, and Climate Change (MoEF & CC) with the goal of educating and preparing young people for careers in the environmental, forestry, and wildlife fields. The program's goals are expanding to include a wider range of environmentally conscious practices, such as monitoring pollution (air, water, noise, and soil), running an ETP, managing trash, overseeing forest management, analyzing water use, and preparing a budget (Shristi,2019).

India's Struggles to meet the SDGs

Below, we'll talk about the four biggest obstacles India has on its way to achieving the SDGs:

1. Defining the Key Indicators: One of India's main challenges is developing suitable indicators to precisely measure progress toward the SDGs. It will be necessary to revise commonly used terms like "poverty," "hunger," "access to safe drinking water," and "education" in order to properly fulfill the SDGs.

2. C**ountry's best efforts in finance:** Development goals and emphasis on this issue since the 4th Five Year Plan, India is slowly growing up from their poverty line. The massive budget deficit makes it impossible to fulfill the SDGs at the current rate of spending.

3. Ownership of the implementation process: Monitoring progress has been cited as areas of concern for the NITI Aayog, despite the fact that its members are tasked with significant roles in taking on this responsibility.

4. Gauging development: the Indian government has admitted the scarcity of data, especially from the country's sub national areas. The insufficient coverage of administrative data is another obstacle that has made it hard to assess progress towards even the Millennial Development Goals (MDGs), the forerunners to the Sustainable Development Goals (SDGs).

The problems that still exist:

Goals 2 (Ending Hunger), 3 (Improving Health), 5 (Female Empowerment), 6 (Clean Water and Sanitation), 8 (Decent Work and Economic Growth), 9 (Industry, Innovation, and Infrastructure), 11 (Sustainable Cities and Communities), 14 (Life below Water), 15 (Life on Land), 16 (Peace, Justice, and Strong Institutions), and 17 (Partnerships for the Goals) all still face significant obstacles.

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Conclusion:

The main causes of environmental deterioration in India are the rapid rise of the population, the development of the economy, and the overuse of natural resources. Deforestation, land degradation, soil erosion, and the decline of wildlife populations are only a few of India's worst environmental catastrophes. Restoring productive capacity to damaged ecosystems, providing financial and technical assistance to farmers and harmonizing a country's agricultural and environmental policy are all critical to the long-term success of a sustainable development approach to agriculture. Resource efficiency, standard-setting to curb potentially polluting activities, defining lands for multiple uses, preservation or conservation, and improving the territory's infrastructure are all possible outcomes of careful physical planning and management throughout the land settlement process.

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Sustainable Agriculture and Environment Protection

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Abstract:

Sustainable agriculture is a process of growing crops and raising animals in a manner that does not harm the environment, maintain biodiversity, and promote the overall health of the ecosystem. Sustainable agriculture is a holistic approach that includes the management of soil, water, and air quality, use of natural resources, and minimizing waste. Environment protection, on the other hand, is the preservation of the natural world, including plants and animals, for future generations. Sustainable agriculture and environment protection are interrelated concepts; sustainable agriculture practices promote environmental protection, and environmental protection measures support sustainable farming practices. This research paper will explore sustainable agriculture and environment protection, highlighting their importance and interconnectivity.

Keywords: - Sustainable agriculture, environment protection, ecosystem

Benefits and Challenges of Sustainable Agriculture

Sustainable agriculture has numerous benefits, which include increased soil fertility, reduced soil erosion, and improved water quality. Sustainable agriculture practices such as crop rotation and intercropping promote soil fertility by reducing soil degradation and enhancing nutrient cycling. These practices also reduce soil erosion by preventing soil compaction, promoting soil structure, and improving water retention capacity. Sustainable agriculture also promotes water quality by reducing the use of agrochemicals that can contaminate the water supply.

Despite these benefits, sustainable agriculture also has its challenges. One of the challenges is the high initial costs of adopting sustainable agriculture practices, which may require capital investments such as the purchase of equipment and inputs. Additionally, the adoption of sustainable agriculture practices may require changes in cultural, social, and institutional practices, which may be difficult to implement.

Impacts of Conventional Farming Practices on the Environment

Conventional farming practices have significant impacts on the environment, including soil degradation, water pollution, and loss of biodiversity. Conventional farming practices such as monoculture, excessive use of fertilizers and pesticides, and over-tillage cause soil degradation by reducing soil structure and promoting soil erosion. These practices also contaminate water resources

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by leaching agrochemicals into the water table and waterways, leading to water pollution. Conventional agriculture also contributes to the loss of biodiversity by reducing the habitats of non-target species.

Measures to Ensure Environmental Protection

Measures that aim to promote environmental protection in sustainable agriculture include promoting crop diversity, reducing the use of agrochemicals, and promoting conservation tillage. Crop diversity promotes biodiversity and improves soil fertility by promoting nutrient cycling and reducing disease and pest pressure. Reduced use of agrochemicals promotes environmental protection by reducing water pollution and soil degradation. Conservation tillage promotes soil conservation by promoting soil structure and reducing soil erosion.

Case Studies

Case studies have demonstrated the benefits of sustainable agriculture practices for environmental protection. One such case study is the Organic Peanut Production Project in Senegal, which aimed to promote sustainable agriculture practices and improve food security. The project promoted crop diversification, conservation tillage, and reduced use of agrochemicals, leading to an increase in soil fertility and crop yield. Another case study is the Ecological Intensive Farming Project in China, which aimed to promote sustainable agriculture practices and improve soil quality. The project promoted the use of organic and ecological fertilizers, crop rotation, and intercropping, leading to an increase in soil fertility and a reduction in water pollution.

Importance of Sustainable Agriculture and Environment Protection

Sustainable agriculture practices are crucial in promoting a healthy environment, maintaining biodiversity and ecosystems, and ensuring food security. Agriculture accounts for over 70% of the world's freshwater usage, and unsustainable farming practices can lead to water depletion and contamination, affecting the quality of life of communities living downstream (FAO, 2021). Sustainable agriculture practices such as crop rotation, intercropping, and conservation tillage reduce soil degradation and increase soil's nutrient content, promoting soil health and improving crop yields. Sustainable agriculture practices also reduce the use of chemicals, resulting in fewer pesticides and fertilizers in the environment, reducing the risk of water and soil contamination that could adversely affect human health.

Environment protection measures such as the protection of forests, wetlands, and marine ecosystems promote biodiversity and ecosystems' health. Environmental degradation, such as deforestation, can

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lead to soil erosion, loss of biodiversity, and habitat loss. Sustainable agricultural practices such as agroforestry, which merges farming and forestry, promote the integration of trees into farming systems, providing habitats for wildlife and promoting biodiversity (FAO, 2021). Protecting forests and maintaining biodiversity is an essential aspect of environment protection as it provides ecological services that humans depend on, such as carbon sequestration, soil conservation, and water filtration.

Interconnectivity of Sustainable Agriculture and Environment Protection

Sustainable agriculture practices promote environmental protection, and environmental protection measures support sustainable farming practices. For instance, sustainable agriculture practices such as agroforestry, conservation tillage, and crop rotation promote soil health, reducing soil degradation and increasing crop yields, resulting in food security. On the other hand, protecting forests, wetlands, and marine ecosystems promotes biodiversity, which provides ecological services that humans depend on, such as carbon sequestration and water conservation.

Sustainable agriculture practices also contribute to climate change mitigation efforts. Agriculture accounts for 25% of global emissions, primarily through animal production and the use of chemical fertilizers in crop production (FAO, 2021). Sustainable agriculture practices such as conservation agriculture, agroforestry, and mixed farming reduce emissions, increase carbon sequestration, and enhance soil health, contributing to carbon reduction efforts.

Conclusion

Sustainable agriculture and environment protection are essential concepts in ensuring the long-term health of our planet, promoting food security, and combating climate change. Sustainable agriculture practices promote environmental protection by reducing soil degradation, preventing water and soil contamination, and reducing emissions. Environmental protection measures, on the other hand, promote biodiversity, ensuring ecological services that humans depend on, such as carbon sequestration and water filtration, adding significant value to sustainable agriculture. Therefore, sustainable agriculture and environment protection must be integrated and approached holistically to promote a healthy planet and ensure a sustainable future.

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Alarming Environmental Issues in India: Facts, Causes and their Solutions

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Abstract

Environmental problems are now so numerous and complicated that they pose a threat to humankind's ability to survive on Earth. This deteriorated state of the environment in India is largely due to rapid urbanization, economic expansion, population growth, forest loss, vehicle emissions, the use of dangerous chemicals, and several other unwanted human activities. Environmental pressure results from economic development that aims to increase production of products and services to meet the demands of a growing population. But if it results in environmental deterioration, is it really worth it? Air and water pollution, solid waste management, and the biodiversity loss are some of the most important environmental issues India is currently facing.

Introduction

Environment means “totality of all living and non-living elements and their interactions between biotic and abiotic elements” that has an impact on human survival and economic activity. The environment's four main functions are providing resources (both renewable and non-renewable), supporting life by maintaining genetic variety, assimilating garbage produced by diverse activities, and providing aesthetic services. Environmental degradation is a broad word that covers both the decreasing and deteriorating of environmental quality due to both natural and human-caused causes. By accelerating urbanization and industrialisation, expanding agriculture, and destroying ecosystems, the country's rapid rise in population and economic development are deteriorating the surroundings. Every nation needs to develop its economy. It sought to increase production in order to meet the demands of the expanding population while reducing the burden on the environment.

In India, some of the most alarming environmental problems along with the possible remedial measures taken by the government are as follows:-

Air Pollution

Air pollution is undeniably India's most persistent environmental concern. India is home to 63 out of 100 polluted cities in the world and New Delhi is at the top having the worst quality of air, according to the World Air Quality Report, 2021.

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Leading contributors of air pollution in India include motor vehicle emissions, the construction sector, industrial waste, agricultural burning, cooking smoke, and energy generation are the. In general, areas with chemical, iron and steel, textile, and petroleum refinery industries have more severe industrial pollution problems. People who live in poorly ventilated homes and cook with domestic stoves, wood, and coal add to the air pollution problem. Chronic exposure to high air pollution levels leads to a variety of adverse health impacts such as coronary artery disease, lung cancer, and high-risk respiratory infections. Air pollution has also been connected to 7 million premature deaths per year.

The lockdown in 2020 to prevent Covid-19 spread resulted in less humanoid activity, which dramatically improved air quality in the country. The daily average Air Quality Index declined from 656 in March-April 2019 to 306 in the same period of 2020, according to Air Quality Index from 2019 and 2020 but it does not last long. The annual PM 2.5 level in India in 2021 was about 58.1 g/m^3, indicating undoubtedly that the country had reverted to pre-pandemic levels.

Steps taken by government to control Air pollution

The government has taken many strict steps in recent years to control air pollution, including the Odd-Even Regulation in Delhi, which imposes traffic restrictions by allowing even-numbered private vehicles on the road on even days and odd-numbered vehicles on odd days. The National Capital Region has banned the use of coal as a source of energy in industrial and residential structures effective from January 2023. Though the main consumers of coal, thermal power plants, will not be subject to the prohibition. The World Air Quality Report clearly shows that, despite efforts to reduce air pollution, India's AQI remains extremely high.

Water Pollution

Water contamination is another urgent environmental issue in India. Water is heavily contaminated with various dangerous chemicals as an outcome of a growth in human population, industrialisation, and the use of fertilizers, herbicides and pesticides, as well as other anthropogenic happenings. It is estimated that over 70% of surface water is unfit for human consumption. Municipal garbage, industrial effluents comprising organic pollutants, heavy metals, poisonous compounds, and mining operations are the main causes of water contamination. According to a recent assessment, industrial and sewage waste discharges are the leading causes of aquatic system pollution in India, and only 10% of the total waste produced is cleaned before being dumped into water bodies. The resulting contaminated water clearly poses threats to the aquatic ecology, human health, and economic activity.

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Typhoid, gastroenteritis, cholera, and hepatitis are just a few of the waterborne illnesses that affect up to 40 million people in India. Aquatic organisms can be killed by industrial waste because it changes their environment and contains a variety of hazardous compounds such as heavy metals, oil products, and pesticides and herbicides. Due to polluted water, India's 16% fresh water fish and aquatic plants are on the verge of extinction.

Measures taken by government to control Water pollution

The Government has launched a several programs to preserve and protect the rivers and water bodies in the nation, including the NRCP (National River Conservation Programme), Jal Jeevan Mission, NLCP (National Lake Conservation Programme), and AMRUT (Atal Mission for Rejuvenation and Urban Transformation). The government has initiated a variety of programmes to decrease water contamination, but more has to be done. A comprehensive waste management plan is required, and citizen participation and involvement are critical for modernising the waste management industry and executing the essential behavioural changes.

Many water treatment facilities have been built, and they use methods like flocculation, skimming, and filtering to get rid of the most dangerous contaminants from the water. In Panjrapur (Maharashtra), one of the biggest plants in the nation will produce every day more than 19 million $m^3$of water, sufficient enough to offer clean water to 96 million people. The government is keen to open several treatment plants around the country in order to promote industrial water reuse.

Waste Management

Waste is any material that has been wasted after being used for its intended purpose. It contains garbage, sewage, and waste from various sources, such as domestic, industrial, construction, agricultural, chemical, plastic, and electronic products, as well as poisonous and dangerous nuclear waste. One of India's most pressing problems is how to dispose of waste safely because it contributes to climate change and environmental damage. Additionally, sewage, garbage, blocked drains, and polluting ground water resources propagate many contagious diseases. Around 277 million tonnes of municipal solid garbage are produced annually in India, the second-most populous nation, and analysts predict that number might rise to 387.8 million tonnes by 2030. Presently, just 5% of the total garbage collected is recycled, 18% is composted, and the rest is dumped on sites. The long-lasting harm caused by plastic garbage makes it a major problem for the ecosystem. Among the top 20 nations with the highest levels of riverine plastic emissions, India is ranked second. The Brahmaputra, Indus, and Ganges rivers are referred to as the "highways of plastic flows" since they transfer and drain the

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majority of the plastic waste produced in the nation. A stringent scientific waste disposal is required for civilization to reduce pollution, global warming, and the terrible repercussions of climate change.

Preventive measures taken by government

There are numerous ways to dispose of waste, including landfills, composting, vermicomposting, and waste compaction, incineration, and biogas production. The 5Rs of waste management are reuse, recycle, reduce, recover, and residual management, encompass all of these factors. From July 1, 2022, government has banned the production, distribution, use and sale of single-use plastics in order to address the country's plastic problems. Under the Swachh Bharat Ayojan (Clean India Mission) of the Indian government, several cities and rural areas in India are implementing various waste management techniques in an effort to achieve the goal of zero waste for a healthy, hygienic, and sustainable society.

Biodiversity Loss

Biodiversity loss is the last but certainly not the least of India's main environmental problems. With a vast range of agro-climatic conditions that support a diverse variety of animals and plants, India is a treasure trove of biodiversity. With an estimated 49,000 plant species, India makes about 8% of the world's total biodiversity. There are also 2500 fish, 150 amphibians, 450 reptiles, 850 mammals, 1200 birds, and 68000 insects. Additionally, India is endowed with a vast range of floral species that are in danger of going extinct due to an increase in development activity. A vast number of plant and animal species are going extinct as agriculture becomes more and more commercialized. Two of the twenty-five "hot spots"—the Eastern Himalayas and the Western Ghats—that have been recognized as regions with a higher level of biological endemism in the biosphere are located in India. According to a assessment published by CSE in 2021, India has already lost over 90% of the territory under the four major biodiversity hotspots (the Himalayas, the Sunderland (including the Nicobar Islands), the Western Ghats, and the Indo-Burma region). Due to natural disasters (such as floods, earthquakes, etc.), habitat loss and fragmentation, over-exploitation, co-extinction, global climate change, hunting, and poaching, the biological diversity of the globe has been fast reducing.

Steps taken by government to control biodiversity loss

Since all life is interconnected and can become out of balance when one type of life is disturbed, biodiversity is crucial for human survival. The crucial issue is not only the preservation of species and habitats, but also the continuation of the conservation process, which is only made possible by local communities and individuals' participation and cooperation, in addition to other conservation

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techniques.

Conclusion

The country has certainly reverted to pre-pandemic levels, as indicated by the unfavourable and negative environmental circumstances caused by rapidly economic expansion, population increase, and unsustainable use of natural resources. Despite covering a wide range of environmental concerns, the various initiatives for conservation and current environmental regulations appear to be unsuccessful due to a lack of implementation, resources, technical challenges faced by many Indian companies, and a lack of participation and cooperation from local communities and individuals.

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Sustainable Water Management Solutions in India

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Abstract: Examining the main problems that water resources managers currently have to deal with and taking into account how they will change over time is a crucial first step in deciding on future directions and, consequently, the challenges we face. This paper makes an effort to concentrate on India's sustainable management of its water resources. To address the growing water shortage, sustainable water resource management requires innovation in technology, institutional structures and regulatory frameworks. A changing and unstable environment along with fast expanding population that is accelerating social and economic development, globalization and urbanization are just many of the difficulties we face today. In times of limited water availability, the management of water resources may focus on boosting water supply and controlling water demand. Integrating green solutions along with intelligent technologies is critical for conserving this precious resource.

Keywords: Water Management, Sustainability, Conservation, Green Solutions

Introduction: Meeting sustainable development ambitions is unthinkable without water. Water has been considered by the United Nations as a standard of sustainability of development. Through this, the interrelationships of water and development have been deeply analyzed in the Sustainable Development Goals (SDGs) achievable in the year 2030. The UN's 17 SDGs have 169 sub-targets, in these 17 SDGs, the 6th SDG is dedicated to water management, while 13 SDGs are indirectly related to water. Similarly, 59 of the 169 sub-goals of the SDGs are indirectly related to water, as water is an indispensable requirement to ensure the sustainable management of the world. Managing water is a prerequisite for ending poverty, ensuring good health and food security. It provides affordable energy, inclusive industrialization, secure and enabling cities. The management of water helps to build peace and security for different communities and different countries.

Water is a pre-requisite for the sustainability of life, livelihood, food security and development. Water is not only a major component of the bio-ecosystem on the earth, but it is synonymous with life force of the earth, sustainability of development, sustainability of environment and life on earth. All great civilizations have flourished and flourished near water sources. Even today, the cultures and livelihoods of human society are based on water, which is currently becoming increasingly endangered

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due to the increasing water crisis, because of the monopolistic tendency of humans to dominate nature, nature is becoming uncontrollable, such as global climate change. The earth's sustainability is decreasing due to increasing population and increasing materialization of development and in the same proportion water resources are also getting eroded.

Challenges in the Water Sector: - The world population is expected to increase by 40 to 50 percent within the next 50 years. This increased population, along with increased industrialization and urbanization, will increase the additional water demand by 5 to 6 times. 1.3 billion people in the world currently lack access to safe drinking water and 2.7 billion people lack adequate sanitation. According to the National Health Profile of India-2018, one out of every 5 deaths in India is due to water-borne diseases.

Water stress arises due to an imbalance between water use and water resources. Food security has increased significantly in the last 40 years, due to which the applicability of water has increased. Currently, 70 percent of the total usable water globally is being consumed by the agriculture sector (up to 90 percent in arid regions), 8 percent of the remaining 30 percent is consumed by domestic activities and 18 percent by the industry sector, while usable water 4 percent of it is evaporating from the reservoirs. The demand for water for developmental activities is increasing in proportion to the per capita availability of water due to lifestyle changes. On the contrary, the availability of water is continuously decreasing. The increasing personal use of water is not only reducing the available amount of water for agriculture and industrial development, but it is also having a profound impact on aquatic ecosystems and their dependent species. Due to this the environmental balance is disturbed and it is not able to play its regulatory role. Currently, water crisis has become a major problem in a large number of countries of the world and in the next decade, about two-thirds of the global population will face extreme water scarcity. India, which supports 18 percent of the world's population and 15 percent of livestock, has only 4 percent of the world's total useful water resources, due to which India is becoming the world's most demanding country. Due to uncontrolled exploitation of ground water, about 1,109 blocks of the country have come under the dark zone, whose number is increasing continuously. Now no part of the country is untouched by the situation of water crisis. In many cities, tankers have become the only means of water supply. Even today 2.17 lakh rural households in the country are far from access to pure drinking water. Due to the indiscriminate exploitation of water, the reserves below the ground are getting empty, the rivers also dry up only after a few months of rain and many are on the verge of ending, while the population's dependence on them is increasing progressively. If the extraction of ground water continues at the same rate, the country will soon be on

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the brink of a serious water crisis. Besides, the ground water in one-third of the country's total districts is contaminated mainly with fluoride and arsenic. In such a situation, sustainable management of the country's water resources has become inevitable.

Sustainable Management: -The ability to meet current water needs without compromising the capacity of future generations to do the same is known as sustainable water management. A multidisciplinary and integrative approach that addresses technical, environmental, economic, landscape aesthetic, sociological, and cultural challenges is necessary to achieve sustainable water manage

Need for Sustainable Measures: -

Recognizing the water crisis, the Government of India had declared the National Water Policy in the year 1987 for the first time after independence, the National Water Policy, 2002 , National Water Policy, 2012, formed the Ministry of Jal Shakti in May 2019 by combining both the Ministry of Water Resources and Drinking Water, launched the 'Atal Bhujal Yojana' on December 25, 2019 and the 'Master Plan for Artificial Recharge of Ground Water-2020' in consultation with the states, in which construction of about 1.42 crore rain water harvesting and artificial recharge structures has been envisaged in the country for better management of the country's water resources, which is responsible for the conservation and management of water resources. Apart from this, National Water Management Project, Dam Rehabilitation and Improvement Project, Water Resource Management and Training Scheme, Namami Gange Program, National River Linking Project, National Program in Hydrology, River Basin Management Program, National Water Mission, Jal Kranti Abhiyan, Jal Shakti Abhiyan, National Rural Drinking Water Program, National Aquifer Mapping and Management Program etc. are also being run by the government.

Green solutions critical for sustainable management: -

The steps of making rain water harvesting mandatory in many states of the country and the 'concept of water panchayats' are heading in the direction of making water conservation a mass movement and empowering local people to play an active role in water management Reviving these traditional systems namely Bamboo pipes and Apatani systems of eastern Himalayas; Ghul (water harvesting system) of western Himalayas; Kund (tank or small reservoir), Khadin (system for surface runoff water for agriculture), Talabs (ponds), Johad (rainwater storage tank), and Baoli (reservoir) of the Thar desert and Gujarat; ahar-pynes (traditional floodwater harvesting system) of Bihar can be an effective way to ensure water security in rural areas, where access to piped water is often limited or

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unreliable. Additionally, these systems are cost-effective, easy to maintain and have a low environmental impact.

Empowering communities, especially women, to take back the management of water resources is also crucial. Women are often the primary users and managers of water resources in rural areas and involving them in decision-making can lead to more sustainable and equitable water management practices.

Community-led initiatives such as water user associations, which bring together different stakeholders to manage water resources, can also be effective in ensuring the sustainable use of water resources. The efficient use of water in agriculture requires the adoption of innovations like resource-conserving farming, drip irrigation, sprinkler irrigation, and water harvesting, as well as the use of smart water systems for water distribution networks.

Though higher energy demands from both thermal and membrane-based compared to groundwater and surface water treatment have challenged the adaption of desalination as a sustainable one. But sustainability of desalination could be improved if it is coupled with renewable energy. Decentralized, solar power desalination has been recommended as a way to provide more sustainable water for Greece's 6000 islands.

Integration of Intelligent Technologies: -

One such technology is the Internet of Things (IoT), which can help in collecting data from various sources such as sensors, drones, satellites, and weather stations. This data can then be analyzed to make informed decisions about water usage and distribution. Another technology that is gaining importance is Artificial Intelligence (AI), which can help in predicting water demand and supply, identifying leaks in pipelines, and detecting anomalies in water quality. One case study could be the use of such technology in a metropolitan like Bengaluru where around 400 million liters of water is wasted everyday due to underground pipe leakages.

Smart water meters are also becoming popular, which can provide real-time information on water usage and help in detecting leaks and reducing wastage. Additionally, remote monitoring systems, such as SCADA (Supervisory Control and Data Acquisition) can help in managing water distribution systems more efficiently.

With the advent of these technologies, it is possible to create a smarter and more efficient water

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management system that can reduce wastage, improve access to clean water, and ensure sustainable use of this precious resource.

Technologies for disinfection can be used to clean up surface water and get rid of pollutants. Decentralized water networks and intelligent water ATMs can help distribute this potable water to more remote areas.

Conclusion

Thus, water management departments must work closely with stakeholders, including local communities, industries, and farmers, to ensure that water resources are allocated fairly and efficiently, and that everyone has access to safe and reliable water supplies. Finally, water management departments must be prepared to respond to emergencies, such as natural disasters or water supply disruptions, to ensure the safety and well-being of the population. Overall, effective water management is very important for the growth and development of any country, so water harvesting and storage should be considered more seriously than before. So we need to use all our experience, application and innovation to face the grave challenge of water crisis facing the nation.

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Geospatial Application use in Natural Hazards and Disasters risk Management: A Review

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Introduction

Besides providing specifics regarding geographic location, spatial data can encompass various other forms of information. There are several fundamental concepts that can facilitate the development of language abilities in the domain of geographical data, hence enhancing one's comprehension and acquisition of spatial data. Vector data can be conceptualized as representations of the real-world in the form of images. The fundamental constituents of vector data consist of points, lines, and polygons. Lines are formed by connecting two or more points, whereas polygons are formed by enclosing a region with many lines. Vectors are particularly advantageous in the representation of broad and comprehensive notions, such as objects or geographic elements. Due to the common practice of storing vector data in files with the extension ".shp," there exists a propensity to utilize both words interchangeably.

(a) Raster data refers to information that is shown in a grid of pixels. The conveyance of information pertaining to an element is achieved through the assignment of a number or color value to every individual pixel within a raster. Rasters frequently incorporate visual cues. In the context of spatial analysis, it is important to note that this concept may have a more specific application in the field of ortho imaging. Ortho imaging refers to the process of capturing photos from spacecraft or other aerial vehicles. The utility of raster data varies depending on the resolution of the data and its intended application.

(b) Spatial data encompasses more than mere geographic coordinates. Attributes are employed to characterize features by furnishing supplementary information that does not possess a spatial quality. Spatial datasets have the potential to incorporate other attributes with location data. The cartographic representation

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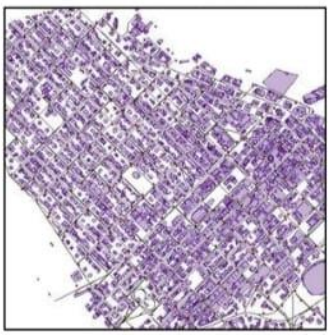

(a)

(b)

of a city's central business district, sometimes referred to as the downtown region, can be illustrated on a map. Each architectural structure may possess details such as its year of construction, number of levels, and the specific function it serves (residential, commercial, governmental, etc.), in addition to its location. A geographic information system (GIS) is commonly employed for the management and examination of spatial data. Spatial data analysis tools refer to software applications or collections of applications that can be effectively utilized in conjunction to interpret and analyze spatial data provided by users. The umbrella term encompasses the activities of analyzing, visualizing, and presenting data. Typically, users engage with many spatial datasets concurrently, undertaking tasks such as comparing or merging them as required. A layer refers to a compilation of spatial data.

1. Methodologies: Multiple optical, radar, thermal, and lidar formats have been used for the acquisition of remote sensing data. Each of these aspects contributes uniquely to the assessment and mapping of damage. The estimation of damage resulting from incidents characterized by detectable heat signatures, such as explosions or gas leaks, can be facilitated through the utilization of thermal data. Radar and lidar data are highly valuable in the context of managing natural disasters such as earthquakes and landslides. Digital elevation models (DEMs) and other indices are employed for the assessment of flood events, whilst optical data is utilized for the cartographic representation of surface damage, such as the destruction of residential structures. Temporal change detection is a commonly utilized technique in damage assessments. The assessment of damage is conducted through a comparative analysis of pre- and post-event photographs depicting the disaster or incident.

2. The significance of geospatial science in the context of emergency response: The term "disaster" encompasses a broad spectrum of occurrences, ranging from rapid events such as avalanches and train accidents, to protracted disasters like floods and hazardous situations in nuclear power plants [1]. The primary objective of disaster management, a multidisciplinary domain that seeks to mitigate human

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distress during catastrophic occurrences, is to systematically monitor and evaluate a diverse array of factors associated with vulnerability and readiness. Plate (2001) and ESRI (1999) have put out a comprehensive five-stage cycle approach for disaster management, encompassing planning, mitigation, preparedness, reaction, and recovery (see Figure 1) [3].

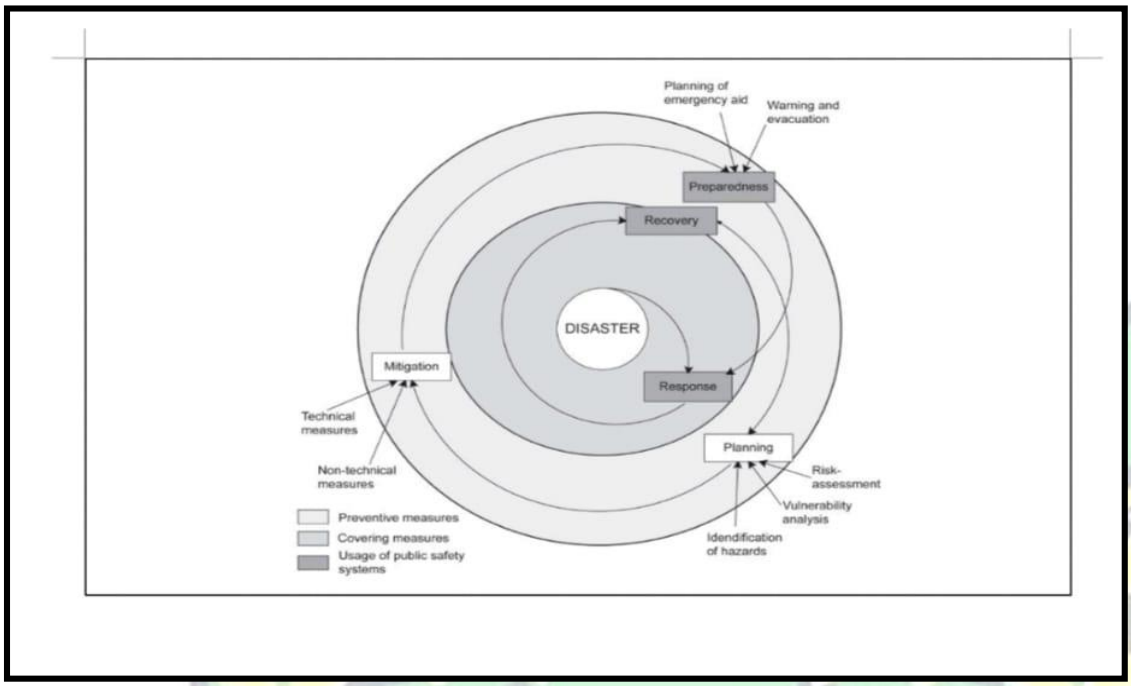

Figure 1: Significance of Geospatial Science for Disaster Management

3. Components of public safety systems: Having a fundamental component of Public Safety Systems (PSS) that is tailored toward crisis scenarios and intended to ease the burden of decision making is crucial [4]. Other modules make it possible to perform tasks like managing a rescue crew. This is done so that agencies like the Red Cross and the Police can tailor the PSS to meet their specific requirements [5]. PSS's (Figure 3) structure and operation.

4. The concept of urgent rescue refers to the immediate and timely intervention aimed at saving individuals or groups from imminent danger or harm.

The phrase "emergency rescue" pertains to the organized reaction to certain pressing circumstances [6]. In the context of a rescue effort, it is necessary to move either the victim or the emergency situation from its present location [7]. In the occurrence of a seismic disaster, inundation, conflagration, or any other unforeseen crisis, it is imperative that law enforcement personnel be promptly sent to the affected location. The passage of time holds great significance in these pressing situations.

5. The incorporation of Geographic Information Systems (GIS) technology inside search-and-rescue

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(SAR) operations.

As per the definition provided at the 1999 Summer Assembly of the University Consortium for Geographic Information Science (UCGIS), the focus of emergency preparedness and response lies predominantly in the interplay between human beings and their surroundings in situations that pose a threat to life or habitat. This endeavor is intricate due to its incorporation of a diverse range of natural calamities that possess fundamentally various origins, including earthquakes, hurricanes, and wildfires. In recent years, great progress has been achieved in the field of geo information science (GI Science) in the areas of data collecting and integration, data ownership, access, and liability, as well as interoperability. These advancements have the potential to be used to a diverse range of catastrophes that have different underlying causes [8]. The significance of spatial data in the coordination of emergency response cannot be overemphasized [9]. Accurate information regarding the whereabouts of the distressed

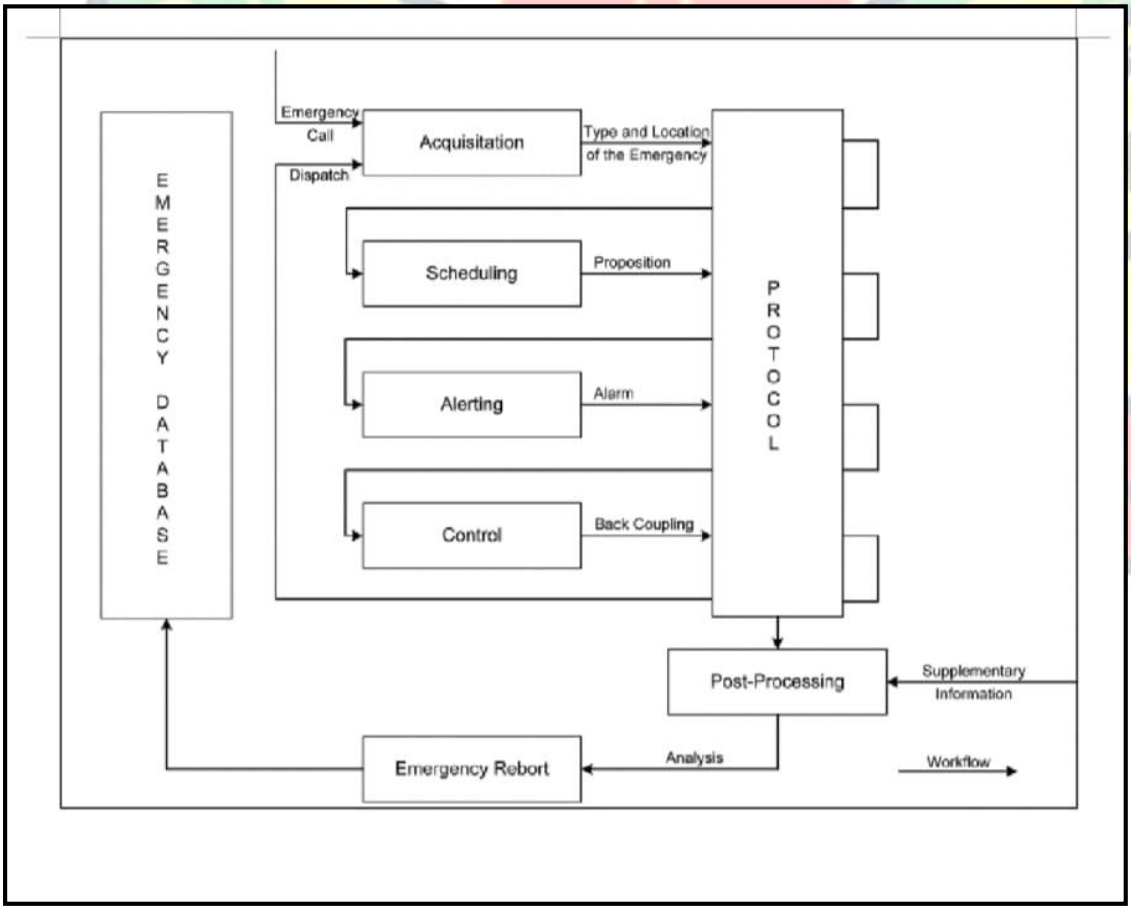

Figure 3: Public Seafety Systems (PSS) constituents

individual, available safe locations, rescue resources, and the immediate surroundings will prove crucial in facilitating the coordination and execution of a rescue mission. The implementation of the

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GI Science-based emergency system is expected to yield substantial improvements in precision and response time, hence enhancing the efficiency of rescue operations [10]. The management and direction of the GI Science rescue crew can be facilitated through the utilization of an auxiliary pre-plan system. The subsequent sections go into the fundamental rationales for utilizing geomatic science in rescue operations.

5.1. Event Scheduling

During emergency situations, it is crucial to present pertinent information on an electronic map [11]. Address coding refers to the procedure in which a system allocates geographic data, specifically geographic coordinates, to a record with the purpose of visually representing that record, typically in the form of an address string, on an electronic map. The standard address database contains the standard address codes, together with the coding table and the total address table. Upon inputting an address, the initial procedure involves the segmentation of the address into distinct components. Subsequently, the determination of the address's position is accomplished by the process of cross-referencing the coordinates and subsequently annotating them on the digital map. Subsequently, the system proceeds to execute a matching operation on the accurately segmented string within its address code repository. By utilizing this dataset, it becomes possible to accurately pinpoint the precise geographical coordinates of the unforeseen event and afterwards visualize its location on a digital cartographic representation. Both fixed line phones, which can be traced through the registered installation address, and mobile phones, which can be tracked using base station locating technology, have the potential to contribute to the development of police alerts. The standard processes for address matching and geocoding have been modified by the Washington State Department of Health [12].

5.2. Exploration of the Local Area

The display of police alarm distribution and police force distribution on a user-specified time period is a necessary feature of a police alarm management interface. During a police alert, the digital map has the capability to promptly update and display the present positions of nearby rescue assets, including police vehicles, police stations, and medical facilities. The textual content displayed on the screen has the capability to be audibly rendered or inputted into a computing device, hence enabling prompt dispatch of the relevant personnel. The examination of the system enables the identification of the most efficient and safest rescue paths available.

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5.3. Tracking in real time via GPS

By utilizing the real-time tracking capabilities of the Global Positioning System (GPS), a mobile device has the ability to transmit its precise geographical coordinates to a central monitoring station over the Global System for Mobile Communications (GSM) wireless network. The GIS processing component encompasses several elements such as the system, databases, hardware servers, software applications, and electronic maps. Additionally, the system comprises the GSM communication module, including components such as the GSM transmission module, communication controller, GSM network, and the related cable transmission. In addition, it is important to note that the GPS receiver and the GPS constellation are integral constituents of the GPS system. The command center facilitates the visualization of personnel and vehicle positions through an electronic map. Additionally, it provides monitoring capabilities to track and highlight specific vehicles. This enables commanding personnel to provide written or auditory instructions to the staff being observed. This system (GPS device) has the capability to communicate various types of information, including longitude, size, direction, speed, and others. Furthermore, the device has the capability to facilitate spoken communication. Furthermore, the mobile device possesses the capability to emit an audible alarm and transmit precise location information to the digital map in the occurrence of an unforeseen circumstance requiring immediate attention.

5.4. Video surveillance and remote monitoring

The primary components of remote monitoring systems for the purpose of rescue and supervision of potentially hazardous sources are on-site sensor data and distant audio and video monitoring [13]. In comparison to alternative monitoring methods, video monitoring technology stands out due to its unparalleled visual effects, rendering it the preferred choice for the safety production and rescue monitoring system [13]. The authors of the study conducted in 2011 were H. Drs. A. Saleh and G. Allaert.

The digital map also presents data pertaining to the position and settings of each video surveillance camera. The interface facilitates the acquisition of video records in real-time or from the past, enabling the person in charge to use the camera from either the staff or consumer perspective.

6. Different GIS Parts

There are three main parts to any GIS:

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I. Information management. This section provides a comprehensive list of significant risk variables, encompassing both their geographical location and distinctive attributes. Geographic Information Systems (GIS) platforms are frequently employed for the management and analysis of spatial data. This type of data encompasses vectorized geographical objects, accompanied by attribute data derived from an electronic map, which is overlaid onto these objects.

2. Secondly, the examination and anticipation of phenomena. The main duty of this section entails the selection of the most suitable computational model for a specific circumstance. In the event of an accident, analog computing is employed to determine its magnitude and visualize the outcomes or extent of its influence on an electronic map, thereby shedding light on the geographical circumstances around possible hazards. This enables the identification of potentially impacted facilities or individuals.

3. Furthermore, there is access to aid for decision-making in rescue operations. Upon the official confirmation of an accident's impact, emergency response protocols are promptly initiated and integrated into a geographical representation, delineating evacuation routes, the placement of essential rescue facilities such as hospitals and fire stations, and the most expeditious path to reach these locations. A Geographic Information System (GIS) platform facilitates many map-related operations through the utilization of techniques such as bird's-eye view of picture layers, spatial query, and map analysis. These operations include but are not limited to resizing, zooming, translating, searching, and managing area and distance.

6.1. Organizational framework

The following are the four levels that make up a GIS system:

1) A Repository for Data;

2) The Open Data Interface

3) A Generic Gis Functionality Layer

4) An Expert-Level Layer for Analyzing Apps.

6.2 Specificational Elements of Gis

1. The Processing Of Visual Data.

2 Merge spatial and real estate information

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3. Three-way Integrated Data Management System

4 .Analyzing space

5. Technologies of the eHUB Connection Pool

6. XML unified switching

6.3 Roles played by a GIS

1. Centralized hub for operations command and coordination

2. A centralized system for managing data

3. Analysis of Space

4. Statistical Result

5 Inquiry Transmission

6. Functions of the System

Conclusion

The area of reducing and managing disaster risk is inherently interdisciplinary. The importance of geographic data is apparent in all three phases of disaster management, namely prevention, response, and recovery. In recent years, the utilization of spatial information technology, including various tools like as geographic information systems (GIS), radio astronomy (RS), and global positioning systems (GPS), has witnessed a notable rise. This surge can be attributed to its valuable contributions in the realm of natural disaster prevention and mitigation. Spatial information technology, being an advanced and effective instrument, is anticipated to emerge as a crucial resource in mitigating natural disasters as the era of information evolves.

