ISSN - 0975-2382

UPUEA ECONOMIC JOURNAL

A Biannual-Bilingual Double Blind Peer Reviewed Refereed Journal of Economics

Volume - 20 (C) Conference No. 20 (Section 4&5) 09th-11th November 2024

20th ANNUAL NATIONAL CONFERENCE

(09th - 11th November, 2024)

Demographic Transition and Social Sector Challenges in India :
Understanding Demographic Dynamics

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Agricultural Growth, Rural Poverty, and Sustainable Development

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India's External Sector Reforms and Challenges

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Exploring Tourism Opportunities and Overcoming Challenges in Uttar Pradesh and Uttarakhand

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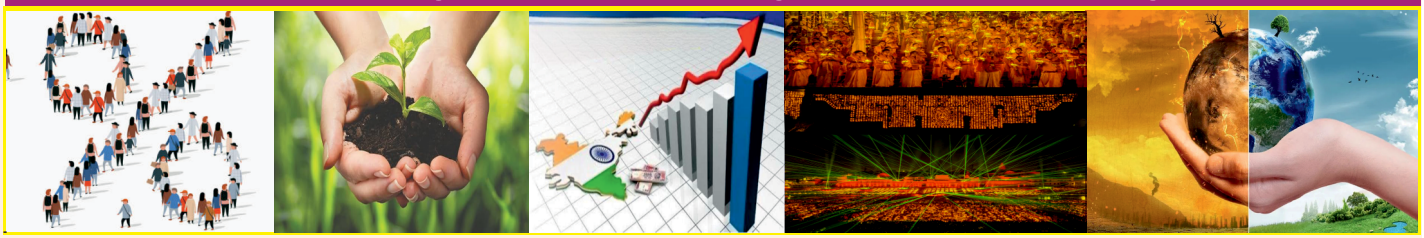
Climate Change and Environmental Degradation: A Global Challenge



Uttar Pradesh - Uttarakhand Economic Association (UPUEA)

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UPUEA ECONOMIC JOURNAL

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Office Address

H.No. 49/294, Defense Enclave-02,
Meeranpur Pinvat, Sarojani Nagar
Lucknow-226401

Correspondence Address

Prof.Vinod Kumar Srivastava
General Secretary, UPUEA,
Department of Economics and Rural Development
Dr. Rammanohar Lohia Avadh University, Ayodhya (U.P.)
Mob.No. 09415382891, 08840416781
E-mail : vksb621@yahoo.com / Website : www.theupuea.org

Organized By

KIPM College of Management, GIDA, Gorakhpur, (U.P.) India

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Uttar Pradesh (India)

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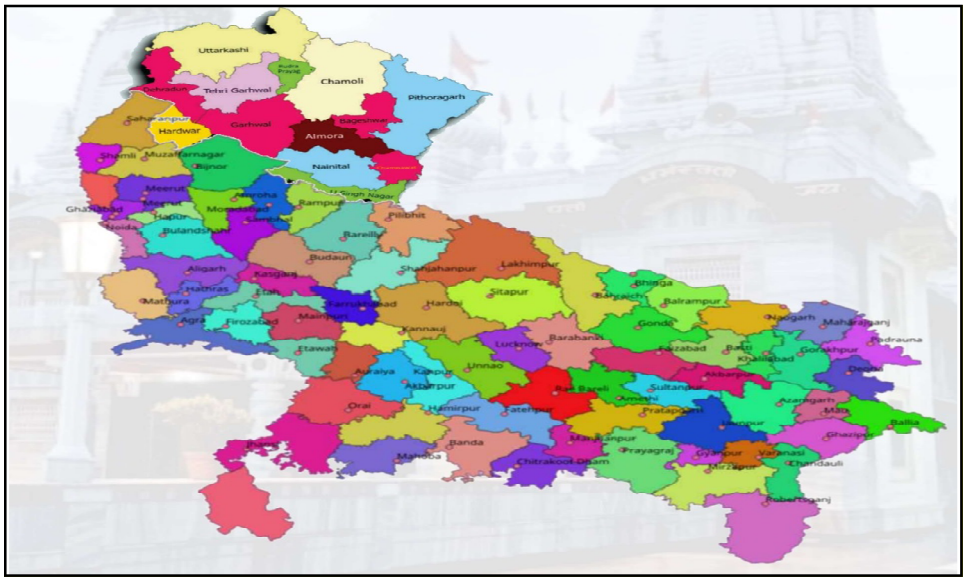
20th Annual National Conference of UPUEA



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Printed By:

RIGHT WAY PUBLICATION & DISTRIBUTION

E-1346, Gali No.14, Shri Ram Colony, Rajiv Nagar, Delhi-110094

Phones: 09235209437, 07840071472

E-mail: *rightwaypublication2015@gmail.com*

Prof. Vinod Kumar Srivastava
General Secretary
Uttar Pradesh-Uttrakhand Economic Association (UPUEA)
Former Head, Department of Economics and Rural Development
Dr. Rammanohar Lohia Avadh University, Ayodhya, (U.P.)
Mob. : +91-9415382891
8840416781
E-mail : vksb621@yahoo.com
Web. : www.theupuea.org
Upuea Society for Promotion of Economics
Registration No. LUC/00551/2022-23

Ref. No.: UPUEA/J.M/20/2024 ***Date: 05-11-2024***

From Secretary's Desk

The Uttar Pradesh-Uttarakhand Economic Association (UPUEA), established in 2005, has experienced remarkable growth, boasting a membership of two thousand seven hundred (2700) life members in less than 20 years. As a premier society of economists dedicated to promoting economic research in both states, UPUEA actively contributes to the field through the publication of research findings.

UPUEA organizes annual conferences that serve as a platform for economists to share their research, collaborate with peers, and engage in stimulating discussions. The increasing participation of delegates, paper presenters, and renowned resource persons underscores the growing significance of these events. Through its commitment to organizing high-quality events and fostering research collaboration, UPUEA plays a pivotal role in advancing economic understanding within Uttar Pradesh and Uttarakhand.

The Uttar Pradesh-Uttarakhand Economic Association (UPUEA) is gearing up for its 20th Annual National Conference, a three-day event scheduled in second week of November 2024 (i.e 09-11, November, 2024). We have received more than Two Hundred Seventy (270) Research papers under the broad theme of the conference: **"India Amrit Kaal: Paving the Way to a $5 Trillion Economy through Contemporary issues of Economy, Business, and Management."** This year's conference delves into the dynamic forces shaping the Indian economy, with a particular focus on the tourism state of Uttar Pradesh and Uttarakhand. Researchers and economists have a great opportunity to contribute their expertise by submitting papers on five key sub-themes:

- ***Demographic Transition and Social Sector Challenges in India: Understanding Demographic Dynamics***
- ***Agricultural Growth, Rural Poverty, and Sustainable Development***
- ***India's External Sector Reforms and Challenges.***
- ***Exploring Tourism Opportunities and Overcoming Challenges in Uttar Pradesh and Uttarakhand***
- ***Climate Change and Environmental Degradation: A Global Challenge***

While the acceptance of the papers for publication in the conference proceedings is a significant achievement, we have observed a tough and continuing challenge of delayed submissions. This last-minute submission often disrupts the conference schedule and compromises the quality of the proceedings. Despite our consistent efforts to communicate deadlines and expectations, we continue to receive late submissions. We understand that unforeseen circumstances may arise, but timely submission is crucial to ensure a smooth and efficient conference.

To ensure a seamless conference experience and timely publication of full papers in the Journal, we kindly request all interested members to contact the General Secretary or Organizing Secretary for any clarifications or updates. Adherence to the specified page limits will contribute to a well-organized and informative conference.

The Uttar Pradesh-Uttarakhand Economic Association (UPUEA), a decade-old organization, recognizes the need to adapt to the rapidly evolving economic landscape. As both states face new challenges, particularly in agriculture and rural development, UPUEA views this as an opportune moment for critical reflection and strategic planning. The association aims to analyze past development efforts, identify lessons learned, and formulate strategies to unlock growth across all sectors.

The Uttar Pradesh Development Report (UDR) *is a significant initiative aimed at understanding the state's development trajectory and identifying key areas for intervention.* ***The report prepared by the Association with the help of Uttar Pradesh government shall provide a comprehensive analysis of various socio-economic indicators, including poverty, education, health, and infrastructure. One of the key focus areas of the UDR is to contribute to the state's goal of achieving 'Zero Poverty.'*** *This ambitious target aligns with the broader national goal of eradicating poverty and ensuring inclusive growth. By analyzing the root causes of poverty, the UDR offers valuable insights into the policy and programmatic interventions needed to achieve the 'Zero Poverty' vision. It emphasizes the need for a multi-pronged approach that combines economic growth, social justice, and environmental sustainability.*

The UPUEA extends its sincere thanks to the numerous funding agencies and institutions whose generous support has been instrumental in facilitating conferences, journal publications, and the printing of conference proceedings. The association is also indebted to Rightway Publications, New Delhi, for their efficient and timely printing services.