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Disparity in Level of Agricultural Development in Haryana: A Geographical Analysis

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Introduction

The economic progress of less developed or developing nations depends heavily on agriculture. Crop or agricultural production, a key indicator, is one aspect of the multifaceted idea of agricultural development. India is one of the biggest growers and producers of the majority of agricultural products on a worldwide scale, yet it ranks quite poorly in terms of yield. A total of 50.2% of Indians are either directly or indirectly reliant on agriculture. Nearly 17.8% and 17% of India's GDP comes from agriculture and related industries, respectively. Agriculture is a significant market for industrial goods and a vital supplier of raw materials for manufacturing.

Additionally, agriculture generates a sizable sum of worthwhile foreign currency. According to Gunnar Myrdal (1958), "The battle for long-term economic development will be won or lost in the agriculture sector."A region's agricultural development justifies the quality of the agricultural system as evidenced by its productivity, efficiency, commercialization, diversification, and quality production while taking a balanced or sustainable approach to the environment.

Objective

The paper aims to study the spatial distribution and pattern of agricultural development in Haryana.

Area of Study:

In the northwest of the country, between the latitudes of 27°39'N and 30°55'N and the longitudes of 74°28'E and 77°36'E, is where the state of Haryana is located. There is a part of the Indo-Gangetic plain. The state has a population of 25,353,081 people and a land area of 44,212 square kilometers, according to the 2011 Indian Census. Haryana had a population of 2.1% of the total. Rajasthan is on its southern border, Himachal Pradesh is to the north, Punjab is to the west, Uttaranchal and Uttar Pradesh are to the east, and Himachal Pradesh is to the north. The national capital Delhi is located southeast of Haryana.

Sources of Data and Research Methodology

The primary source of secondary data for the current study, "Disparity in the level of Agricultural

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Development in Haryana: A Geographical Analysis," is the Census of India. The study is focused on 2011. Made use of comprised data pertaining to pertinent indicators. Composite scores are calculated using the statistical method known as Principal Component Analysis (PCA), and the findings are categorized into four categories: very high, high, low, and very low. The levels of agricultural development in the state are represented by the indicators below.

Indicators of Agricultural Development

a. Agricultural Productivity
b. Percentage of Gross Area Sown to Total Cropped Area
c. The proportion of gross area sown in commercial crops to the total area cultivated in crops.
d. Per Thousands of Hectares of Net Area Sown, Regulated Markets
e. Cropping Intensity
f. Net Irrigated Area as a Proportion of Net Sown Area
g. Intensity of Irrigation
h. The number of tubewells and pumping sets per 1,000 hectares of sown net area
i. The Tons of Fertilizer Consumed Per Thousand Hectares of Gross Area Sown
j. Tractors per Thousand Net Hectares Sown

Developmental Level of Agriculture

The Principal Component Analysis approach has been used to determine the levels of agricultural development, and the composite or total score is subsequently extracted. Based on the degree of agricultural development, the state has been divided into four categories:

1. High Agriculturally Developed Area (More than 3)

2. Moderately Agriculturally Developed Areas (0–3)

3. Low Agriculturally Development Area (-3 to 0)

4. Very Low Agriculturally Development Area (less than -3)

1. Area of High level of Agricultural Development (More than 3)

The northeastern areas of Haryana, comprising the districts of Ambala, Kurukshetra and Karnal, are highly agricultural developed districts. These districts have favourable physical conditions and also

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Table 1.1
Haryana: Levels of Agricultural Development,2011

Category	**No. of Districts**	**Districts**
High (More than 3)	3	Ambala, Kurukshetra, Karnal
Moderate (0-3)	9	Panchkula, Yamuna Nagar, Kaithal, Panipat, Sonipat, Faridabad, Palwal, Fatehabad, Sirsa
Low (-3 to 0)	6	Rohtak, Rewari, Mahendragarh, Bhiwani, Jind, Hisar
Very Low (Less than -3)	3	Jhajjar, Gurgaon, Mewat

Source: Computed by Author

technological and institutional factors. The area is gifted with fertile soil, higher intensity of irrigational facilities and more mechanized farm practices such as pumping and tubewell sets, fertilizer, tractorization and more regulated markets, resulting in overall higher agricultural productivity. These districts have favourable physical conditions and also technological and institutional factors.

2. Area of Moderate level of Agricultural Development (0- 3)

Panchkula, Yamuna Nagar, Kaithal, Panipat, Sonipat, Faridabad, Palwal, Fatehabad, and Sirsa districts are in the moderate category of agricultural development. Some areas are adjoining the areas with high levels of development. The northern areas are more fertile and have solid irrigational infrastructure.

3. **Area of Low level of Agricultural Development (-3 to 0)**

The districts of Rohtak, Rewari, Mahendragarh, Bhiwani, Jind and Hisar are at low levels of agricultural development.

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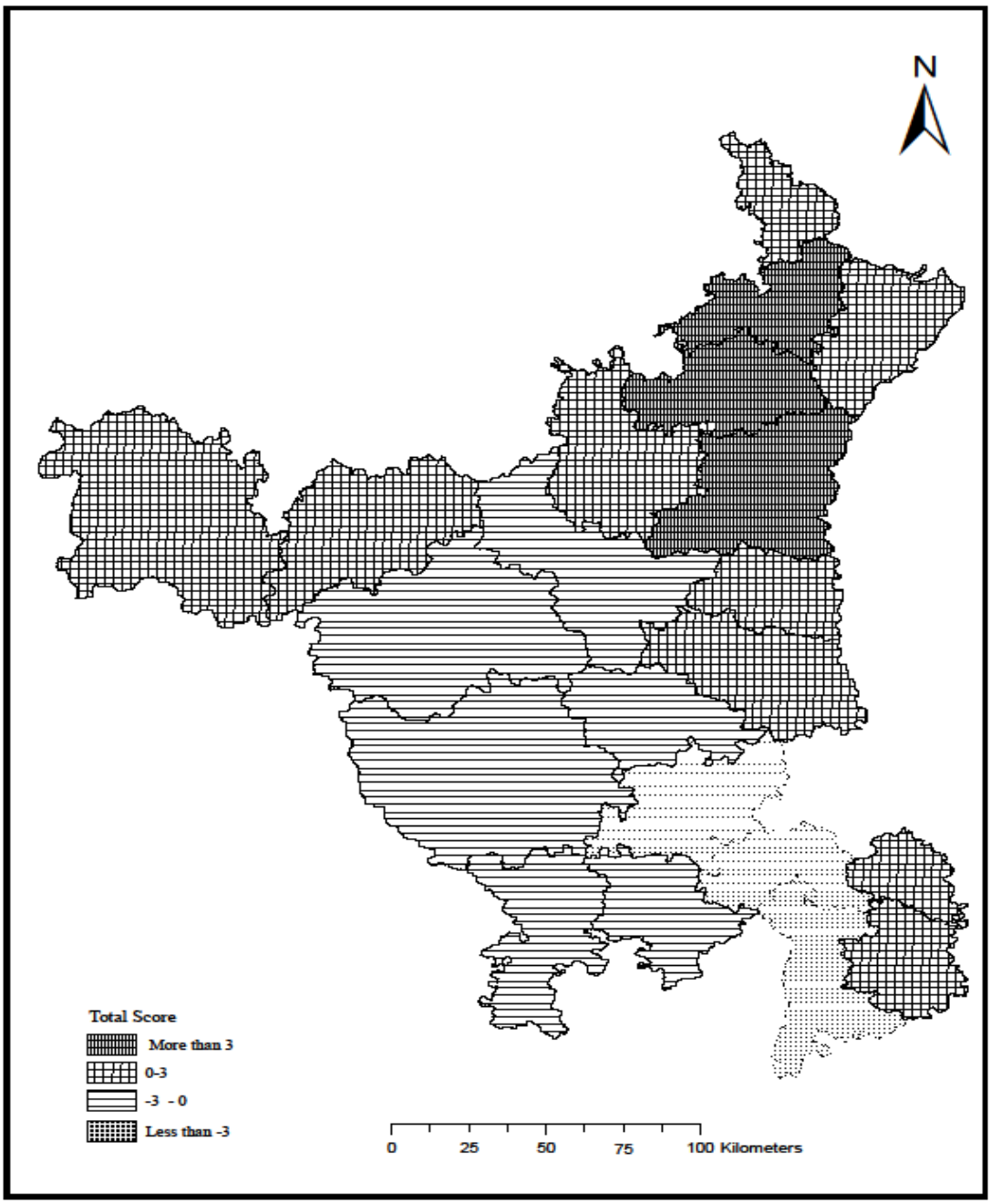
Map 1.1 Haryana: Levels of Agricultural Development, 2011



Source: Based on Table 1.1

4. Area of Very Low Level of Agricultural Development (Less than -3)

Jhajjar, Gurgaon, and Mewat districts have a deficient level of agricultural development with a total score of less than -3.

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CONCLUSION

The correlation coefficients between the extracted components and the variables are used in the study to show the component loading of the three components on the chosen variables in the original data sets. The first component is positively correlated with all of the chosen development indicators, according to the Eigenvalue retrieved, as these vary in the same direction as the component. Intensity of cropping, net irrigated area as a proportion of net area seeded, fertilizer use, and irrigation intensity all show high loadings. Negative relationships exist between the first component and the gross area cropped to the cropped area, the gross area seeded under commercial crops to the total cropped area, regulated markets, tube wells and pumping sets, and tractors. It demonstrates how food grains predominate in agricultural planting patterns. With regard to controlled markets, tube wells, pumping systems, and tractorization, the second component exhibits considerable positive loading. The remaining loadings are either insignificant or adversely linked. A large load is also visible in the third component's cropping intensity, irrigation intensity, and tractor count. These component loadings demonstrate the intense nature of the region's agriculture and the dominance of food crops. The degree of technology and mechanization used in the region has a significant impact on the per capita agricultural productivity. The component's individual score provides information about the nature and scope of its relationships with other components. It is discovered that certain scores are favorable and others are negative. In comparison, places with high and positive total scores show greater advancement than those with low and negative total ratings. Overall, physical variables have a greater impact on the level of agricultural development. Modern agricultural technology has helped diminish the importance of physical traits, but it is important to understand the financial costs associated with such efforts. Although their influence has been diminished, physical elements still play a part. It seems that the presence of a favorable physical resource base determines the efficacy of all other factors emerge.

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Glaciers and Global Warming

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Introduction

Melting and retreating glaciers have become a global phenomenon that is inextricably linked to rising temperatures worldwide. The glaciers, like marine coral reefs, are very susceptible to global warming; not solely do glacier on high mountain peaks show signs of worry, but also polar as well as sub-polar glaciers. Increased industrialisation and urbanization are linked to increasing worldwide temperatures and changing the climate. It has led in the slow receding of the the planet's glaciers for over a half-century, and the world is experiencing the highest temperatures on record in human history. In accordance to a 2019 data study from the University of Zurich (Switzerland), "the impact of climate change has caused a staggering 9.6 billion tonnes of ice from glaciers worldwide to melt since 1961."

A glacier is a vast, slow-flowing river of ice formed by compressed accumulations of snow that deformed and flow slowly due to gravity. In terms of its total water storage, the ice from glaciers is the world's second biggest fresh water reserve, behind the seas. Glaciers cover enormous areas in the poles but can only be found on the highest mountains in the tropical regions.

Glaciers may be found on every continent in the world, including the African continent Despite being a part of Oceania, which contains many Pacific island chains in addition to the huge island like Papua New Guinea and New Zealand, Australia lacks glaciers. There are glaciers on each of these islands.

Glaciers need certain climatic conditions. The majority are located in areas with substantial amounts of snow during the winter and cool summer temperatures. Winters the snow accumulate and is gathered over the summer as a result of these circumstances (through evaporate, transpiration, or melting). Such conditions are common in polarized as well as alpine regions.

GLACIERS CLASSIFICATION

Glaciers are categorised based on their shape or temperature.

Glacier classification by shape:

Glaciers are classified into two types: confined (by geography) and unconfined.

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- Contained glaciers: In alpine areas, ice masses are frequently surrounded by valley walls. They are accurately referred to as "glaciers" and are typically classified as follows:
- Cirque Glacier: One of the tiniest alpine glaciers, developed in amphitheatre-like bowls and limited to their basins. Cirque glaciers may range in size from a few hectares to many kilometers.
- Valley glaciers often begin as a few cirque glaciers and migrate throughout the valley as they acquire mass, grow, and merge with others.

The Piedmont glacier is a valley glacier that drains into flat ground nearby.

- Unconfined Glaciers: Unconfined glaciers can extend over 1000 square kilometers and be thousands of meters thick. They are classified into two groups:

a) Ice sheets: they are large enough to envelop an entire continent (more than 50,000 km2). Huge continental ice sheets can be found only in Antarctica and Greenland. These ice sheets deliver massive amounts of fresh water. The amount of ice is so vast that when the Greenland ice sheet vanished, global sea levels would rise by 20 feet. Sea level would increase by 210 feet if the Antarctic ice sheet disappeared.

b) Ice caps are far smaller than continental ice sheets.

GLACIER TEMPERATURE CLASSIFICATION:

Glacier temperature is critical to investigating the glacier system as meltwater, erosion, and deposition rates are all connected to the glacier's thermal characteristics, particularly its bed. Classification is based on the ice temperatures at the surface of temperate, polar, and sub-polar glaciers. There are two types of bed temperatures: warm and chilly.

Temperate climate glaciers include: Apart for the topmost few meters of a temperate glacier, temperature exceeds the pressure of melt point across the ice mass. Temperature differences occur on an annual cycle in this stratum.

Glaciers in the Arctic: Polar glaciers are usually below the surface melting point. Those glaciers do not produce meltwater.

Subarctic Glaciers: In the summer, subarctic glacier melt to the point of melted at their surface, producing meltwater.

The glaciers' average speed varies. Their weight causes them to sway. Sometimes glaciers flow so

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slowly that they are imperceptible to the naked eye. In certain situations, they may travel hundreds of meters each day.

Glacial Ice Formation: The glaciers form when winter snow does not melt completely in the summer. As a result of that, snow fields develop. As it accumulates, snow compresses into granular form. Underneath the pressure of the layers of snow above it, the granules snow recrystallises form firn, a thick, grainy ice. It typically requires around two winters for snow to convert into firn, a mix of snow and ice. The larger ice crystals becomes so compacted and thick over time that the air gaps between them become unimportant. This is referred to as glacial ice. Glacier ice is often blue or green in hue due to its density.

Snowflake Granular Snow Firn Glacier Ice

Glaciers and Climate Change:

A glacier is the the planet's most sensitive organ, like an aging knee recognizing the arrival of winter. Whenever it is cold, its upper reaches collect snow and ice, whereas its lower reaches dissolve when it is warm. As a result, balancing accumulation and melting is vital to its long-term sustainability. Glaciers worldwide are a barometer for warming temperatures, which has lately been exacerbated by rising greenhouse gas emissions.

Glaciers are melting all across the world as a result of global warming. This is especially noticeable in glaciers in the tropics and subtropics. Let ourselves now consequently focus to the Himalayan glaciers, which, based on the Intergovernmental Panel on Climate Change (IPCC) report, are receding at an alarming rate, and if the present rate of melt keeps going, the probability of their vanished by 2035, or perhaps sooner, is very high if the earth continues to warm at its current rate.

However certain researchers disagree with the UN conclusions, and the rate of retreat varies greatly, glacier specialists in the countries of China, India, and Nepal are witnessing the short-term effects of glacier melting.

Although the Himalayan glaciers serve as the headwaters for Asia's seven largest rivers (the the Ganga River, Brahmaputra, Irrawaddy, Mekong, Yangtze, and Huang Ho), melting these would have serious repercussions. These rivers provide a lifeline to 1.3 billion people who live downstream. According to experts, melting glaciers may cause instability mountain terrain, higher levels of sediment in rivers, and disruptions in irrigation systems. Experts worry that glacier loss may thrust the Himalayan region into a feast-or-famine cycle, jeopardizing the water supply of major populations. Increased melting of

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glaciers will boost the flow of rivers, possibly triggering catastrophic flooding in the short term, but supplies of water will dwindle in the not-too-distant future, causing severe water shortages with disastrous results for nations that include China, India Nepal, Pakistan, and Bangladesh, in which farming is the mainstay of livelihood to feed the majority of the population.

Glacier melt will not only have an impact on agriculture, yet it will also have an impact on the economy of the area by restricting the amount of power accessible from hydroelectric facilities and diminishing industrial production. In India, power shortages are currently responsible for 10% of the country's overall electric consumption and 20 percent of the maximum capacity demand (World Bank, 2000). The prospect that hydropower's potential for energy may not be noticed has serious repercussions for the nation's overall growth plans at a moment as the Indian government is taking steps to promote energy from renewable resources as an environmentally friendly means of satisfying the the nation's growing energy needs. Processing of food, mining, paper, chemical, and steel manufacturing are just a few of the industries that rely on an ongoing source of water, as both an input and as a medium for effluent dilution.

While slowing national economic growth, the consequences will almost definitely be felt most acutely at local scales by humanity's most vulnerable members, particularly women and children from families with low incomes. Increasing limits on rural life may force many landless and destitute peasants to seek better employment possibilities inside the region's cities, a decision with significant socioeconomic and cultural repercussions for rural as well as urban areas.

Furthermore, deglaciation is going to exert a significant influence on biodiversity. High-altitude vegetation and animals that rely on melting glaciers will go extinct during the dry season. Humans who are worried about being able to get to water throughout the year are likely to pay lesser consideration to the requirement to maintain diversity as the impact of climate change worsens.

The scale of glaciers melting and the implications for million of people whose lives rely on potable water from such sources cannot be overstated. While the current level of deglaciation is unclear, it is prudent to plan for the worst. It is critical to assess the risk of various development sectors and design adaption methods. Climate change consequences and remedies are worldwide concerns. As a result, regional coordination is required to establish harmonized policies, in addition to the national discussions on the relationship between changes in the climate, mitigation along with adaptation measures, as well as development activities.

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Sustainable Development and Economic Policy in India

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Abstract

The concept of sustainable development has gained significant attention worldwide due to its long-term benefits for the economy, society and the environment. India, being one of the fastest growing economies in the world, faces several challenges in implementing sustainable development policies while ensuring economic growth. The objective of this paper to analyse the sustainable development policies in India and their impact on economic growth. The government initiatives and policies to promote sustainable development, including the National Action Plan on Climate Change, the Swachh Bharat Abhiyan and the Smart Cities Mission. Furthermore, the paper evaluates the challenges and barriers to the implementation of sustainable development policies in India, including inadequate infrastructure, lack of awareness, and corruption. Finally, the paper proposes a set of recommendations for policymakers to promote sustainable development while ensuring economic growth in India.

Keywords: Sustainable Development, Economic Policy, India, National Action Plan on Climate Change, Swachh Bharat Abhiyan, Smart Cities Mission

Introduction:

Sustainable development has become a critical aspect of economic policy in developing countries, including India. The concept of sustainable development emphasizes the need for economic growth, social development and environmental protection. In India, sustainable development policies are critical to ensure the country long-term economic growth while addressing the challenges of poverty, inequality, and environmental degradation. India has made significant progress in recent years in promoting sustainable development policies, including the National Action Plan on Climate Change, the Swachh Bharat Abhiyan and the Smart Cities Mission etc. However, there are still several challenges and barriers to the effective implementation of sustainable development policies in India, including inadequate infrastructure, lack of awareness, and corruption.

The objectives of this paper are to analyse the sustainable development policies in India and their impact on economic growth.

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Sustainable Development Policies in India:

The Government of India has taken several initiatives and policies to promote sustainable development in the country.

1. The National Action Plan on Climate Change (NAPCC) is a comprehensive policy framework that aims to mitigate greenhouse gas emissions and adapt to the impacts of climate change. The NAPCC consists of eight missions, including the National Solar Mission, the National Mission for Enhanced Energy Efficiency and the National Water Mission. The NAPCC also includes a set of guidelines for sectors such as agriculture, forestry, and urban development to reduce their carbon footprint.
2. The Swachh Bharat Abhiyan (Clean India Mission) is another critical initiative of the government to promote sustainable development. The mission aims to make India clean and free of open defecation by building toilets, promoting waste management and creating awareness about hygiene and sanitation. The Swachh Bharat Abhiyan has been successful in promoting behavioural change among the population and improving sanitation and hygiene in the country.
3. The Smart Cities Mission is another flagship initiative of the government to promote sustainable development in urban areas. The mission aims to transform 100 cities into smart cities by using technology and innovation to enhance the quality of life of citizens. The Smart Cities Mission focuses on areas such as transportation, water supply, energy management, and waste management to make cities more liveable and sustainable.

Impact of Sustainable Development Policies on Economic Growth:

The sustainable development policies in India have had a significant impact on the country economic growth. The implementation of sustainable development policies has led to the creation of new economic opportunities, increased competitiveness, and enhanced productivity. Additionally, sustainable development policies have helped to attract foreign investment and promote international trade.

The National Action Plan on Climate Change has played a crucial role in promoting sustainable development in the country. The expansion of renewable energy sources has led to the creation of new jobs and the development of new industries. For instance, the National Solar Mission has led to a significant increase in solar capacity, making India one of the leading countries in solar energy production. The development of renewable energy sources has also helped to reduce the country's

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dependence on fossil fuels, leading to significant cost savings.

The Swachh Bharat Abhiyan has also had a positive impact on the economy. The mission has led to the creation of new jobs in waste management and sanitation, contributing to the country's employment rate. Additionally, the improvement in sanitation and hygiene has helped to reduce the incidence of waterborne diseases, leading to cost savings in healthcare.

The Smart Cities Mission has also contributed to the country's economic growth. The mission has attracted foreign investment and led to the development of new infrastructure, including transportation, energy, and water supply systems. The development of smart cities has also helped to create new economic opportunities, including the development of new technologies and the provision of new services.

Challenges and Barriers to Implementation:

Despite the progress made in promoting sustainable development in India, several challenges and barriers to implementation exist. The country inadequate infrastructure is one of the most significant barriers to the effective implementation of sustainable development policies. The lack of proper infrastructure, including transportation, energy, and water supply systems, makes it challenging to implement sustainable development policies effectively.

Lack of awareness is another significant challenge in promoting sustainable development in India. Many people in the country are not aware of the importance of sustainable development and its long-term benefits. This lack of awareness makes it difficult to implement sustainable development policies and programs effectively.

Corruption is also a significant challenge to sustainable development in India. Corruption can undermine the effectiveness of sustainable development policies and programs by diverting resources away from their intended purposes. Corruption also creates a lack of trust in government institutions and reduces the willingness of citizens to participate in sustainable development initiatives.

Recommendations:

To promote sustainable development while ensuring economic growth in India, policymakers need to focus on the following recommendations:

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1. Improve infrastructure: The government needs to invest in improving infrastructure, including transportation, energy, and water supply systems, to enable effective implementation of sustainable development policies.
2. Increase awareness: The government needs to create awareness among citizens about the importance of sustainable development and its long-term benefits.
3. Promote transparency and accountability: The government needs to promote transparency and accountability in the implementation of sustainable development policies and programs to reduce corruption.
4. Foster public-private partnerships: The government needs to encourage public-private partnerships to promote sustainable development initiatives, leveraging the expertise and resources of the private sector.

Conclusion:

Sustainable development policies are critical to promoting economic growth, social development, and environmental protection in India. The National Action Plan on Climate Change, the Swachh Bharat Abhiyan, and the Smart Cities Mission are examples of the government's initiatives to promote sustainable development in the country. However, several challenges and barriers to implementation exist, including inadequate infrastructure, lack of awareness, and corruption. Policymakers need to focus on improving infrastructure, increasing awareness, promoting transparency and accountability, and fostering public-private partnerships to promote sustainable development while ensuring economic growth in India

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India'S Net Zero Target and Its Strategy for Its Achievement

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Abstract

NET ZERO" means equilibrium between the earth warming amount from green house gases and the amount excluded from the atmosphere to gear climate change. At COP26 summit at the Glasgow our Prime Minister Sh. Narender Modi has proclaimed that India should have fix the target of "NET ZERO" emission by 2070. It means that they will release only as much green house gases and other gases as can be soaked up by nature and other technologies. For that India is jacking up the use of natural gases, Bio-fuels, green hydrogen and use of ethanol mixing with gasoline for eradicating carbon footprints. Freshly India has come with the strategy named LT-LEDS (Long Term Low Emission Development Strategy) in COP27 summit, was held in Sharm el-Sheikh in Egypt in November2022. First India will use renewable energy for fulfilling its 50% energy demand. India 's mission the National Hydrogen mission was launched in 2021 is estimated to becoming India green Hydrogen exporter .India estimated for achieving 20% ethanol blending with petroleum by 2025.India estimated 30% electric vehicles of the total vehicles by 2030 through FAME India scheme. India is planning at large scale interruption in five sectors namely, energy and electricity, forestry, transport, urban design and industries. In this paper we will discuss about Net zero Strategy of India and challenges facing India for this.

Key Words:-Climate Change, Green House, Hydrogen, Renewable Energy, Electric Vehicle

INTRODUCTION:

-Climate change stands as a significant global environmental challenge**.** Climate change sparked by human convinced global warming and it is one of the hardest threats to the human being. To address the issue of global warming, it is essential to restrict the increase to 1.5 degrees Celsius, decrease CO2 emissions by 45% by 2030, and ultimately achieve carbon neutrality by approximately 2050. For curing that India has updated his environmental targets in the form of National Determined Contribution to line up targets set at Cop26 and Cop27. For achieving such type of targets, India shall

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need adequate amount of finance and management. Internal source of finance is not enough for that. Secondly there will be need more coordination among various entities for tackles up such a big problem. India will face other problems like increasing level of pollution in cities, declining forest cover etc. Freshly India has come with new strategy named **Long Term Low Emission Development Strategy** for achieving its Net Zero Target by 2070, which has been set in Cop 26 summit. In Cop 27 held in Egypt India intended upon tools to achieve the aforementioned target. The LT-LEDS is a qualitative strategy and was accepted from Paris Deal in15 Dec 2015. According to Paris Deal 2015 countries will progression their economies beyond accomplishing near term NDCs targets and also struggle toward the larger climate objectives of biting off the emission by 45% by 2030 and will execute net zero target by 2050. We took Paris agreement as a base year for our analysis because it proves like a landmark for the world. First time in Paris agreement all countries comes together through a binding agreement for combat climate change. From this agreement India has worked on four key factors:-

- India has added little amount to earth warming, its traditional contribution has been insignificant yet India is having 17% of world population.
- India has momentous energy needs for progress.
- India has pledged low carbon strategy for development and cordially pursuing them.
- India needs to be climatic flexible.

India has also assured to meet with 50%energy from renewable resources. Our country also confirms Paris Climate deal which was held in 2015. These are the targets which India has set in Paris deal.

To lessen emissions intensity by at least by 2030.

To build an additional sink of carbon about 2.5bn-3bn tones.

To manufacture at least 40% electricity from non –fossil fuels by 2030

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- India’s decarbonisation plan accord on the promise made by the developed countries to provide monetary support to the developing countries.
- For achieving aforesaid targets India will need **trillions of dollars.**
- India has also set up the numerical figures for achieving its targets.

Objectives:-

- Here we will discuss about Net Zero Target strategy of India

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- Second we will discuss about the challenges facing India for this target.

LT-LEDS FEATURES

LT-LEDS strategy works on the vision of life, lifestyle for the environment. LT-LEDS will focus on rational utilization of national recourses with energy security. The change over from fossil fuels will take over in sustainable and rational manner. The strategy will focus on enhancing use of Bio fuels. Mainly focus on ethanol blending in petrol, use of green hydrogen fuel, encouraging electrical vehicle etc. the strategy will also promote smart city initiatives with future sustainable, climate resilient urban development. The industrial sector will continue with the theme of **Make in India** and **Aatmanirbhar Bharat.** India work on PAT (Perform, Achieve and Trade) scheme for improvement energy efficiency and work on the National Hydrogen Mission for promoting electrification, recycling.

What is NET ZERO TARGET?

"NET ZERO" means equilibrium between the earth warming amount from green house gases and the amount excluded from the atmosphere to gear up climate change. It is also referred to as carbon neutrality, which is not meaning that a country should bring down its emission to Zero. According this strategy more carbon soak up by increased absorption methods and elimination of gases from the atmosphere more rational and futuristic manner.

STEPS TAKEN BY INDIA FOR NET ZERO COMMITMENT

India is now poised to demonstrate its dedication to safeguarding the environment and embracing renewable energy to reduce its carbon footprint. Prime Minister Narendra Modi announced five ambitious goals at the COP 26 summit in Glasgow in November 2021, aiming to accelerate emission reduction. Among these targets was the significant achievement of reaching net-zero emissions by 2070.

India's four other commitments by 2030

- The goals outlined include increasing non-fossil energy capacity to 500 Gigawatts (GWs),
- Achieving 50% of energy needs from renewable sources,
- Reducing the carbon intensity of the economy by 45%, and cutting total estimated carbon emissions by one billion tonnes.

The initiative begins with the single-word concept 'LIFE,' which stands for 'Lifestyle for Environment,' advocating for conscious and responsible practices instead of reckless and harmful consumption.

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India's commitment to achieving net-zero carbon emissions is evident in the union budgets for 2022-23 and 2023-24. During her budget speech, Union Finance Minister Nirmala Sitharaman highlighted that climate change risks represent significant negative impacts on India and other nations. She emphasized the importance of the low-carbon development strategy endorsed by the Prime Minister, underscoring the Indian government's strong commitment to sustainable development.

New Developments - India's commitment to Green Energy Future

- Encouraging the generation of eco-friendly energy from wind, solar, and hydro initiatives, aiming to decrease reliance on fossil fuels.
- Indian Railways is committed to achieving complete electrification to attain Net Zero Carbon Emission status by 2030.
- Emphasizing the Mission Circular Economy and implementing India's Vehicle Scrap Policy.
- India has witnessed an expansion of its forest and tree cover by 2261 square kilometers.
- Advocating for the adoption of green Hydrogen and green Ammonia as alternative fuels, replacing traditional fossil fuels.

FOCUS ON RENEWABLE ENERGY

- In January 2022, a funding of Rs 1,500 crores was sanctioned by the government for the Indian Renewable Energy Development Agency (IREDA).
- The government has also given the green light to the Intra-State Transmission System - Green Energy Corridor in seven different states.
- As of December 31, 2021, the installed solar power capacity reached 49.35 Gigawatts (GWs).
- The Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) Scheme was introduced in 2019.
- Efforts are underway for the development of Solar Parks and Ultra Mega Solar Power Projects to establish a substantial power grid

Improvement in forest cover

India stands as the world's tenth-largest nation in terms of forested land. Notably, it secured the third position globally in the annual average net growth of forest area from 2010 to 2020. According to the India State of Forest Report 2020-21, India's overall forest cover in 2021 measured 7,13,789 square kilometers, marking a noteworthy increase of 3.14% since 2011. This expansion in forest cover owes itself to enhanced conservation strategies, effective protection, afforestation initiatives, tree planting campaigns, and the practice of agro-forestry. Furthermore,

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India distinguished itself as one of the leading countries in the world's top ten, in terms of average annual net forest area augmentation from 2010 to 2020, as per the findings of the India State of Forest Report 2021.

STEPS TAKEN FOR PLASTIC WASTE MANAGEMENT

The Ministry of Environment, Forest, and Climate Change officially introduced the Plastic Waste Management Amendment Rules, 2021 in August 2021. Starting from July 1, 2022, there will be a ban on the production, import, storage, distribution, sale, and utilization of specific single-use plastic items, encompassing materials like polystyrene and expanded polystyrene. This regulation aims to enhance the circular economy for plastic packaging waste, encourage the exploration of innovative substitutes for plastics, and foster the adoption of eco-friendly plastic packaging solutions.

INITIATIVES for AIR POLLUTION

The National Clean Air Programme (NCAP), initiated by the Ministry of Environment, Forest and Climate Change (MOEFCC) in 2019, is currently being executed across 132 cities. Its goal is to attain a reduction of up to 30 percent in the levels of particulate matter (PM), a harmful air pollutant with adverse effects on public health, by the year 2024 throughout the nation.

Steps to Curb Vehicular Emissions –

- India swiftly transitioned from BS-IV to BS-VI standards for both fuel and vehicles starting in April 2020.
- The expansion of metro rail systems for public transportation has progressed, encompassing additional cities.
- The implementation of cleaner or alternative fuels such as CNG, LPG, and ethanol blending in petrol has been initiated.

Comprehensive approach cutting across Ministries:

The collective responsibility for propelling India towards a net zero trajectory lies with multiple ministries, including:

- The Ministry of Environment, Forest, and Climate Change (MoEFCC)
- The Ministry of New and Renewable Energy (MNRE)
- The Ministry of Heavy Industries

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The Ministry of Environment, Forest and Climate Change (MOEFCC)

We can see very much difference between allocated Budget, Revised Budget and Actual budget. In 2013-14 the allocated budget was 2630.2 crores rupees, in revised budget after decrease it become 2040 crores and in actual 1889.69 crores rupees has been used for environment. We can see maximum difference in 2020-21, which were 1085 crores between allocated and revised budget. There was maximum difference between revised budgets and actual in 2019-20.we can also see that after 2015 Paris summits the allocated budget has increased. But in 2021-22 it has been decreased and came down to 2869.63 crores

Table 1:-Union Budget for Environment and Forest Ministry from 2013-14 to 2023-24

years	Allocated Budget	Revised budget	Actual	Difference in Revised budget and actual	Difference in allocated budget and Revised budget
2013-14	2630.2	2040	1889.69	150.31	590.2
2014-15	2256	1764.6	1599.24	165.36	491.4
2015-16	1681.6	1668.6	1521.12	147.48	13
2016-17	2250.34	2327.51	2277.89	49.62	-77.17
2017-18	2675.42	2675.42	2626.61	48.81	0
2018-19	2675.42	2675.42	2558.58	116.84	0
2019-20	3175.72	2959.72	2657.94	301.78	216
2020-21	3100	2015	1966.92	48.08	1085
2021-22	2869.93	2520	2432	88	349.93
2022-23	3030	2478	_		552
2023-24	3079.4	_	_		-

Source: open union budget (**The Ministry of Heavy Industries)**

In table 2 we can also see the difference between allocated budget, revised and actual budget. In 2015, the budget was allocated 1624.73 crores but it has been decreased in revised budget about 70.73 crores . In actual, 0nly 915.45 crore rupees has been used.In 2016-17 allocated budget was 1300 crore which has become 3080.3 crores in revised and the used budget was 3585.94 crores . Which we can see the positive factor of Paris summit. But in 2017-18 the allocated budget was 2600 crores, but in revised

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form it has become 1107.26. This has been come down more steps. An only 1034.13 crores rupee has been used for that. After 2021 summit cop26, we can see change in budget. In 2022-23, 3306 crores have been allocated for heavy industry. We can also see that there is no much difference in allocated and revised budget.

Table 2:-Union Budget for Heavy Ministry from 2013-14 to 2023-24

Years	Allocated Budget	Revised budget	Actual	Difference between Revised and Actual Budged	Difference between Allocated and Revised Budget
2013-14	1028.97	1254.92	1085.47	169.45	-225.95
2014-15	1243.62	1285	1197.34	87.66	-41.38
2015-16	1624.73	921	915.45	5.55	703.73
2016-17	1300	3080.3	3585.94	-505.64	-1780.3
2017-18	2600	1107.26	1051.77	55.49	1492.74
2018-19	1125.73	1036.34	1034.13	2.21	89.39
2019-20	1162	1367	1274.22	92.78	-205
2020-21	1489.98	900	866.99	33.01	589.98
2021-22	995.27	1181	1167.58	13.42	-185.73
2022-23	3306	3220	_	-	86
2023-24	6167.63	_	_	-	-

Source: open union budget (**The Ministry of Heavy Industries)**

In Table 3 we can see boom in allocated budget for new and renewable energy ministry. In 2015-16 the allocated budget was 303.21 crore, which hiked up 5035.79 in 2016-17. We can see positive progress in allocated budget. In 2022-23 the allocated budget was 6900 crores which hiked up 10222 crores in 2023-24. But we can see difference in allocated, revised and actual budget.

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Table:-3. Union Budget for New and Renewable energy Ministry From 2013-14 to 2023-24

Years	Allocated budget	Revised budget	Actual	Difference between Revised and Actual	Difference between Allocated and Revised
2013-14	1533.55	437.96	395.19	42.77	1095.59
2014-15	956.39	554.89	515.18	39.71	401.5
2015-16	303.21	262.07	226.02	36.05	41.14
2016-17	5035.79	4360.13	3828.96	531.17	675.66
2017-18	5472.84	4080	3644.62	435.38	1392.84
2018-19	5146.63	5146.63	4224.62	922.01	0
2019-20	5254.83	3891.74	3308.83	582.91	1363.09
2020-21	5753	3591	2643.3	947.7	2162
2021-22	5753	7681.8	6582.95	1098.85	-1928.8
2022-23	6900	7033	_	-	-133
2023-24	10222	_	_	-	-

Source:-open union budget

Findings:

- We found that there are very much anomalies in budget allocation. The amount of allocated budget, revised and the used budget was not same.
- We found that there is very much difference in the allocated budget in different climate change ministries.
- Maximum focus has been on ministry of new and renewable. Secondly focus on the ministry of heavy industries. We can see less focus on environment and forest ministry.
- We can also see improvement in funds after 2015 Paris summit and in 2021, cop26 summit.

Conclusion:-

- **I**ndia has set Net Zero Target itself which is too difficult to achieve. Set a target and work on it for achieving are two different things. India is third biggest emitter of the world. Which has major dependence on coal causes many difficulties.

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- India is a developing country faces lack of funding. India will need a strong framework and coordination for achieving Net Zero Target. According to climate experts it will probably harder for US and China in some extent then How India will cop up with this target.
- India has lacks solid subdivision targets and short term targets. India has to do much work for this.
- India has heavily dependent on coal and there is no clear guideline for going away.
- India need to be innovate new methods for development which will be green, sustainable, co-friendly and conceivable.
- India is a home for world's most polluted cities. Sometimes there occurs pollution related deaths. So there is a difficult task for handle these cities and achieving its goal.
- There is lack of finance and technologies in India for fulfilling his target. For achieving Net Zero Target by 2070 India will need an investment of $10.0 trillion in the beginning but it is very difficult.
- Other problem India will faces fair and equal growth for the nation.

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SPATIO-TEMPORAL ANALYSIS OF URBANISATION IN HARYANA

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Abstract

Population growth in urban areas is referred as urbanisation. The process of society moving from rural to an urban setting is dynamic. It is intimately related to economic growth and the industrial revolution. Due to industrialization, individuals have begun to migrate towards the industrial areas sprinkled throughout Haryana in quest of work. The present study is an attempt to analyze the spatial patterns of urbanisation in Haryana. This study is entirely based on secondary data. Findings of the study showed that urbanisation was initially a very gradual process, but in recent years it has accelerated and become more significant for economic development of Haryana. The proportion of Haryana's population living in urban areas increased by two-fold between 1951 and 2011 (17.07 % to 34.88 %), with significant variances at district level. Districts with highest proportion of urban people are Faridabad (79.51%), Gurgaon (68.82%), Panchkula (55.81%), Panipat (46.05%), Ambala (44.38%), and Yamunanagar (38.94%). All of these districts serve as a center for commerce, industry, and trade, establishing a basis for increased urbanisation in the regions that attract in-migration. Mewat (Nuh), which has a population of just 11.39% in 2011, was the least urbanised district in 2011. The next least urbanised districts are Mahendragarh (14.41%), Fatehabad (19.06%), Bhiwani (19.66%), and Palwal (22.69%).

Key words: Urbanisation, Agriculture, Industrial Development and Growth.

Introduction

Urbanisation is the process by which rural areas develop urban areas as agricultural practices formerly widespread in villages become non-agricultural and related changes in behavioral patterns occur. The transition of a society from rural to an urban setting is a dynamic process. It has a close connection to economic expansion and the industrialization. Urbanisation contributes to the expansion of secondary and tertiary industries like manufacturing, trade, services, etc., but it also poses a threat to the expansion of agricultural areas. Many services that can't be offered in tiny rural

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regions will be provided by urban areas. A transit system, sewage and water services, more options for learning and entertainment, and more specialized health facilities in the urban city are a few examples. The increased population density brought on by urbanisation is also to be blamed for changes in population demographics, poorly designed infrastructure, lack of basic services, and changes in the environment.

The majority of the population of Haryana, an agricultural state in India's northern plain, lives in rural areas. Nevertheless, over the past several decades, the state has experienced rapid and unchecked urban growth as a result of growth in trade industry. In comparison to the national average of 31.16 %, Haryana has a higher proportion of its population living in urban areas 34.88 % than the national average (according to census 2011).

Study Area

Haryana is a landlocked state that is situated in the northwestern part of India extending between 27˚37' N to 30˚35' N and 74˚28'E and 77˚36' E. At the time of formation of Haryana on Nov 1, 1966,there were seven districts including Ambala, Karnal, Rohtak, Gurgaon, Mehendragarh, Hisar and Jind. Boundaries of the current districts were thereafter altered periodically to notify new districts.The state covered a geographical area of 44212 sq. kms.

Objectives

- To elucidate urban population trend of Haryana.
- To analyze the spatial temporal patterns of urbanisation in Haryana.

Data and Methodology

Statistics on the population of districts was primarily gathered from secondary sources, such as census publications released by the directorate of census operations, Haryana and statistical abstract of Haryana.The current analysis will focus on the years 1951 through 2011 because this is the longest time frame for which it is possible to obtain consistent and trustworthy data on the various demographic characteristics and facets of urbanisation in Haryana.

Result and Discussion

Urban population of Haryana increased from 17.07% in 1951 to 17.22% and 17.66% in 1961 and 1971, respectively. Its percentage peaked at 21.88 % in 1981 and 28.92 % in 2001. The urbanisation share was 34.88 % in the Census of 2011, which is higher than the Indian proportion of 31.16 %.

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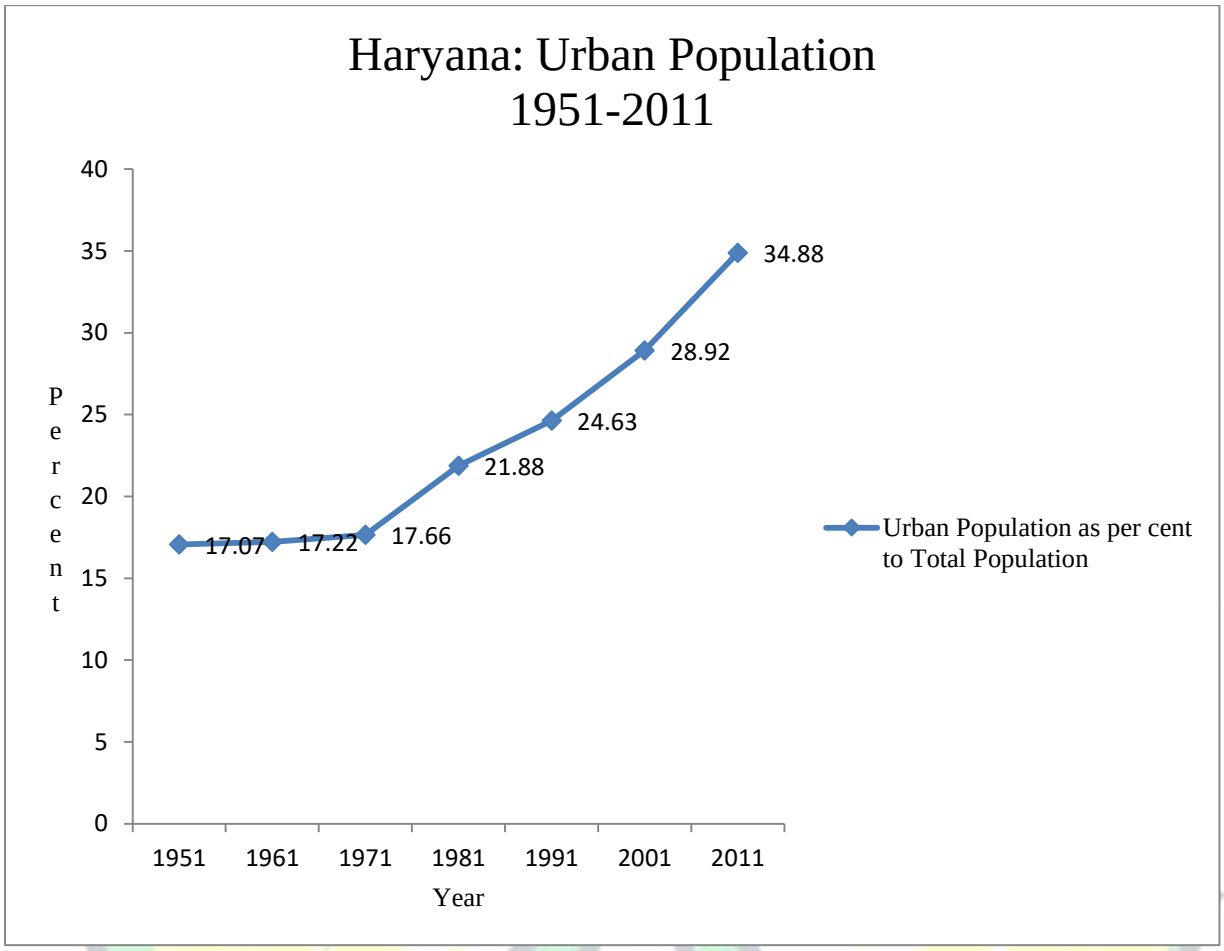

According to the Census of India 2001, there were 61, 15,304 urban residents in the state overall, living in 106 urban centres. Gurgaon district has highest number of towns (12) with a total number of 3, 09,703 residents. Yamunanagar having 11 towns has ranked second after Gurgaon district. Nonetheless, it had 3, 93,022 urban residents. On the other hand with only three towns and a total urban population of 3, 29,604 people, Rohtak district had the lowest number of towns.

Haryana is rapidly urbanising, with 8.8 million residents living in 154 towns and cities (Census of India, 2011), or 34.88% of the total population of Haryana. Forty-eight new towns were established between 2001 and 2011, bringing the total number of towns to 154 in same year.

Faridabad, Gurgaon, Panipat, Hisar and Ambala have the highest level of urbanisation, which may be related to migration, while Mewat, Mahendragarh, Fatehabad and other areas in the state's Northern and Western regions have the diversification, and a higher concentration of agricultural work.

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Urban Population and Number of Town in Haryana (2001-11)				
District	Urban Population -2001	Number of Town -2001	Urban Population -2011	Number of Town -2011
Ambala	3,57,028	6	5,00,774	15
Panchkula	2,08,395	4	3,13,230	8
Yamunanagar	3,93,022	11	4,72,829	12
Kurukshetra	2,15,511	4	2,79,225	5
Kaithal	1,83,482	4	2,36,011	4
Karnal	3,37,842	7	4,54,810	8
Panipat	3,92,080	6	5,55,085	12
Sonipat	3,21,375	4	4,53,364	8
Rohtak	3,29,604	3	4,46,164	5
Jhajjar	1,95,097	5	2,43,339	5
Gurgaon	3,09,703	12	10,42,253	9
Nuh(Mewat)	70,217	-	1,24,106	8
Rewari	1,36,174	4	2,33,430	9
Mahendragarh	1,09,636	5	1,32,855	5
Bhiwani	2,70,393	6	3,21,322	6
Faridabad	12,10,428	6	14,38,855	3
Palwal	-	-	2,36,544	6
Jind	2,41,577	5	3,05,583	6
Hisar	3,98,118	5	5,53,488	11
Fatehabad	1,42,157	4	1,79,588	4
Sirsa	2,93,465	5	3,19,248	5

Source: Statistical Abstract of Haryana, 2001-02, 2019-20, Department of Economic and Statistical Analysis, Haryana.

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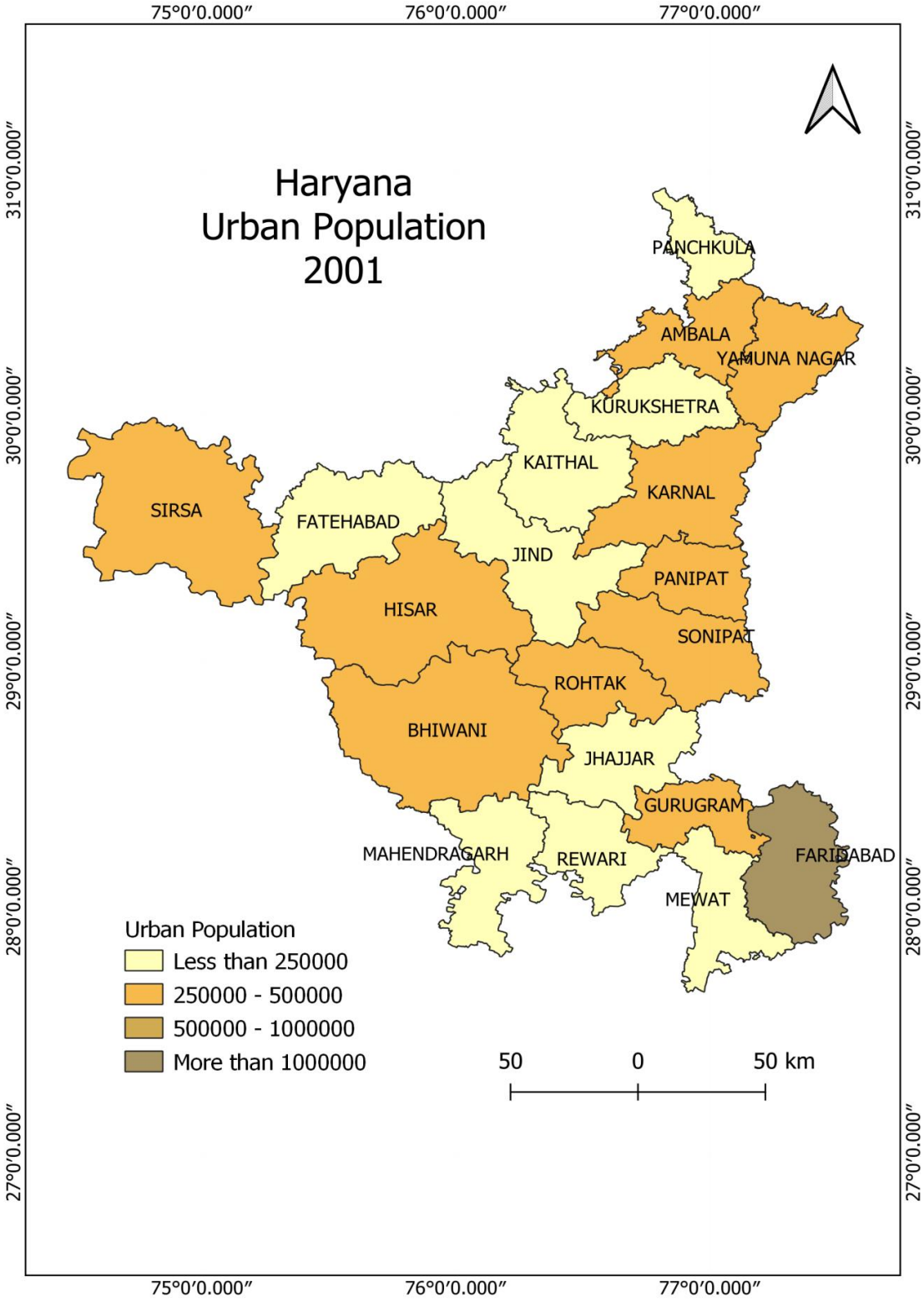

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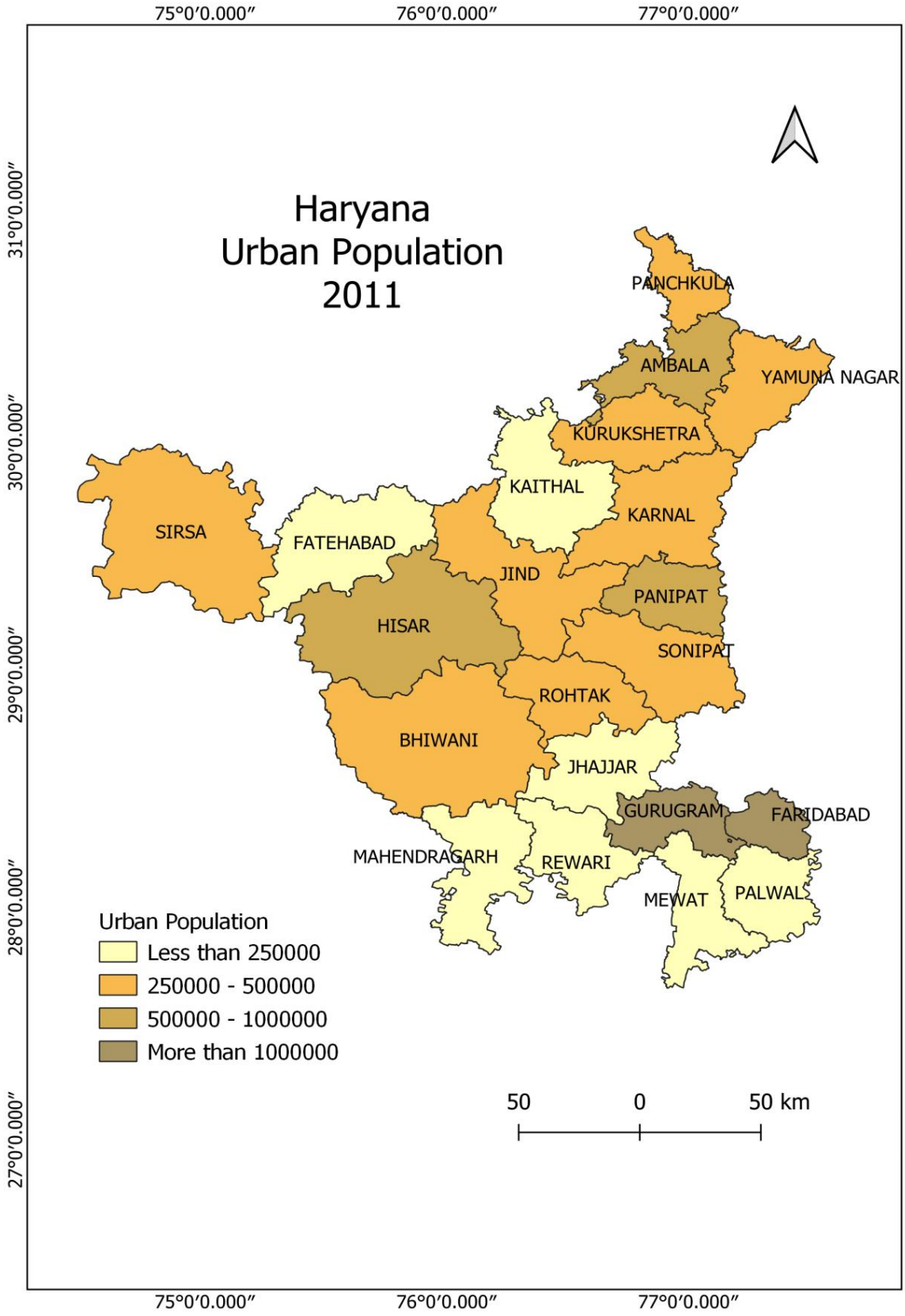

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Haryana: Urban Population in Percentage (2001-11)		
District	Urban Population as percent to Total Population	
	2001	2011
Ambala	35.2	44.38
Panchkula	44.49	55.81
Yamunanagar	37.73	38.94
Kurukshetra	26.11	28.95
Kaithal	19.39	21.97
Karnal	26.15	30.21
Panipat	40.53	46.05
Sonipat	25.15	31.27
Rohtak	35.06	42.04
Jhajjar	22.17	25.39
Gurgaon	35.58	68.82
Nuh(Mewat)	7.51	11.39
Rewari	17.79	25.93
Mahendragarh	13.49	14.41
Bhiwani	18.97	19.66
Faridabad	77.8	79.51
Palwal	19.18	22.69
Jind	20.3	22.9
Hisar	25.9	31.74
Fatehabad	17.36	19.06
Sirsa	26.28	24.65

Source: Statistical Abstract of Haryana, 2001-02, 2019-20, Department of Economic and Statistical Analysis, Haryana.

Level of Urbanisation (2001)

District Faridabad has been found to have the greatest percentage of urban residents (77.8 %). It has the highest level of urbanisation out of all the districts in the state due to its proximity to the National Capital of New Delhi, in-migration from other areas of the nation, and development of numerous industries. Eleven of the total 21 districts are distinguished by a moderate number of urban residents. The following districts have a higher percentage of urban residents than others: Panchkula (44.49%), Panipat (40.53%), Ambala (35.2%), Yamunanagar (37.73%), Gurgaon (35.58%), Rohtak (35.06%), Sirsa (26.28%), Karnal (26.15%), Kurukshetra (26.11%), Hisar (25.9%) and Sonipat (25.15 %).

Nine districts out of a total of 21 have a low proportion of urban residents. These include Mewat (Nuh) (7.51%), Mahendragarh (13.49%), Fatehabad (17.36%), Rewari (17.79%), Bhiwani (18.97%), Palwal (19.18%), Kaithal (19.39%), Jind (20.3%), and Jhajjar (22.17%).

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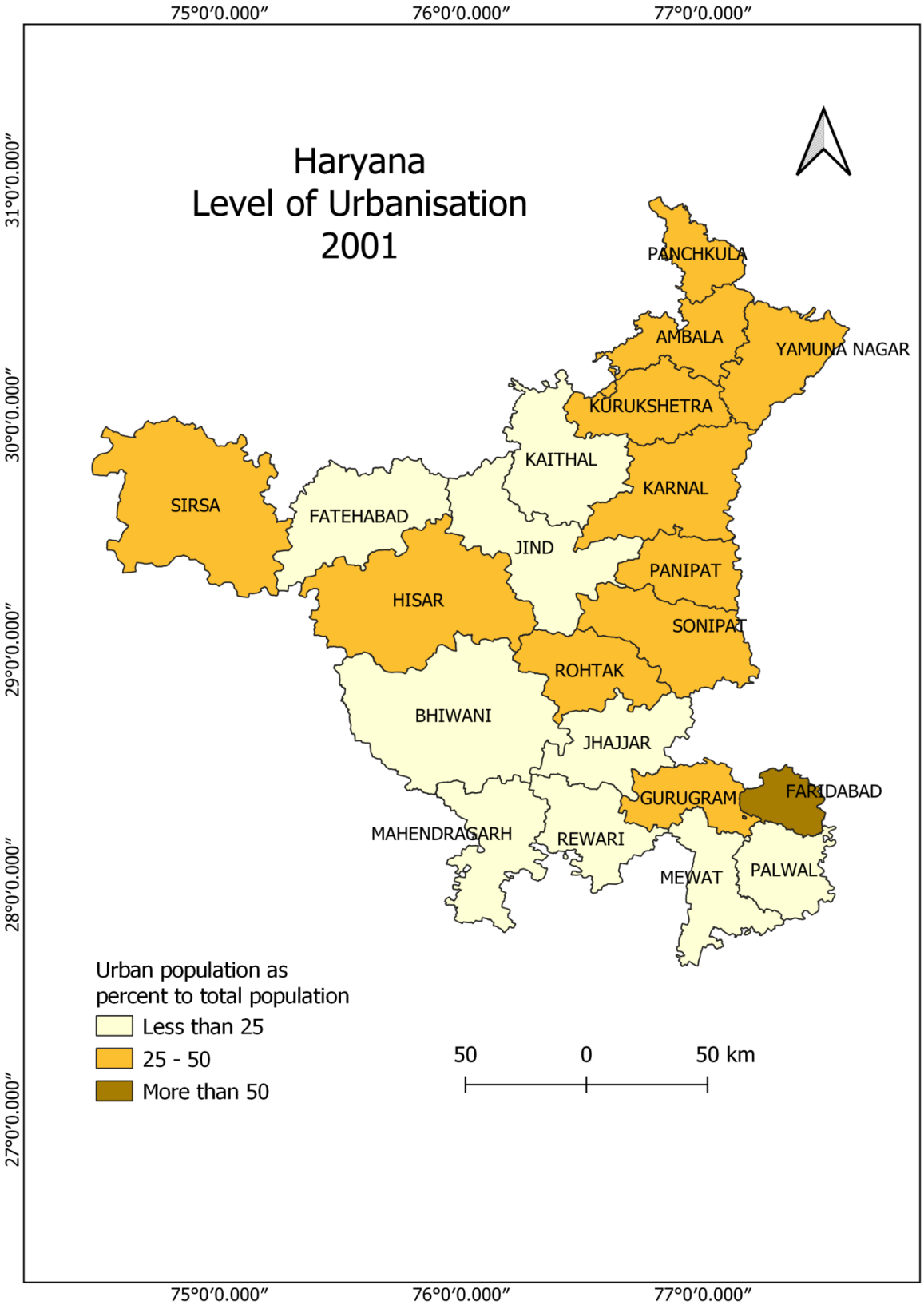

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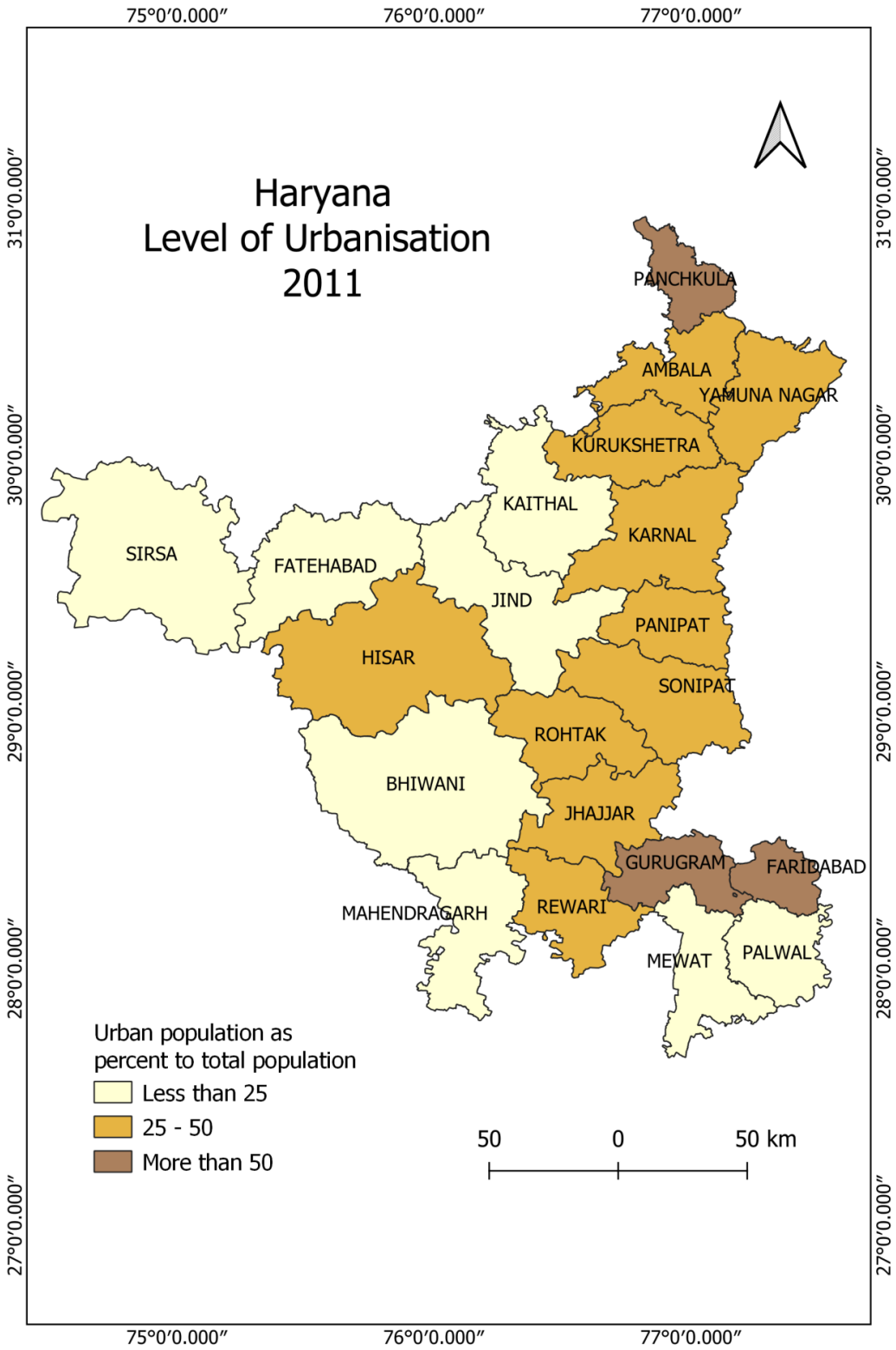

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The level of urbanisation has varied significantly across districts, according to the profile. Faridabad, which has an astounding proportion of 79.51% urban residents, is still in first place. With 68.82% urbanisation, the district of Gurugram has become a significant urban hub that competes with the nearby district of Faridabad. Gurgaon district's level of urbanisation increased by approximately two times between 2001 and 2011, increasing from 35.58 % to 68.82 %.Due to its proximity to Chandigarh, the joint capital of Punjab and Haryana, Panchkula district had the third-highest urban population percent (55.81%).

Jajjhar (25.39 %), Rewari (25.93 %), Kurukshetra (28.95 %), Karnal (30.21 %), Sonipat (31.27 %), Hisar (31.74 %), Yamunanagar (38.94 %), Rohtak (42.04 %), Ambala (44.38 %),Panipat (46.05 %) exhibit a moderate share (25-50%) of urban population to their total population. The least number of urban populations is found in the districts of Mewat (11.39%), Mahendragarh (14.41%), Fatehabad (19.06%), Bhiwani (19.66%), Kaithal (21.97%), Palwal (22.69%), Jind (22.9%), and Sirsa (24.65%). Every district has reported an increase in urbanisation on different levels, which indicates to the scope for development aid on the whole in future.

Conclusion

Faridabad, Gurgaon, Panchkula, Panipat, Ambala, Rohtak, and Yamunanagar are the districts with largest percentage of urban residents, followed by Faridabad (79.51%),Gurgaon (68.82%), Panchkula (55.81%), Panipat (46.05%), Ambala (44.38%), and Yamunanagar (38.94 %). All of these districts are hubs for business, trade, and industry, which form the foundation for greater urbanisation in the areas luring in-migration.

Mewat (Nuh), which was a district from 2001 to 2011, became the least urbanised district in 2011 with a population of only 11.39%. Mahendragarh (14.41%), Fatehabad (19.06%), Bhiwani (19.66%), and Palwal (22.69%) are the next most little urbanised districts.

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Maritime Geography and Geo-Strategy

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Abstract

Maritime strength and geographical factors are intricately intertwined, serving as pivotal determinants in a nation's journey toward achieving the status of a maritime force. Geographical attributes, including seas, straits, pivotal passages, and outlying islands, wield significant influence over a nation's maritime prowess. Furthermore, these geographical characteristics inherently dictate the maritime routes that underpin a country's economic vitality. This document underscores the pertinence and significance of geography in shaping maritime strategies. The paper delves into an examination of India's and China's geographical landscapes, elucidating their impact on the evolution of their maritime capabilities. The paper is structured into four distinct sections. The initial segment expounds upon the nexus connecting geography and maritime power. It establishes a correlation between maritime geographical traits and the integrity of sea lines of communication (SLOCs), directly shaping a nation's maritime strength. The subsequent section dissects the United Nations Convention on the Law of the Sea (UNCLOS III) and establishes a relationship between the regulatory framework of the Exclusive Economic Zone (EEZ) and maritime influence. The third and fourth sections conduct a comprehensive analysis of India's and China's maritime geographical features, respectively. Concluding the paper, the final section accentuates the maritime geography within the Asia Pacific region. It asserts that maritime geography is pivotal in influencing both the economic and security dimensions of this region.

Keywords: Maritime Strength, Geographical Factors, Conflict, Strategic Interests, Naval Strategy, Indian Ocean, International Legal Framework

The Interplay of Geography and Maritime Influence

Throughout history, states have formulated maritime strategies deeply rooted in their geographic context. Geography serves as the cornerstone upon which maritime operations are meticulously devised. Integral geographical elements such as islands, straits, reefs, corals, and indented coastlines significantly shape the formulation of naval strategies. Beyond military implications, geography also holds value for economists and politicians, aiding their comprehension of strategic dynamics. Economists focus on factors like optimal routes, efficient transport costs, and timely cargo delivery when shaping maritime economic strategies. Politicians, on the other hand, base their strategies for

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maritime strength on diplomatic relations with nations within their maritime sphere.

In the realm of military analysis, geographic factors loom large. Not only do military planners assess the proximity of allies and adversaries, but they also consider the traversable geography required to provide assistance. Undoubtedly, the understanding of geography and its implications on maritime power profoundly influences strategic decisions. The concept of geo-strategic regions varies in size, quantity, and location, contingent upon the global or regional interests of individual nation-states.

The Geographic Determinants of Geo-Strategic Regions

Geo-strategic regions are fundamentally shaped by geographical attributes, delineating their boundaries. While nations with global interests may encompass multiple geo-strategic regions – as seen with the United States and its significance in the Indian and Pacific Oceans – others with localized interests might limit their geo-strategic focus to their territorial sea or Exclusive Economic Zone (EEZ). Smaller states, such as Fiji, concentrate their influence within their EEZs, safeguarding their maritime and national concerns. In contrast, countries seeking a broader influence establish more extensive geo-strategic boundaries, deploying naval forces capable of spanning long distances to protect their national interests.

Notably, straits, choke points, and sea lines of communication (SLOCs) hold a position within the sphere of geo-strategic regions. Despite their modest size, these features possess equal strategic significance to the controlling state. Straits, like the Malacca and the Panama Canal, can be considered integral parts of geo-strategic regions due to their role in facilitating maritime trade and connectivity. Similarly, SLOCs, the routes taken by ships for transporting goods, serve as vital economic lifelines for states, functioning as essential conduits for trade and economic prosperity.

United Nations Convention on the Law of the Sea (UNCLOS)

The establishment of maritime legal frameworks, such as the United Nations Convention on the Law of the Sea (UNCLOS), stems from international efforts to regulate oceanic boundaries. This convention, ratified in 1982, shapes the legal basis for maritime activities. Encompassing territorial seas, high seas, exclusive economic zones (EEZs), and the continental shelf, UNCLOS forms a comprehensive framework for ocean management. Among its key provisions are delineation of base lines, establishment of a 12 nautical mile territorial sea, unimpeded transit through international straits, EEZ extension up to 200 nautical miles, and rights over continental shelf resources.

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The Significance of the Exclusive Economic Zone (EEZ)

As terrestrial resource exhaustion escalates, sea-based resources have garnered increasing attention globally. With growing populations and food shortages, the oceans have evolved into a pivotal source of sustenance. These resources span hydrocarbons, food (fish, plankton, seaweed), metals (copper, gold, coal), and various minerals. Hydrocarbons, particularly oil and gas, have emerged as high-value marine assets, with extensive exploration activities taking place within EEZs. Fishery resources, despite depletion due to overfishing, remain a vital food source. Furthermore, the seabed harbors minerals like manganese, nickel, and gold, although in smaller quantities.

India's Maritime Geography

India, geographically oriented as a maritime state, is surrounded by important straits, choke points, and the expansive Indian Ocean. With a coastline stretching 7,500 kilometers, it shares maritime boundaries with Pakistan, Sri Lanka, Bangladesh, Myanmar, Thailand, and Indonesia. Shipping lanes, traversing through Indian waters, connect the Asia-Pacific region with the west coast of the United States. The Indian Ocean encompasses critical seas like the Red Sea, Persian Gulf, Arabian Sea, Bay of Bengal, and Andaman Sea, further solidifying India's maritime significance.

China's Maritime Geography

China's maritime importance is grounded in its position within the Asia-Pacific region. The country's extensive coastline and proximity to vital seas, straits, and choke points contribute to its maritime influence. The South China Sea, Yellow Sea, and East China Sea encompass China's territory, with key island groups like the Paracels and Spratlys adding to its strategic geography. These waters also host significant sea-lanes, ensuring the flow of goods vital to the region's economies. The Malacca Strait, Sunda Strait, and Lombok Strait, among others, serve as crucial conduits for maritime trade.

Geo-Strategic Significance of the Asia Pacific

The Asia-Pacific region has witnessed a remarkable economic boom, driven by liberal economic policies and market integration. This growth has spurred intensified shipping activities and trade, with sea-borne trade exceeding half a trillion dollars. The region's economic dynamism hinges on maritime activities, fueling demands for safe sea lines and security of maritime routes. Critical choke points, like the Malacca Strait, assume pivotal roles in ensuring the unhindered flow of trade and energy resources. The interactions between geography, economics, and security intricately shape the geo-strategic landscape of the Asia-Pacific region.

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1. **Geographical Significance in Maritime Strategy**: Geographical features such as islands, straits, reefs, coastlines, and other maritime aspects are the foundation upon which maritime strategies are built. These features influence everything from war plans to economic decisions and diplomatic relations.

2. **Economic Considerations**: Economists factor in geography when developing maritime economic strategies. Elements like the shortest route, transportation costs, and timely cargo delivery are paramount. Efficient maritime routes contribute significantly to economic growth and trade.

3. **Political Implications**: Politicians also consider geography when crafting maritime strategies. Relations with countries in a maritime area of interest can influence a nation's growth of maritime power. The geopolitical landscape shapes a country's approach to maritime diplomacy and influence.

4. **Military Perspective**: From a military standpoint, geography dictates the locations of allies, adversaries, and the routes that need to be traversed for mutual assistance. The understanding of geography is critical for planning military operations and responses.

5. **Geo-Strategic Regions**: Geo-strategic regions vary in size, number, and location based on a nation's interests. A state with global interests might have multiple geo-strategic regions, while a state with local interests focuses on a more limited area. The strategic importance of a region can depend on economic, political, and security considerations.

6. **Role of Straits and Choke Points**: Straits, choke points, and sea lanes are pivotal in shaping maritime strategy. They are narrow passages that have significant strategic value. Control over these areas can provide a nation with geopolitical leverage and control over maritime trade routes.

7. **Exclusive Economic Zones (EEZs) and National Interests**: A nation's EEZ, which extends up to 200 nautical miles from its coastline, is a key area of maritime interest. It's important for safeguarding resources and asserting influence.

8. **Global and Local Interests**: Nations with global interests often have strategic interests in multiple oceanic regions. For instance, the United States has interests in both the Indian and Pacific Oceans. On the other hand, states with localized interests might focus on safeguarding their immediate surroundings.

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9. **Safeguarding Trade Routes**: Maritime trade routes, also known as Sea Lines of Communication (SLOCs), are vital for a nation's economy. These routes are like the "arteries" that keep the economic "body" of a region functioning by facilitating the flow of goods.

10. **Diplomatic Relations**: Geographical proximity can lead to diplomatic relationships and collaborations. Nations with shared interests in certain areas often form alliances and agreements to ensure mutual security and stability.

11. **Presence and Naval Power**: Nations that need to exert influence beyond their immediate areas may establish extended geo-strategic boundaries. Naval forces are built to traverse long distances to protect national interests and project power.

In summary, geography is a linchpin in maritime affairs, influencing everything from trade and economy to diplomacy, military strategy, and geopolitical power dynamics. It serves as the foundation on which nations build their maritime policies and actions.

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STRATEGIES FOR SUSTAINABLE DEVELOPMENT FOR FUTURE

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ABSTRACT:

Sustainable development is one of the most important focus area of governments and corporations all around the world. It means optimum utilization of resources we have to use resources in such a manner that the achievement of economic growth doesn't adversely affect the availability of resources to future generations. This paper highlights the strategies such as National Sustainable Development Strategies (NSDS) for achieving sustainable development and thereby improving quality of life for current and future generations. These strategies are related with development that permanently enhances a society's capacity to improve its quality of life and enhances the opportunities for its people, from generations to generations.

Keywords: Sustainable, development, strategies, environment, intergenerational.

INTRODUCTION:

Sustainable development is probably the most talked-about focus area of policy-makers all around the world in today's time. Historically, social and economic growth has considered utilization of natural resources as one of the inputs and has ignored the replenishment or conservation of such natural resources. Sustainable development recognizes that natural resources are finite in nature and belong to both present and future generations. Considering this, sustainable development provides guiding principle of optimum utilization of resources in such a manner that the pursuance of economic growth while raising the existing standard of living, doesn't diminish the ability of the future generations to fulfill their own requirements.

Globally every country including like India has realized that their future generation must not suffer due to lack of resources which are vital for survival and sustenance. This require a methodical approach to development planning. It involves the idea of preservation and awareness about the needs of conservation of resources.

One of the earliest steps in devising a strategy was taken by International Union of Conservation of

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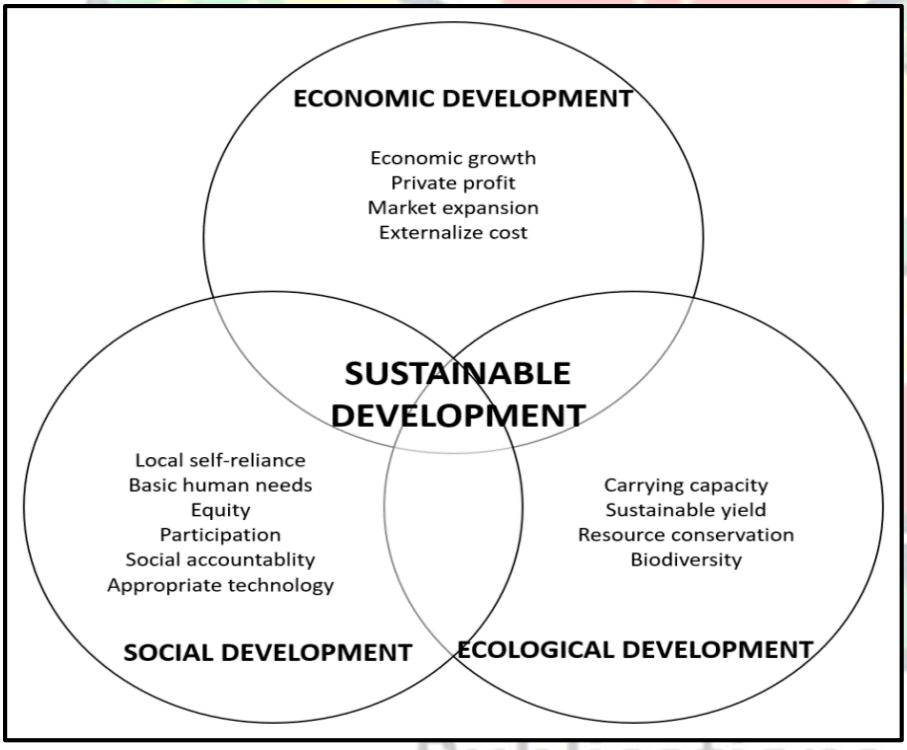
Nature and Natural Resources (IUCN) in association with United Nations and World Wildlife Fund (WWF). IUCN in 1980 published the document titled "World Conservation Strategy" which provided an intellectual framework and practical guidance for necessary conservation actions and was primarily addressed to governmental policy makers, conservationist and development practitioners. Subsequently this led to 1992 Agenda 21, Millenium Development Goals (MDGs) to Sustaianble Development Goals (SDGs) which are presently focus of governments and corporations.

KEY ELEMENTS OF STRATEGY FOR SUSTAINABLE DEVELOPMENT

Any strategy to achieve sustainable development will be created around following three key elements:

- Social Inclusion,
- Economic Development,
- Environmental Sustainability



SUSTAINABLE DEVELOPMENT GOALS

United Nations Conference on Environment and Development (UNCED) held in 1992 adopted Agenda 21 which proposed the concept of National Sustainable Development Strategies (NSDS). UN member states set a target for formulation and elaboration of NSDS by 2002, however the progress on NSDS was sub-optimal. After may attempts, in 2015 NSDS finally resulted into adaption of 17 Sustainable Development Goals (SDGs) which have global applicability and take into account the

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varying capacities, capabilities and development status of member nations.

These SDGs set out quantitative objectives across the social, economic, and environmental dimensions of sustainable development, all to be achieved by 2030.

STRATEGIES FOR IMPLEMENTING SDGs

The SDGs build on the success of the Millennium Development Goals (MDGs) by rallying collective action by member nations and by providing a time-bound set of globally agreed goals. While MDGs achieved great successes in some areas like reducing the mortality rate of children aged lesser than 5 years by half, still many countries did not make sufficient progress, particularly on environmental sustainability. Hence SDGs have tried to address such shortcomings by being broader and more complex, and endeavor to move towards sustainable use of resources.

However, achieving the SDGs will require deep, structural changes across all sectors of society. Like MDGs, achievement of SDGs will require policy intervention by government at many levels.

These strategies can be built around major themes which can be mutually exclusive and can be pillars around which government and policy makers can build programs/interventions to successfully achieve SDGs. These sustainable development strategies will help users access multiple development and climate impact across the environmental, social and economic dimensions, and help in reduction of the pollution, creation of job opportunities, improved access to health, access to clean energy, protection of ecosystems and more.

An indicative list of themes for building the SDG implementation strategies is given below:

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- Education to build human capital
- Health to achieve well-being
- Clean energy to reduce carbon footprint
- Sustainable agricultural methods and food sources
- Sustainable infrastructure and communities
- Digitalization for expanding access to government resources

CONCLUSION

The sustainable development goals have provided a well-structure framework to achieve equity, equality and upliftment of human society. Like MDGs, these goals can also be achieved by creating programs for having long-term horizon like education and short to medium term like clean energy. Countries like India have already set in motion initiatives around clean energy which have achieved great success. All that is needed to replicate such initiatives in other fields like education, agricultural etc.

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Urbanization Effects on Resources and Sustainable Development

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ABSTRACT

As the world population is increasing day by day the demand for urban places is also increasing because people are moving more towards urban places from the rural areas for better lifestyle, good income, good health facilities and better education. So, the population pressure over the urban areas is increasing day by day and ultimately this increasing population pressure indirectly puts burden over the world natural resources. As the world natural resources which are known to us are very limited as compared to the population of the world which increased in a geometric progression. So, there is a need to adopt such approaches and techniques which are sustainable by nature so that the world natural resources can be saved for our future generation. That is why, nowadays many countries of the world are giving more importance to the concept of sustainable development and adopting many non-conventional sources of energy and the ways of sustainable technology in day-to-day life so that this beautiful Earth can be save for our coming future generation.

Key Words: Urbanization, Population, Natural Resources and Sustainable Development.