(Vinod Kumar Srivastava)
General Secretary

Volume 20 (C), Conference No. 20
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THEME 4

Exploring Tourism Opportunities and Overcoming Challenges in Uttar Pradesh and Uttarakhand

Building a Sustainable Future: Tourism, Climate Change and Environmental Sustainability

Sandeep Kumar[1] & Rajni Nigam[2]

ABSTRACT

Tourism is significant contributor to the world's economy. As tourists look for out the world's attractions, they definitely take off impressions - a few advantageous, others hindering. Here, it unloads the complex relationship between tourism, the environment, and climate change, maintain the balance we must accomplish for a sustainable future. At this stage, it is fundamental to explore the pressure between the benefits of tourism and the environmental impacts. As Tourism - one of the world's biggest businesses, worth 7.6% of worldwide GDP each year - has a noteworthy effect on the environment, both positive and negative. On the one hand, it can lead to a more noteworthy appreciation for nature and preservation, as sightseers investigate flawless shorelines, lavish woodlands, and beautiful scenes. This appreciation can interpret into expanded fundings for national parks, natural life preservation, and the conservation of social legacy destinations. The carbon impression of tourism is another basic concern. Air travel, a important component of global tourism, contributes considerably to greenhouse gas emissions and therefore climate change. The aviation sector contributes around 2% of annual global carbon dioxide emissions. This opposite relationship between tourism and climate change highlights the urgent need for the sustainable practices. However, mass tourism - where the number tourists outpace an area's capacity - can harm ecosystems, disturb natural wildlife, and lead to pollution. Humans have a more significant impact on their physical environment in various ways, such as contamination, defilement, overpopulation, deforestation, burning fossil powers and driving to soil erosion, polluting air and water quality, climate change etc. As climate change rethinks the Indian tourism scene, policymakers must sanction vigorous and viable sustainable tourism policies. This tactical pivot is crucial not only for the survival of the tourism sector but also for maintaining a balance between ecological integrity and economic development, confirming a sustainable future for one of the world's most exciting tourist destinations. In other words, as the world contends with this issue, it underscores the importance of invention in sustainable travel and the necessity for a global perspective on balancing economic needs with environmental responsibility.

Keywords: *Tourism, Ecotourism, Environmental sustainability,Carbon-footprints, Climate change*

1. Professor & Head, Department of Economics, DDU Gorakhpur University, Gorakhpur (U.P)
2. Research Scholar, Department of Economics, DDU Gorakhpur University, Gorakhpur (U.P)

Introduction

An important factor in the global economy is tourism. There is no denying that tourists leave behind both positive and negative footprints as they explore the world's attractions. In this instance, it explores the delicate balance that needs to be struck for a sustainable future by dissecting the intricate relationship between tourism, the environment, and climate change. Examining the conflict between tourism's advantages and its negative effects on the environment is crucial at this point. Since tourism affects the environment significantly, both positively and negatively, it is one of the biggest industries in the world, accounting for 7.6% of global GDP annually. On the one hand, it can contribute to a greater awareness for ecology and conservation, as tourists encounter original seashores, rich woods, and appealing landscapes. This appreciation may translate into more money being allocated to national parks, wildlife refuges, and cultural heritage places. One more potentially fatal issue related to tourism is its carbon footprints. A major part of global tourism is air travel, which significantly increases greenhouse gas emissions and consequently causes climate change. It is estimated that the aviation industry provides 2% of global carbon dioxide emissions per year.

Though tourism plays a part in climate change, the sector itself is greatly impacted by global warming. Warming waters are causing coral bleaching, which puts world heritage sites like the Great Barrier Reef in danger. Popular vacation spots like the Maldives are also vulnerable to rising sea levels. Tourism and climate change have an inverse relationship, which highlights how urgently sustainable practices are needed.

But these natural treasures may potentially be under stress due to the high volume of visitors. When visitors exceed an area's capacity, it's known as mass tourism, and this can disrupt or injure native fauna, destroy ecosystems, and cause pollution. In Nepal, for instance, popular trekking routes have seen environmental degradation due to littering. Humans have a more significant effect on their natural environment in several ways, such as pollution, contamination, overcrowding, deforestation, burning fossil fuels and contributing to soil erosion, degrading air and water quality, climate change, etc. Policymakers must implement strong and efficient sustainable tourism policies as climate change reshapes the Indian tourism industry. This strategic change is critical to the survival of the tourism industry as well as the preservation of the harmony between ecological preservation and economic growth, ensuring the long-term viability of one of the most fascinating travel destinations on the planet. Stated differently, the world's challenges with this issue highlight the need for innovation in sustainable travel and the need for a global understanding of how to strike a balance between economic needs and environmental responsibility.