Introduction

The land is not exceeding day by day, but the population explosion is increasing day by day and this increasing population is degrading all kinds of resources whether they are natural or any other kind of resources. This increasing population is putting tremendous pressure over all kind of resources. We human beings have been using land and its valuable resources for centuries to pursuit their better livelihood. But the way we are consuming all these resources is not right because we are consuming all these natural resources in an unplanned, unmanaged, and haphazard way. We are exploiting them badly and such kind of exploitation of all these natural resources has also altering the natural settings of the surrounding environment as well as all kinds of the ecosystems whether they are micro or macro ecosystems. With the vast appearance of agriculture practices, industrialization, urbanization, modern technological developments, and capitalist economic growth, the exploitation of land and their resources has increased dramatically which results an uncontrolled, unplanned, and haphazard spreading and expansion of urban cities in many areas of the world. Yet we have significant percentage

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of land to live but this percentage of land will become short one day, as the green belt in the form of Agriculture land and Forest land is decreasing fastly because of the increasing world population. It is estimated that in 2015 the world population was 7.3 billion and it became 8 billion in 2022 and 9.2 billion in 2050 and 10.4 billion in 2100 according to the United Nations Projected Data 2022. This population growth is mainly caused because of the declining levels of Mortality and an increased levels of life expectancies because of good medical facilities which is standing at 73.8 and 68.4 (Female and Male) respectively. [1] With these a female survival advantage is also observed in all regions of the world because of female's increased literacy level. With this increasing world population, the demand for goods, foods, shelters, and clothes will also increase. Presently, the land use practices for various activities like housing, agriculture, market, recreational activities, industries, and mining are becomes more intensive not only in the big urban centres but also in the surrounding villages of the urban centres and in small towns. This kind of expansion can be easily seen in the form of an increased Urban Sprawl. This process of urban sprawl usually consumes the surrounding areas of the main city which is mainly once an agriculture land. Migration of people in urban areas from rural areas for good lifestyles, good education, good health facilities and good employment purposes is continuously increasing the phenomena of "Urban Heat Islands". So, it will not be wrong if we say that such land use changes are not a local phenomenon but now it has become a global phenomenon and altering the global environmental conditions all over the world.

Acc. to the Nature Conservancy 2008, "Cities are growing more faster and there will be nearly 2 billion new cities residences accounts for around 60% of the world population by the end of the year 2030 leading to a server damage of natural resources and ecosystem. As the population in the cities grow, more land and more natural resources are required to support the growth of population, so now this will become the responsibility of world's scientists, thinkers, urban planners, governments officials, educationalist, and the policy makers to start thinking about all these environmental problems and act wisely so that we will give a healthy Earth to our upcoming new generations.

Urbanization is the process through which a growing fraction of a nation's or region's population migrates from rural to urban regions, spurring the expansion of cities and towns. The availability and distribution of resources can be significantly impacted by urbanisation.

The demand for resources like water, electricity, and food rises along with urbanisation. This could put great stress on the ecosystems and natural resources that support cities, causing problems like water scarcity, various kind of pollution, and deforestation etc.

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On the other side, as the urban areas frequently have more effective systems for resource usage and recycling than the rural regions, urbanisation can also result an improvement in the resource management. For instance, trash management and recycling are generally better in the urban regions as compared to the rural regions.

Urbanization and Resource Usage

Urbanization can also have substantial effects on resources usage. As there are more people to support, there is a greater demand for resources like land, water, food, and energy, which can have a huge impact on resources. Increasing population can impact resources in the following ways:

First one is on the Land Use:

As metropolitan areas grow, they frequently encroach on areas that were formerly used for forestry, agriculture, or other natural activities. Deforestation, habitat degradation, and biodiversity loss are all the possible outcomes of this, all of which can have detrimental effects on the environment.

Second one is on the Water Resources:

Urbanization can strain water supplies, especially in areas where freshwater supplies are scarce. Cities need a lot of water for drinking, sanitation, and other uses, which can cause aquifers to be overused, water shortages, and increasing water pollution. Population growth also raises the demand for the water, which can cause resource rivalry and territorial disputes in the places where water is scarce.

Third one is over the Food Resources:

There is a rising demand for food as the population grows. Deforestation, overfishing, and intense farming methods may result from this, which over time may lower soil quality and food production. Future food availability and production may potentially be impacted by the climate change.

Metropolitan areas not only use more land, water and food but also use more energy as compared to the rural ones, mostly because of the need and demand for more means of transportation and increased means of communication.

Sustainable Development and Urbanization

Sustainable development and urbanisation are closely related. Urbanization can, on the one hand, have detrimental effects on the environment and the social structure of the cities, such as increasing pollution, resource depletion, and inequality. Contrarily, the sustainable development aims to ensure the decreasing pollution, environmental protection, equal social development, and equal economic

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growth all in a coordinated and balanced manner.

The urbanisation should be planned and managed in such a way that it should not only considers environmental, social and cultural aspects but it will also support the concept of sustainable development. Such aspects must include utilization of environment friendly products and procedures, such as energy-efficient equipment's and architecture, renewable energy sources, and green transportation etc. Additionally, it must call for the advancement of social fairness, with equitable access for all citizens to affordable housing, healthcare, education, and cultural resources etc. Moreover, sustainable urbanisation can provide a better life and livelihood to live.

Trends in Global Urbanisation Statistics since 1901

"Since 1901, there has been a dramatic rise in the percentage of people living in urban regions all around the world. Just 13% of the world's population lived in urban areas in 1901, but by the end of 2020, that proportion had risen to 56%", According to the United Nations. [2]

The following are some pertinent figures on Global Urbanisation Trends:

- Only 86 cities in the globe had a population of more than one million in 1901, now there are 548 such cities in the end of the year 2020.
- Tokyo, with a population of 1.5 million, was the city with the largest population in the world in 1901. Tokyo was still one of the world's most populous cities in 2020, although several others had overtaken it.

Some Statistics about World Natural Resources

Below are some facts regarding the planet's natural resources, which include minerals and natural vegetation.

Minerals:

According to the production value, the top five mineral-producing nations worldwide are China, the US, Russia, Australia, and India.

The five minerals that are most frequently mined worldwide are copper, phosphate rock, bauxite (aluminium ore), and coal etc. [3]

The following major minerals have significant global reserves:

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- Estimated 1.13 trillion tonnes of Coal.
- Estimated 170 billion tonnes of Iron.
- Estimated 55–75 billion tonnes of Bauxite.
- Estimated 70 billion tonnes of Phosphate Rock
- Estimated 720 million tonnes of Copper.

Natural Plant Life:

The largest forests in the world are in China, Brazil, Canada, the United States, and Russia.

Boreal (or taiga) forests, tropical rainforests, temperate deciduous forests, and Mediterranean forests are the most prevalent types of forests.

Acc. to the Food and Agriculture Organization of UN, the global forest area has declined from 31.6% to total land area in 1990 to 30.8% in 2020.

Acc. to UN Environment Programme (UNEP) in their 2021 Report, which covers the period from 2015 to 2020, notes that deforestation and forest degradation continue to be the major environmental challenges, with an estimated 10 million hectares of forest loss each year.

Solutions for all the existing World Environmental Problems:

Regrettably, not a single solution is there for all kinds of every environmental issue which help us and guide us towards sustainable growth. Sustainable Development involves a concerted effort from all levels of society, including individuals, governments, and organisations. To achieve Sustainable Development, a variety of environmental issues must be resolved. The following are some remedies for some of the main environmental issues:

Minimize Carbon Emissions: World temperature is rising worldwide because of various human activities, and climate change threatens almost every aspect of human life. One of the biggest problems which the world is currently experiencing is climate change. Mainly CO_2 is responsible for increasing world temp. It is found that presently the world is 1.1° C warmer as compared to 19th Century. Now the CO_2 amount has increased by 50%. So, the countries must limit their carbon emissions if they want to lessen the effects of climate change. This can be accomplished by using energy - efficient equipment's and technology in day-to-day life, cutting back on the use of fossil fuels and using renewable energy sources, minimize their non vegetarian food, encouraging energy conservation, and

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using sustainable means of transportation etc. To collect Carbon Dioxide, more trees should be planted, and current forests should be preserved. With all these slow measures we must take the help of latest technology by which CO_2 from the atmosphere is directly convert in the form of rocks and later on buried underground or under the oceans. Such kind of technology is very costly and presently is using in the Iceland where Orca Plant can suck up around 4,000 tonnes of atmospheric Carbon per year and transforming it into rock. The Direct Air Carbon Capture is the concept by which carbon can be sucked out of the air through industrial and chemical processes. "Climeworks'a company who started Orca in Iceland since 2021 is working over this technology. Geothermal power is used by this plant for its operation, this plant suck carbon from the air and mix it with water, later then inject it at a depth of 1000 mts. into the nearby basalt rock, where it gets mineralised. CO_2 when mix with water turns it to stone in about two years and Hyride of Sulphur (H2S) within four months." [4]

Encourage Sustainable Agriculture and Farming Practices: Sustainable farming methods can help lessen the -ve effects of agricultural activities on the environment while also boosting output and ensuring food security. This can be done by encouraging sustainable land usage practices, using organic farming methods, using fewer pesticides and fertilisers, precision farming, crop rotation and intercropping etc.

Afforestation: It means the process of planting trees in areas where they previously did not exist. Promoting reforestation and sustainable forest management techniques, as well as enforcing laws and regulations to protect forests. Afforestation can have a positive impact on several Sustainable Development Goals including SDG 1 - No Poverty, SDG 6 - Clean Water and Sanitation, SDG 8 - Decent Work and Economic Growth, SDG 12 - Responsible Consumption and Production, SDG 13 - Climate Action, SDG 15 - Life on Land etc. [5]

Reducing Emission: Reducing emissions from power plants, industries, and transportation to reduce air pollution, promoting smart, clean, and green technology while minimising the use of fossil fuels.

Avoiding Plastic: Today's use of plastic is increased in almost every field of life, and it is very important to control the use of this plastic. Plastic pollution can be reduced by the use eco -friendly and biodegradable plastic in day-to-day life.

Minimizing Various Kind of Wastes: By the use of 3R approach i.e., Reduce, Reuse and Recycle we can minimize the amount of various kind of wastes. By using optimal management and disposal techniques for different kinds of wastes we can also reduce the solid waste amount. By the use of advance wastewater treatment technology, we can reduce our agricultural and industrial runoff into

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aquatic bodies. Not only should this but by the establishment of Solid Waste Management and Treatment Plants in all the cities we can also reduce and manage the waste .Each

and every individual in the family adopt the approach of Minimum Waste Generation.

To alleviate environmental pollution and accomplish the Sustainable Development Goals, several strategies can be used (SDGs). Many of these options include:

Solar, wind, hydro, and geothermal energies are few examples of various sources of renewable energy that can help us to reduce the amount of greenhouse gas emissions and also fight air pollution. Green House Gases emissions can be lower down by fostering research and development in all the above said fields, and also by expanding the usage of renewable and clean - green energy technology, and by offering incentives for its use.

A circular economy is an economic system in which resources are used and reused, hence generating less waste and pollution. The use of sustainable materials and the implementation of policies that support products reuse, repair, and recycling can help achieve this.

Increasing public awareness and educating people about the hazards of plastic pollution and the advantages of sustainable practises can persuade people to adopt eco-friendly habits.

There are several actions that can be made to reduce environmental pollution and realise the objectives of sustainable development:

Perform Environmental Audits. Environmental audits can be done are through assessments of a company's environmental performance. They assist the companies in locating pollution sources, estimating its impacts, and help them in choosing the most effective defences against the pollution.

Monitoring and Reporting: It's very difficult to regularly check the pollution levels of various companies, to assess how well pollution control techniques are working. To keep track on the levels of air, water and soil pollutions various online digitally smart monitoring and reporting systems should be placed at various companies so that proper monitoring can be done.

Improvements in Technology: Technology can be a major factor in lowering down the levels of various pollution. Improvement in the equipment’s and cleaning processes can reduce waste and pollution at the initial stage itself.

Government Initiated for Strict Rules: More and more monetary fine should be imposed by the

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government for breaking of any kind of environment protection rules with the help of automatic smart technology.

Above all, one step which we can take is that by inculcating the habit of using less resources and generating less waste in our kids with the help of school curriculum.

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Environmental and Ecological Concerns in Vandana Shiva's Staying Alive: Women, Ecology, and Development

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Abstract:

Vandana Shiva is an Indian Scholar, environmentalist, activist and eco-feminist. She focuses on disadvantages of economic globalisation process, side effects of green revolution and modern western science. In the book Staying Alive: Women, Ecology, and Development, she points out how technocratic change has contributed to mal-development which is also responsible for women's underdevelopment and environmental degradation. The masculine paradigm of food production which is known as green revolution involves the disruption of the essential connection among human beings, forestry, animal husbandry and agriculture. Modern human beings have claimed a position of dominance over other living species. They blindly exploit natural resources which lead to serious complication and drastic consequences to the environment. The rapid technological advancement has worked in two ways. On the one hand, fish farming, green houses, chemical fertilisers have temporary enhanced the earth's capacity. While on the other hand, technological advancements have led to unbearable pressure on the planet. Shiva urges individuals to act in a responsible way to enhance the health and integrity of biosphere. Human beings are integral part of the biosphere and any potential destruction of it, will lead to complete self-destruction.

Introduction

Shiva has published thirteen scientific books that focus on various contemporary issues and which can be grasped by the layman. She has also produced numerous scientific articles and research papers that gained her international recognition. Shiva's major works are Staying Alive (1988), Violence of the Green Revolution (1993), Ecofeminism (1993), Biopiracy: The Plunder of Nature and Knowledge (1997), Water Wars (2000), Globalisation's New Wars (2005) and Earth Democracy (2005). The titles of these books are adequately illustrative of the author's wide interests in protecting the environment and in raising people's awareness about important social and ecological issues.

It is important to mention that Shiva emerges as an eminent and open minded advocate of anti-globalisation, she consistently points out the disadvantages and harms of the economic globalisation

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process. Her interests are varied and focus on resolving complexities, surrounding the Green Revolution, the draw backs of modem Western science and the ills of biotechnology. She also discusses environmental pollution, unfair trade and ecological issues arising from globalised agriculture. Shiva is able to extensively describe, the manifestations and applications of ecofeminism. It refers to the male domination over the Female and Nature (Salleh 43).

Shiva's Works and Her Concerns

Shiva has received an astonishing number of awards for her contributions to environment, conservation, food security and for defending human rights. The Golden Plant Award (International Award of Ecology) was awarded for her outstanding contributions to ecology and the environment in Denmark in 1997. The Alfonso Comin Award Barcelona in 1997 was awarded to her for her contributions to protect biodiversity, save seeds and promote traditional organic farming method that protect farmer's rights since the mid-199, she has been promoting traditional knowledge and livelihood, sustainable agriculture and biodiversity conversation, particularly in support of small community and marginalised groups, including women, small farmers and indigenous and local community in India. In Staying Alive: Women, Ecology and Development, Shiva indicates her decision to look at the roots that see development as a project of gender ideology. The Western patriarchal economic assumption that is geared for profits, she claims, subjugates the humane assumption of economics, as the provision of sustenance. This creates great poverty which is grounded in ecological devastation. Shiva argues that modern science, which is reductionist in nature, is not universal. It subjugates nature and leads to the exclusion of women as experts. They are partners with nature in the production of sustenance. "Scientific forestry" which is reductionist in nature (as it promotes only single species) and aims at maximisation of profits, results in the destruction of forest ecosystems and displacement of rural and tribal women. Shiva claims that these women generate survival through the forests. Chipko, the famous movement of peasant women, Shiva explains, was in reaction to this destruction of forests. The book also examines the food crisis arising from flawed masculinist agricultural science. The draw backs of economic development and Green and the White Revolutions are also examined. They reveal the marginalisation of rural women and the adverse effects on local species and breeds. Shiva warns that the water crisis threatens the survival of all forms of life. Limited or scarce water resources are overexploited or diverted from survival needs.

Shiva is prone to regard instability as associated with market fundamentalism, cultural fundamentalism, immense uneven economic growth, skewed public food distribution systems and large scale non-organic chemical intensive farming. Undoubtedly, such issues need a thorough

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exploration, so that the writers can reach certain conclusions about effective and just interventions. This could save livelihoods and improve the lives of people, across the world.

She analyses all the aspects of the natural and physical environment. The environmentalist Shiva is seriously concerned with the characteristics and healthy functioning of the Earth's vital biosphere. Our biosphere is the global sum of all ecosystems and it crucially supports all life. The vital biosphere is actually a sustainable and self-regulating system, which is concerned with the progressive integration, of all living beings and their relationships, including their extensive interaction with the lithosphere, hydrosphere and atmosphere. It is obvious that every part of the planet supports life, to a varying degree. Our biosphere consists of a series of biomes, inhabited by particular flora and fauna. The biosphere is identified as that part of the planet, in which life evolves and vital natural life processes and cycles develop and transform over time. Today, human beings almost everywhere have claimed a position of dominance over other living species. They often act as if they are not an integral part of the biosphere, they feel that they can allow themselves to ignore it. However, such ignorance leads to serious complications and drastic consequences to the environment. In the past, the human population was not that extensive, its collective actions did not have a substantial impact, on the health of the biosphere or on the carrying capacity of the planet. In the twenty-first century the situation has completely changed due to the rapid technological advancement that served the needs and increasing demands of the growing population across the world. Technological advances have worked in two ways. On the one hand, advances in fertilization composting, greenhouses, fish farming and land reclamation have temporarily enhanced the Earth's carrying capacity. While on the other hand, many new developments in the technologies of resource extraction have led to overwhelming pressures on the resources of the planet on which human beings depend. They also at the same time pollute the external environments of land, air and water at an unprecedented rate. The only difference between human beings and other species is that humans are aware of the specificity and the outcomes of their actions.

Shiva is extremely concerned with the negative impact of irrational human actions on the environment. She criticises the way that people act as if the economy is more significant than the ecological health of the biosphere. In her writings, Shiva underlines the importance of human dependence on the biospheric life support system. She encourages individuals to act in a reasonable and responsible way that enhances the health, stability, and integrity of the biosphere. The value of individual worth and integrity, in the context of the biosphere, is immensely important. Moreover, the perspective of "eco-ethics" can be explained, with the idea that human spirituality has its roots in

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Nature. Human beings are an inseparable part of the biosphere and any potential destruction of this system leads to complete self-destruction. Therefore, people need to fine-tune their interactions to the requirements of the evolving social and ecological systems, concerned with preserving the integrity and health of the biosphere. Species, both old and new constantly evolve in the biosphere; human beings use the biosphere indefinitely. The continuous ignorance of natural laws, related to physics and biology will apparently place human beings in a critical position in such a manner that nature's laws are impeded. In this way the phenomenon of ecological overshoot emerges, as it refers to the use of resources more rapidly than the planet can regenerate them.

Shiva has ceaselessly voiced her concern for the preservation of nature's full diversity and the human cultural diversity that is linked to it. Shiva also gives much attention to the issue of the risks of factory-farmed animals and birds, fed on unnatural diets, antibiotics and hormones. She investigates new age diseases like the mad cow disease and avian influenza. Shiva examines the extreme consumerist lifestyles in the West and the environmental consequences that are felt in poor countries.

In the Book Staying Alive Shiva again points to the irrigation systems that for instance, replace better suited local drought resistant crops with water-thirsty cash crops. The other common environmental issues that she looks into are biotechnology and its threats to nature's diversity, deforestation through acts like timber logging and mining. The increase in desertification, human induced salination and water logging through profuse irrigation is also examined. According to her, water logging, salinity, micro-nutrient deficiency and toxicity are direct consequences of modern agriculture system which is entirely based on maximum profit formula. Shiva is also worried about pollution of underground water resources, ozone depletion, climate change and disposal of hazardous wastes.

Some of her main concerns include biodiversity conservation, modern hybrids displacing traditional indigenous varieties, genetically engineered organisms and their ecological consequences. She also looks into toxic pollution, degradation of natural resources, extinction of endemic species and almost all other major environmental questions. For instance, Shiva's organisation, Navdanya is an efficient national programme for biodiversity conservation and farmers' rights. Shiva mentions that India still retains plenty of peasant agriculture and seed diversity. This means that farmers need to be encouraged to exert control over seeds. Under the Navdanya programme, team of seed keepers and organic producers also provide training on sustainable agriculture techniques. She exposes the myth of miracle seeds (hybrid seeds). She asserts that hybrid seeds do not produce seeds. Farmers have to by new supplies of seeds every year. Hybrid sees could no more be viewed as a source of plant life.

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They are only a source of private profit only. These news seeds are highly vulnerable to pests. Consequently they have created demand for pesticides to ensure pest control and plant protection. The advocates of green revolution declare natural seeds as inferior and primitive. Even Ragi and Jowar are labelled as coarse grain. In reality coarse grains are nature's most productive crops in terms of nutrition.

As Shiva explains, the seeds represent the source of life and embody human biological and cultural diversity. Moreover the seeds relate to the narrow link, between the past and the future, of the evolution process. Shiva is quite disturbed about the initiatives of various state governments. They sign certain memoranda, with seed corporations in order to privatise, the national diverse genetic heritage. Farmers are in a quite vulnerable position; corporations steal their genetic wealth and in turn, sell them patented genetically engineered seeds. Therefore, the Indian environmental activist has been trying to convince the public that individuals need to make efforts to defend natural seeds as commons. In addition to that farmers breed, for resilience and nutrition but from the perspective of industrial breeding, seed companies are solely oriented to increase profits. The future of the seeds and the future of farmers obviously depend on the conservation of the biodiversity of the seeds.

The enhanced connection between environmentalism and women appears to be Shiva's important contribution to the environmental movement. For her efforts, she won the prestigious Right Livelihood Award in 1993, which is also recognized as "the alternative Nobel Prize." Her being a part of the Indian National Environmental Council is indicative, of Shiva's continuous work in finding solutions to severe environmental issues. Shiva argues that the majority of rational individuals need to understand that humanity's actions have negatively impacted the environment. The regrettable thing is that only an insignificant number of people make any real effort to change their personal impact on the environment, in order to regulate their ecological footprints on the planet.

Shiva, the Indian environmental activist, also an authority on ecology, stresses on the complex ecological interconnectedness of all living beings in her Vedic Ecology. She looks into GMOs in her pursuit of ecological stability. Human beings, she reminds us, are an inseparable part of the planet's diversity. This means that we are all members of the "Earth Family" as well. This global family, or '"Vasudhaiva Kutumbkam " as Shiva puts it in Vedic terms, consists of diverse interconnected species that also include various micro-organisms, plants and animals. From this perspective of interrelatedness and interconnectedness, Shiva claims that living in accordance with the requirements of biodiversity means that individuals should be deeply aware of their ecological and species being, with all its significant limitations and potentials. At the same time, human beings should be aware of

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others and their potential in the ecological "Earth Family", in order to attain an adequate level of co-operation and humanity. The simple recognition that human beings are just one among many species can definitely benefit the environment according to Shiva. The idea of being part of the "Earth Family," is revolutionary in the sense that it has the potential, to change every aspect of the organisation of society. Culture in India and the East has been based on the assumption that we are all an "Earth Family."

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Urbanisation Challenges and Sustainable DevelopmentPlanning in New Delhi

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Abstract

The national capital of the country, New Delhi, has a population of 16.35 million people, makingit the second largest urban agglomeration (UA) in the country. In contrast to the growth of every other metropolitan in India since 1931, the growth of the Delhi UA has averaged more than 4.0 percent annually across each and every decade. The core of the Delhi UA, which includes New Delhi and Central Delhi, had reached its maximum level of urbanisation and as a result, there is increasing unsustainable encroachment of peripheral lands with consequent repercussion for the environment.

This research paper attempts to uncover the contemporary concept of sustainable urbanism. In this paper, we will also argue that there is a pressing need for environmentally responsible urban growth in Delhi. The rapid urbanisation that has taken place in India has resulted in a haphazard condition. It carries with it a host of issues on the social and ecological fronts albeit it has a track record of fostering economic growth and development, both of which are beneficial.

The study is also aimed to explore the following specific study questions: what exactly is sustainable urbanism, what are the difficulties of implementing sustainable urbanism in Delhi, andwhat are the potential benefits of doing so? The results will be analysed by conducting a survey ofsustainable urbanism, issues and opportunities faced by sustainable urbanists for Delhi through secondary literature. The investigation is divided into two primary parts: the first examines the present state of sustainable urbanism in Delhi, and the second examines the implications of thesefindings. As a result of the inherent complexity and interconnectedness of each of these problems,a solution to any one of them may also have beneficial effects on the others. In the case of Delhi,population growth is an extremely sensitive issue from both a social and ethical point of view. Population growth has generally become a threat to the entire planet and especially to the metropolitan area. In this study, we could explore solutions and other issues that are important elements to discuss.

Keywords: Delhi, urban governance, sustainable urbanism, challenges and opportunities

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Introduction

Sustainable urbanism focuses on strengthening cities' long-term viability by lowering consumption, waste, and harmful effects on people and places while enhancing the overall well-being of people and places. It includes the study of cities and the urbanism practices connected to their construction. Among other things, well-being encompasses all aspects of cities and their residents in terms of physical, environmental, economic, social, health, and equity. The subject of sustainable urbanism is becoming a serious topic of discussion due to the steadily increasing urban population. Cities are not only socially and economically essential but should also be environmentally sustainable. Urban sustainability refers to environmentally friendly buildings, energy sources, water supplies, and other elements. Creating a harmonious ecology requires that this ecosystem be compatible with the influence on people's needs and available resources (Bibriet al., 2020).

The second largest urban agglomeration (UA) in India is the national capital, Delhi. Unlikeany other Indian metropolis, Delhi UA has grown by over 4.0 per cent per decade since 1931, while the population growth dropped to 2.39 per cent from 2001 to 2011(Kundu, 2015). During the previous decade, New Delhi and Central Delhi were fully urbanised. In contrast, peripheral districts had higher growth rates and absorbed a significant number of migrants (Kundu et al., 2020). Due to a lack of time and intense development pressure, India's urban expansion is not sustainable, and consequently, social and environmental issues have surfaced. The Indian government built more than 70 steel towns at the time of independence while giving existing metropolises more attention. Unplanned urban growth results in overworked infrastructure, the expansion of slums, environmental degradation, traffic issues, and high living costs. India's massive population, diverse geography, and planners have caused huge migration from rural to urban areas, which has resulted in underfunded administration ("REFORMS in URBAN PLANNING CAPACITY in INDIA Final Report," 2021).

Both environmental concerns and opportunities are generated by cities. On the one hand, a city's environmental impact is heightened by rapid urbanisation. Cities consume over 75% of the world's energy and release 70% of their CO_2 emissions. For the most part, ecological issues are ignored when building urban infrastructure. Urban living puts a great deal of pressure on the planet's ecosystems since it is driven by and influenced by a resource-intensive consumer society.As of now, human beings' ecological footprint exceeds the planet's carrying capacity by 50%, andbiodiversity is in sharp decline (Chu & Karr, 2017). Wells have significantly deteriorated due to our activities and the environmental services that are necessary for our survival. Cities have a hugepotential to serve as

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centres for the creation of smart, sustainable solutions that can assist human needs while leaving a smaller environmental imprint and improving quality of life. Strong, visionary leadership is necessary at the urban level in parallel with global processes on sustainability and climate. Cities that are already addressing sustainability concerns with vigour are rising to the top on the global stage (Velenturf & Purnell, 2021).

In this article, we look at the problems that cities deal with, the regulations that cities put in place, sustainable urbanism, and the opportunities that sustainable urbanism offers. Urban planning is seeing a rise in popularity for the relatively new idea of sustainable urbanism. In this paper, the researcher makes the case that Delhi urgently needs urban expansion that is environmentally conscious. India has experienced tremendous urbanisation, leading to a situation that cannot be sustained. Although it has a history of promoting economic growth and development, both of which are advantageous, it also bears a number of challenges on the social and ecological fronts. In this study, the researcher looked at a number of issues with governance, implementation, inadequacies, and spatial design. What constitutes sustainable urbanism, what difficulties does it encounter in Delhi, and what benefits can accrue from doing so are some of the more particular study topics.

Methodology

The original research, reviews, and reports on planning and sustainable development - in Delhi were retrieved from journals, books and government websites. Using specific keywords such as “Delhi”, “Sustainable planning”, “Urbanisation”, “Planning”, and “Future perspective - Urbanisation”, literature was searched in a number of electronic databases. Individually as well asin combinations, these keywords were used to find all relevant works published up to 2022. The literature was then screened, and related articles were chosen. The data has been compiled after acritical examination of the relevant literature. The investigation is divided into two primary parts:the first examines the present state of sustainable urbanism in Delhi, and the second examines the implications of these findings. Also, we will discuss the difficulties as well as the potential that arepresent in sustainable urbanism. As a result of the inherent complexity and interconnectedness ofeach of these problems, a solution to any one of them may also have beneficial effects on the others.

Results and Discussion

It is crucial to consider Delhi’s current situation in order to realise a sustainable urban city.The following sustainability study will examine Delhi’s current level of sustainable urbanism. Thisentails taking a close look at environmental concerns, water use and management, carbon impact,and

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transportation patterns.

Current Scenario – Delhi

Urban planning includes land use and building form. High-rise structures and flats, commercial and retail centres, housing areas, and highway and road expansion have also changed Delhi's urbanform. Changes in urban form can lead to housing concerns and slums. This would inevitably degrade the urban environment, causing socio-economic and welfare issues like poorer productivity. Urban planning, lax policies, and the government's unwillingness to foster expansion led to this result. Delhi's automobiles are rarely regulated or standardised, and traffic laws are nonexistent. Public buses are sometimes overloaded, without seatbelts or doors, and travellers hangout the sides. Air pollution and greenhouse gases are also caused by slow traffic and poor vehiclenorms.

A targeted transformation of the socio-economic, ecological, and built environments is necessary to accommodate the city's rapid growth while preserving both its opulent history and contemporary developments. The nation's capital as well as a centre for business, culture, and sports, the city will act as a catalyst and focal point for ideas and actions. The strategic planning itself, along with connected elements of the various authorities involved in urban services and development, along with participatory strategic planning on local levels, is the cornerstone for Delhi to become a world-class city, in addition to significant issues like ecology, housing, physical infrastructure, land, transport, and other institutional facilities (Economic Survey of Delhi 2016 - 2017 | Planning Department |, 2017).

Need for Sustainable Urbanism for Delhi

By 2026, it is anticipated that over 40 million people will reside in Delhi. Rapid urbanisation has put pressure on infrastructure, the availability of housing, and, therefore, the riseof slums, in addition to the increased issues posed by environmental degradation. A significant change in how land is used could be another important effect of the rapid population growth. The built-up conurbation has taken the place of once fertile fields and water bodies, along with agricultural lands. A total of 97,067 hectares of land were used for agriculture in the Delhi area in1951. Only 25,000 hectares remain as of today due to hybrid capitalism taking the role of the maineconomic force that was agriculture (Sharma & Abhay, 2022). Since the late 20th century, high- tech sectors, particularly those in information technology and telecommunications, have taken overthe traditional commodities sector, particularly the selling of older goods like spices that helped make Delhi a significant national commercial hub. Hence, as a result of economic globalisation, the chasm between the poor and the

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rich has widened and the poor's access to land and housing has been severely restricted (Amit et al., 2017).

Delhi residents have a 0.70-metric-ton carbon footprint. Delhi emits less carbon than London and Mexico City. Even though this may seem optimistic, Delhi's unequal development drives such data, and the city's carbon footprint, which is far greater than the Indian average, remains a severe worry. 86% of Delhi residences have charred brick walls despite having stone, slate, or concrete roofs (Paravantis et al., 2021). Environmental challenges affect many parts of Delhi society. Air quality emission standards are not yet in transport laws. The Supreme Court ofIndia's 1998 directives to reduce Delhi's vehicular pollution failed (Chatterji, 2020).

Opportunities for Sustainable Urbanism in Delhi

Future generations' resources need strict politics, planning, and implementation. Recycling, reducing, and reuse must be part of all political endeavours (3Rs - Reduce, Reuse & Recycle, 2020). Urban green spaces and nature-based solutions can improve urban space, local resilience, and sustainable lifestyles, improving urban dwellers' health and wellness. Ecosystemsbenefit humans. Plants and trees, regulating services in wetlands and pollinating crops, supporting services that sustain all other services, and cultural services, including the benefits of being outside(Bratman et al., 2015)

These green initiatives could provide an opportunity for people:

- Vertical Gardening at The Dull Metro Pillars is a green project of DMRC (Delhi Metro Rail Cooperation). (Aranha, 2018)
- collaborating on the green building initiative (Alankrita Soni, 2022)
- Encouraging Children to Participate in The Swachh Chetna - An Eco Club Delhi Greens (Department of Environment, 2020)
- Red Brick Eco Solution (Department of Environment, 2020)
- Plan to reduce traffic - Mega Decongestion Project (Delhi's "Mega Decongestion Project"is announced by AAP to lessen traffic congestion, 2022)

Solutions and Findings

Finally, a sustainable urban shape can improve a city's social, economic, and environmental conditions. A well-designed and effective city plan tailored to Delhi's needs and capacities will handle many contemporary challenges like transport, urban trends, and health. Current Delhi transit

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circumstances are arbitrary and cause various safety, wellness, health, and economic difficulties. Transport and road quality are major challenges. Public transit improvements will reduce inequality and provide critical services to low-income households. Delhi's Metro Rail and Bus Rapid Transportation systems handle this critical issue. As shown by past events, much depends on government and authority to preserve essential services. Moreover, law enforcement and regulations must be included.

Conclusion

In conclusion, Delhi can learn from other Indian cities to become more sustainable. Knowing what the city and its inhabitants need, such as equal road and transport services, health,and safety, is crucial. Improving services and transit for all incomes, ages, and modes of mobility.The city can create a livable, sustainable urban shape after establishing a solid base. Greener metro rail and public transport, pollution reduction, urban re-naturing, and improved health and welfare.

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Agricultural Development and Sustainability

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Abstract

Since the middle of the twentieth century, the agricultural sector has seen spectacular growth throughout the world. The Green Revolution's technology-driven expansion has significantly reduced the global supply of food grains, ensuring the food security of the world's expanding population. The sustainability of the next stage of growth, however, poses a significant obstacle. Notwithstanding the recent boom in manufacturing and services and the falling contribution of agriculture to the national economy, India may still be safely classified as an agricultural nation because the majority of its workers (65%) are still involved in agriculture and related industries. The importance of sustainable agriculture has been underlined in the current paper. A shift from profit-oriented sustainable farming to production-oriented farming is required in light of the evolving agricultural environment. In this regard, the rate of resource-conserving technologies (RCTs) adoption by Indian farmers, for the most part, adequate; but, as things stand, conservation agriculture is only halfway developed. The ability of farmers and all other agricultural development players, as well as the larger community, to learn, experiment, adapt, and collaborate effectively, are the key to sustainable agriculture. As a result, small farm management that increases the farming system's productivity, profitability, and sustainability will go a long way towards ensuring overall sustainability.

Keywords: Sustainability, Agriculture, Green Revolution, Technology, Policies

Introduction:

Two significant technical revolutions in global agriculture have occurred to date: the Green Revolution and the Gene Revolution, which followed it. In 1968, the phrase "Green Revolution" was developed to describe the extraordinary expansion of agriculture. With the use of breeding procedures to create high yield cultivars, it entailed the application of science to boost agricultural growth (HYVs). These HYVs, along with increased application of pesticides and fertilisers, enhanced irrigation, mechanisation, and soil conservation through reduced use of machines, contributed to the amazing rise in agriculture that was eventually observed. Due to its close ties to rural development, sustainable agrarian development has become a top priority in many recent global development discourses. Yet,

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agro-systems modernization is a major focus of agrarian development paradigms, which ignore the social aspect (social networking/learning) of agricultural innovation. In light of the aforementioned, this reflective article reviews several points of view on the contribution of farmer social networking and learning to agrarian development, with a focus on India. In India, cyclical interactions between water (irrigation), food (agricultural), and energy have caused severe socio-environmental crises that call for targeted policy solutions, such as groundwater depletion, energy shortages, failed irrigation systems, food insecurity, and loss of livelihood. The emphasis placed on external inputs as a way to boost food production over the past 50 years by agricultural development strategies has been extremely successful. This has caused a rise in the use of pesticides, inorganic fertiliser, animal feed, tractors, and other technology on a global scale. Yet, the natural resources and processes that these foreign inputs have replaced are now less effective. Pesticides have taken the place of biological, cultural, and mechanical methods for controlling weeds, pests, and diseases. Inorganic fertilisers have taken the place of composts, nitrogen-fixing plants, and livestock manures. Although the Green Revolution produced great successes, it has run into significant equality, stability, and sustainability issues, necessitating the need for a "new phase" of agricultural research and development. In this article, productivity, stability, sustainability, and equity are defined as four agricultural performance metrics. It is believed that development cannot be based on any one level since agro-ecosystems are represented as a hierarchy increasing from the level of the individual plant or animal all the way to national systems connected by international trade. An examination of the worldwide limitations on just and sustainable development, the essential national policies, and the requirements of rural households serve to illustrate this point. The priorities for research and development for the new phase of development are summarised in this paper's conclusion.

Objectives:

1. To deal with concerns about threats to sustainability.
2. To evaluate the current state of the resources, both natural and human.
3. To evaluate sustainability in agricultural practices.

Data Methodology:

The data has been collected for the study of agricultural development and sustainability and what bring them. The required data was collected from secondary sources are- the websites looked into in order to gather the prior information and the related literature about the topic. This information is descriptive and analytical in nature.

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Need of sustainable agriculture:

Food production in sustainable agricultural systems is done by the utilisation of existing soil nutrient and water cycles, as well as naturally occurring energy fluxes. These approaches aim to produce food that is nutrient-dense while also being devoid of artificial chemicals that may be hazardous to human health. These systems aim to avoid the use of synthetically compounded fertilisers, pesticides, growth regulators, and livestock feed additives by relying on crop rotation, crop residues, animal manures, legumes, green manures, off-farm organic wastes, appropriate mechanical cultivation, and mineral-bearing rocks. They instead seek to preserve soil fertility and productivity. The availability and quality of natural resources such as soil and water are critical for sustaining agricultural productivity.

By encouraging conservation and sustainable use of these limited natural resources through appropriate site-specific methods, agricultural expansion can be maintained. Around 60% of India's net sown land is still devoted to rain-fed agriculture, which produces 40% of the nation's food supply. Hence, developing rain-fed agriculture and conserving natural resources together hold the key to supplying the nation's growing demand for food grain. Sustainable agriculture systems are ones that are economically feasible, meet society's demand for healthy food, and do so while preserving or improving the environment's quality for coming generations. Agricultural expansion may be sustained by encouraging conservation and sustainable use of these limited natural resources through site-specific strategies. Rain-fed agriculture still accounts for over 60% of India's net planted acreage and accounts for 40% of the country's food supply. As a result, expanding rain-fed agriculture and safeguarding natural resources are critical to meeting the nation's growing need for food grain. Sustainable agricultural systems are economically viable, fulfil society's need for nutritious food, and do so while protecting or increasing the quality of the environment for future generations.

Best Practices for Sustainable Agriculture:

- Vermicomposting is the practise of composting organic waste using earthworms. Earthworms can devour almost any type of organic material, and they can consume their own body weight each day. The hatching and proliferation of earthworms, the creation of compost from solid organic waste, and the utilisation of its castings have all contributed to the development of an essential instrument for trash recycling across the globe.
- The term "farm yard manure" describes the decomposing mixture of animal excrement and urine, as well as any leftover roughages or feed that was given to the cattle. Farmyard manure

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also increases the soil's ability to store water, and it enhances the physical/chemical properties and nutritional balances, which increase and sustain crop yield.

- The System of Rice Intensification (SRI) idea concentrates on regulating the soil, water, plants, and nutrients in a balanced relationship, allowing rice plants to develop as much as possible. Using various management techniques, System Rice Intensification boosts productivity of land, labour, water, and capital while increasing rice production.
- Bio fertilisers are substances that contain living microorganisms on a carrier-based (solid or liquid) that are beneficial to agriculture in terms of fixing nitrogen, solubilizing phosphorus, or mobilising nutrients while also boosting the productivity of the soil and crop. The substance with normal farming methods, fertilisers and pesticides has an impact on the quality of the crop, however bio fertilisers and bio insecticides are considered environmentally beneficial and sustainable. Bio fertilisers are inexpensive, renewable sources of plant nutrients that can be used to augment chemical fertilisers and meet plant nutrition needs.
- Intercropping and crop rotation are other names for mixed cropping. It is the simultaneous cultivation of two or more crops on the same field. On the same plot of land, planting multiple crops will enable the crops to coexist and grow. Crop output is increased while soil fertility is enhanced by multiple cropping.

Policies:

It is believed that a robust policy must be formed quickly in order to undertake a national strategy of sustainable agricultural output. The following factors should be included in policy statements on various agricultural sectors to guarantee the protection and effective use of soil and water resources. In irrigated agriculture, water losses from reservoirs and canals should be maintained to a minimum, and good field water management should be promoted to enhance water productivity through crop diversity and novel water-saving measures. With proper soil and water conservation measures in rainfed agriculture, agro-forests, perennial orchards, field crop farms, mixed timber plantations, grazing areas and other appropriate land use types should be built on a watershed basis. To make these areas viable for sustainable rainfed agriculture that will benefit farmers in the short, medium, and long terms, state resources should be utilised. Policy on sustainable agriculture should emphasise the significance of protecting natural resources (land, water, forest, atmosphere, etc.) while successfully using them for agricultural output. Through raising awareness, making resource conservation mandatory, developing better technology, and managing rainwater, rivers, tanks, and groundwater safely and effectively, all land users for agriculture should be encouraged to use natural resources

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sustainably. Agriculture should be mechanised in every way feasible to lower production costs and boost product quality, but without having a negative impact on the environment, such as increased wind and water erosion, increased water and soil nutrient losses, air pollution, etc. The application of indigenous knowledge in agriculture should be emphasised in national policy since it ensures the preservation and utilisation of traditional crops and varieties, resource conservation techniques, medicinal plants, cottage industries, and the agricultural history of the nation. Most socioeconomic and environmental issues that result from unsustainable farming practises might be solved by sustainable agriculture. The three basic objectives of sustainable agriculture are socio-economic equity, economic profitability, and environmental health. Conscious of this, the Indian government has introduced a number of policies and programmes to meet the need for essential inputs sustainably. The purpose of the current study is to list and evaluate important Indian efforts, including the Soil Health Card programme, Parampragat Krishi Vikas Yojna, PM Krishi Sinchayi Yojna, and PM Fasal Bima Yojna. The study's goal is to examine India's efforts and strategy for the advancement of sustainable agriculture.

Conclusion:

In conclusion, sustainable agricultural systems use cutting-edge, scientifically based techniques to increase productivity while minimising environmental damage. More creative business strategies can be used to profit from the techniques being used to promote agricultural sustainability. All farms can benefit from the many sustainable farming techniques outlined above, which yield a variety of fuels, foods, and fibres. These techniques can guarantee productivity, profitability, and long-term sustainability of the farming system with scientific application and good management. The most pressing problem right now is that farming does not consistently provide farmers with a financial benefit. Policies governing import and export do not adequately address how to sustain farming's viability. A decline in the nation's agricultural resource base and environmental contamination have resulted from farming without enough consideration for the preservation of natural resources like soil and water and environmental protection. The government has not given farming input or timely marketing resources enough attention. Agriculture uses land resources for a variety of purposes without taking into account their suitability, capacity, or susceptibility to degradation. The latest developments in marketing, technology, and agriculture are largely unknown to farmers. The development of organic farming is more important for the advancement of sustainable agriculture. It's time to take decisive action to get around the obstacles that organic farming faces. A comprehensive framework is required that incorporates organic farming and bottom-up solutions. Additionally, it ought to address the mutual information exchange between institutions of farmers and technology

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Patterns of Social Amenities and facilities of Hisar District, Haryana

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Abstract:

This research paper on the title social amenities and facilities in which any area having overall social development like literacy of the area, the sex ratio, the rate of crime, and many more points etc. It includes the development of every child with their basic needs such as sufficient nutrients, basic education and a good environment to live in. Social development contains the growth of her skills, the sound health of every individual, electricity, water supply and each woman's utmost safety. The social development of any region means enhancing the overall development. Any region's ability to develop socio-economically is influenced by its geographic setting and access to transportation. It also depends on the literacy rate, employment rate, overall infrastructure, and so on. The more an area is in a geographically important region, the more the chance of that region to be economically developed, as most industrialists look forward to grabbing such areas because of the strategic opportunities. The more a region is full of industries and employees, the more that region would generate taxes that will directly impact that region's economy.

Key Words: Social facilities, infrastructures, Accessibilities and connectivity.

Introduction:

Social development in any region refers to the growth in cultural and political aspects in that area; it is the index showing the quality of living in that area. Social development in any area depends on the overall literacy of that area, the sex ratio, the rate of crime, the employment ratio and many more points. It includes the development of every child with their basic needs such as sufficient nutrients, basic education and a good environment to live in. Social development contains the growth of her skills, the sound health of every individual, and each woman's utmost safety.

Chaudhary et al. (2021), the population of Hisar constitutes the people from all the religions, predominantly Hindus consisting of around 85.6% in the district. Hisar has a very low average sex ratio of 824, which is a result of traditional practises that primarily discriminate against women's status and encourage the birth of males (Bamel et al. 2021). Therefore, improving the status and providing better education to women is important to break the social prejudice in the community and promote women’s empowerment in the Hisar district. Around 50% of the population in Hisar is landless; the

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population has very small landholdings.

Social conditions can be improved by maintaining a proper balance between every sector and trying to improve every sector or field in a more effective manner. Proper planning needs to be made by the Hisar district with the help of the state government to enhance their social status. A proper analysis needs to be done by collecting more authentic data and information about every district mainly the Hisar district of the Haryana country (Rani et al. 2019). A better economic condition helps in understanding better the scope of improvement in different fields with any type of disturbances. The economic condition can be improved by analysing the performance of every sector properly and messing every performance in a more appropriate manner (Saharan et al.2020). Government try to make better schemes that can provide better help to the people of the Hisar district.

The population is mostly dependent on agriculture for their livelihood, and the level of wages paid to the workers is very low, and they are subjected to exploitation. This indicates that the household development of the people in Hisar is not well-established, and most of the population is in poverty. As per the view of Ekta et al. (2019), the population of Hisar poses an increased value of livestock owned and maintained by the rural household as they are mostly dependent on the livestock that helps them fight the drought conditions. Moreover, livestock acts as a source of nutrition for the people providing them with meat and other products. Thus, the government needs to introduce programs that help safeguard the livelihood conditions of the people in Hisar. The measures ought to encourage dairy development, animal protection and nutritional standards in order to aid the socio-economic development of the Hisar district of Haryana.

Geographical Profile of Study Area

In this context, the thesis has been done on the social and economic developments of a district called Hisar in the state of Haryana in India. Haryana state has almost 22 districts and the Hisar district is one of the largest and most developed districts out of 22 districts, and the district has four subdivisions such as Hansi, Hisar, Narnaud and Barwala. The Hisar district possesses 3983 square kilometres of the area with 6 Tehsils such as Barwala, Adampur, Bass, Hansi, Hisar and Narnaud and 3 sub-tehsils namely Kheri, Balsamand and Uklana. The district also possesses 1 municipal corporation, 4 municipalities, and 9 blocks, with 276 villages and 308 panchayats (Hisar, 2022). The main city of the district is Hisar; the latitude of Hisar is 29.149763 degrees North and 75.723853 degrees east, and it is

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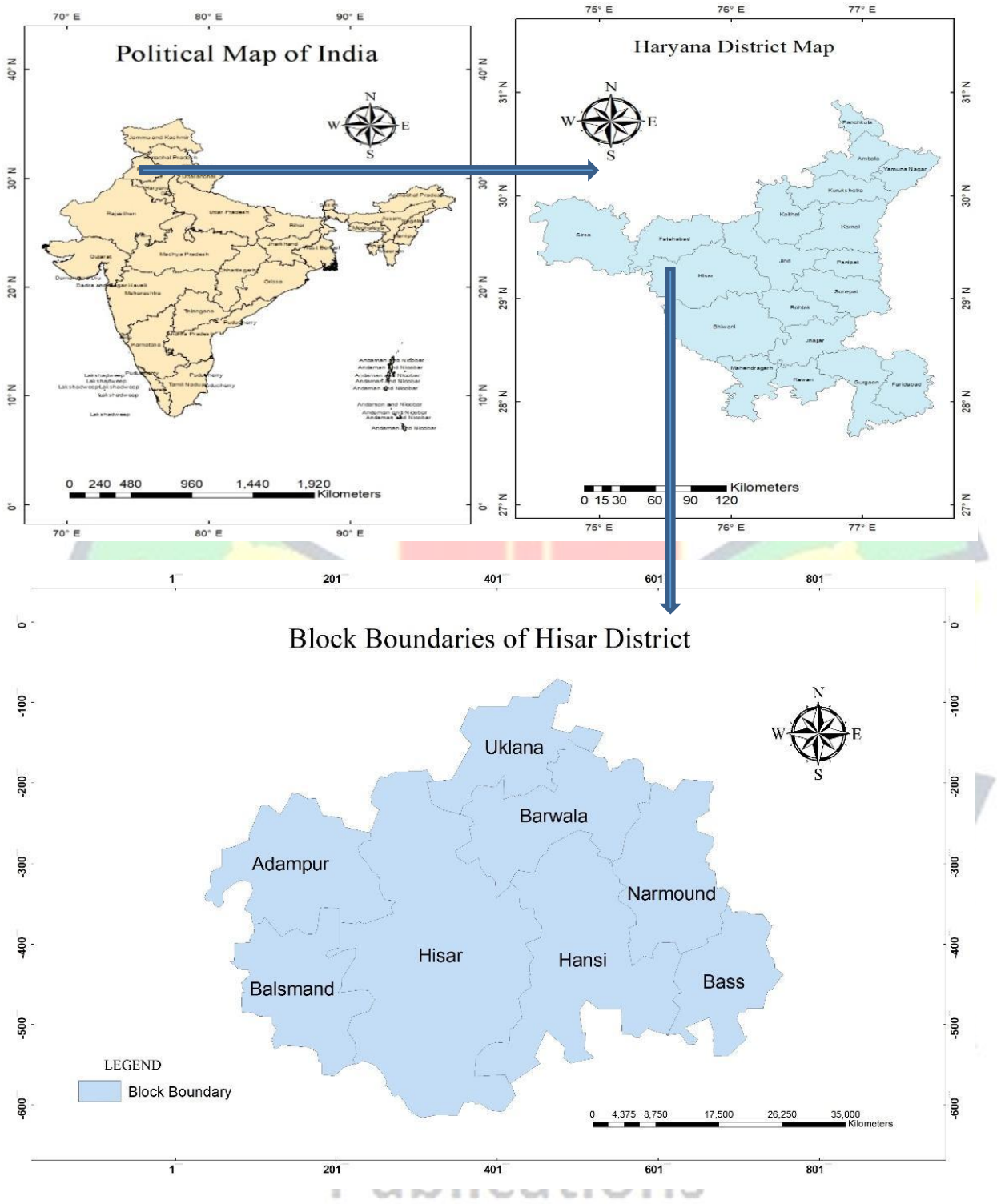

about 212 metres above sea level. “Indira Gandhi International Airport” is one of the international airports which is in “New Delhi” near to Hisar district. ; it is nearly 170 kilometres away from the capital of India. Transport facilities are provided and roads are connected to the airport from the Hisar district, so the snakes easier for people of Hisar district to reach the airport within a quick interval of time.

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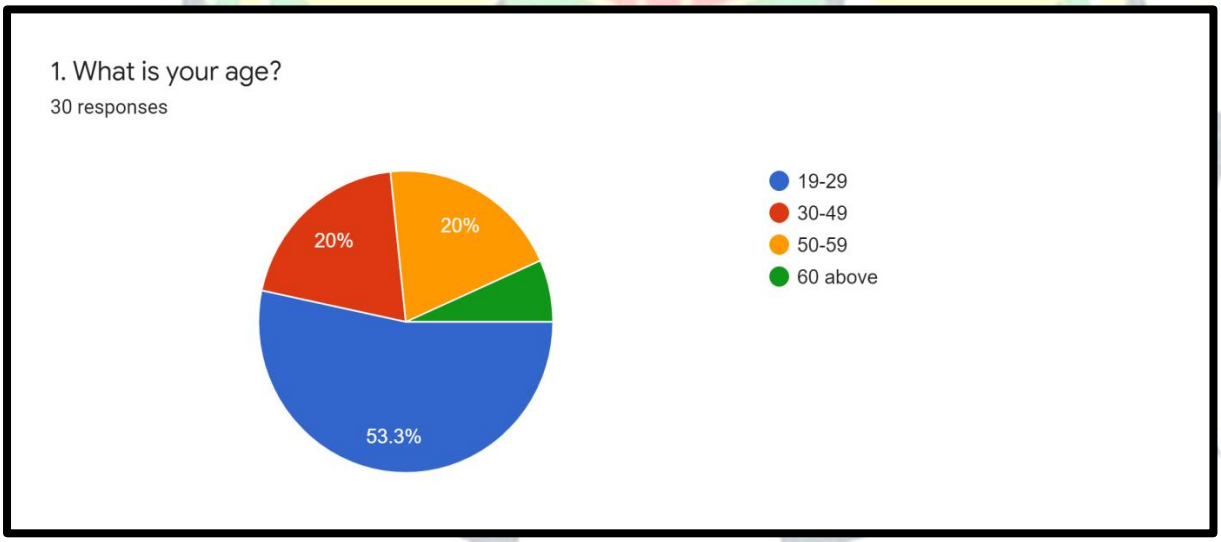
Table : Age Wise Basic Amenities and Facilities Analysis

. **Response**	**No. of respondents**	**Percentage of respondents**	**Total no. of respondents**
19-29	16	53.3	30
30-49	6	20	30
50-59	6	20	30
60 and above	2	6.7	30



Gender Wise Basic Amenities and Facilities Analysis:

given their beneficial responses during a survey. There are equal numbers of responses other and prefer not says groups, it is around 10%.

What is your gender?

The Role of Available of Electricity in Social Development:

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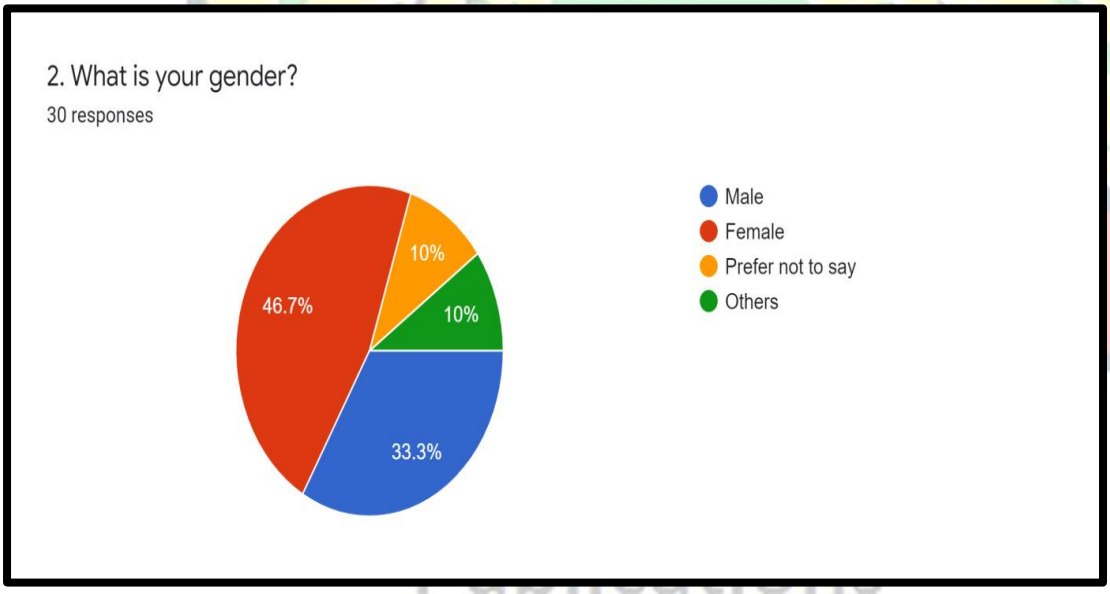
Around 63.3% of participants say yes that there is the availability of electricity in several villages in the Hisar district. This shows that the people of Hisar can do several works and use more new machines or tools to enhance their work and performance in different sectors and fields. Availability of electricity gives lots of advantages in doing lots of work quickly and with more comfort.

Response	**No. of respondents**	**Percentage of respondents**	**Total no. of respondents**
Male	10	33.3	30
Female	14	46.7	30
Prefer not to say	3	10	30
Others	3	10	30



Around 36.7% of participants say no regarding availability of electricity in several villages of the Hisar district. These participants said that some villages are facing lots of problems because of the unavailability of electricity.

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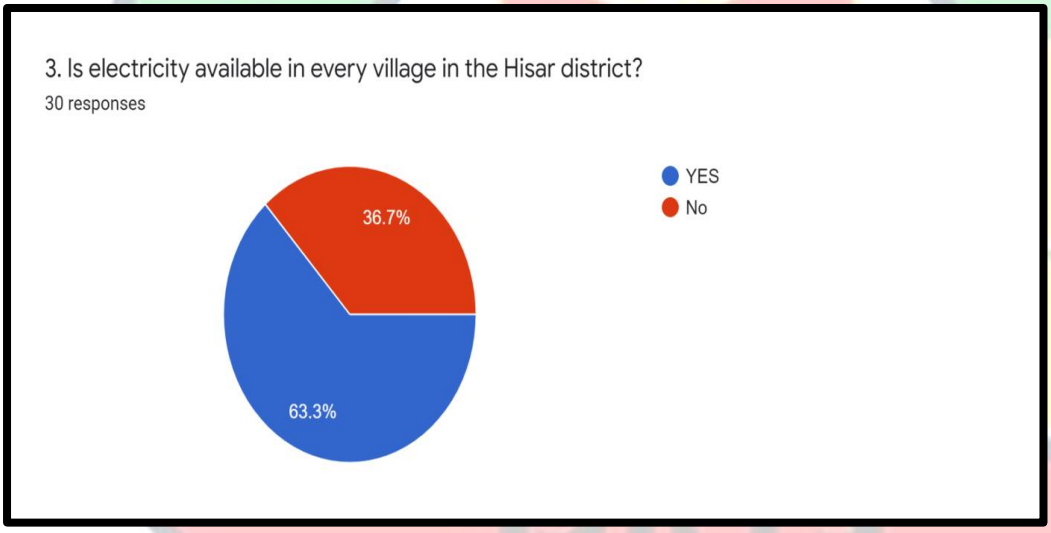
Is electricity available in every village in the Hisar district?

Bhiwani, Mewat, and Palwal, in another way, have weak HDI principles of 0.339, 0.276, and 0.271 respectively. Haryana's Department of Economic and Statistical Analysis states that people are unaware of the development rate of other states. Social

Response	**No. of respondents**	**Percentage of respondents**	**Total no. of respondents**
Yes	19	63.3	30
No	11	36.7	30



development helps in enhancing overall activities that are performed within an area. Government need to try better ways and methods that can provide better help in giving proper training to everyone people, this helps in making everyone more capable to perform a different task. Better training helps in enhancing the personal skills that can be used to get more opportunities in different sectors (Kathpalia et al. 2021). The Haryana government try to make a proper environment and try to spread awareness in every part of the Haryana state about every step for their well fair, this helps every to understand that scheme in more effective ways.

This helps them to make better use of that government steps for their personal welfare and provide better livelihood to their family. Better income sources help everyone to provide better facilities for their families and provide better education from higher standards of institutes (Rani and Meera, 2019).

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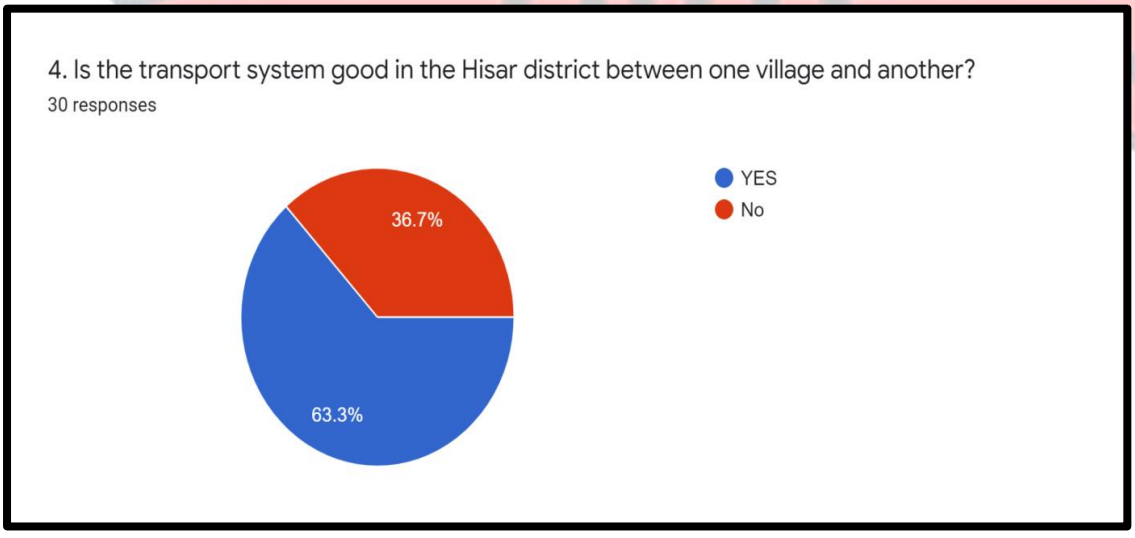
This helps their child to do better in their life and makes them proud of their parents. When the persons of areas get educated then automatically overall development of the state or country becomes higher and with good speed. Every parent wants to provide a better life for their family and give better opportunities to their child to enhance the skills in which they are interested.

The Role of Transport System in Social Development:

This particular question was based on the transportation system of the Hisar district. This has helped this research to identify the current scenario of the transport facilities between the villages of Hisar. The survey results have found that the population of the Hisar people are satisfied with the transport facilities. The 63.3% of the people have responded with yes to this survey question, which means more

Response	No. of respondents	Percentage of respondents	Total no. of respondents
Yes	**19**	**63.3**	**30**
No	**11**	**36.7**	**30**



than half population is satisfied with transportation. This has been identified that the main public transportation of Hisar district depends upon the cycle rickshaws and auto rickshaws. However, major

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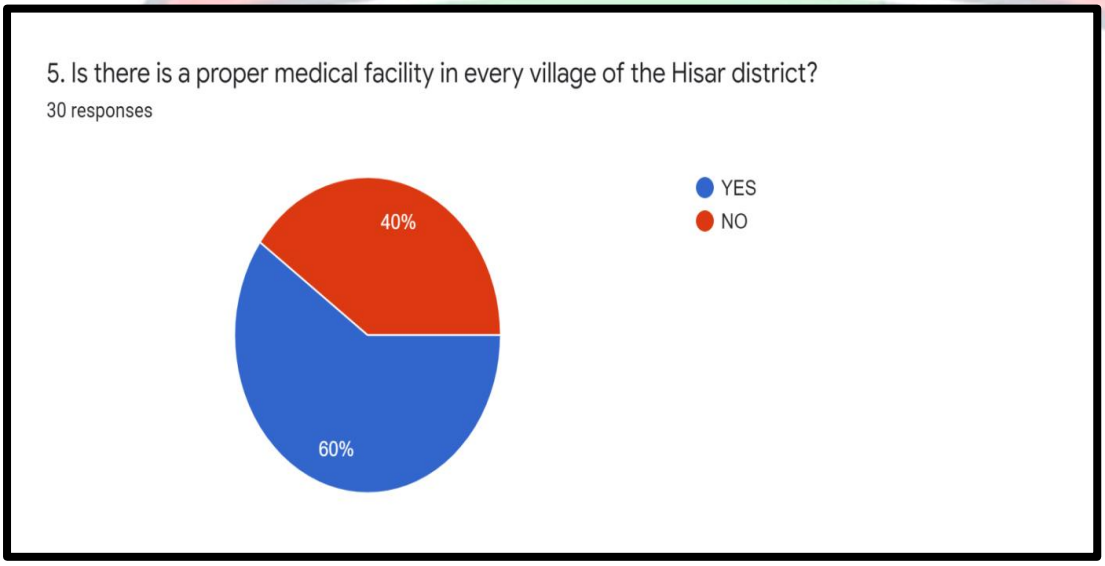
parts of the district are still not connected with railway transportation. There are 36.7% of the participants of the survey has responded with no, which means they think there are possibilities for transportation system enhancement.

Is the transport system good in the Hisar district between one village and another?The Role of Medical Facilities for social Development:

This survey question was formed to retrieve the data for knowing the views of the people about the medical facilities available. The 60% of the people in this survey from 25 different villages think that the medical facilities are well structured. However, there are 40% of the people think that medical facilities need to be more profound in the district. This has been observed that the primary care centres do not have a significant resource, and therefore people of the district suffer.

Is there is a proper medical facility in every village of the Hisar district?

Response	**No. of respondents**	**Percentage of respondents**	**Total no. of respondents**
Yes	18	60	30
No	12	14	30



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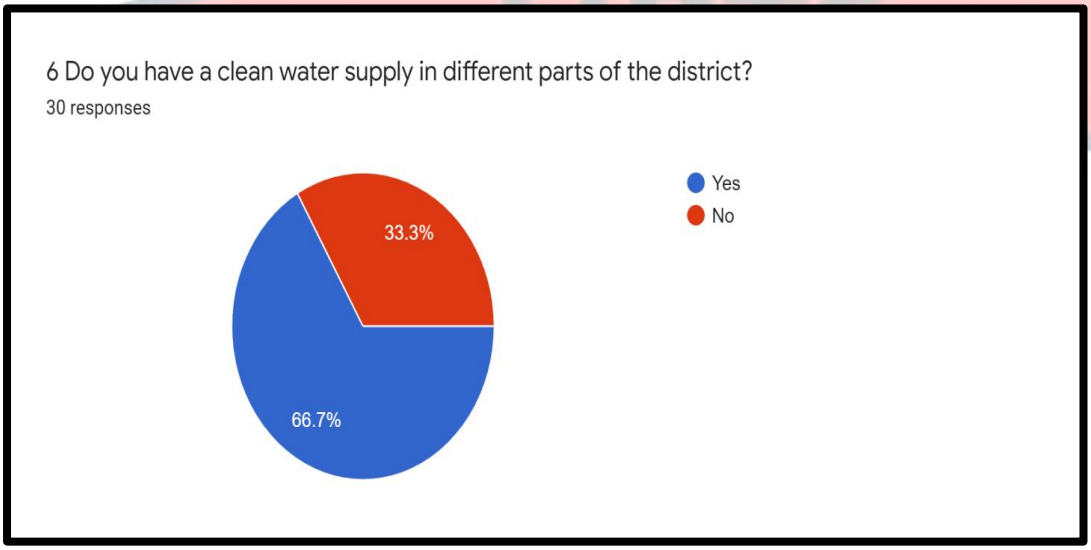
The Role of Clean Water Supplies for Social Development:

The question was based on the access to clean water supplies, which is an essential element in deciding the basic standard of living in the Hisar district of "Haryana". It was found from the survey that approximately 66.7 % of the people living in the Hisar district responded that they have access to a clean water supply. On the other hand, about 33.3 % responded in n negative to this question.

Do you have a clean water supply in different parts of the district?

Response	**No. of respondents**	**Percentage of respondents**	**Total no. of respondents**
Yes	20	66.7	30
No	10	33.3	30

Table 5.6: response of question 6



The response to the query suggests that the Hisar region has a very high standard of living. The district has had sustainable growth in both its socio-economic realms, and the vast majority of its citizens have

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access to clean water. However, water is a basic element of life, and all need access to clean drinking water to survive. Therefore, it is essential to provide for the rest of the people comprising 33.3%, who responded negatively to clean water. Women's and girls' violence has been on the rise. Kidnappings increased by 259 percent between 2011 and 2015, while molestation occurrences rose by 382 percent during the same period. Ever-married women who experienced spousal abuse climbed from 27.3 percent in 2005 to 32 percent in 2015. Only 23.66% of the 35 employees are women at the moment. Females who are in school have a literacy rate of 56.65% (2015–16); nonetheless, there are still not a lot of girls pursuing further education. The benefits of success have not been distributed fairly.

Conclusion:

This research paper is linked with “Areas need to be social developed of Hisar”. This section of the conclusion has depicted the various roles of the development of the social and economic development of the Hisar district. It has been found from this section that the development of the agriculture sector will develop employment opportunities in the Hisar district, and will create more food industries. According to the statement of Deswal et al. (2021), due to the development of the new food industry many people of the Hisar can get good jobs in the industries. Moreover, due to the development of the social sector, there will produce more crops and food products, and Hisar can supply good crops and foods to the food industries, and they can earn more money. This will help to develop the economy of the Hisar. Moreover, for maintaining a good quality of the produced crops the industries will develop the roads and the transportation system will be better, which will help to social development in the areas of the Hisar district.

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Spatial Distribution of Rice residue fire during Kharif season using Geospatial Techniques: A case Study Sirsa District

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Abstract:

One of the largest global biomasses burning activities, excluding biofuels, is the burning of crop waste in fields and makes a significant contribution to air pollution. While being a typical practice among farmers all over India, burning rice stubble has gained attention recently due to its connection to Delhi's winter pollution levels.

During the rice harvesting season in the Sirsa district of Haryana, active rice stubble fire spots were noted. Visible Infrared Imaging Radiometer (VIIRS), National Polar-Orbiting Partnership (NPP)- (VIIRS NPP) and National Oceanic and Atmospheric Administration (VIIRS NOAA) active fire data with spatial resolution of 375x375 m were used to provide locations of active Rice Stubble fires, which could be valuable in monitoring the issue. The stubble fire occurrences are based on satellite data that is now accessible as well as data on Fire rice stubble that was available at the spot between October 1st and November 30th (2022). In order to pick up all charred Location during Fire occurrences, we typically obtain the satellite data at daily intervals. Yet for the sake of spatial distribution, we just utilize the weekly mean of Fire Incidence. In our study, we found that the number of fire points in the district of Sirsa began to rise in the second week of October, reached a peak in the third week of November, and then began to fall once more. We can observe from the outcome that the fire incidence peaked in mid-November.

Keywords: Rice Stubble, Geospatial Technique, Distribution, Environment, Fire Incidence.

Introduction:

In Haryana and Punjab, crop residue burning occurrences start in September and increase progressively over the following weeks. Every year, when winter approaches, this well-known trend results in a "airpocalypse" that paralyses northern India (Kurinji 2019; Kurinji, Khan, and Ganguly 2021; Jethva et al. 2019).

In order to plant wheat as the following crop, paddy crop remnants are removed from the field and

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burned. Where the "combine harvesting" approach is used Burning of the crop residue left behind by combine harvesters makes stubble burning necessary. Combines are tools that harvest crops as well as thresh, or separate the grain, and clean them all at once. But, because they don't cut closely enough to the ground, they leave behind stubble. Because these residues are not very beneficial to the farmer and there is pressure on the farmer to sow the next crop in time, these residues place a burden on the farmer's back.

Crop residue burning occurs for two main reasons: The first is that, at the end of the Kharif season, there is only a very small window of time between paddy harvest and wheat sowing. Second, it takes a lot of labor to remove the paddy stalk that is still on the field. The farmer's sole easy choice is to burn the residue immediately on the field because labour is scarce and there is a small window of time between rice harvest and wheat sowing. Burning residues is less work and costs less for farmers.

Due to the fact that it occurs during the stubble burning seasons, the severe haze seen over South Asia in the winter has been connected to biomass burning (Ghosh et al., 2019; Khwaja et al., 2012). In India, New Delhi and the other NCR (National Capital Region) cities have been dealing with severe smog and haze pollution brought on by a variety of anthropogenic activities, as well as lower winter temperatures, particularly from October to December each year. Delhi has been ranked as one of the world's most polluted cities since 1990. Latest data from 2019's global air quality report revealed that 14 of the world's 20 most polluted cities are in India, with the city of Ghaziabad in Uttar Pradesh ranking highest (U.P), (Sikarwar and Rani, 2020).

Study Area:

The Sirsa district was founded on September 1st, 1975. According to legend, Sirsa is one of the earliest cities in North India. The Mahabharata makes note of Sirsa's ancient name, Sairishaka. The origin of the town's name is the subject of several urban legends. Sairishaka was its previous name, and it appears that Sirsa was perverted from it.

The administrative centre for the district is in Sirsa. The Sirsa district can be found between 29°14′ and 29°59′ north latitude and between 74°27′ and 75°18′ east longitude. In the north and north-east, the districts of Punjab's Faridkot and Bathinda, and in the west and south, the districts of Rajasthan's Ganga Nagar. Geographical size of the district is 4,277 sq. km. which is 10.3% of overall geographical area of the state. It is a portion of the Indo-Gangetic alluvial plain, and its geography may be roughly divided into three main categories, namely the Haryana Plain, the alluvial bed of Ghaggar or Nali, and

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Sand Dunes tract, from north to south.

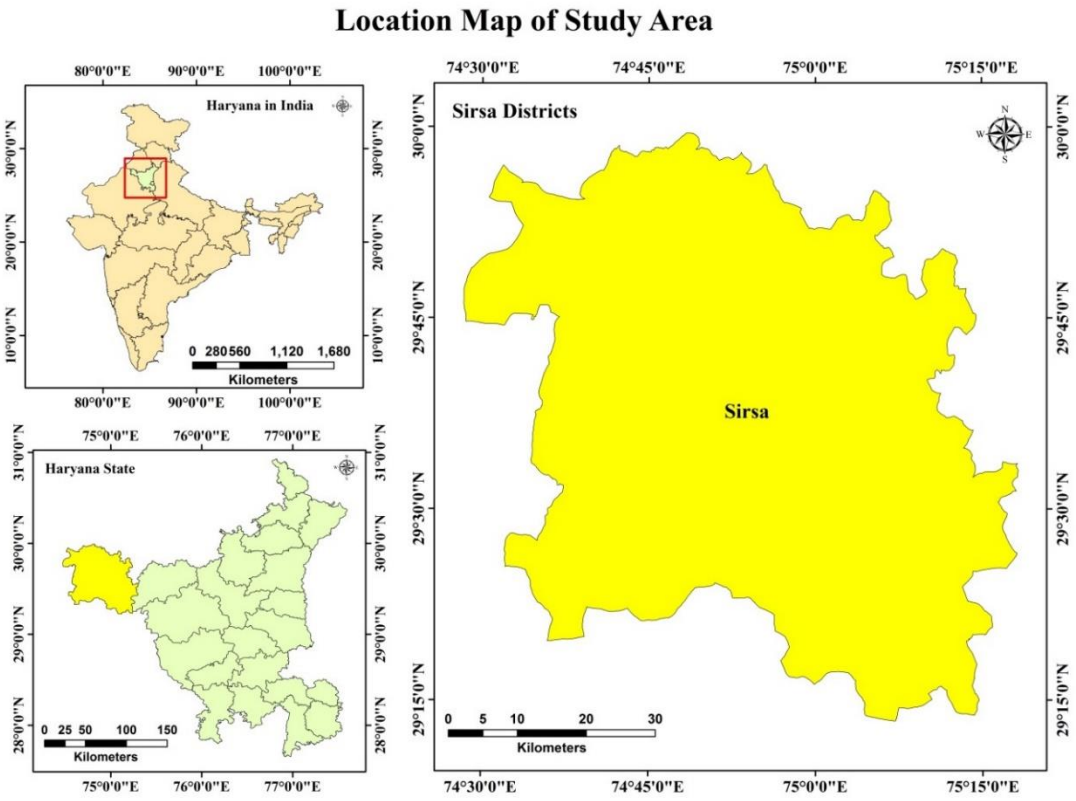

Figure-1: Location map of Study area (Sirsa District)

The district is part of the Hisar division and is made up of seven development blocks, including Sirsa, Dabwali, Baragudha, Rania, Odhan, Ellenabad, and Nathusari Chopta. It also has four tehsils, Sirsa, Dabwali, Rania, and Ellenabad.

Material and Methodology:

The actions done to accomplish the project aim are included in this section. This section will discuss the numerous procedures followed and the methods employed. The following is a flowchart of the overall methodology used for the work (Figure-2)

Data Acquisition:

The Visible Infrared Imaging Radiometer Suite (VIIRS) sensor on the Suomi National Polar-orbiting Partnership (SUOMI- NPP and NOAA) satellite, which has 375 m (Table-1) of active fire products available at NASA's Level-1 and Atmosphere Archive and Distribution System's (LAADS) Web, was used for the current study. Although there were some time gaps, the NASA website made the data for India available.

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Table-1: Data and services utilized for monitoring of active Rice Stubble Fire Incidents in Near Real Time from Satellite

	Data and Services	**Data Details**
Rice Stubble Fire (Near Real Time)	SUOMI NPP – VIIRS (375m)	Data was downloaded from NASA website
	VIIRS NOAA (375m)	Data was downloaded from NASA website

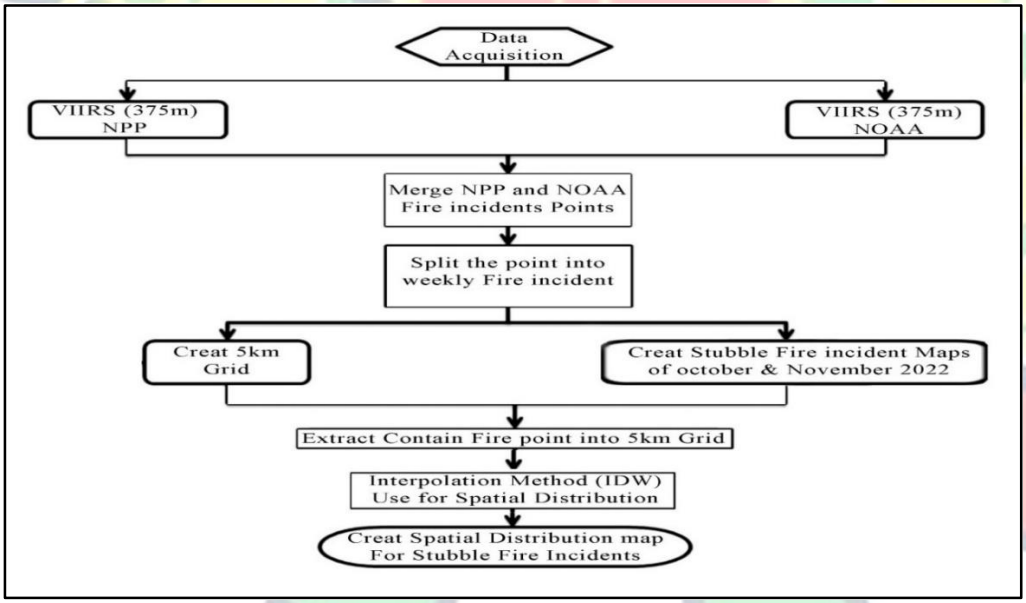

Figure-2: Flow chart of Methodology.

Interpolation Method:

With the Inverse Distance Weighted (IDW) interpolation technique, cell values are estimated by averaging the values of sample data points nearby each processing cell. The more effect or weight a point has on the averaging process, the closer it is to the approximated cell's centre.

The ArcGIS 10.8 Geostatistical Analyst toolbar's Inverse Distance Weighted (IDW) interpolation was used to calculate the spatial distribution. IDW interpolation is a method that is frequently employed in

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variable mapping. This method of interpolation is precise and convex, and it only suits the continuous model of spatial variation. This approach was developed in mining and geological engineering using locations that were solely weighed by distance.

Result and Discussion:

During the rice harvest in the districts of Haryana, active crop Stubble Fire Sites was noted. After further processing and filtering the data from the SUOMI National Polar-Orbiting Partnership (NPP)-Visible Infrared Imaging Radiometer (NPP and NOAA-VIIRS) active Rice Stubble fire products with a spatial resolution of 375x375 m and temporal Resolution of 1Day , which are available at the NASA website, the locations of near real-time active crop stubble fires were provided.

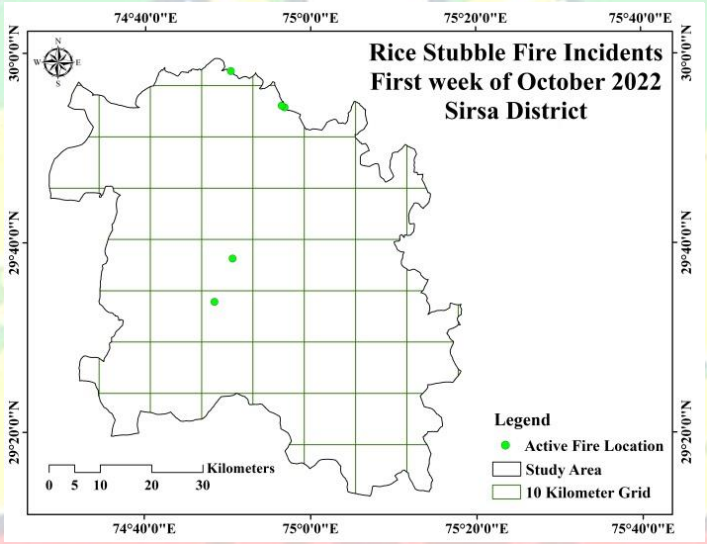

Figure-3: AFL 1st Week Oct. 2022

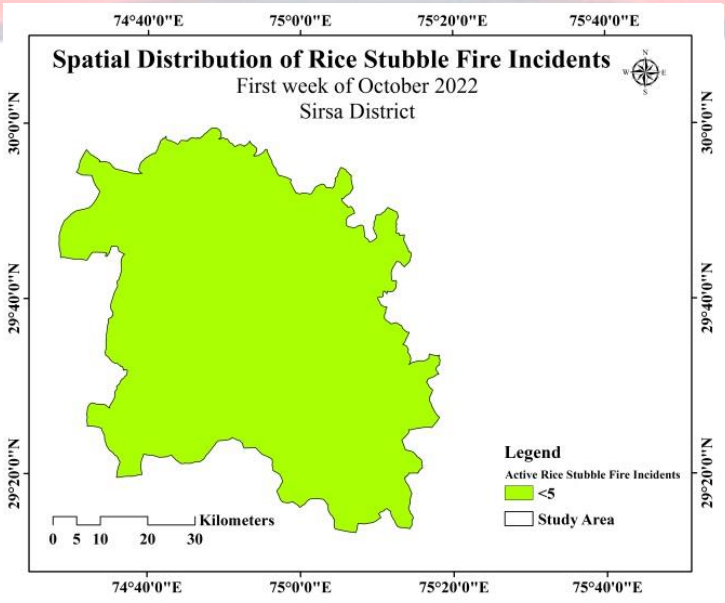

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Figure-4: Spatial Distribution 1st Week Oct. 2022

The first week of October marks the beginning of the rice crop's harvesting week, thus only a small number of fire occurrence 5 points are detected in the first week, and the spatial distribution falls into just one class which is less than 5 incidents see in Figure 3 and 4.