The Sustainable Development Goals (SDGs) of the United Nations Environment Programme (UN Agenda for 2030) are based on the shared understanding that human health and a healthy environment are interdependent and essential to the fulfilment of fundamental human rights, such as the right to life, well-being, food, water, and sanitation, quality of life, and biodiversity to ensure healthy lives and encourage well-being for all at all ages (SDG 3). This includes air quality, which is dependent on terrestrial ecosystems (SDG15), oceans (SDG14), cities (SDG11), water, cleanliness, and hygiene (SDG6), and air quality, which is dependent upon terrestrial ecosystems (SDG15), (Swain 2018; Opoku 2019; Scharlemann et al. 2020). According to the UNEP, the lack of access to

clean water and poor sanitation facilities accounts for 58% of diarrhoea cases in poorer nations, which has been linked to 3.5 million fatalities worldwide.

In this light, the present study is classified into five parts, in which part I of this paper deals with introductory area of tourism, climate change and environmental sustainability. While part II, elaborates the concept of tourism and its importance, in addition with environment friendly concept of tourism i.e. 'ecotourism'. In part III, we will see the relationship between tourism and climate change and how does tourism contribute to climate change are also illustrated. whereas part IV deals with the emerging concerns about tourism and environmental sustainability and how it generates negative impact which leads environmental unsustainability can also be visualised. In the last, part V suggests some efforts for the future of tourism, so that the balance between tourism and environmental sustainability is maintained.

Importance of Tourism

Travel is encouraged by the dynamic force of tourism to experience new customs and events, meet people, engage with values, explore cultures, and take in the beauty of the natural world. In order to grow and maintain the tourism business, tourism development attracts tourists to a particular location. Furthermore, environmental sustainability refers to the prudent, future-focused endeavour to conserve natural resources and socio-cultural legacy in order to safeguard environmental ecosystems while promoting human health and economic prosperity. Clean and green natural landscaping, abundant biodiversity, pristine beaches, vast expanses of desert steppes, sociocultural values, and archaeological heritage are all examples of how to sustainably manage the environment and demonstrate how eager the locals are to welcome tourists. As a result, the quality of sustainable and environment friendly tourism is strongly impacted by increases in tourism development and visitor arrivals. In this context, tourism expansion and environmental sustainability are viewed as interconnected paradigms.

The tourism development process and its different dynamics revolve around the nature of tourism planned for a particular destination or area, which can be specified as ecotourism, sustainable tourism, green tourism or regenerative tourism, etc. Ecotourism is "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education" (Cheia, 2013; TIES, 2015). According to the World Conservation Union (IUCN), ecotourism involves "Environmentally responsible travel to natural areas, to enjoy and appreciate nature (and accompanying cultural features, both past, and present) that promote conservation, have a low visitor impact and provide for beneficially active socio-economic involvement of local peoples". Furthermore, it is described as "responsible travel to natural areas that conserves the environment and sustains the well-being of local people" by Blangy and Wood (1993). A well-defined set of ideals, such as "environmental conservation and education, cultural preservation and experience, and economic benefits," form the foundation of the ecotourism idea.

One of the primary components of a nation's service sector is tourism and travel-related services. Tourism services can contribute to capital transfer, job creation, cultural exchange (globalization), and improved welfare in the host nation by generating the tourist flow. The World Tourism

Organization's Yearbook of Tourism Statistics states that from 522.2 billion US dollars in 1995 to over 1.86 trillion US dollars in 2019, there has been a growth in international tourism. This growth demonstrates how crucial tourism services are to a nation's ability to make money, particularly during the Corona and Post-Corona periods. Reviving green economic growth is a key subject that was discussed in the Corona era and depends on the post-Corona era. Stated differently, nations ought to strategize their comeback to green economic growth. In other words, nations should plan their return to economic prosperity while keeping environmental concerns in mind. To this goal, the tourist industry has developed a branch known as ecotourism, or sustainable tourism, which addresses environmental concerns and aims to assist governments in improving environmental protection regulations. Ecotourism is an environmentally conscious approach that opposes overtourism. According to the International Ecotourism Society, ecotourism is an effective strategy to save the environment while also improving the well-being of local communities.

However, even as more travelers embrace sustainable holidays and opt for ecologically friendly forms of transportation such as trains or electric automobiles, we cannot ignore the unavoidable emissions connected with reaching distant or remote areas. Air travel remains a significant barrier to totally green tourism. Despite gains in aviation technology and fuel efficiency, flights remain a substantial source of carbon dioxide and other greenhouse gas emissions, which contribute to global warming.