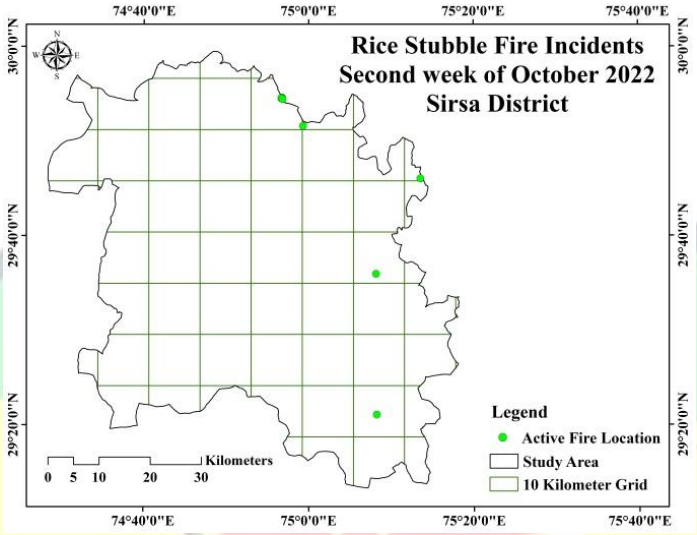

Figure-5: AFL 2nd Week Oct. 2022

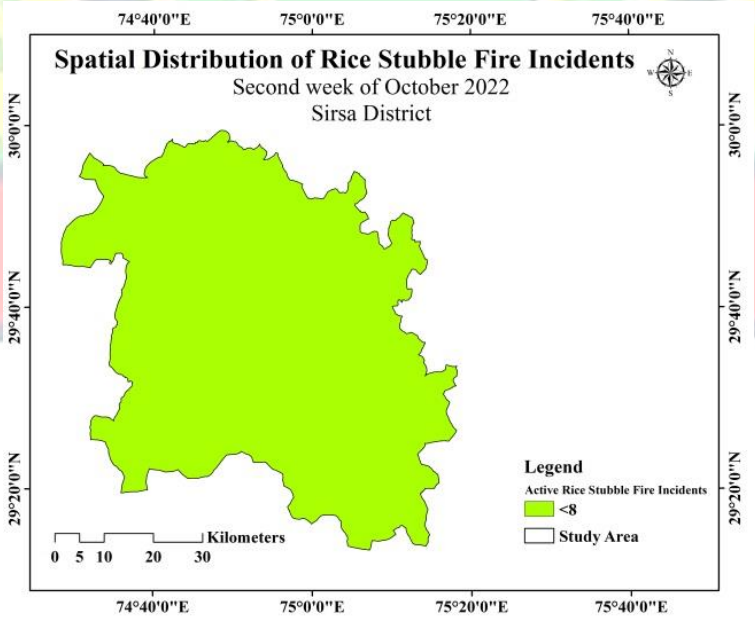

Figure-6: Spatial Distribution 2nd Week Oct. 2022

Only a few fires are detected in the second week of October (8 points are found), and the spatial distribution only includes one class of fires which is less than 8 incidents), as shown in Figures 5 and

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6.

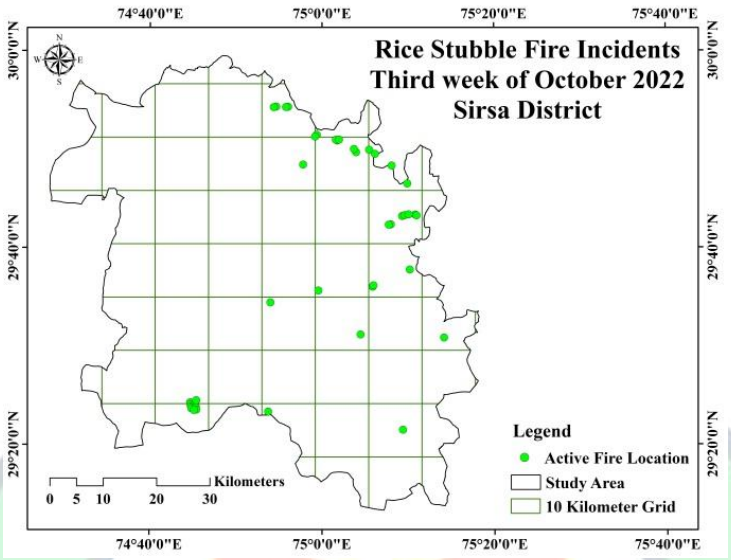

Figure-7: AFL 3rd Week Oct. 2022

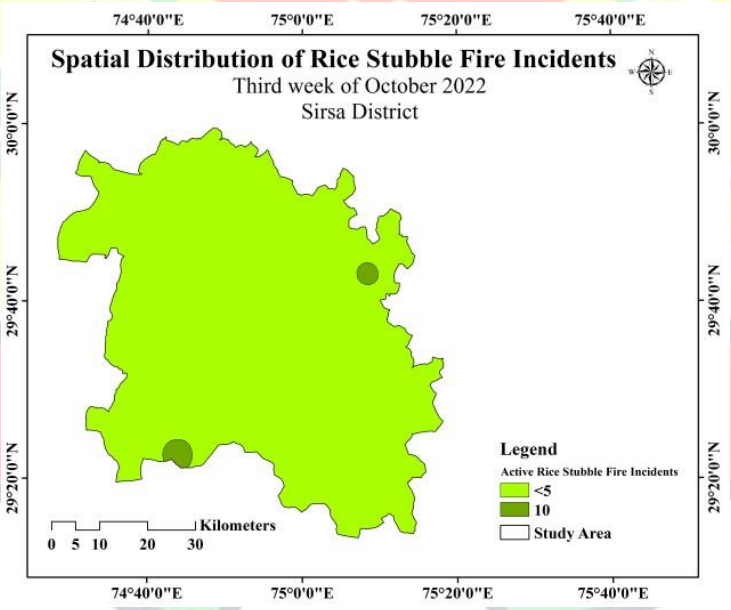

Figure-8: Spatial Distribution 3rd Week Oct. 2022

The Third week of October marks the Starting of the Detection of rice stubble fire incidents more than the second week of October, thus a big number of fire occurrence 43 points are detected in the Third week, and the spatial distribution falls into Two class just one class which is less than 5 incidents and 2nd class is 10 incidents see in Figure 7 and 8.

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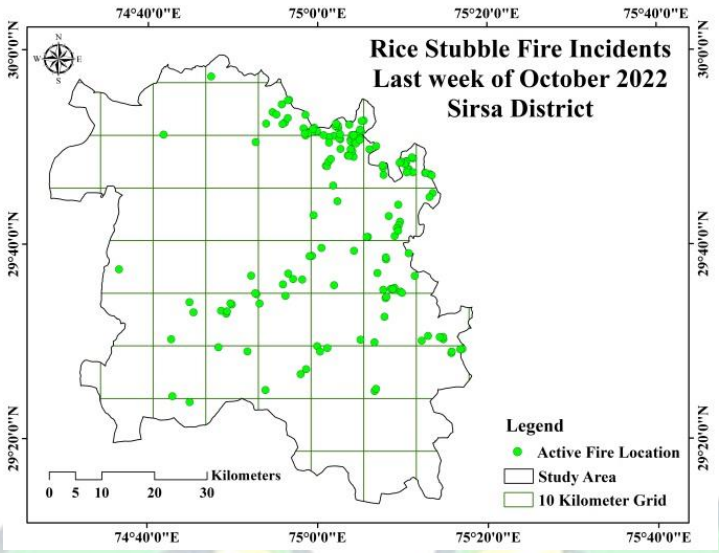

Figure-9: AFL Last Week Oct. 2022

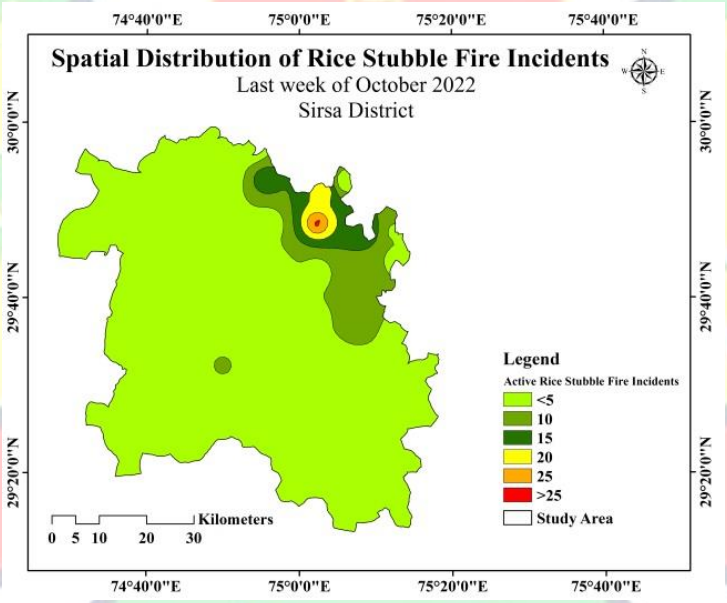

Figure-10: Spatial Distribution Last Week Oct. 2022

The last week of October also marks the highest of the Detection of rice stubble fire incidents more than the Third week of October, thus a big number of fire occurrence 160 points are detected in the last week, and the spatial distribution falls into six class minimum is less than 5 incidents and maximum is >25 incidents see in Figure 9 and 10. These class is based on the fire incident contain in 10 km grid.

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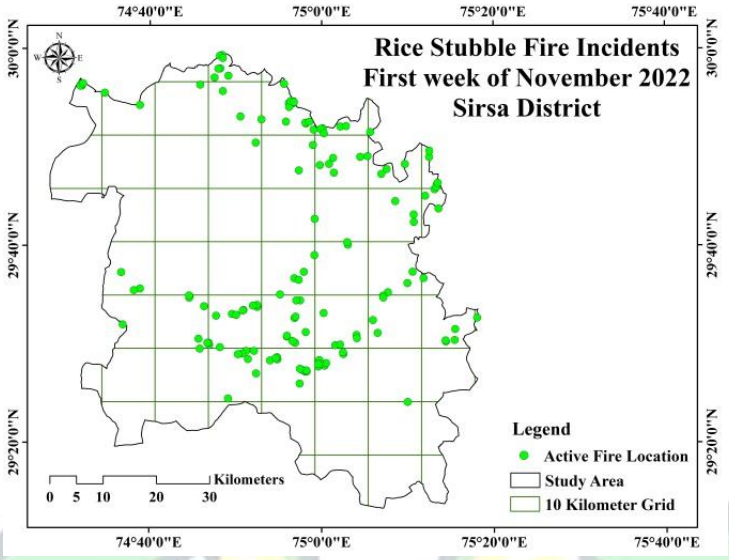

Figure-11: AFL 1st Week Nov. 2022

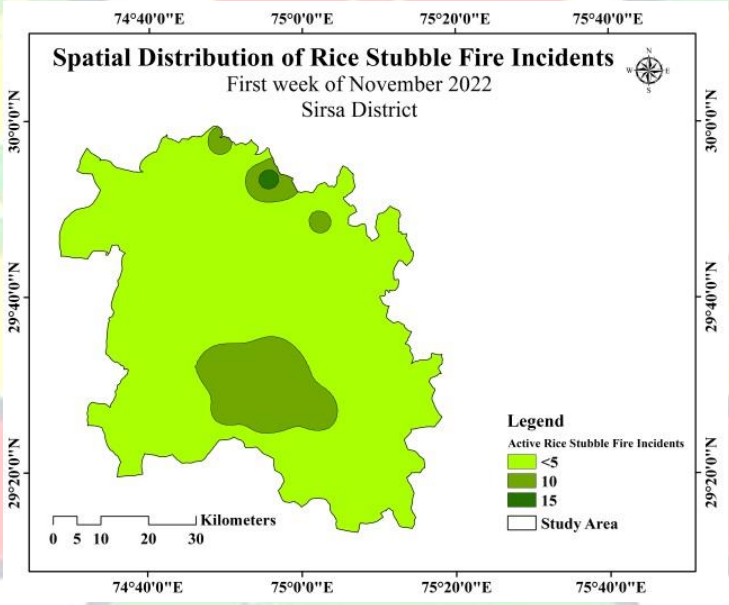

Figure-12: Spatial Distribution 1st Week Nov. 2022

The First week of November also marks the highest of the Detection of rice stubble fire incidents little bit less than the Last week of October, thus a big number of fire occurrence 143 points are detected in the First week, and the spatial distribution falls into Three class minimum is less than 5 incidents and maximum is 15 incidents see in Figure 11 and 12.

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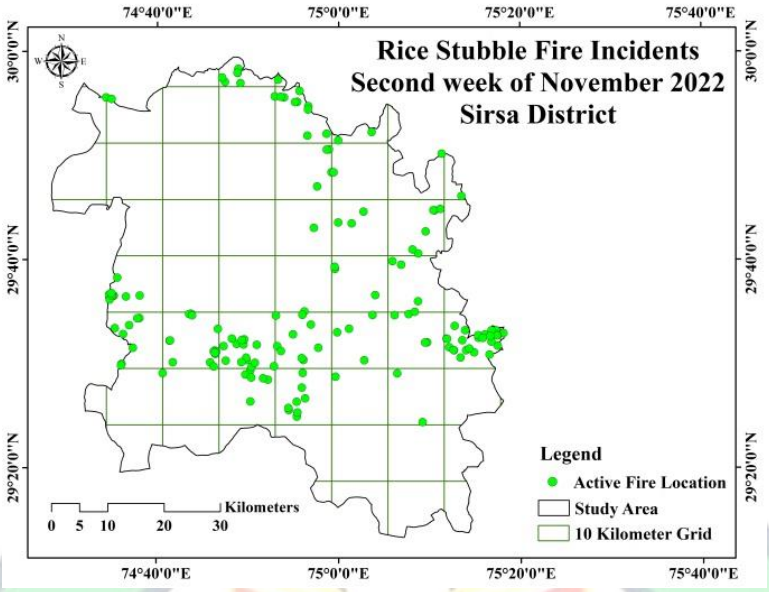

Figure-13: AFL 2nd Week Nov. 2022

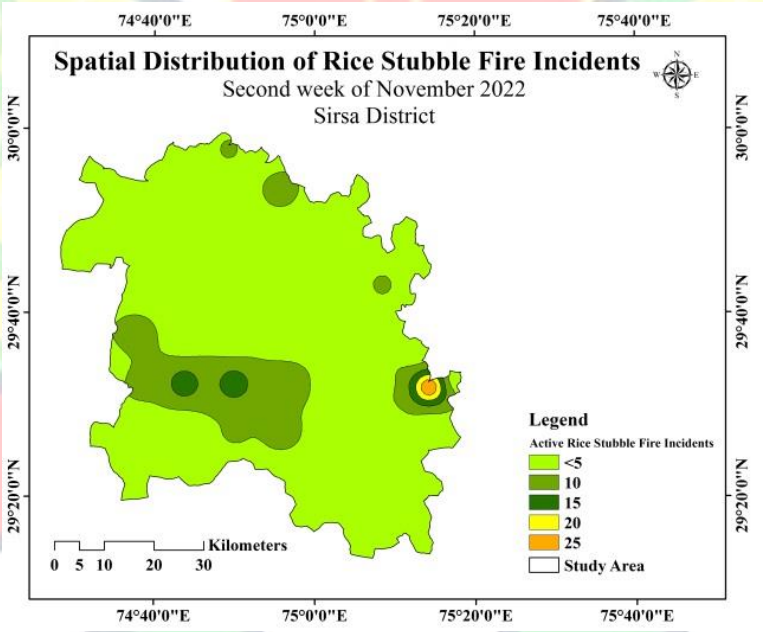

Figure-14: Spatial Distribution 2nd Week Nov. 2022

These class is based on the fire incident contain in 10 km grid. The Second week of November also marks the highest of the Detection of rice stubble fire incidents more than the First week of November, thus a big number of fire occurrence 153 points are detected in the Second week, and the spatial distribution falls into Five class minimum is less than 5 incidents and maximum is 25 incidents see in Figure 13 and 14. These class is based on the fire incident contain in 10 km grid.

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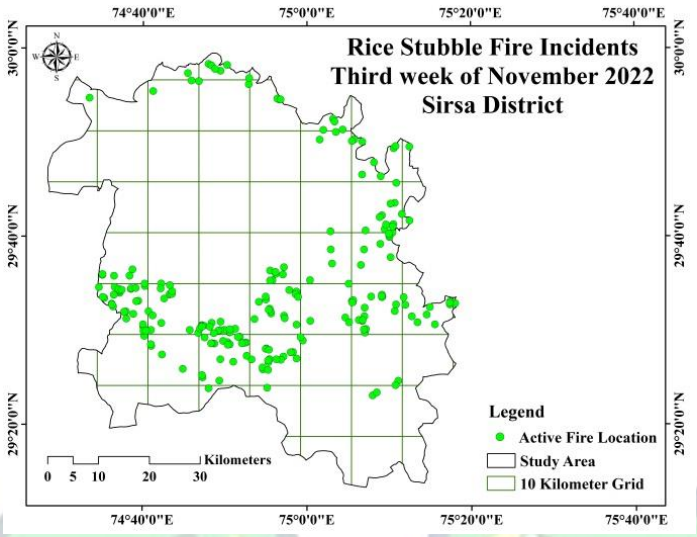

Figure-15: AFL 3rd Week Nov. 2022

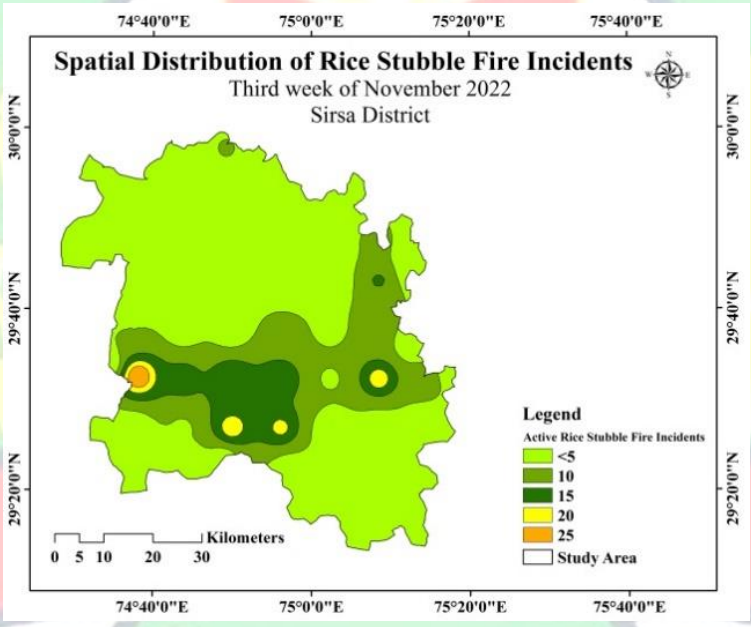

Figure-16: Spatial Distribution 3rd Week Nov. 2022

The Third week of November also marks the maximum number of the Detection of rice stubble fire incidents more than the second week of November, thus a big number of fire occurrence 221 points are detected in the Third week, and the spatial distribution falls into Five class minimum is less than 5 incidents and maximum is 25 incidents see in Figure 15 and 16. These class is based on the fire incident contain in 10 km grid.

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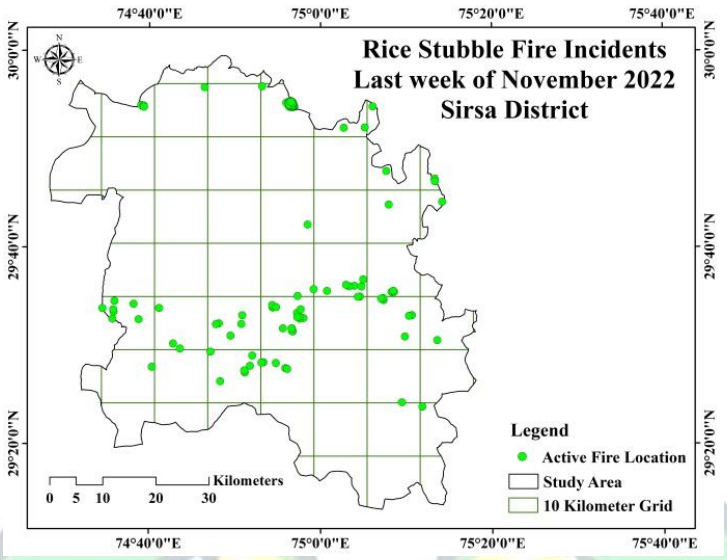

Figure-17: AFL Last Week Nov. 2022

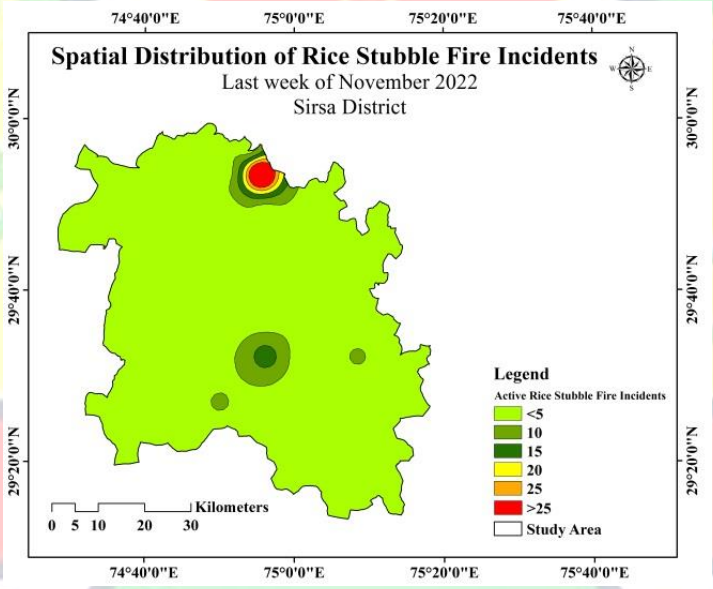

Figure-18: Spatial Distribution Last Week Nov. 2022

Due to the beginning of the wheat crop sowing period, the last week of November is the week with the lowest number of fire incidents. Also marks the number of the Detection of rice stubble fire incidents less than the third week of November, thus a number of fire occurrence 121 points are detected in the last week, and the spatial distribution falls into six class minimum is less than 5 incidents and maximum is >25.

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Effective Weeks	**Active Rice Stubble Fire Incident**
October First Week	5
October Second Week	8
October Third Week	43
October Last Week	160
November First Week	143
November Second Week	153
November Third Week	221
November Last Week	121
Total	**854**

Table-2: Weekly Active Rice Stubble fire incident of October first week to November Last week

Active Rice Stubble Fire Incidents	October_2022 (Area in Hectare)				November_2022 (Area in Hectare)			
	1st Week	2nd Week	3rd Week	Last Week	1st Week	2nd Week	3rd Week	Last Week
<5	427068.3	427068.3	422786.4	371351.4	373274.2	358079.7	294702.0	401739.2
10	Nil	Nil	4281.9	36354.8	52523.2	60539.2	86558.8	16155.0
15	Nil	Nil	Nil	12937.5	1270.9	6500.9	39363.6	4076.6
20	Nil	Nil	Nil	4923.1	Nil	1222.4	5000.0	1565.0
25	Nil	Nil	Nil	1413.0	Nil	726.1	1443.9	1152.5
>25	Nil	Nil	Nil	88.5	Nil	Nil	Nil	2380.0

Table-3: Weekly Active Rice Stubble fire spatial Distribution area (in Hectare)

incidents see in Figure 17 and 18. These class is based on the fire incident contain in 10 km grid.If we look at the spatial distribution of fire incidents, the maximum area that the Sirsa district may cover is less than five fire incidents (Table-3). This is because the only places where rice is grown are close to the Ghaggar belt and a small portion of the Ellenabad region.The maximum fire incident area detect

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in last week of October (88.5 Hectare) and Last week of November (2380 hectare).

Conclusion:

The health of the population exposed to the pollutants from burning rice stubble is seriously at danger and most affected month is October last week and November third and fourth week because the maximum fog and aerosols release from rice stubble fire and they have been related to a number of health problems, including in some extreme cases death. Burning stubble may cause climate change, global warming, and the loss of soil nutrients in addition to atmospheric pollutants. Thus, comprehensive policies must be put in place immediately to stop this threat at its source.

Some Solutions for Reduce of Rice Stubble Fire:

- **Rice residue as Animal Feed:** Animals can be fed on the leftovers from cooking rice. Because to the high silica concentration of the rice residue, this procedure is not particularly common among farmers.
- **Rice residue as Bio Thermal Industries:** Brick kiln industries, energy generating, and many other heat-related industries can all utilize rice residue.
- **Rice residue** as Mushrooms Growing Industries: Moreover, mushrooms like Agaricus bisporus, Volvariella volvacea, and Pleurotus species are grown using paddy straw.
- **Other:** Paper Production, Making Bio Gas.

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Sustainability & Sustainable Development

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Abstract

In the present times, the concept of sustainability has emerged as an answer to all kinds of environmental crises in the world. Since the late 20th century and early 21st century, a lot of literature has been written to clarify the definition and applicability of the concept of sustainable development. There are two main ideas behind this concept. First, the exploitation of resources does not satisfy all human demands and the second is recycling, resource substitution, public policies and new technology can meet the needs of human welfare. The quality of human life can be improved by optimum use of resources and sustainable development. Yet the concept of sustainability is very complex that is discussed in national and international conferences. Sustainable strategies are applied to local and regional environmental issues. It is clear that development is not possible by keeping the quality of ecosystem and human life at stake; therefore flexibility and mobility are essential for the concept of sustainability. The aim of the present study is that sustainable development is a continuous process in which human welfare is not possible without the co-existence of nature.

Introduction:

The concept of "sustainability" has gained widespread popularity as a viable remedy for the numerous global, regional, and local issues that modern civilization is now confronting. Developing and developed nation’s deals with different types of problem like: political conflict, overpopulation and lack of medical facilities are the major issues in developing countries while pollution, unlimited urban expansion and infrastructure deterioration are major problems faced by the developed nations. The World Commission on Environment and Development of the United Nations coined the phrase "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WECD, 1987) as the most popular definition of sustainable development. According to MSN Encarta (WWW), "sustainable" is defined as "able to be maintained". However, based on the volume of books and papers that have been published in scholarly journals, it appears that there are many divergent viewpoints and ideas about what actually constitutes

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"sustainability," if it can be reached, how it can be done, and in some cases, whether it is just a pipe dream of achieving the so-called "heaven on earth."

The purpose of this paper's research is to examine connected ideas about local, national, and international perspectives on ethical resource utilization and sustainable growth. The unified strategy for sustainable development and the utilization of earth's resources has been described in this paper. The harm caused to the environment regarding the use of resources has been reviewed.

The Concept of Sustainability:

Sustainable development is the process of improving the quality of human life, taking into account the limits of the environment. The concept of sustainability rests on the following basic concepts:

- Residing within a range of the planet's carrying capacity for life.
- Being aware of the connections between the economy, society, and environment.
- Ensuring that possibilities and assets are distributed fairly to both this generation and the one after it.

One widely used paradigm divides sustainability challenges into three groups to help appreciate their difficulty: social/political, environmental, and economic issues. As seen in Figure 1, these three issue categories are placed as the vertices of a triangle known as Munasinghe's triangle. This offers a useful

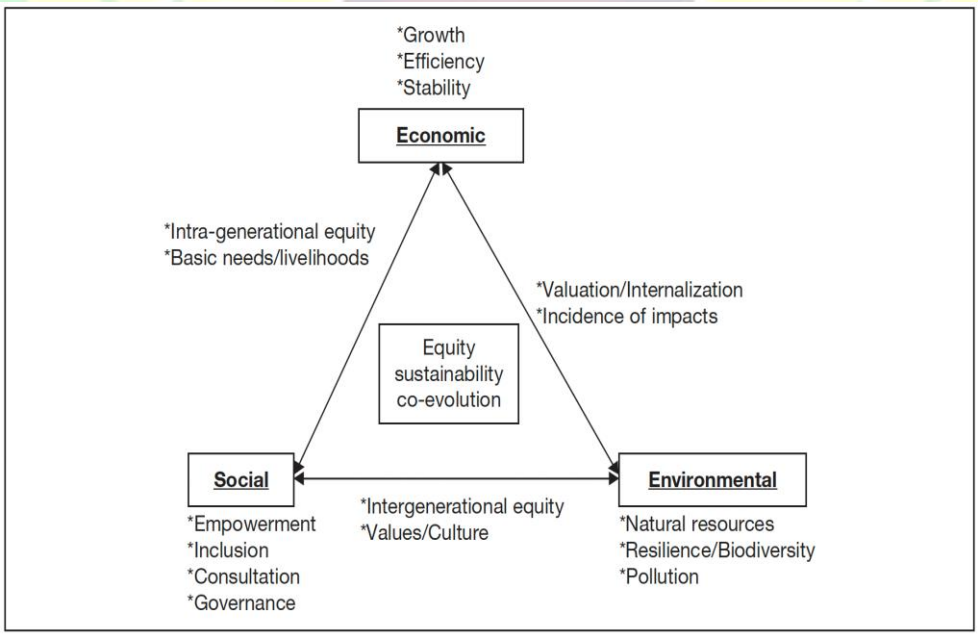

Figure 1: Munasinghe's Sustainable Triangle

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classification system for sustainability attributes and brings to light concerns like social and political implications that are sometimes overlooked in conventional design processes or are otherwise dominated by factors like time, cost, and quality.

As shown in a different framework (Figure 2), all 3 elements interact while a central "zone of sustainability" (Spies, 2003) acknowledges the interconnection of ecological, economic, and social systems. This idea of three interconnected factors is commonly referred to in business as the "Triple Bottom Line"—improving profitability, the environment, and people's lives.

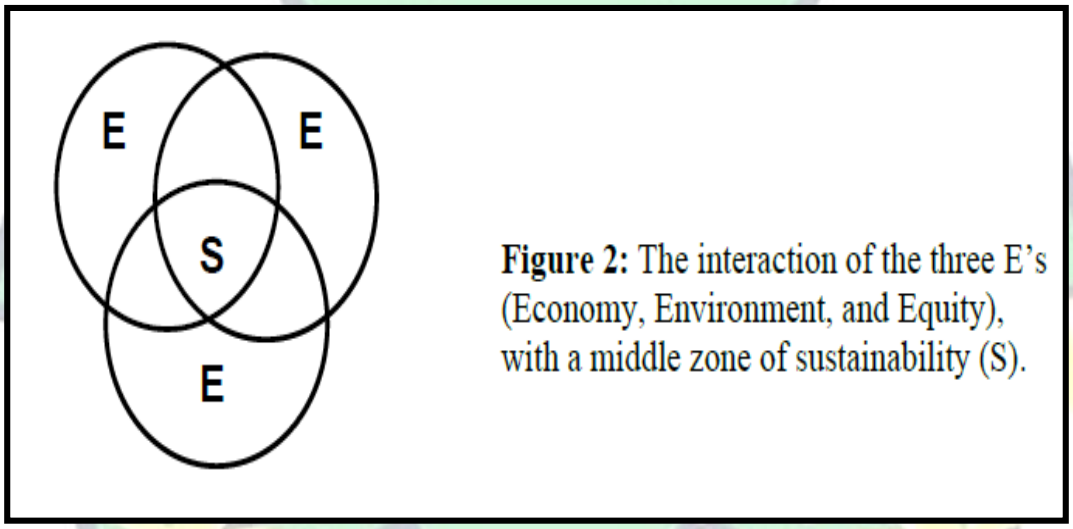

Figure 2: The interaction of the three E's (Economy, Environment, and Equity), with a middle zone of sustainability (S).

The economics professor Herman Daly provided a new structure, rearranging sustainable into a triangle with the three E's: environment, equity, and economy (Figure 3). The Environment, also known as the "Ultimate Means," is located at the base of the triangle and stands for natural resources

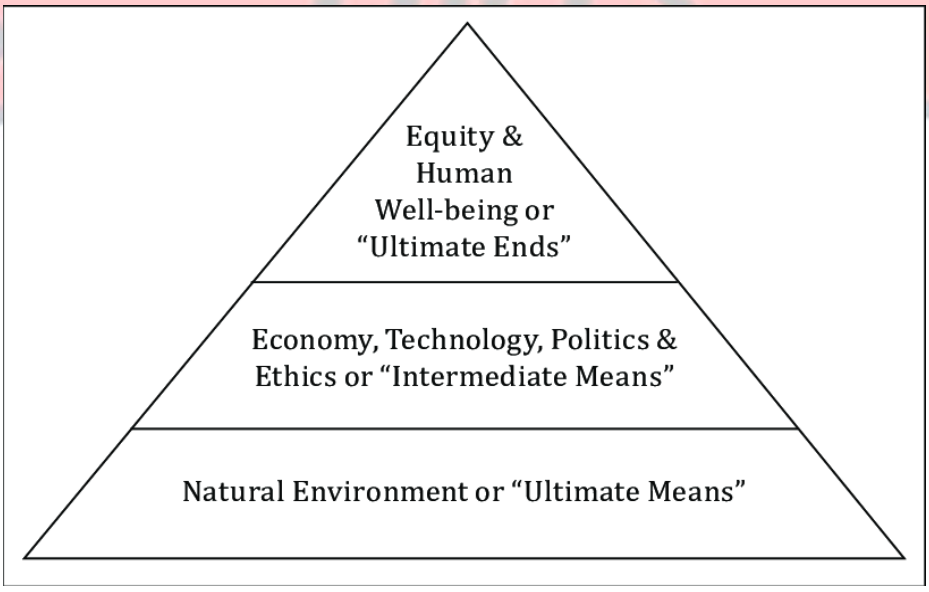

Figure 3: Daly's Sustainability Triangle

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as a requirement for a good human life. The Economy, which is on the following rung and encompasses technology, politics, and ethics, is not autonomous but acts as a means of accomplishing ultimate goals. Equity, also known as the "Ultimate End," which refers to a person's well-being, is at the top of the list. Daly contends that economic activity is successful inasmuch as it preserves and restores the ultimate means (the environment) and makes it possible to realize the ultimate aims (equity) (Daly, 1990).

According to Becker (2002), the concept of sustainability offers some degree of structure and is just one side of the competing coin. Sustainability is the recognition of the varied natural and cultural diversity that may be used for benefits across many levels of geography. Here, sustainably is seen as the optimization of the renewable alternatives that each locality, region, or country possesses in the course of growth (via their unique historical and ecological characteristics).

Resource Use and Sustainability:

Resources mainly provide two functions, first are rare material for the fabrication of goods and services and second are ecological services. That’s why resources are called the backbone of the economy. According to the De Zeeuw, 2000 the classification of Natural resources is as follows:

- Resources that are not renewable and non cyclic
- Exhaustible resources but recyclable
- Resources that can be replenished quickly, like fish
- Resources that regenerate slowly, like forests
- Resources for ecological preservation
- Flow resources

The usage of renewable and nonrenewable natural resources is significantly influenced by the issue of depletion. Extraction exceeding renewal rate leads to resource depletion for renewable resources. Sink operations that absorb and reuse trash from both production and consumption are included in environmental services. Resources from the environment and flows never stop and are constantly present. Pollution, on the other hand, may deteriorate environmental resources and make them unusable.

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Resource Use and Environmental Concerns:

Resources have been plentifully available all the planet throughout history. Over time, new technology and the influence of development committees have also replaced diminishing resources with others. As the complexity of society and business increased, natural resources were converted into financial and infrastructural assets. Ruttan in 1993 described three waves of concern about resources and the environment as follows.

1. As innovation advanced to enhance the rate of manufacturing, the 'quantitative correlation among the availability of resources and capitalist development' became a cause of early worry in the decades between the Second World War (1940-1950).
2. 1960-1970: Due to increasing technological development, the exploitation of natural resources increased, due to which the problem of environmental pollution started increasing. One concerned concern about the carrying capacity of ecosystems while the other rapidly increased per capita income led to increased consumer demand for environmental amenities.
3. By bringing awareness to resource constraints, the 1972 study "Limits to Growth" sparked a 3rd wave of concern in the middle of the 1980s that focused on issues related to environmental quality, human health, and global environmental issues. The environment's quality declined as a result of overuse of natural resources, and attempts were undertaken to locate substitute supplies for the coming generation.

Sustainable Development Goals:

There are seventeen interconnected objectives formulated by the **"UNITED NATIONS GENERAL ASSEMBLY"** for to serve the planet for the future generation. The objectives are also known as the Global Goals. The SDGs highlights the interdependency of socio-cultural ecological and economic feature of sustainable development. In 2015 the global goals are adopted by the UNGA with the support of 193 countries and the implementation of these goals was done in 2016 as worldwide. The objectives are the following:

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17 Goals of Sustainable Development		
1	**Zero Poverty**	Put an end to poverty in all its manifestations worldwide
2	**Zero Hunger**	Establish food security, increase nutrition, and advance environmentally friendly farming to end hunger.
3	**Good Health And Well-Being**	Assure that everyone is healthy and encourage it across all levels
4	**Quality Education**	Make certain that all students have access to excellent, inclusive schooling, and encourage possibilities for continuous growth.
5	**Gender Equality**	Obtain gender Egalitarianism and develop women empowerment.
6	**Clean Water And Sanitation**	Ensuring that water resources should be accessible to everyone & managed sustainably.
7	**Affordable And Clean Energy**	Assure that everyone has a source of contemporary, ecologically sound, inexpensive power.
8	**Decent Work And Economic Growth**	Encourage enduring, equitable, and secure development, complete and effective job opportunities, & fair wages for everyone.
9	**Industry, Innovation And Infrastructure**	Develop robust facilities advance inclusively, ecological industrial development, and encourage entrepreneurship
10	**Reduced Inequalities**	Minimize inequalities both inside and across nations
11	**Sustainable Cities And Communities**	Develop the secure, robust, & ecological human settlement.
12	**Responsible Consumption And Production**	Establish environmentally friendly methods of manufacturing and usage
13	**Climate Action**	Immediately tackle climate change and its effects
14	**Life Below Water**	Towards the sake of sustainable growth, protect and responsibly use the maritime environment and its resources.
15	**Life On Land**	Protecting, restoring, and fostering equitable utilization of terrestrial ecosystems, managing woodlands ecologically, battling deforestation, halting and reversing degradation of land, and promoting biodiversity conservation
16	**Peace, Justice, And Strong Institutions**	Establish peaceful and inclusive cultures for long-term growth, ensure that everyone has a right to equity, and create equitable structures across all stages.
17	**Partnerships For The Goals**	Bolster implementation strategies and resurrect the Worldwide Partnership for Sustainability

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Conclusion:

Due to the increasing population, the need for resources is increasing. For which conservation of resources and their optimum use is essential for human welfare. For the first time internationally, the Brundtland Commission 1987 advised that the needs of the present need to be met without compromising the ability of future generations to meet their own needs. The word sustainable development reduces the distance between human knowledge and ignorance. The concept of sustainability is a step towards the initiative of recognizing the human potential through which the potential of future generations can be channelized.

Today in the world two ideologies are standing in opposition to each other for human welfare. One of which believes that the resources present on the earth cannot always meet the needs of human beings. On the other hand, there is the view that if the resources are used by humans with proper policy and new technology, then possibly the earth can satisfy human needs indefinitely. Since the concept of sustainability is a dynamic concept, there should be flexibility in the policy makers and curriculum related to it. Along with this, there should be a changeable approach in human needs and techniques.

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Vertical Farming: A New Perspective to Indian Farming

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Introduction

The practice of vertical farming has a long history, with some of the oldest examples being foundin the seven wonders of Philon, such as the hanging gardens of the ancient city of Babylon, constructed in the 6th century BC[1]. Within the early twentieth century, Gilbert Ellis popularized the concept of “vertical cultivating”, through his book called ‘Vertical Farming’.

William Frederick Gerick at the University of California at Berkeley came up with the idea of hydroponics way back in the 1930s.[2]. In the 1980s, Swedish organic farmer Ake Olsson introduced vertical farming as an approach to growing vegetables in urban areas [3]. The term "vertical farming" was further developed in 1991 by Dickson Despommeier, who popularized theconcept as we know it today. A recent method of preserving our agricultural practices is vertical farming. It includes cultivation of crops in vertical layer. The new hope for solving many global problems, including food scarcity, climate change, environmental degradation, and the promotion of biodiversity, is vertical farming. Urbanization is accelerating at a rate that predicts by 2050, 80% of the globe’s population, or about 6.5 billion people, would settle in cities, about double the current number. Cities are the main culprits when it comes to polluting the planet.

According to Habitat, cities account for around 70% of total CO2 emissions, which is bad news for future cities and contributes to climate change. As a result, in a scenario where cities make upthe majority of the land, ensuring food security to feed urban dwellers who cannot solely rely on traditional farming methods [4]. With vertical farming, we use smartphone apps to regulate artificial light, ventilation, temperature, moisture, and nutrient management. Vertical farming is much more beneficial than traditional farming since it uses less water, spends less on chemicals, and produces better crops. Vertical farming provides an opportunity to contribute to the local economy. Abandoned buildings in urban areas that lack access to fresh produce can be convertedinto vertical farms to provide local populations with nutritious food.

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Objective

The following are the study's aims.

I. To discourse about the purpose of vertical farming.

II. To consider the benefits and drawbacks of vertical farming.

III. To talk about the viability of vertical farming in the context of India.

Techniques involved in Vertical Farming:

All cutting-edge techniques are combined in vertical farming to increase both productivity and quality. Physical layout, growing medium, lighting and sustainability features are included.

I. Physical Layout: The main aim of vertical farming is to utilise the space in order to get the qualityyield. The most promising layout in vertical farming is either grown on the horizontal plane whichis vertically staked or growing the plant vertically and starched in an upward direction [5]. With this design, the grower may make effective use of the vertically available space. As a comparison to the same region on open land, it would enable the planter to obtain a greater harvest in less time.