Ecotourism

Simply put, "ecologically sound tourism" or "ecologically sensitive tourism" is what is meant by "ecotourism." "Eco tourism is the responsible travel to natural areas that conserves the environment and improves the well-being of local people," according to the International Ecotourism Society. Ecotourism, then, is a type of travel centred around environment friendly travel destinations. The main themes of ecotourism include discovering new ways to live on the planet, volunteering, experiencing the local way of life, and wild life. Programs that improve the cultural integrity of the local population and reduce the negative impacts of traditional tourism on the environment are examples of responsible eco-tourism.

Ecotourism reduces the impact of tourism on a particular destination's tourism resources, including physical, social, interactive, and psychosomatic consequences. Ecotourism also requires travelers and hosts to have a positive and responsible approach to maintaining and preserving all components of the environmental ecosystem. Ecotourism shows a purpose-driven approach, with a strong emphasis on producing and providing value for the location while remaining sensitive to local environmental, political, and social challenges.

Ecotourism is built on three approaches: economics, marketing, and ecology. However, two approaches are commonly used: the human-centric approach and the bio-centric approach. The human-centric approach assumes that man is superior. This perspective emphasized that God empowered man to use nature, which was given to him for the purpose of meeting his needs. The biocentric approach undermines human primacy. It sees man as merely a link in the larger ecological system. This is built on the principles of mutual trust and respect.

Tourism and Climate Change

Climate change is both a global and a local issue. Its impacts are felt all throughout the world, including India. Climate change is aggravated by rising temperatures, irregular monsoons, and a rise in the frequency of extreme weather events, which are transforming not only landscapes but also travel patterns and business tactics across the country. Climate change has a significant impact on ecosystems' ability to mitigate life-threatening events such as maintaining water quality, controlling water flows, unbalancing temporal weather and glaciers, displacing or eradicating biodiversity, wildfire, and drought. According to research studies, advocated that exposure to natural environments is correlated with mental health, and proximity to green space is associated with lowering stress and minimizing depression and anxiety. Furthermore, pollution, over-exploitation of natural resources, climate change, invasive and displacing species, and other factors all have an impact on the ecosystem. As a result, providing clean air and water, hygienic locations, and green areas improves quality of life by reducing mortality, increasing value-added productivity, and ensuring mental health. Climate change, on the other hand, exacerbates environmental health risks by causing disruptions in terrestrial ecosystems, oceans, biodiversity, and availability to safe drinking water.

In recent millennia, climate change has emerged as a major hazard to human survival. Many countries have regional and international gatherings on environmental and climate change issues. Regardless of environmental concerns, population expansion, and a lack of control over greenhouse gas emissions, industrialization has been the most significant driver of the climate change challenge. Chao and Feng (2018) emphasize human activity as the primary source of climate change, stating that this challenge poses a threat to life on Earth. Woodward (2019) suggested that climate change concerns include rising global temperatures, melting polar ice caps, and severe disease outbreaks. Therefore, in order to manage and reduce the risk of global change, immediate regulations and solutions are required.

One of the main worries is that tourism significantly fuels climate change by doing the following: (i) Emissions from aviation: (ii) A rise in energy usage: (iii) Transportation between locations: (iv) Emissions from cruise ships: (v) Using non-renewable resources excessively (vi) Carbon sequestration and land use.

To combat environmental problems, countries around the world have attempted to develop and execute a variety of environmental policies collectively or individually over the last few decades. International agreements such as the Paris Agreement of 2015, the Kyoto Protocol of 1997, the Montreal Protocol of 1987, and the Vienna Convention on the Protection of the Ozone Layer of 1985 can be addressed, with the primary goal of integrating the international community's goals and motivations in response to the world's environmental threats. However, a collection of earlier studies, such as Zheng et al. (2017), Takashima (2018), and Roelfs ema et al. (2022), stressed the inefficiency of these global agreements, particularly after the United States exited the Paris Agreement on June 1, 2017. The primary reason for this inefficiency has been the need for nations to be more motivated to fulfil their international commitments related to environmental challenges. To achieve their objectives for environmental protection, many governments have attempted to develop and execute green policies, but they only view the threat posed by climate change as something that affects their own borders. In keeping with sustainable development, these policies include green

financial ones (green taxes, green subsidies), green monetary ones (green loans, green financing), and green cultural and social ones. A sustainable economy, zero-carbon economy, green economy, or eco-friendly economy is the ultimate aim of various green initiatives. According to Lee et al. (2022), the green economy is a broad term that includes services, agriculture, and green industries. Given how deeply environmental sustainability permeates social interactions and existence, the service industry ought to give it more consideration.

In summary, while tourism can bring economic benefits to many regions, its role in climate change cannot be ignored. Sustainable and responsible tourism is crucial to mitigate these adverse effects on our environment.

Tourism and Environmental Sustainability

The appreciation of the environment calls for broader concern to companies and individuals worldwide toward environmental sustainability while travelling. Back in the 1980s, ecotourism was viewed as little more than tourists enjoying themselves in nature while learning about environmental preservation. However, the idea of ecotourism has evolved significantly in the twenty-first century, incorporating the vital components of environmental preservation, promoting economic growth, and participating in social inclusion to support human rights, cultural preservation, and pertinent ethical problems. Generally speaking, the tourism sector generates cash for the hotel, food, and beverage, transportation, and guiding services industries, as well as new jobs and company venture formation that contribute significantly to the economic prosperity of the host country. Nevertheless, the ecology suffers as a result of unsustainable tourism. The majority of critics think that tourism is harmful. Numerous incidents that highlight the negative effects of a large influx of tourists to a place that degrades the environment are frequently reported in the news. The effects of noise pollution, deteriorating air quality from driving, activities associated to lodging that pollute water, and waste production that results in the loss of biodiversity are evident. Thus, the idea of ecotourism aids in the development of the host community's economy while also teaching visitors about their duty to preserve the environment.

In 1992, the International Union for Conservation of Nature acknowledged that tourism posed a threat to the environment. The authorities insist that a sustainable approach to tourism development is necessary. Three key principles—culturally acceptable, economically feasible, and ecologically sensitive—must be implemented for the sustainable growth of ecotourism: suitable planning, integrated management, and inclusive management. On the other side, highlights the interdependence of three difficulties with ecotourism: safeguarding the environment, avoiding locals' exploitation, and honouring the social and cultural customs of the host community. The foundation of the tourism industry's sustainability is community-based ecotourism, which emphasizes environmental, social, and cultural sustainability and is essential to overcoming obstacles. The local population is knowledgeable about cultural practices, environmental issues, and means of subsistence in addition to protecting the natural environment and its resources.

Without the individual, environmental sustainability cannot be achieved; therefore, people must become more conscious of their surroundings. Multi-institutional support is essential to the success of ecotourism development. Based on data and conclusions, opinions regarding ecotourism are

divided around the globe. According to researchers, ecotourism cannot flourish if the local population is not empowered, creating possibilities and educating the locals about tourism. Another issue facing ecotourism is the shrinking amount of natural resource area due to population growth. In such a scenario, the application of ecotourism policies and concepts is utterly failing.

In many instances, the growth of ecotourism has also contributed to the expansion of the local economy by driving up the demand for local services, goods, and handicrafts from the region's farmers and producers. Positive word-of-mouth and those connected to the livelihood sector gradually develop chances for the livelihood sector. This is encouraging since it shows that those who were smuggling timber and fishing are switching to ecotourism because it's a more lucrative industry. With the goal of educating tourists about all issues, the proper and conceptual interpretation of ecotourism explains how all problems related to tourism are solved by ecotourism, including economic development, environmental awareness, poverty reduction, and cultural preservation. This is because tourism has a negative impact on the environment in many ways, such as damage to the natural environment, water scarcity, waste management problems, light and noise pollution, and the invasion of non-native species.

The Future of Tourism

There are possibilities and problems for the tourism industry in the future. The need to manage travel's environmental impact is become more pressing as it expands globally. The sector needs to change to become more sustainable so that people can continue to enjoy the planet's beauties while it is preserved. The following are some ways that eco-friendly or sustainable tourism might lead the way:

The following: conservation and community-based tourism; renewable energy and green infrastructure; carbon offsetting and eco-friendly transportation; eco-tourism and responsible travel.

How people can lessen the impact they have on the environment when they travel.

People are becoming more conscious of the effects that travel has on the environment and are searching for ways to reduce their carbon footprint while still taking use of the advantages of seeing new locations. Making better decisions when driving is only one aspect of sustainable travel; other factors include preparation and awareness of your actions' effects. Travelers can lessen the detrimental effects of tourism and help preserve the environment by implementing eco-friendly activities. The practical actions people can take to lessen their travel-related environmental impact are listed below:

- select environmentally friendly lodging
- use public transit,
- minimize waste,
- respect local species,
- minimize carbon emissions,
- travel light, be energy-conscious,
- avoid over tourism hotspots
- educate others as well as yourself

The combined efforts of all parties involved—governments, corporations, communities, and tourists—will determine the direction of tourism in the future. Regulations encouraging sustainable behaviours, such carbon levies on flights and more stringent environmental requirements for travel agencies, must be put in place by policymakers. Companies in the tourism sector need to make sustainability a fundamental operating tenet, not merely a marketing gimmick.