II. Lighting: Light is the second-most crucial element. Regardless of where in an area vertical farming is practised, either artificial or natural light is necessary to promote plant development. It must be kept in mind that in order to perform photosynthesis when artificial light is applied, it must emit anelectromagnetic spectrum. Because it releases little heat and has a wide spectrum, LED lighting is highly favoured because it promotes good plant germination and growth.

Processes of Vertical Farming:

In order to increase output, vertical farming enables the fusion of several complex growing techniques into a single system [5].

I. Hydroponics: It is a method for employing mineral nutrition solutions to grow food in water without needing dirt. The key advantages of this strategy are that it reduces soil- related cultivation problems including pests, diseases, and insects that are carried by the soil.

II. Aeroponics: It is a method for employing mineral nutrition solutions to grow food in water without needing dirt. Aeroponics uses nutritious solutions or mist in place of water. Due to

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the plants' attachment to a framework and nutrient treatment of the roots, it requires very little space, little moisture, and no soil.

III. Aquaponics: Aquaculture is the practice of raising fish for food, while hydroponics is the practice of cultivating plants without soil. Both terms are used interchangeably to describe the symbiotic relationship between fish and plants. The symbiosis is accomplished by feeding "fertigate," which is nutritionally waste from marine tanks, to hydroponic generation beds.

Vertical Farming in the World:

When Dickson Despommier, a professor at Columbia University, and his students came up with the idea of a massive skyscraper construction that could feed more than 50,000 people, that is when the modern notion of vertical farming first emerged. At this time, vertical farming starts to gain popularity [5]. Although vertical farming is gaining acceptance at Global scale, neverthelessnot all regions of globe have adopted a new way of food production equally. Around the world, more and more vertical farms are currently being built in each of the countries that are particularly open to the idea. It has been already launched in the Singapore, Japan, Spain, Europeand USA. Examples of successful vertical farming include Aerofarms, Green Sense in USA, Delicious in the Netherlands, Sharp's strawberry farm in Dubai and Spread, Toshiba as well as more than 100 vertical farms in Japan and Packet Greens in Singapore, as well as the EU funded INF ARM in Berlin. FARM operates more than 50 vertical farms across Berlin in supermarkets, restaurants and distribution warehouses [6]. Successful vertical farms can be found in the Netherlands, Sharp's strawberry farm in Dubai; Spread; Toshiba and more than I00 vertical farms in Japan; Packet Greens in Singapore; and the EU-funded Berlin-based firm, INFARM, which operates more than 50 farms in supermarkets, restaurants and distribution warehouses across Berlin [7]. Hydroponics has been identified by (NASA) National Aeronautics and Space Administration researchers as a viable technology for growing food in space. Because of the rise in demand for organic food, the need to ensure urban food security, and growing concerns about water availability in some areas, especially in the southern and central regions of Europe. The European vertical farming industry has anticipated to see the highest CAGR (Compound Annual Growth Rate) throughout the projection period [8].

Advantages of Vertical Farming:

1. Financial Viability: Although the upfront initial investment associated with verticalfarming

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is generally higher, if and when the whole agricultural production design is done correctly, it makes absolute sense and is financially viable to grow, harvest, and produce aspecific crop throughout the year or during a specific season.

2. Water Efficient: With vertical farming, it is possible to grow crops with 70-95% less water than is needed for conventional farming. Also, as the plants are being grown in enormous vertical greenhouses, any naturally occurring transpiration will be captured and used againfor irrigation.
3. Enhancing Public Health: Also, because the majority of crops are cultivated "without the use of pesticides," this has a favourable long-term impact on public health. As a result, consumers can expect pesticide-free fruit that is also wholesome, seasonal, and environmentally friendly.
4. Employment: The potential for protected cultivation to provide new jobs, skill sets, and economic possibilities for our nation's agriculture students, who are recognised as being able to adapt and advance with the learning curve swiftly, must be emphasised.
5. Environmental Conservation: Due of the ability to avoid the deforestation that comes with regular farming, vertical farming aids in resource conservation.
6. Resistant to Weather Disruptions: Vertical Crops are resistant to bad weather as they are nurtured indoors. In other words, less crop damage is caused by extreme or unexpected weather conditions.
7. Increased Crop Yield: The primary benefit of vertical farming is the improved crop yield that comes with a reduced land area requirement. It is feasible to grow a greater variety of crops simultaneously since vegetation do not grow on the same areas of land. In some cases, vertical farming can increase crop production per acre over more traditional methods.

Disadvantages of Vertical Farming:

1. High Energy Consumption: On a vertical surface, the sun’s intensity is much lower during the growing season than if the crops were planted on level ground.
2. Interfere ith Pollination: Since vertical farming occurs in a controlled environment, insects are absent. Human pollination is therefore necessary, which requires time and prove costly.

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3. Labour Cost: Due to their predominance in urban areas where wages are greater and therequirement for more specialised staff, vertical farming labour expenses may even behigher. Yet, automation in vertical farms can mean fewer employees are required.

Manual pollination could turn out being one of most time-consuming processes in vertical farms.

4. Disruption to the rural sector: The possibility for rural communities, especially those whose economies are based on agriculture, to be disrupted is another problem and drawback of vertical farming. Vertical farms have the potential to eliminate traditional farming jobs. Farmers that lack the skills necessary for vertical farming would be out of ajob. Agriculture-dependent communities would undoubtedly suffer.

Scope of Vertical Farming in India:

India has now become the fifth largest economy in the world. It is the centre for a wide range of cultivated plant species. The majority of people in India rely on farming as their main source of income. Therefore, in order to boost food resources in light of the ever-accelerating urbanization,it is required to invent, research, and adopt new approaches. India is a country with diverse climatic conditions which enhances the potentiality to grow a wide crop around the year [9] Indiais one of the countries that produces the most fruits, vegetables, and other agricultural products. In soilless environments, ICAR experts are working on the concept of ‘vertical farming’, where food crops can be grown even on the top floors of multi-storeyed buildings in major metropolisessuch as Chennai, Kolkata, Mumbai and New Delhi without soil and pesticides [7]. Additionally, India's diverse climatic circumstances increase its capacity to cultivate a wide range of crops all year round. India is now the world's second-largest grower of vegetables behind China, owing to its diversified environment [5]. In Kolkata, ICAR scientists are developing a module for growingvegetables and fruit in multi-storey structures. The cultivation of vegetables and fruits under poly-houses and net houses is mainly done for export-oriented flowers and certain vegetables. Scientists at the BKVN (Bidhan Chandra Krishi Viswa Vidyalaya Nadia) have had some initial success in small scale cultivation of brinjals and tomatoes [8]. In Punjab, researchers have tried out vertical farming and had some success growing fruits, veggies, and potatoes without soil in acontrolled environment. In India, mushroom cultivation was the most popular vertical farming technique [10]. Vertical agriculture is utilized for the cultivation of a variety of seasonal vegetables, such as leafy greens, salads, chives, mints, herbs (including sweet, lemon, and cinnamon), oreganos, and herbs, as well as

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for the production of tomatoes and strawberries, as well as herbs, radishes, icebergs, and spinach. This type of farming is primarily used in urban areas to meet the needs of the local population. Additionally, vertical farming is also employed to cultivate some indoor flora for aesthetic purposes [11]. In India the vertical farming is under testing period however it has been implemented in some of the cities and agriculture universitieswhere its feasibility is under observations. If vertical fanning takes place in India, than it would have easy to supply the fresh vegetable throughout the year which will help the grower to gain the profit [9].

Conclusion

We shall have to employ a number of strategies to pave the way for the twentieth-century ecological insurgency. Without any doubt, vertical farming offers a solution to some of the most pressing problems in Indian agriculture, including a lack of or surplus of farm products, excessive pesticide and fertilizer use, degrading soils, as well as unemployment. Yet, there are obstacles, such as the Indian farming community's resistance to vertical farming. Indian farmers deal with anumber of issues, such as daylong electricity outages, the lack of minimum support prices, an oversupplied market, a shortage of water supplies, etc. The population of India as well as the worldkeeps on increasing by multiplication level which is supposed to be 1.5 billion by 2035. This is a great challenge for agriculture to feed the food for large population when agriculture land is decreasing. VF supplies the fresh fruit and vegetable in adequate amount to the people [9]. A significant barrier to the implementation of vertical breeding in India is the initial high cost of infrastructures for a large-scale farm. Other obstacles that vertical farming in India must overcome include public awareness, the agricultural community's inclusion, technical know-how, costs associated with managing and maintaining vertical farming systems, and its financial viability [6].

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भारत में बढ़ती पर्यावरणीय समस्या के निवारण में राष्ट्रीय हरित अधिकरण की भूमिका

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सारांश

पर्यावरणीय मुद्दों को कानून की परिधि में अंग्रेजी हुकूमत काल से रखा जाता रहा है। आजादी के बाद भारत में पर्यावरणीय समस्याओं के निवारण के लिए समय–समय पर अनेक कानून एवं नीतियों का निर्माण किया गया परंतु किसी विशेष अधिकरण की गैर हाजिरी में यह अधिनियम एवं नीतियां आधे अधूरे रूप में ही क्रियाविंत किए गए। देश में बढ़ती पर्यावरणीय समस्याएं एवं न्यायिक व्यवस्था पर पर्यावरण संबंधी मुकदमों के बढ़ते बोझ को कम करने की लिए उच्चतम न्यायालय ने एक विशेष अधिकरण की आवश्यकता पर ध्यान केंद्रित किया। देश में पर्यावरण संरक्षण एवं प्राकृतिक संसाधनों के संरक्षण से जुड़े मुकदमों के प्रभावी एवं शीघ्र निवारण के लिए राष्ट्रीय हरित अधिकरण अधिनियम 2010 के तहत राष्ट्रीय हरित अधिकरण की स्थापना की गई। राष्ट्रीय हरित अधिकरण (National Green Tribunal)की स्थापना के साथ भारत एक विशेष पर्यावरण न्यायाधिकरण स्थापित करने वाला दुनिया का तीसरा एवं विकासशील देश का प्रथम देश बन गया। इस लेख के माध्यम से हम यह स्पष्ट करने की कोशिश करेंगे कि राष्ट्रीय हरित अधिकरण पर्यावरणीय समस्याओं के समाधान के लिए किस प्रकार से अपनी महत्वपूर्ण भूमिका अदा कर रहा है।

मूल शब्द –: पर्यावरण संरक्षण, प्राकृतिक संसाधन, प्रदूषण ,राष्ट्रीय हरित अधिकरण ,सतत पोषणीय विकास।

प्रस्तावना

देश में बढ़ती हुई आबादी के कारण प्राकृतिक संसाधनों पर दबाव बढ़ता जा रहा है और यह दबाव विभिन्न प्रकार की प्राकृतिक समस्याओं को जन्म देता है। इन पर्यावरणीय समस्याओं के कारण पर्यावरण का पिछले चार दशक से अवक्रमण बढ़ता जा रहा हैं । पर्यावरण अवक्रमण का विनाशकारी प्रभाव न किसी एक देश पर होकर बल्कि पूरे विश्व को अपनी चपेट में लेता है। पर्यावरण संरक्षण को लेकर विश्व स्तर पर भी प्रयास किए गए और भारत सरकार भी पर्यावरण संरक्षण हेतु विभिन्न पर्यावरण कानून लागू करने का कदम उठा रही हैं । जैसे भारत वन अधिनियम 1927 ,वन सुरक्षा अधिनियम 1991)1972 में संशोधित (पर्यावरण सुरक्षा अधिनियम ,1986 वन संरक्षण

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शोध पद्धति

इस शोध पत्र के अंतर्गत वर्णनात्मक एवं विश्लेषणात्मक अध्ययन पर बल दिया गया है। शोध पत्र में द्वितीय आंकड़ों के रूप में

विभिन्न शोध पत्र,समाचार पत्र, एनजीटी की सरकारी वेबसाइट एवं पुस्तकों का प्रयोग किया गया है।

राष्ट्रीय हरित अधिकरण2010

राष्ट्रीय हरित अधिकरण की स्थापना 18 अक्टूबर 2010 को राष्ट्रीय हरित अधिकरण अधिनियम 2010 के तहत की गई थी। ऑस्ट्रेलिया एवं न्यूजीलैंड के बाद भारत विशेष पर्यावरण न्यायाधिकरण स्थापित करने वाला दुनिया का तीसरा देश बना । राष्ट्रीय हरित अधिकरण में अध्यक्ष,न्यायिक सदस्य और विशेषज्ञ सदस्य शामिल है जिनका कार्यकाल 5 वर्ष तक होता है। इस अधिकरण के सदस्य को पुनः पद पर नियुक्त नहीं किया जा सकता। केंद्र सरकार द्वारा एक चयन समिति का गठन किया जाता है जिनके द्वारा न्यायिक और विशेषज्ञ सदस्यों की नियुक्ति की जाती है। यह आवश्यक है कि राष्ट्रीय हरित अधिकरण में कम से कम 10 एवं अधिकतम 20 पूर्णकालीन न्यायिक एवं विशेषज्ञ सदस्य हो। राष्ट्रीय हरित अधिकरण को 5 स्थानों पर स्थापित किया गया है और इसका मुख्यालय नई दिल्ली में है चार क्षेत्रीय कार्यालय भोपाल, पुणे, कोलकाता एवं चेन्नई में स्थित है। इनका वर्णन जोन वाइज इस प्रकार से हैं–

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a. **उत्तरी जोन -:** इस जोन के बैठने का स्थान नई दिल्ली है एवं इसके अंतर्गत प्रादेशिक क्षेत्राधिकार –उत्तर प्रदेश ,उत्तराखंड ,पंजाब ,हरियाणा,हिमाचल प्रदेश, जम्मू कश्मीर ,राष्ट्रीय राजधानी दिल्ली एवं केंद्र शासित प्रदेश चंडीगढ़ है।
b. **पश्चिमी जोन-:** इस जोन के बैठने का स्थान पुणे है एवं इसके अंतर्गत प्रादेशिक क्षेत्राधिकार –महाराष्ट्र , गुजरात ,गोवा ,केंद्रशासित प्रदेश दमन एंड दीव तथा दादर नगर हवेली आते हैं।
c. **मध्य जोन -:**इस जोन के बैठने का स्थान भोपाल में है और इसके अंतर्गत प्रादेशिक क्षेत्राधिकार –:मध्य प्रदेश ,राजस्थान और छत्तीसगढ़ शामिल है।
d. **दक्षिणी जोन -:**इस जोन के बैठने का स्थान चेन्नई में है और इसके अंतर्गत प्रादेशिक क्षेत्राधिकार –:केरल , तमिलनाडु ,आंध्र प्रदेश, कर्नाटक केंद्रशासित प्रदेश पांडिचेरी एवं लक्ष्यद्वीप है।
e. **पूर्वी जोन** –:इस जोन के बैठने का स्थान कोलकाता में है और इसके अंतर्गत प्रादेशिक क्षेत्राधिकार–: पश्चिम बंगाल, उड़ीसा, बिहार, असम ,अरुणाचल प्रदेश, मिजोरम, त्रिपुरा, नागालैंड, मेघालय,मणिपुर एवं अंडमान और निकोबार द्वीप समूह शामिल है।

भारत में राष्ट्रीय हरित अधिकरण की आवश्यकता

पर्यावरण संरक्षण और वनों के संरक्षण तथा अन्य प्राकृतिक संसाधनों से संबंधित मामलों के प्रभावी एवं शीघ्र निपटाने के लिए इस अधिकरण की स्थापना की गई। इस अधिकरण का प्रमुख उद्देश्य है पर्यावरण से जुड़े मामलों को जल्द सुलझाना ताकि बड़े न्यायालयों से पर्यावरण संबंधी मुकदमेबाजी का भार कम किया जा सके। इस अधिकरण में पर्यावरण से जुड़े मुकदमों का निपटारा 6 महीने के अंदर करने की कोशिश की जाती है।

राष्ट्रीय हरित अधिकरण की शक्तियां एवं अधिकार क्षेत्र

राष्ट्रीय हरित अधिकरण उन सभी विवादों पर सुनवाई कर सकता है जो प्रत्यक्ष या अप्रत्यक्ष रुप से पर्यावरण से जुड़े हुए हैं। यह भारत के संविधान के अनुच्छेद (Article 21) 21 से भी प्रेरणा लेता है जो भारत के नागरिकों को एक स्वस्थ वातावरण प्रदान करने का आश्वासन देता है। इसमें पर्यावरण से जुड़े कानूनी अधिकारों को लागू करना भी शामिल है। किसी भी आदेश एवं निर्णय ओर अधिनिर्णय को देते समय यह आवश्यक है कि राष्ट्रीय हरित अधिकरण उस पर सतत विकास,निवारण एवं प्रदूषण भुगतान आदि सिद्धांत लागू करें। एनजीटी सिविल प्रक्रिया संहिता 1908 के तहत निर्धारित प्रक्रिया द्वारा सीमित नहीं है ,बल्कि एनजीटी' प्राकृतिक न्याय 'के सिद्धांतों द्वारा

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निर्देशित है। अधिकरण अपने आदेश अनुसार पर्यावरण प्रदूषण या किसी अन्य पर्यावरण के नुकसान से पीड़ितों को क्षतिपूर्ति प्रदान कर सकता है। राष्ट्रीय हरित अधिकरण के अधिनियम में नियमों का पालन ना करने पर कारावास एवं आर्थिक दंड दोनों का प्रावधान भी किया गया है। राष्ट्रीय हरित अधिकरण द्वारा दिए गए आदेश या निर्णय के विरुद्ध सर्वोच्च न्यायालय में 90 दिनों के भीतर अपील का भी प्रावधान है। पर्यावरण से जुड़े सात कानून पर राष्ट्रीय हरित अधिकरण नागरिकों के मामलों की सुनवाई कर सकता है जो इस प्रकार से हैं–:

- जल) प्रदूषण की रोकथाम और नियंत्रण (अधिनियम1974 ,
- जल) प्रदूषण की रोकथाम और नियंत्रण (उपकर अधिनियम1977 ,
- वन) संरक्षण (अधिनियम1980 ,
- वायु) प्रदूषण की रोकथाम और नियंत्रण (अधिनियम1981 ,
- पर्यावरण) संरक्षण (अधिनियम1986 ,
- सार्वजनिक देयता बीमा अधिनियम1991 ,
- जैविक विविधता अधिनियम2002 ,

नोट –:वन्य जीव संरक्षण अधिनियम1972 एवं अनुसूचित जनजाति और अन्य पारंपरिक वन निवासी अधिनियम 2006 ,ये दो महत्वपूर्ण अधिनियम को राष्ट्रीय हरित अधिकरण के अधिकार क्षेत्र से बाहर रखा गया है।

राष्ट्रीय हरित अधिकरण द्वारा पर्यावरण संरक्षण को लेकर उठाए गए महत्वपूर्ण कदम

राष्ट्रीय हरित अधिकरण को सरल भाषा में पर्यावरण अदालत कह सकते हैं जिसे हाईकोर्ट के समान शक्तियां प्राप्त है। पिछले बीते वर्षों में राष्ट्रीय हरित अधिकरण के द्वारा पर्यावरण संरक्षण को लेकर सख्त आदेश पारित किये गए । एनजीटी के द्वारा लिए गए फैसले से पर्यावरण और मानव स्वास्थ्य के हित में रहे है ,जिसमें वायु प्रदूषण, ध्वनि प्रदूषण, जल प्रदूषण, जैव विविधता, ठोस कचरा प्रबंधन के रूप में रहें। इनका वर्णन हम इस प्रकार से कर सकते हैं–

1. इस अधिकरण की स्थापना के पीछे प्रमुख कारण पर्यावरण से जुड़े मुकदमों को जल्द से जल्द निपटारा करने का रहा है। यह कार्य एनजीटी ने बखूबी निभाया है, उदाहरण के तौर पर इसकी स्थापना से

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लेकर 31 जनवरी 2023 तक इसके पास 40104 मामले रहे जिसमें से 38106 मामले निपटाए गए एवं 1998 मामले अभी भी लंबित है। इस प्रकार से कहा जा सकता है कि 95% मामलों का निपटारा एनजीटी के द्वारा किया गया।

2. वर्ष 2012 में एनजीटी ने खुले में कचरा जलाने में पूर्ण प्रतिबंध लगा दिया था जो वायु प्रदूषण को रोकने के लिए महत्वपूर्ण कदम उठाया गया।
3. साल 2012 में स्टील कंपनी POSCO ने उड़ीसा सरकार के साथ संयंत्र स्थापित करने का समझौता किया था। यह समझौता नजदीक के ग्रामीण लोगों के हितों को प्रभावित करता है इसे देखते हुए एनजीटी ने इसे निरस्त कर दिया था।
4. वर्ष 2013 में एनजीटी ने प्रदूषण भुगतान सिद्धांत का पालन करते हुए उत्तराखंड में अलकनंदा हाइड्रो पावर लिमिटेड को यह आदेश दिए कि वह सभी याचिकाकर्ताओं की क्षतिपूर्ति करे ।
5. 2014 में एनजीटी ने सरकार से सिफारिश की कि वह दिल्ली व उत्तर प्रदेश में यमुना के 52 किलोमीटर के हिस्से को शिक्षण क्षेत्र घोषित करें ताकि यमुना को प्रदूषण होने से बचाया जा सके।
6. जनवरी 2015 में, अधिकरण ने यमुना कायाकल्प योजना को सार्थक करने के उद्देश्य से नदी में कचरा या धार्मिक वस्तुओं को फेंकने वाले लोगों पर 5,000 रुपये का जुर्माना लगाने सहित कई अन्य निर्देश पारित किए। अधिकरण ने निर्माण सामग्री को भी नदी में फेंकने पर प्रतिबंध लगा दिया और उल्लंघन करने वालों पर 50,000 रुपये का जुर्माना लगाने के आदेश दिए।
7. सितंबर 2015 में दिल्ली ब्रांच में मूर्ति विसर्जन के द्वारा प्रयोग की जाने वाली सामग्री प्लास्टिक / प्लास्टिक ऑफ पेरिस पर रोक लगा गया और इसके स्थान पर आइडल बायोडिग्रेडेबल सामग्री का आदेश दिया।
8. एनजीटी ने 2015 में आदेश देते हुए यह निर्देश दिए कि दिल्ली की सड़कों पर 10 साल पुरानी डीजल वाले वाहन नहीं चल सकते क्योंकि यह साधन वायु प्रदूषण को बढ़ावा देते हैं।
9. दिसंबर 2015 में ,एनजीटी ने दिल्ली ,राजस्थान ,हरियाणा ,पंजाब और उत्तर प्रदेश के किसी भी हिस्से में कृषि अवशेषों को जलाने पर रोक लगा दी और राज्यों को निर्देश दिया कि वे कृषि अवशेषों

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को निकालने के लिए किसानों को मौद्रिक और तकनीकी सहायता प्रदान करें जिनका उपयोग औद्योगिक ईंधन के रूप में किया जा सकता है।

10. अधिकरण ने जुलाई 2017 में गंगा को पुनः जीवंत एवं स्वच्छ करने हेतु कई दिशा–निर्देश जारी किए ,जिसके तहत हरिद्वार–उन्नाव खंड के किनारे से 100 मीटर के क्षेत्र को' नो–डेवलपमेंट जोन ' घोषित किया गया और 500 मीटर के भीतर कचरे को डंप करने पर भी रोक लगा दी।
11. राष्ट्रीय हरित अधिकरण के अध्यक्ष न्यायमूर्ति आदर्श कुमार गोयल की अध्यक्षता में पश्चिम उत्तर प्रदेश के 6 जिलों में काली, कृष्णा एवं हिडन नदियों को प्रदूषण कर रही 124 औद्योगिक इकाइयों को बंद करने और उनके खिलाफ मामला दर्ज करने के आदेश दिए।
12. दिल्ली में बढ़ते वायु प्रदूषण को लेकर एनजीटी ने डीसीटी को आदेश दिए कि दिल्ली में ऐसी बसों की सुविधा दी जाए जो यात्री की मंजिल तक जाए। इस सुविधा से दिल्ली की सड़कों पर व्यक्तिगत गाड़ियों की संख्या कम होगी जिसे वायु प्रदूषण को कम किया जा सकता है।
13. केंद्रीय प्रदूषण नियंत्रण बोर्ड द्वारा प्रस्तावित ध्वनि प्रदूषण मापदंडों के उल्लंघन के लिए एनजीटी द्वारा भारी जुर्माने की मंजूरी दी गई है। इसी के साथ पुलिस को निर्देश दिए गए कि ध्वनि प्रदूषण के नियमों का उल्लंघन करने वालों के प्रति सख्त से सख्त कार्रवाई की जाए।
14. 2017 में एनजीटी द्वारा दिल्ली में 50 माइक्रोन से कम मोटाई वाले प्लास्टिक बैग पर पूर्ण प्रतिबंध लगा दिया गया।
15. एनजीटी के द्वारा वर्ष 2019 में न्यायमूर्ति आदर्श कुमार गोयल की अध्यक्षता में उत्तराखंड प्रदूषण नियंत्रण बोर्ड को गंगा या उसकी सहायक नदियों में गंदा पानी या औद्योगिक अवशिष्ट डालने को प्रतिबंधित करने का निर्देश दिया।
16. राष्ट्रीय हरित अधिकरण के द्वारा समय-समय पर पर्यावरण नियमों का उल्लंघन करने पर केंद्र शासित प्रदेश,राज्य सरकार एवं विभिन्न गैर –सरकारी संस्थाओं और औद्योगिक इकाइयों पर जुर्माना लगाया गया ताकि भविष्य में पर्यावरण को लेकर किसी प्रकार की लापरवाही ना बरतें।

राष्ट्रीय हरित अधिकरण की खामियां

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- राष्ट्रीय हरित अधिकरण की स्थापना के पीछे प्रमुख उद्देश्य पर्यावरण संबंधी मामलों को जल्द से जल्द निपटाने का रहा जिसमें किसी पर्यावरणीय समस्या के मामलों को निपटाने के लिए 6 महीने का समय रखा गया परंतु मानव और वित्तीय संसाधनों के अभाव में यहां पर भी यह अधिकरण आलोचना का शिकार हुआ है
- अनुच्छेद 32 के तहत कोई एनजीटी के निर्णय से असंतुष्ट हो तो वह उच्च व उच्चतम न्यायालय में निर्णय के 90 दिनों के अंदर गुहार लगा सकता है। ऐसा अगर होता है तो एनजीटी की क्या जरूरत है क्योंकि इस प्रक्रिया से दोषियों को समय मिल जाता है।
- यह अधिकरण 5 शाखाओं)मुख्यालय नई दिल्ली एवं क्षेत्रीय कार्यालय भोपाल ,कोलकाता ,पुणे एवं चेन्नई (एवं 30 से 40 सदस्य के साथ संपूर्ण देश की 130 करोड़ जनसंख्या को कैसे पर्यावरणीय मुकदमों को लेकर संबंध स्थापित कर सकता है ,क्योंकि दूरदराज के लोग इससे वंचित रह जाते हैं।
- एनजीटी के द्वारा केवल बड़े स्तर पर ही पर्यावरणीय समस्याओं पर ही सुनवाई की जाती है, जबकि छोटी स्तर की औद्योगिक इकाइयों से होने वाले पर्यावरण प्रदूषण पर किसी प्रकार का ध्यान केंद्रित नहीं है क्योंकि छोटी इकाइयों का भी प्रदूषण फैलाने में महत्वपूर्ण योगदान रहता है।
- राष्ट्रीय हरित अधिकरण एक वैधानिक संस्था होने के कारण ही है इसमें स्पष्ट रूप से परिभाषित नहीं किया गया कि किन मुकदमों को न्यायालयों के समक्ष चुनौती दी जा सकती है और किन को नहीं।
- राष्ट्रीय हरित अधिकरण के द्वारा मुआवजे के निर्धारण करने की सटीक विधि ना होने के कारण बार-बार आलोचना का शिकार होता रहता है।
- राष्ट्रीय हरित अधिकरण के द्वारा केंद्र शासित प्रदेश एवं राज्य सरकारों ,गैर –सरकारी कंपनियों और औद्योगिक इकाइयों पर जुर्माना तो बढ़ता जा रहा है परंतु पर्यावरण प्रदूषण कम होने का नाम नहीं ले रहा। इस बात से स्पष्ट होता है कि केंद्र शासित प्रदेश एवं राज्य सरकार जुर्माना भरने के लिए तो तैयार है किंतु पर्यावरण संरक्षण के पक्ष में नहीं है।

निष्कर्ष

इस शोध पत्र के माध्यम से यह चर्चा की गई है कि राष्ट्रीय हरित अधिकरण 2010 के द्वारा पर्यावरण संरक्षण को लेकर महत्वपूर्ण कदम उठाए गए। पर्यावरण संरक्षण को लेकर एनजीटी ने उल्लेखनीय कार्य किए है , इसने पर्यावरण के सुरक्षा कवच को लेकर अपनी अलग छवि निर्मित की है। एनजीटी में कुछ कमियां भी है अगर उनको दूर कर दिया जाए तथा सतत पोषणीय विकास के साथ बड़े स्तर पर काम किया जाए तो

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पर्यावरण संरक्षण एवं देश के आर्थिक विकास को धनात्मक दिशा में चलाया जा सकता है।

संदर्भ सूची-:

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- भारत में पर्यावरण :समस्याएं और समाधान ,महेंद्र कुमार मिश्रा।
- संसाधन एवं पर्यावरण ,डॉ राजकुमार गुर्जर एवं बी.सी .जाट।
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अभिज्ञानशाकुन्तलम् में पर्यावरण संरक्षण: एक अनुशीलन

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आधुनिक शब्दावली में जिसे 'पर्यावरण' या 'परिवेशिकी' कहा जाता है उसे ही भारतीय पारम्परिक शब्दावली में 'प्रकृति' कहा जाता रहा है। 'पर्यावरण' शब्द की व्युत्पति परि+आ+वृ+ल्यूट् से हुई है, जिसका अर्थ है-वह वातावरण जो मनुष्य को चारों ओर से व्याप्त कर उससे प्रत्यक्ष अथवा अप्रत्यक्ष रूप से जुड़ा है[i]। प्रकृति के उत्पादन जैसे जल, वायु, मृदा, पादप तथा विभिन्न प्राणी यहाँ तक कि स्वयं मानव भी पर्यावरण का एक अंष है। इस पर्यावरण से मानव का तभी से अविभाज्य सम्बन्ध है जब से वह इस पृथ्वी पर अवतीर्ण हुआ है[ii]।

प्राचीन काल में प्रकृति का स्वरूप अत्यन्त शुद्ध था। 'माता भूमिःपुत्रोऽहं पृथिव्याः'[iii]। भाव के कारण मानव ने पृथिवी से छेड़छाड़ नहीं की। यही कारण है कि कवियों ने प्रायः प्रकृति के विशुद्ध रूप का चित्रण किया है। सर्वत्र तपोवन का साम्राज्य[iv]यत्किंचित् वायु-प्रदूषण का अनवरत अनुष्ठीय-मान यज्ञधूम से शुद्धीकरण, पृथिवी का अशोषण, जल में अशुद्धिकारक तत्त्वों के निपेक्ष-विधान आदि के कारण प्रकृति पूर्णतः विशुद्ध थी और मानव के लिए हितकारिणी भी।

वर्तमान में औद्योगिकीकरण, वनों की कटाई, वन्य जीवों का विनाश, परमाणु परीक्षण, आधुनिकीकरण आदि के कारण यह असन्तुलन वृद्धिगत हो रहा है। पर्यावरण के अवांछनीय परिवर्तन ही प्रदूषण कहलाते हैं। बढ़ते हुए प्रदूषणों के कारण आज मानव जाति का अस्तित्व ही खतरे में पड़ गया है। प्रदूषणों में मुख्य रूप से जल प्रदूषण, वायु प्रदूषण, मृदा प्रदूषण, ध्वनि प्रदूषण इत्यादि है। इन प्रदूषणों को दूर करने और पर्यावरण संरक्षण की महती आवश्यकता आज अनुभव

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की जा रही है।

हमारे प्राचीन ऋषियों, मनीषियों तथा साहित्यकारों का ध्यान, सदैव से पर्यावरण पर केन्द्रित रहा है। संस्कृत साहित्य को यदि हम पर्यावरण साहित्य कहें तो अत्युक्ति नहीं होगी। प्रथम शताब्दी ई0पू0 में हुए कवि कालिदास[v] की पर्यावरण विषयक धारणाओं के अध्ययन और विश्लेषण से इस पर्यावरण संरक्षण में कुछ सहायता मिल सके, इस उद्देश्य से उनके साहित्य की मीमांसा करने पर हम पर्यावरण के भव्य चित्रों का दर्शन करते हैं। उनके काव्यों में वर्णित पर्यावरण को हम पर्यावरण की भारतीय अवधारणा का मापदण्ड कह सकते हैं।

महाकवि कालिदास का प्रकृति-प्रेम और पर्यावरण अनुराग उनकी सातों कृतियों में परिलक्षित होता है। उनका समग्र साहित्य पर्यावरण-संरक्षण की भावना से ओत-प्रोत है। इनकी काव्य प्रतिभा की चरम परिणति प्रकृति-चित्रण में ही हुई है और उनके काव्य सर्जन का प्रारम्भ भी प्रकृति के चित्रण से ही माना जाता है।

प्राकृतिक सौन्दर्य के प्रति सतत् जागरूक कवि कालिदास प्रकृति के मांगलिक रूप के उपासक हैं। प्रकृति के मांगलिक रूप के द्वारा पर्यावरण-संरक्षण के प्रति एक सचेत दृष्टिकोण उनके सभी काव्यों में सर्वदा विद्यमान रहा है। यहाँ हम केवल उनके विश्वप्रसिद्ध नाटक 'अभिज्ञानशाकुन्तलम्' के आधार पर कालिदास की पर्यावरण विषयक संचेतना का अवलोकन करेंगे।

कालिदास के इस नाटक में प्रकृति, जीवन के स्पन्दन के साथ सजीव प्रतीत होती है तथा सदा मानव को नवीन ऊर्जा प्रदान करती हैं। यों तो कवि के दोनों खण्डकाव्यों-ऋतुसंहार एवं मेघदूतम् तथा महाकाव्यों की पृष्ठभूमि में भी प्रकृति मुख्य पात्र रही है। परन्तु नाटकों में और उनमें भी विशेष रूप से शाकुन्तलम् की पृष्ठभूमि में तो प्रकृति ही है। नाटक के अनिवार्य अंग के रूप में भी प्रकृति का चित्रण है। प्रकृति के जड़ पदार्थों का मानवीकरण, प्रकृति का स्वतन्त्र तथा प्रकृति एवं मानव के सहज स्वाभाविक एवं घनिष्ठ सम्बन्धों का मनोहारी चित्रण कालिदास की विषेषता है। नाटक का

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प्रत्येक अंक प्रकृति के मध्य ही अवस्थित है। सर्वप्रथम नान्दी श्लोक ही शंकर की अष्ट मूर्तियों के रूप में प्रकृति के पाँचों तत्त्वों सूर्य और चन्द्रमा के साथ मनुष्य के साहचर्य को दर्शाता है[vi]।

इस जगती में मानव तथा प्रकृति, मानव तथा देवता के मध्य एक दृढ़ मैत्री बन्धन का सर्वश्रेष्ठ उपाय यज्ञ ही था। यज्ञ में समर्पण की भावना निहित है। तत्त्वों में साम्य तथा सूर्य और चन्द्रमा का नियमित रूप में कालचक्र प्रवर्तित करना। यजमान के यज्ञ में आहुति डालने पर निर्भर है। यही यज्ञाहुति मानव एवं प्रकृति के सह सम्बन्ध की व्याख्या है। सूत्रधार द्वारा ग्रीष्म ऋतु का स्वाभाविक वर्णन है[vii]। फिर दुष्यन्त के तीर से बचने की कोषिष करते हुए तथा तेज़ दौड़ते हुए हिरण की स्वाभाविक चेष्टाओं की बड़ी ही सूक्ष्मता से वर्णन है। प्रकृति के इस निरीह मासूम प्राणी की हिंसा न की जाए यह स्पष्ट आदेश है - 'आश्रममृगोऽयं न हन्तव्यो न हन्तव्यः[viii]।'मृगया राजाओं का प्रिय व्यसन रहा है। पर फिर भी आश्रमवासी प्राणियों के लिए पूर्ण अभय था। आज धरती पर अनेकों जन्तु व प्राणी लुप्त प्राय होते जा रहे हैं। मानव ने अपनी लोलुपता के कारण अन्धाधुन्ध उन्हें मारकर, उनकी जातियों को लुप्त होने के कगार तक पहुँचा दिया है। कालिदास का दुष्यन्त राजा होते हुए भी शिकार के लिए व्यर्थ हिंसा नहीं करता तथा तपोवन के तपस्वियों की इस आज्ञा का सम्मान करता है। तपोवन भारतीय संस्कृति के अविभाज्य अंग रहे हैं। वास्तव में आश्रमों का भौगोलिक और भौतिक परिवेष जितना सात्विक, पवित्र एवं सुन्दर होता है, उसका आध्यात्मिक रूप भी उतना ही पावन एवं कमनीय होता है। यहाँ तपोवनों में मृगशावक अपनी माता की गोद छोड़कर ऋषियों और ऋषि पत्नियों की गोदी में बैठ जीवन यापन करते हैं और जिनके कुश की तेज नोक से छिद जाने वाले मुख की पीड़ा को इंगुदी का तेल लगाकर ऋषिजन दूर किया करते हैं[ix]।

प्रथम अंक में शुकों के घोंसलों से उनके मुख से गिरे हुए तृणधान्य दिखाई पड़ते हैं तो कहीं इंगुदी नाम के वृक्ष के फलों को तेल निकालने के लिए तोड़नें वाले अत्यन्त चिकने पत्थर हैं[x]। निर्भय हिरण विचरण कर रहे हैं। आश्रम की कुटियों के आँगन में नवमालिका की लताएँ तथा केसर के वृक्ष हैं जिनपर भ्रमर उड़ रहे हैं[xi]। दुष्यन्त सर्वप्रथम शकुन्तला को जब देखता है तो वह सहोदर-स्नेह के

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वशीभूत हो छोटे-छोटे पौधों को स्वयं सींच रही होती है[xii]। शकुन्तला के सौन्दर्य वर्णन में भी प्रकृति के अंग प्रत्यंग सहायक होते हैं। शकुन्तला व उसकी सखियों को दुष्यन्त 'वनलता' कहता है[xiii]। दूसरे अंक में मृगयाशील दुष्यन्त की मृगया के विस्तृत वर्णन में घने बसे वनों तथा पशुओं का स्वाभाविक चित्रण हुआ है। तपोवन तथा आश्रम के जीवन में बाधा पहुँचाने वाले राक्षसों की बात सुनकर दुष्यन्त तपोवन की रक्षा का भार अपने ऊपर लेता है[xiv]। दुष्यन्त का स्वार्थ (शकुन्तला के प्रति प्रेम) तो है ही तपोवन में रुकने का कारण- 'तपोवनोपराधः परिहरणीयः[xv] तपोवनों की बाधा से बचाना चाहिए-यह कर्त्तव्य भावना भी है। तपोवनों को निर्भय करने के लिए- 'दीक्षिताः खलु पौरवः[xvi]'16 वह पौरव है, दीक्षित है।

तृतीय अंक में मालिनी नदी के तट पर बेंत के कुंजों में एक लतामण्डप है जहाँ शीतल मन्द पवन चल रहा है, कमल के फूलों की सुगन्ध है[xvii]।

चतुर्थ अंक तो 'प्रकृति के संसार को' सुन्दरतम रूप में अभिव्यक्त करता है। इस अंक को तो पर्यावरण-दर्शन का महत्त्वपूर्ण विषय कहा जा सकता है। प्रकृति रमणी शकुन्तला जब पतिगृह जाने को सजती है तो किसी वृक्ष ने चन्द्रमा की तरह सफेद मांगलिक रेशमी वस्त्र उत्पन्न करके दिए, किसी ने पाँव रंगने के लिए बड़ी ही सुन्दर महावर निकाल कर दिया। इसी प्रकार सब वृक्षों ने मणिबन्ध देह तक निकले हुए पल्लव के समान सुन्दर वन देवताओं के हाथों ने विविध अलंकार दिए[xviii]। शकुन्तला के सुख और सौभाग्य में प्रकृति प्रसन्न थी, सहभागी थी परन्तु उसकी विदाई को देखकर काश्यप ही नहीं अपितु वन देवता, वृक्ष, पक्षी व पशु सभी कातर और व्याकुल हो जाते हैं[xix]। शकुन्तला का इन सबके प्रति अगाध प्रेम था। वह वृक्षों को सींचने से पूर्व पानी पीने की इच्छा भी नहीं करती थी। उसे अपने आपको पुष्पों से अलंकृत करने का बड़ा शौक था फिर भी वह कलियों को, पत्तों को तोड़ती नहीं थी। वृक्षों के फूलने का समय उसके लिए उत्सव होता था[xx]। आश्चर्य नहीं कि उसकी विदाई पर वृक्ष भी रो पड़े हों, कोयल की मधुर ध्वनि से उसे विदा देते हैं[xxi]। वास्तव में सारा तपोवन अश्रुविगलित हो उठा है। हरिणियों ने घास खाना छोड़ दिया है, मोरों ने नृत्य बन्द कर दिया है और वनस्पतियां

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उसके वियोग में आंसू बहा रही हैं[xxii]।

प्रकृति और मानव की परस्पर प्रगाढ़ मैत्री, सहज सहानुभूति तथा रमणीय रागात्मक वृत्ति

का सम्बन्ध इतने सूक्ष्म रूप से वर्णित करना कालिदास जैसे पर्यावरण-दार्शनिक के लिए ही सम्भव था।