It is important to give local communities the authority to control tourism in a way that protects their natural and cultural assets while also benefiting them financially. Travelers need to have a responsible mindset as well, realizing that every trip has an impact and adopting decisions that will reduce environmental harm.

The tourism sector has a clear choice going forward: either embrace environmental sustainability or suffer the long-term effects of climate change and environmental degradation. The travel sector can take the lead in establishing a future where tourism and the environment coexist peacefully by making investments in green infrastructure and encouraging ethical travel behaviours.

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Rediscovering Ayodhya: Evaluating the Economic Boom and Cultural Revival through Religious Tourism

Prof. Vinod Kumar Srivastava[1]

ABSTRACT

Ayodhya, the birthplace of Dasaratha Nandan Maryada Purushottam Lord Shri Rama, has been important in the field of Indian tourism since ancient times, where not only national but also global tourists have been coming with faith in God. In Uttar Pradesh, Ayodhya is one of the various important religious tourist destinations of India, which plays an important role in generating employment, income and livelihood for the local residents and also contributes an important role in the development of State as well as National Economy. The aims of the present study are to analyze the impact of religious tourism on economic development in Ayodhya and to examine the effects of religious tourism on cultural heritage and community identity in Ayodhya. The present study is based on qualitative observations and secondary data analysis. The data has been analysed using appropriate statistical tools. This research study will prove useful for researchers, industrial experts and policy makers working in various fields.

Keywords: *Religious Tourism, Economic Boom, Employment, Ayodhya, Uttar Pradesh.*

1. Introduction

India is a country that imbibes the spirit of unity in diversity and has taught peace and harmony to the entire world. India is a country that has a confluence of different religions and calls for a culture of brotherhood. India is a country that imbibes the spirit of unity in diversity and has taught the whole world the lesson of peace and harmony. India is a country that has a confluence of different religions and invokes the culture of brotherhood. Ayodhya district located in central Uttar Pradesh is known as a confluence of religious tourism and cultural and historical heritage. Ayodhya is unique as one of the most ancient and sacred places in India. This city is included in the major pilgrimage sites of Hinduism and is especially known as the birthplace of Lord Rama. According to religious texts, Ayodhya is described as the holy capital of the Satyuga, which was ruled by Lord Rama, the seventh incarnation of Lord Vishnu. Ram Janmabhoomi Temple is located at this site, which is visited with great reverence by crores of Hindus and other devotees. Apart from Hinduism, Ayodhya is also important for the followers of Jainism, as it is considered to be the birthplace of

1. Professor, Department of Economics and Rural Development, Dr. Rammanohar Lohia Avadh University, Ayodhya, (U.P.) Email: vksb621@yahoomail.com

Lord Adinath (the first Tirthankara). Similarly, Ayodhya is also associated with Buddhism and Sikhism. The major religious places here include Hanumangarhi Temple, Kanak Bhawan, Laxman Fort, and the banks of the Saryu River, which are the center of spiritual energy for the followers of Hinduism.

The study focuses on the growth of religious tourism and investment in Ayodhya, where the construction of the Ram temple has increased the number of pilgrims. This development has led to increased employment and economic opportunities in the hotels, transportation, and other associated sectors (Maheshwari, 2024). The domestic and foreign tourist arrivals in Ayodhya have increased rapidly after the inauguration of the Ram temple. The tourism surge has had a positive impact on local business, hotel industry, and job creation, boosting economic growth Mishra, A. (2023). The expansion of Ayodhya airport and railways has increased tourism access in Uttar Pradesh. The study shows that new transportation facilities have brought positive changes to local businesses and the increased number of tourists has increased regional income (Mathur, 2023). Religious tourism created the new jobs opportunities and growth of local businesses. The study shows that improvements in the management of religious sites and the travel services industry have enabled regional economic development (Mehra, 2023). The religious tourism has increased after the Covid-19 pandemic in India. According to the data, 1.5 crore people have visited to Ayodhya Temple since the consecration ceremony (The Economic Times). A study that examined the relationship between religious tourism and regional economic growth found that areas with pilgrimage sites experience an increase in local business, infrastructure development, and employment opportunities (Chand and Chauhan, 2016). Government initiatives to promote religious tourism playing a significant role in economic development. Infrastructure projects and marketing efforts provide significant economic benefits to the local economy (Sharma, 2022).

A study by Das and Roy (2021) focused on the environmental and economic impacts of religious tourism. The study discussed economic benefits such as employment and business opportunities as well as environmental challenges, indicating the need for environmentally sustainable tourism practices. According to the study, religious tourism promotes infrastructure development, especially in terms of road improvements, sanitation, and public amenities (Verma, 2020). Better infrastructure not only enhances the tourist experience but also improves the quality of life of local residents. A study by Gupta and Kaur (2019) found that cities associated with religious tourism experience an increase in hospitality, transportation, and retail businesses, providing economic stability to local small and medium businesses.