पंचम अंक यद्यपि हस्तिनापुर के राजप्रसाद में घटित होता है परन्तु यहां भी हम प्रकृति से नितान्त दूर नहीं है। प्रकृति की रम्यता का प्रभाव मानव की प्रकृति पर पड़ता है। भ्रमर और परभृत् का उल्लेख मानव और प्रकृति के सम्बन्ध को याद दिलाता है।

नाटक का छठा अंक प्रमदवन के एक दृष्य का होता है जो कि बसन्त ऋतु की शोभा से मंडित है। धीवर द्वारा शकुन्तला की अंगूठी मिलने की घटना से राजा विचलित है इसलिए वसन्तोत्सव का प्रतिषेध कर दिया गया है। राजा के मन के भावानुसार प्रजाजन तो वसन्तोत्सव नहीं मनाते ही हैं। वसन्त काल के वृक्षों तथा पक्षियों ने भी महाराज की आज्ञा का पालन किया है[xxiii]। यह मानव व प्रकृति की सुख-दुख में सहभागिता का निदर्शन है। यहां प्रकृति मनुष्य के दुख और सुख में क्रियात्मक रूप से आगे बढ़कर भाग भी लेती है।

सप्तम अंक में दुष्यन्त को प्रवह वायु तथा मेघों के मार्ग द्वारा स्वर्ग से पृथिवी की ओर लौटते हुए दिखाया गया है[xxiv]। भगवान् मारिची की पर्णकुटी के चारों और हेमकूट पर्वत पर मन्दारवृक्ष[xxv], कल्पवृक्ष[xxvi], अशोकवृक्षों[xxvii] की बहुतायत है तथा स्वर्ण कमलों वाली झीलें हैं। अतः प्रकृति के प्रति अभिव्यक्त प्रेम भावना के विनियम में प्रेम ही मिलता है एवं प्रकृति के प्रति द्वेष की भावना प्रकृति को मनुष्य के लिए प्रतिकूल बना देती है।

इस प्रकार से अभिज्ञानशाकुन्तल नामक नाटक में सर्वत्र प्रकृति कहीं भी मनुष्य के जीवन के प्रति प्रतिकूल कार्य नहीं करती। मानव तथा प्रकृति का पूर्ण सामंजस्य ही यहां दृष्टिगोचर होता है। एक के बिना दूसरे की कल्पना करना भी असम्भव है। प्रकृति यहां मानव के सुख-दुख में उसके साथ

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हंसती रोती है। प्रकृति और मानव के इस घनिष्ठ सम्बन्ध को आज के युग में जबकि मानव प्रकृति से दूर जा रहा है, फिर से सजीव करने की आवश्यकता है।

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पञ्चमहायज्ञ : एक पर्यावरणीय चेतना

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वेद भारतीय संस्कृति के सर्वस्व हैं । ज्ञान तथा विज्ञान दोनों का ही मूल स्रोत ज्ञान है । वेद विहित शाश्वत् मूल्य सार्वकालिक तथा सार्वभौमिक हैं यथा "संगच्छध्वं संवदध्वं सं वो मनांसि जानताम्, देवा भागं यथा पूर्वे संजनाना उपासते[1] ।

प्रस्तुत शोधपत्र का उद्देश्य शास्त्रों में प्रतिपादित पञ्चमहायज्ञ की अवधारणा पर चर्चा करना तथा इससे सम्बद्ध उद्धरणादि का आलोडनविलोडन– करना। मनुस्मृति तथा शतपथ ब्राह्मण में विद्यमान पञ्चमहायज्ञ से सम्बन्धित उद्धरणों का संग्रहण । आधुनिक समय में ये प्रासङ्गिक हैं या नहीं ? इस विषय पर चर्चा करना । ऋषि व आर्षवक्ताओं की दूरदर्शिता तथा सामाजिक समरसता पर चर्चा करना ।

शोधपत्र के विषयानुरूप पञ्चमहायज्ञ क्या हैं ? यह वर्णित करना अपरिहार्य प्रतीत होता है ।

'यज्ञ' यानि यजन करना अथवा क्रमपूर्वक किसी कार्य का अनुष्ठान करना । वेदों में से यज्ञादि का वर्णन यजुर्वेद में विहित है –यथा यजनात् यजु:[iii]। वेद भारतीय संस्कृति के सर्वस्व हैं । ज्ञान तथा विज्ञान दोनों का ही मूल स्रोत ज्ञान है । वेद विहित शाश्वत मूल्य सार्वकालिक तथा सार्वभौमिक हैं यथा "संगच्छध्वं संवदध्वं सं वो मनांसि जानताम्, देवा भागं यथा पूर्वे संजनाना उपासते[iii] ।

शास्त्रों में चार क्षत्रियादि चार वर्ण तथा वर्णाश्रम कथित हैं । चार आश्रम- ब्रह्मचर्य, गृहस्थ, वानप्रस्थ तथा सन्यासाश्रम[iv] । इन आश्रमों में से गृहस्थाश्रम का प्राधान्य कहा है क्योंकि सारे आश्रम इसी के ही इर्दगिर्द– घूमते हैं जैसा कि मनुस्मृति में कहा है -

यस्मात्त्रयोऽप्याश्रमिणो ज्ञानेनान्नेन चान्वहम्।

[1] ऋग्वेद, १०/१९१/२

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गृहस्थेनैव धार्यन्ते तस्माज्ज्येष्ठाश्रमो गृही[vi] ॥

जिस प्रकार वायु से सभी जीव जीवन धारण करते हैं[vi] उसी प्रकार गृहस्थाश्रम पर अन्य आश्रम आश्रित हैं।[vii] यथा सभी नद व नदियां अन्त में सागर का आश्रय लेती हैं तथा सभी आश्रमी गृहस्थ का आश्रय लेते हैं[viii]।

गृहस्थाश्रम में प्रवेश करने के बाद पञ्च महायज्ञ कर्त्तव्य रूप में कहे हैं । ये पञ्च महायज्ञ बौधायनधर्मसूत्र में महासत्र नाम से अभिहित हैं[2] यथा- *'वैवाहिकेऽग्नौ कुर्वीत गृह्यं कर्म यथाविधि:*[ix] । ये यज्ञ गृहस्थ को नित्य करने चाहिए ।

ये पांच अधोलिखित हैं-यथा

"ऋषियज्ञं देवयज्ञं भूतयज्ञां च सर्वदा।

नृयज्ञं पितृयज्ञं च यथाशक्ति न हापयेत्[x] ॥

- ब्रह्मयज्ञ
- देवयज्ञ
- पितृयज्ञ
- भूतयज्ञ
- अतिथियज्ञ[xi]

ब्रह्मयज्ञ:- अध्यापनं ब्रह्मयज्ञ:'[xii] वेदादि शास्त्रों को पढ़ना व पढाना। शतपथब्राह्मण में स्वाध्याय को ब्रहमयज्ञ कहा है[xiii] । हमने जिन ऋषि मुनियों से ज्ञान प्राप्त किया है उस ज्ञान को अन्य व्यक्तियों तक सम्प्रेषित करना जैसा कि मनुस्मृति में कहा है-

" *स्वाध्याये नित्ययुक्त: स्याद्दैवे चैवेह कर्मणि*[xiv] "। और भी-

[2] बौधायनधर्मसूत्रम्,महर्षि बौधायन, पाण्डेय उमेशचन्द्र, चौखम्बा प्रकाशन वाराणसी,पु.मु.२००५

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"स्वाध्यायेनार्चयेतर्षीन्होमैर्देवान्यथाविधि: ।

पितृन् श्राद्धैश्च नृनन्नैर्भूतानि बलिकर्मणा[xv] ॥

देवयज्ञ:- किसी देव को लक्ष्य मानकर यज्ञ का अनुष्ठान करना। संस्कृतशास्त्रों में देव को दाता कहा है

यथा निरूक्तकार कहते हैं– *देवो दानाद् द्योतनाद् दीपनाद् वा*[xvi] ।

"अग्नौ प्रास्ताहुति: सम्यगादित्यं उपतिष्ठते ,आदित्याज्जायते वृष्टिर्वृष्टेरन्नं तत: प्रजा:"[xvii] ॥

यज्ञादि करने से आसपास के वातावरण में सकारात्मकता फ़ैलती है ऐसा शोधकार्यों द्वारा सिद्ध हो चुका है । इस प्रकार इससे पर्यावरण शुद्धि होती है ।

पितृयज्ञ- मनुस्मृति में कहा है- 'पितृयज्ञस्तु तर्पणम्'[xviii]। माता-पिता व पूर्वजों का आदर व सम्मान करना । पितृयज्ञा को द्विविधा कहा है श्राद्ध व तर्पण । मृत माता पिता या पूर्वजों का श्राद्धादि करना । जीवित माता-पिता को अपने कार्यों से प्रसन्न करना ही तर्पण है[xix]। याज्ञवल्क्य स्मृतिकार ने इस यज्ञ का फल अभीष्ट फल प्राप्ति कहा है [xx]। इस यज्ञ को करने से घर में विद्यमान बच्चों में अच्छे संस्कारों का उदय होगा तथा आज के युग में बने वृद्धाश्रमों में न्यूनता आएगी ।

बलिवैश्वदेव यज्ञ(भूतयज्ञ)- भूतयज्ञ में प्राणियों के लिए बलि यानि वस्तु त्याग । मनुस्मृति में कहा है- 'बलिर्भोतौ[xxi]। पक्षी व अन्य आस पास के जीव-जन्तुओं के लिए पानी व खाद्य वस्तुएं रखना । वृक्षादि का संरक्षण करना। यह यज्ञ पारिस्थितिक तन्त्र को मजबूत करने का सर्वोत्तम साधन है । इस यज्ञ को करने से मानसिक सन्तोष व आत्मिक तुष्टि मिलती है ।

नृ (अतिथियज्ञ)- अतिथिदेवो भव'[xxii]। मनुस्मृति में नृयज्ञ को अतिथिपूजन के रूप में कहा है- नृयज्ञोऽतिथिपूजनम्'[xxiii] घर में आने वाले अतिथि का सम्मान व सत्कार करना । कठोपनिषद् में अतिथि को अग्निस्वरूप कहा है[xxiv] । घर आया मेहमान का आदर न करने पर वह उस घर की समृद्धि ले जाता है और पाप कर्म को छोड़ जाता है ।[xxv] संस्कारविधि के अनुसार अतिथिसत्कार जो जिस योग्य हो उसी के अनुसार उसका उत्तम, मध्यम व अधम रीति से सत्कार करना चाहिए । यथा-" आसनावसथओ शय्यामनुव्रज्यामुपासनाम्, उत्तमेषूत्तमं कुर्याद्धीनं हीने समे समम्"[xxvi]

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। जो कपटी बकुलवृत्ति,नास्तिक,हिंसक, शठ, परपदार्थहारी अतिथिवेशधारी हो उसका वचनमात्र से भी सत्कार नहीं करना चाहिए[xxvii] । बौधयनधर्मसूत्र में इसे मनुष्ययज्ञ नामधेय से ब्राहमण के लिए मूल, फल, शाक आदि लाने को कहा है[xxviii] ।

यह यज्ञ भी जन जन में व्याप्त है । घर आए शत्रु का भी आदर सत्कार करना चाहिए ।

इन पांच यज्ञों की प्रक्रिया को देखकर इनकी व्यावहारिकता तथा प्रासङ्गिकता स्पष्ट हो जाती है । इन यज्ञों को करने से आस पास के जीव जन्तुओं व वृक्षादि अर्थात् पर्यावरण का संरक्षण होता है जिसकी वर्तमान समय में अत्यावश्यकता है । व्यक्ति और पर्यावरण के मध्य समरसता व तालमेल बढता है । आधुनिक समय में जिस सह–अस्तित्ववाद(Sustainable development) चर्चा अब हो रही है वह चिन्तन हजारों वर्ष पूर्व हमारे ऋषि मुनियों ने दे दिया था । वेदों में न केवल मनुष्यों की सुविधा के बारे में कहा है अपितु यहां वृक्ष, औषधि, वनस्पति आदि के कल्याण की भी कामना की गई है। इस प्रकार इन यज्ञों से हमारे घर से लेकर पर्यावरण तक सुख व आनन्द का वातावरण बन पाएगा । वेदों में सबकी मंगलकामना की गई है यथा-

सर्वे भवन्तु सुखिन: सर्वे सन्तु निरामया:। सर्वे भद्राणि पश्यन्तु मा कश्चिद्दुखभागभवेत्: ।

सन्दर्भग्रन्थसूची:-

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हिंदी साहित्य में पर्यावरण संरक्षण चेतना

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शोध सार

साहित्य समाज का दर्पण ही नहीं वरन दीपक भी रहा है जिसने व्यक्ति और समाज को हमेशा नई राह दिखाई है। सामाजिक, सांस्कृतिक, मानवीय प्राकृतिक एवं पर्यावरणीय मुद्दों पर साहित्य ने व्यक्ति का मार्ग प्रशस्त किया है। साहित्य कभी भी मानवीय संकटों से अछूता नहीं रहा।भारतीय दर्शनीय मानता है कि इस देह की रचना पर्यावरण के महत्वपूर्ण घटकों- पृथ्वी, जल,अग्नि, वायु और आकाश से हुई है, इसलिए मनुष्य का शरीर और चेतना पर्यावरण आधारित हैं तथा उसके अस्तित्व के लिए अनिवार्य है। मनुष्य का अस्तित्व सीधे तौर पर पर्यावरणीय घटकों के साथ जुड़ा हुआ है। पर्यावरण संरक्षण के उपायों की जानकारी हर स्तर और हर उम्र के व्यक्ति के लिए आवश्यक है प्रकृति के प्रति प्रेम आदर की भावना, सादगी पूर्ण जीवन पद्धति और वानिकी के प्रति नई चेतना जागृत करनी होगी। इस जनजागृति में साहित्य ने महती भूमिका निभाई है। साहित्य हमें पर्यावरण पर अपने प्रभावों की जिम्मेदारी लेने की आवश्यकता की याद दिला सकता है। साहित्य प्रकृति के साथ तादात्म्य स्थापित करके प्राकृतिक विध्वंस को रोकने और प्राकृतिक संसाधनों का सदुपयोग करने की प्रेरणा देता है।

आधुनिक भोगवादी संस्कृति ने विश्व को पर्यावरणीय संकट के मुहाने पर लाकर खड़ा कर दिया है। मानव द्वारा निरंतर किए जा रहे पर्यावरण विनाश से हमें भविष्य की चिंता सताने लगी है।हिंदी साहित्य में आदिकाल से लेकर आधुनिक काल तक प्रकृति को हमेशा विशेष स्थान मिला है। पर्यावरण चेतना की समृद्ध परंपरा हमारे साहित्य में रही है वह आज भी उतनी ही प्रासंगिक है। इस लेख में साहित्य के माध्यम से प्रकृति और पर्यावरण संरक्षण की चेतना के व्यावहारिक पक्षों की विवेचना की गई है।

बीज शब्द- हिंदी साहित्य, पर्यावरण संरक्षण, पर्यावरणीय चेतना, प्राकृतिक संकट।

परिचय- साहित्य में पर्यावरणीय चेतना आधुनिक युग की भांति आवश्यक और औपचारिक रूप में भले ही न हो लेकिन इसका अर्थ यह नहीं है कि उस युग में व्यक्ति पर्यावरण के प्रति सचेत नहीं था। हां, यह सच है

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कि उसकी पर्यावरणीय चेतना का कोई वैश्विक मंच नहीं था परंतु उसकी जीवनशैली, समस्त क्रियाकलाप और आचरण इससे प्रतिबद्ध अवश्य था कि पर्यावरणीय शुद्धता को बनाए रखा जाए ताकि इस ब्रह्मांड, जगत और मानव का अस्तित्व बना रहे।

पर्यावरण से तात्पर्य समस्त ब्रह्मांड से है चारों ओर के सभी पदार्थ हैं, जो हमें आवृत किए हुए हैं और जिन तत्वों से मिलकर हमारा शरीर निर्मित हुआ है। इन सब का समग्र रूप ही पर्यावरण है। पर्यावरण संरक्षण अधिनियम -1986 के अनुसार जल,वायु,भूमि इन तीनों से संबंधित कारक तथा मानव,पौधे, सूक्ष्म जीव अन्य जीवित जगत पर्यावरण के अंतर्गत आता है।

तुलसीदास जी 'रामचरितमानस' में कहते हैं कि मनुष्य शरीर इन प्राकृतिक तत्वों की देन है-

"छिति,जल, पावक, गगन समीरा।

पंच रचित अति अधम शरीरा।।"

इस युग के व्यक्ति की पर्यावरणीय चेतना नैतिकता एवं आध्यात्मिकता से आप्लावित्त थी। उनके लिए जीव जंतु पेड़ पौधों की रक्षा कर्तव्य मात्र ने होकर धर्म था। वनस्पति,वृक्ष,पर्वत,नदियां ऋतुएं व पर्यावरण के अन्य अंगों से व्यक्ति का गहन जुड़ाव था। जिसको हजारी प्रसाद द्विवेदी ने अपने निबंध 'कुटज' में अभिव्यक्त किया है-

"यह धरती मेरी माता है और मैं इसका पुत्र हूं।इसलिए मैं सदैव इसका सम्मान करता हूं और मेरी धरती माता के प्रति मैं नतमस्तक हूं।"1

किसी भी भाषा या देश का साहित्य उसके दर्शन से प्रभावित होता है। हिंदी साहित्य में भी भारतीय दर्शनों की छवि देखी जा सकती है। समस्त जीवो में प्रभु के वास की कल्पना पारिस्थितिकी तंत्र को बनाए रखने की ओर इशारा करती है प्रकृति के प्रति प्रेम, संरक्षण और आत्मानुभूति उसी चेतना का हिस्सा है। पर्यावरण के महत्व को कबीर जी ने लगभग 600 साल पूर्व पहचान लिया था-

डाली छेड़ूं न पता छेड़ूं न कोई जीव सताऊं।

पात-पात में प्रभु वसत है वाही को शीश नवाऊं।।

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भले ही पत्तों में परमात्मा बसने की बात से कोई इत्तेफाक ना रखें लेकिन पेड़ पौधे सुरक्षित है तो ऑक्सीजन है, जिस पर मनुष्य का अस्तित्व टिका हुआ है। इसको सभी स्वीकारते हैं।

हिंदी साहित्य में संभवतः पहली बार पर्यावरण असंतुलन की समस्या पर 'कामायनी' में विचार किया गया। देव सभ्यता के नष्ट होने का कारण जयशंकर 'प्रसाद' जी ने देवताओं की अकर्मण्यता और प्रकृति का असंतुलित दोहन बताया। प्रकृति देवताओं की ऐसे ही अकर्मण्यता और लालची वृत्ति से क्षुब्ध होकर विकराल रूप ग्रहण करती है और फिर जलाप्लावन होता है। जिसमें देव सभ्यता का विनाश होता है-

"प्रकृति रही दुर्जेय,
पराजित हम सब थे भूले मद में, भोले थे,
हां! तिरते केवल सब विलासिता के नद में।
यह सब डूबे, डूबा उनका
विभव, बन गया पारावार
उमड़ रहा है देव सुखों पर
दुख जलधि का नाद अपार।" 2

प्रसाद जी ने इसके माध्यम से मानव सभ्यता को आगाह किया है की प्रकृति विध्वंस के बाद नवसृजन की ओर अग्रसर भी होती है लेकिन उसमें अनधिकार लालच का हस्तक्षेप नहीं होना चाहिए। गांधी जी ने कहा है-"प्रकृति के भंडार में हर किसी की जरूरतें पूरी करने के यथेष्ट संसाधन है, पर किसी भी लालच को पूरा करने में यह भंडार असमर्थ हैं।"3

साहित्य समस्याओं को समाज के नजरिए से समझने समझाने का प्रयास करता है। आधुनिक साहित्य अपने इस उद्देश्य की पूर्ति बखूबी कर रहा है। सतत विकास लक्ष्यों की बात को सार्वजनिक मंचों तक साहित्य लेकर जा रहा है तथा पर्यावरण संरक्षण और जलवायु मुद्दों पर आने वाली पीढ़ियों को संवेदनशील भी बना रहा है। जल,प्रकृति,वातावरण संरक्षण के मुद्दों पर सहज ज्ञान देने का काम साहित्य अनवरत रूप से करता आ रहा है। जल संरक्षण पर बात करते वक्त हमारा ध्यान इस बात पर भी जाता है कि परंपरागत संरक्षण व्यवस्था बावड़ी और तालाब अधिक किफायती थे, इस मुद्दे पर अनुपम मिश्र की पुस्तकें 'आज भी खरे हैं

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तालाब, और 'राजस्थान की रजत बूंदें' हमें जल संरक्षण के प्रति संवेदनशील करती हैं। हम सब जानते हैं जल ही जीवन है लेकिन लगातार बढ़ रही जनसंख्या और लगातार घट रहे जल स्रोत के कारण पानी की भयंकर समस्या होती जा रही है। ऐसे माहौल में 'राजस्थान की रजत बूंदें' हमें जल प्राप्ति के अन्य स्रोतों और पानी के उचित उपयोग पर विचार करने में मदद करती है। छोटे कुएं, बावड़ी और जलाशयों का निर्माण कर पानी के भूमिगत जल स्तर को बढ़ाया जाए।"4

फिल्म और लघु वृत्त चित्र भी एक प्रकार से साहित्य का हिस्सा रहे हैं हाल ही में ऑस्कर पुरस्कार के लिए नामित लघु वृत्त चित्र 'एलीफेंट व्हिस्परर्स'एक विशेष मूल्य दृष्टि की ओर ले कर जाती है जो मनुष्य और पशुओं के बीच आत्मीय रागात्मक संबंध का चित्रण करती है। इसमें प्रकृति की संतानों मनुष्य और पशु साथ-साथ सुख से जीते हैं, उनकी समान अस्मिता और गरिमा है, उनके बीच किसी प्रकार का संघर्ष ना होकर समरसता है। यह पर्यावरण के साथ साथ न्याय एवं एकाकार होने का संदेश है। पश्चिम में जलवायु परिवर्तन पर बड़े पैमाने पर विचार हो रहा है और धीरे-धीरे भारत में भी यह मुद्दा मुख्यधारा में आ रहा है। इस मुद्दे पर जब सरकार बनेगी और वोट मांगे जाएंगे इस बात का इंतजार रहेगा। जब हम इस दिशा में सोचेंगे और जीरो कार्बन पर बात करेंगे तो सोते ही कुछ मुद्दे इसके साथ उभर कर सामने आएंगे, जिनमें पर्यावरण संरक्षण
मनुष्य और प्रकृति के बीच सामंजस्य, पशुओं के अधिकार, आदिवासियों की अस्मिता और पुनर्वास आदि मुख्य मुद्दे होंगे।

इस फिल्म के ऑस्कर जीतने के बाद विश्व भर में वन्य पशु संरक्षण की चेतना मुखर होगी कि मनुष्य और पशु प्रकृति में एक दूसरे को क्षति पहुंचाए बिना स्नेह और सामंजस्य के साथ रह सकते हैं। इससे बड़ा कोई संदेश विश्व के लिए नहीं हो सकता और इसका आधारभूत मूल्य यह है कि पृथ्वी की रक्षा सर्वोपरि है।

आधुनिक कवियों एवं लेखकों ने भी मानव की समसामयिक समस्याओं को अपनी लेखनी से चित्रित किया है। दोहाकार कवि हरेराम 'समीप' ने कंकरीट जंगल उगाने के लिए प्रकृति के उपहार हरे भरे वनों को काटने वाले व्यक्ति को लताड़ते हुए, वर्षा चक्र से उत्पन्न पर्यावरणीय संकट की ओर इशारा किया है-

"तूं बारिश के वास्ते,

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आसमान मत कोस।

जब धरती बंजर करी,

तब न हुआ अफसोस।।"

हिंदी साहित्य की पर्यावरण चेतना तब तक अधूरी है जब तक आदिवासी महिलाएं और पर्यावरणविद इसमें शामिल ना हो आदिवासी चिंतन परंपरा में मनुष्य इस कायनात का श्रेष्ठ प्राणी नहीं है बल्कि मानव जीव जगत, वनस्पति जगत की अन्य इकाइयों की तरह एक इकाई मात्र है। असी चिंतन में एक चींटी, एक लता, एक पौधे और कीटों का भी इस पृथ्वी पर उतना ही हक है, जितना किसी इंसान का है। इसलिए जब विकास की आड़ में प्राकृतिक उपादानों जंगल, नदी, पहाड़ आदि का अंधाधुंध दोहन होता है तो आदिवासी स्वर् हुंकार भरने लगता है और उलगुलान का आह्वान करने लगता है।

पर्यावरण एवं प्रकृति रक्षण के संघर्ष में अखिल भारतीय स्तर पर विभिन्न आंदोलनों का नेतृत्व महिलाओं के हाथों में देख 'ग्लोबल गांव के देवता' उपन्यास के उपन्यासकार रणेन्द्र को एहसास होता है कि "धरती भी स्त्री, प्रकृति भी स्त्री, सरना भाई भी स्त्री और उसके लिए लड़ाई लड़ती सत्यभामा, इरोम शर्मिला, सीके जानू, सुरेखा दलबी और यहां पाट में बुधनी दी और सहिया ललिता भी स्त्री। शायद स्त्री ही स्त्री की व्यथा समझती है। सीता की तरह धरती की बेटियां धरती में समाने को तैयार हैं। शिकारी जो भी समझता रहे।"5

सारे सम्मेलनों, चेतावनियों एवं पर्यावरण सुरक्षा का विशालकाय तंत्र खड़ा करने के बावजूद भी प्रश्न ज्यों का त्यों बना हुआ है। समस्या की विकरालता घटने के स्थान पर बढी है क्योंकि जन भावनाएं जागृत नहीं की गई। प्रकृति के साथ मनुष्य के भाव भरे संबंधों का मर्म नहीं समझाया गया। इसकी सारगर्भित व्याख्या नहीं की गई। आज की वर्तमान पीढ़ी इस बात से अनजान है कि प्रकृति से उसके कुछ वैसे ही भावनात्मक रिश्ते हैं जैसे कि अपने परिजनों सगे संबंधियों से हैं।

आज का संवेदनशील रचनाकार पर्यावरण की हो रही हानि से तथा परिवर्तनों से आंखें नहीं चुरा सकता। पर्यावरण संरक्षण के प्रति सचेत करते हुए,पर्यावरण चिंताओं के प्रति पाठकों को संदेश देना अपना परम कर्तव्य समझता है।

लेखक और ब्लॉगर उमेश पंत ने लगातार 18 दिनों तक उत्तराखंड के धारचूला कस्बे के ऊपर के हिमालय

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क्षेत्र आदि कैलाश, ओम पर्वत की यात्राएं की जिसके आधार पर उन्होंने यात्रा वृतांत 'इनरलाइन पास' लिखा। उमेश कहते हैं, 'इन क्षेत्रों में नदी के बहाव वाले इलाकों में लोगों ने घर बना लिए हैं। जिस दिन नदी अपने बहाव वाले रास्ते पर वापस आएगी उस दिन वह सब कुछ बहा कर अपने साथ ले जाएगी।पर्यावरण के प्रति हो रहे इस तरह के खिलवाड़ के प्रति लोगों को मैंने इस किताब में चेताया है।'

उमेश कहते हैं, 'हाल मैं ट्रैवलिंग एक ट्रेंड के रूप में उभरा है व्यस्त दिनचर्या से समय निकालकर युवा आसपास की नदियों पर्वतों पहाड़ों को देखते हैं यदि उन्हें कहीं भी इनका नुकसान दिखता है तू भी न सिर्फ चिंतित होते हैं बल्कि आलेख यात्रा वृतांत उपन्यास आदि लिखकर दूसरों को भी पर्यावरण के प्रति जागरूक बनाते हैं।'

राष्ट्रीय पुस्तक न्यास के अध्यक्ष बलदेव भाई शर्मा कहते हैं,'पर्यावरण जलवायु परिवर्तन ग्लोबल वार्मिंग इस समय विश्व भर के लिए चिंता के विषय बने हुए हैं। लोगों को प्रकृति, पर्यावरण और जलवायु संरक्षण के प्रति जागरूक करने के लिए पुस्तक मेले की यह थीम रखी गई है इस विषय पर अंग्रेजी में कई नॉनफिक्शन किताबें और फिक्शन किताबें लिखी गई हैं मगर इन दिनों हिंदी में भी इस विषय पर लगातार काम हो रहा है।'

निष्कर्ष

मीलों तक फैले जंगलों और उन में रहने वाले वन्यजीवों को सबसे अधिक नुकसान इंसानों ने पहुंचाया है। आजादी से पहले जंगल को बचाने के लिए लोगों ने जंगल सत्याग्रह चलाया और फिर आजादी के बाद सुंदरलाल बहुगुणा के नेतृत्व में चिपको आंदोलन शुरू किया गया। साहित्य जलवायु परिवर्तन के प्रति केवल चिंता नहीं करता है बल्कि पर्यावरण के प्रति लोगों में जागरूकता भी पैदा करता है।

मानव सभ्यता यदि अभी सूचित नहीं हुई तो वैज्ञानिकों के अनुसार 30-35 वर्षों के बाद दुनिया के कई देश डूबने के कगार पर होंगे। समुद्र के बढे जलस्तर के कारण पहले बांग्लादेश म्यांमार और इंग्लैंड डूबेगा फिर भारत की बारी आएगी।

प्रकृति ने मनुष्य को अनोखी प्रतिभा, क्षमता, सर्जनशीलता, तर्कशक्ति देकर विवेकशील,चिंतनशील एवं बुद्धिमान प्राणी के रूप में विकसित किया। अतः मनुष्य का दायित्व है कि वह प्राकृतिक संसाधनों में संतुलन स्थापित करते हुए, स्वस्थ वातावरण सृजित करने को अपना प्राथमिक कर्तव्य स्वीकार करें। आज मनुष्य

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अपनी स्वार्थ पूर्ति हेतु इस मूल कर्तव्य से विमुख हो रहा है। पर्यावरणीय समस्याएं अत्यधिक औद्योगिकरण और अप्रत्याशित जनसंख्या वृद्धि का परिणाम न होकर उसके विकास की अपूर्णता का द्योतक है।

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वेदों में पर्यावरण-तत्त्व

डा.मुकेश कुमार
असिस्टैंट प्रोफेसर संस्कृत
राजकीय महाविद्यालय हिसार

भारतीय परंपरा ने सदैव ही प्रकृति से मैत्री भाव विकसित करने का उपदेश दिया है, न कि प्रकृति से द्रोह करने का। औद्योगिक क्रान्ति से प्रभावित पाश्चात्य विचारधारा ने प्रकृति का दोहन और शोषण करने की जिस विनाशकारी प्रवृत्ति को आज जन्म दिया है उसके परिणाम सम्पूर्ण विश्व के सामने हैं। पूर्व के मुकाबले आज मनुष्य ने औद्योगिक विकास, भौतिक समृद्धि और उपनिवेशवाद की अन्धी दौड़ में खनिज पदार्थ, जंगलों और वन्य प्राणियों का विनाश किया है। बड़े शहरों में आज साँस लेना कठिन हो गया है। आधुनिकता और प्रगति के नाम पर सभ्य समाज ने जिस प्रकार की जीवन पद्धति अपना ली है उसमें प्रकृति का सान्निध्य समाप्त हो गया है और जीवन में रासायनिक पदार्थों का प्रयोग निरन्तर बढ़ता जा रहा है, जिसके कारण कैंसर आदि प्राणघाती बीमारियाँ बढ़ती जा रही हैं। आम इस्तेमाल की चीजों जैसे- दाँत साफ करने का ब्रश, दन्तमंजन और प्रसाधन सामग्री के रूप में इस्तेमाल की जाने वाली प्लास्टिक की टयूबों, थैलियों से वातावरण दूषित हो रहा है। प्राचीन भारतीय जीवन पद्धति में यह ध्यान रखा गया कि हम प्रकृति से जितनी मात्रा में लें उतनी मात्रा में उसे लौटा दें।

पर्यावरण प्रदूषण के कारण तापमान में वृद्धि होने से हिमनद तेजी से पिघल रहे हैं, नदियाँ सूख रही हैं। भारत-पाकिस्तान के लिए महत्वपूर्ण सिन्धु नदी के 44.8 प्रतिशत हिमनद सूख गये हैं क्योंकि हिन्दमहासागर में भारत और पाकिस्तान के ऊपर 3 कि. मी. से ज्यादा क्षेत्र में भूरे बादल हैं जो कारखानों से निकले हुए धुएँ और जैव ईंधन से बने हैं जिनमें सल्फेट और कार्बन की अधिकता है। कहने का तात्पर्य है कि चाहे 1984 की भोपाल त्रासदी हो या परमाणु भट्ठियों के अपशिष्ट जैसे विषैले

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पदार्थों के विसर्जन से उत्पन्न बड़ी समस्या जिसका ताजातरीन उदाहरण चीन में स्थित कुकुशिमा परमाणु भट्ठी का है, इन सबके भयावह परिणाम आज सारे विश्व ने देखे हैं।

आधुनिक सन्दर्भ में सामाजिक एवं लोक कल्याणकारी चिन्तन तथा उनसे जुड़ी हुई विभिन्न अवधारणाओं को संस्कृत वाङ्मय में खोजने का प्रयास आश्चर्यजनक नहीं है। प्राचीन भारतीय परम्पराओं, रीति-रिवाजों, धर्माचरण, या धार्मिक कृत्यों में यदि हम थोड़ा सा भी अन्दर प्रवेश कर रहस्यान्वेषी प्रज्ञा से अध्ययन करें तो अपने पूर्वजों ऋषियों के प्रति, जिन्होंने प्रभुवाणी वेद के गूढ़ रहस्यों को समझकर लोक कल्याण के लिए अनेक उपाय बताये हैं, हमारा सिर श्रद्धा से झुक जायेगा।

पर्यावरणीय समस्या का सर्वप्रथम वैदिक समाधान तो हमारी आश्रम व्यवस्था में ही है, जिसमें कहा गया है कि 50 वर्ष से अधिक की अवस्था वाला कोई भी व्यक्ति नगर या ग्रामों में न रहे तथा प्रत्येक व्यक्ति को अपने द्वारा किये गये प्रदूषण को शुद्ध करने के लिए नियमित अग्निहोत्रादि यज्ञों को करते रहने चाहिए। यज्ञ में डाले हुए पदार्थ सूक्ष्मातिसूक्ष्म होकर सब जगह फैल जाते है एवं जीवन और दीप्तिकारक घृत के साथ मिलकर विभिन्न प्रकार की औषधियों एवं पर्यावरण को सुगन्धित तथा पवित्र कर देते है ।1 यथा अजश्रृंगी, गूगल, पीता, नलदी, कीटाणु, औक्षगन्धि इत्यादि के द्वारा कृमिनाश की चर्चा की गई है।2

अग्नि के द्वारा कीटाणुओं को नष्ट करने बहुत से प्रमाण हमें वेदों में मिले हैं।3 यज्ञों से न केवल पर्यावरण शुद्ध होता है अपितु वे धन-धान्य एवं पुष्टि प्रदान करते हैं।4 इसके साथ पृथिवीस्थ दोषों को दूर करने का महत्त्वपूर्ण कार्य हमारी वृक्ष-वनस्पति बड़ी ही सहजता से करती हैं। वेदों में कहा गया है कि जिस भूमि में जितनी ज्यादा वृक्ष-वनस्पति विद्यमान रहती है, वह भूमि समस्त जनों का पोषण करने में उतनी ही अधिक समर्थ होती है।5 अतः अधिक से अधिक वृक्षारोपण को बढ़ावा दिया गया है। ऋग्वेद में लिखित है कि जल में उगने वाले पौधे, आकाश, वन तथा वृक्षों से आच्छादित पर्वत प्रदूषण को कम करते हैं।6 यजुर्वेद में भी वृक्षों को दुष्प्रभावों का शमन करने वाला कहा गया है।7.8

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अथर्ववेद में कुछ पौधों, जैसे अपामार्ग को बहुत शक्तिशाली माना गया हैं इसके बारे में यहाँ तक कहा गया है कि जहाँ अपामार्ग पौधा होता है वहाँ किसी प्रकार का दुष्प्रभाव नहीं होता है।9 इसके साथ-साथ अथर्ववेद में शक्तियुक्त पौधों के नाम भी गिनाये गये हैं। 10

हमारे यहाँ आकाश को शब्दगुण कहा गया है परन्तु निरन्तर बढता हुआ शोर आकाश में ध्वनि प्रदूषण उत्पन्न कर रहा है। उसके रोकथाम के लिए ऋषियों ने अधिक शब्द न करने का उपदेश दिया था और मौन धारण को विशेष महत्त्व दिया था।11 इसके साथ-साथ यज्ञों में उच्चरित होने वाली वैदिक ऋचाओं की पावन ध्वनि से प्रदूषण नष्ट होगा, जो कि मानव की गहन चिन्ता का विषय है।

आधुनिक जगत् में व्याप्त पर्यावरण प्रदूषण की विकराल समस्या के समाधान के लिए जो साधन प्रस्तावित हैं वे एक बौनी विधियाँ मात्र हैं। जबकि उन विधियों को और बड़े स्तर पर कार्यान्वित करने की आवश्यकता है। जिसका सही मार्गदर्शन वेदों की शरण में आये बिना नहीं हो सकता। कहने का तात्पर्य है कि पहले हम भौतिकता के पीछे अपनी दौड़ का वेद के ज्ञान-विज्ञान के परिप्रेक्ष्य में मूल्यांकन करें तथा विवेकपूर्ण विचार करें कि जिन सुख-सुविधाओं के लिए हम प्रयास कर रहे हैं उनसे हम कितने सुखी हैं ? प्रदूषण को दूर करने के लिए अग्निहोत्र, यज्ञीय भावना, वृक्षारोपण, सूर्योपासना, अहिंसा की प्रकृति और संयमित जीवन जीने की कला अपनायें एवं अज्ञानतावश अगर यह प्रदूषण हमारे चारों ओर फैल गया है तो निरन्तर इसका शोधन करते रहना चाहिए जब हम द्यौं, अन्तरिक्ष, पृथिवी, जल, वनस्पति, सूर्य, ग्रह, नक्षत्र, वायु आदि में सर्वत्र शक्ति स्थापना करेंगे तभी इस प्रदूषण जैसी विकराल समस्या से निजात पाया जा सकता है। इस क्षेत्र में सभी सुधीजन थोड़ा-थोड़ा प्रयास कर रहे हैं। विभिन्न महाद्वीपों में विगत 15 वर्षों से इस दिशा में अध्ययन किया जा रहा है। किसी ने कभी इसकी कल्पना भी नहीं की थी कि एक दिन हम वर्षा के जल को प्रयोगशाला में भेजेंगे और यह जांच करायेंगे कि इसमें अम्लता कितनी है और यह अम्लता मानव, नदियों तथा भूमि की क्षमता के अन्दर है या नहीं ? वेदों में निहित अग्निहोत्र पर्यावरणीय समस्या से निजात पाने का महत्वपूर्ण उपाय है।

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वर्तमान समय में 4 देशों में अग्निहोत्र का प्रचलन काफी बढ़ा है। जिनमें चिली, अमेरिका, पोलैण्ड और जर्मनी प्रमुख हैं। अमेरिका अकेला देश है जो इस बात पर गर्व कर सकता है कि उसके देश में 9 सितम्बर 1998 से अखण्ड हवन दिन-रात चल रहा है। उसका नाम है अग्निहोत्र प्रेस फार्म मैडीसीन वर्जीनिया, जहाँ प्रथम वैदिक यज्ञशाला का निर्माण हुआ यह यज्ञशाला पर्वतीय क्षेत्र में है। जिसे आज सबसे कम प्रदूषित क्षेत्र माना जाता है। इसका उद्घाटन 22 सितम्बर 1973 को हुआ उसके बाद ही पाश्चात्त्य जगत् में अग्निहोत्र का प्रचलन बढा । चिली के एण्डीज पर्वत पर एक विशिष्ट यज्ञशाला का निर्माण हुआ है। वहाँ अनेक लोगों ने विभिन्न रोगों से मुक्ति प्राप्त की है।

पोलैण्ड में भी वैज्ञानिकों के दल ने यज्ञोपचार का प्रचार-प्रसार जोर-शोर से किया है। पोलैण्ड में 17 स्थानों पर यज्ञकर्ताओं के केन्द्र हैं। जब वहाँ अग्निहोत्र का प्रचलन शुरू किया गया तो घोषित किया गया कि मात्र वे ही आयें जो उसी दिन से यज्ञ शुरू करने को तैयार हों। उस दिन कम से कम वहाँ 200 वैज्ञानिक यज्ञ में शामिल होने आये। जबकि अग्निहोत्र हमारे भारतवर्ष की देन है और यहाँ पर इसका प्रयोग कम होता जा रहा है। पर्यावरणशुद्धि के लिए हमें वृक्षारोपण, अग्निहोत्र के अनुष्ठान तथा विषैले रासायनिक पदार्थों का सीमित प्रयोग आदि पर ध्यान देना होगा।

तात्पर्य है कि वर्तमान समय में समस्त विश्व की उन्नति और विकास के साथ-साथ उसका उत्कर्ष तभी हो सकता है जब हम सभी इस क्षेत्र में थोड़ा-थोड़ा प्रयास करें और जो प्रयास जारी हैं उन्हें और विस्तृत रूप प्रदान करें। हो सकता है इस प्रकार हम सबका प्रयास मिलकर एक बड़ा रूप धारण कर ले, जिससे विश्व अभ्युदय के सन्दर्भ में हमारी पर्यावरणीय समस्या का पूर्णतः समाधान हो जाये ।

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The environment and the economy are really both two sides of the same coin. If we cannot sustain the environment, we cannot sustain ourselves.

-Wangari Maathai

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