Anantharaman (2019) discussed the cultural and economic exchanges generated by religious tourism. In Ayodhya, tourist arrivals promote local handicrafts, leading to preservation of cultural heritage and economic development. The religious tourism leads to sustained tourist traffic, which supports the local economy by generating jobs and increasing demand for local products and services (Singh, 2018). Kumar (2017) studied the employment generation potential of religious tourism in Uttar Pradesh. It was found that pilgrimage sites are major sources of permanent and temporary employment, providing employment opportunities in the hospitality, retail and transport sectors,

especially for the youth. Mehta (2015) showed in his study that religious tourism increases income generation opportunities, which helps low-income families. This indicates that tourism income can reduce economic inequalities around religious sites.

Objectives of the Study

- To analyze the impact of Religious Tourism on Economic Development in Ayodhya.

2. Research Methodology

The present study is based on qualitative observations and secondary data analysis. The data has been analysed using appropriate statistical tools.

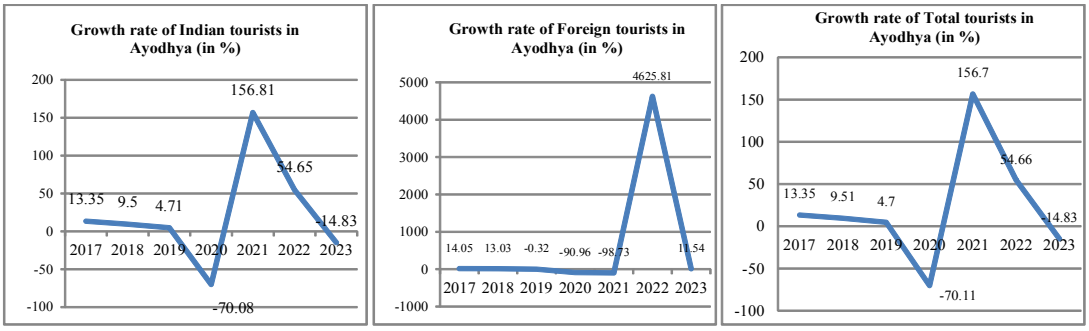
3. Results and Discussion

Table 1: Growth rate of Tourists in Ayodhya (in %)

Year	Growth rate of tourists in Ayodhya (in %)		
	Indian	Foreigners Growth	Growth
2017	13.35	14.05	13.35
2018	9.50	13.03	9.51
2019	4.71	-0.32	4.70
2020	-70.08	-90.96	-70.11
2021	156.81	-98.73	156.70
2022	54.65	4625.81	54.66
2023	-14.83	11.54	-14.83

Source: https://uptourism.gov.in/en/article/year-wise-tourist-statistics

Figure 1: Growth rate of Tourists in Ayodhya (in %)



Source: Table 1

A fluctuating trend of Indian and Foreign tourist growth has been found in Ayodhya. According to the data, the growth rate of Indian tourists in Ayodhya was 13.35 percent in 2027 which declined to 9.5 percent, 4.71 percent and -70.08 percent in 2018, 2019 and 2020 respectively. In 2021, it was increased by 156.81 percent after that it declined to 54.65 percent and 14.83 percent in 2022 and 2023 respectively.

According to the trend of foreign tourists, the growth of foreign tourists in Ayodhya was 14.05 percent in 2017. It was declined to 13.03 percent, -0.32 percent, -090.96 percent and -98.73 percent in 2018, 2019, 2020 and 2021 respectively. In 2022, it increased to 4625.81 percent after that it again declined to 11.54 percent.

The trend of growth rate of total tourists in Ayodhya shows that it was 13.35 percent in 2017 which declined to 9.51 percent, 4.7 percent and -70.11 percent in 2018, 2019 and 2020 respectively. In 2021, it increased to 156.7 percent after that it again declined to 54.66 percent and -14.83 percent in 2022 and 2023 respectively (figure 1).

Due to religious tourism, lakhs of devotees come here every year, which not only preserves the cultural heritage but also strengthens the local and regional economy.

- **Increase in employment opportunities:** Due to the increasing influence of religious tourism, the demand for hotels, guest houses, restaurants, and other services has increased in Ayodhya. Due to this, local youth are getting employment opportunities, which are strengthening their economic condition.
- **Increase in demand for local products:** Pilgrims buy various types of souvenirs, worship materials, and handicraft products in Ayodhya. This increases the income of local artisans and traders and also promotes regional products.
- **Infrastructure Development:** To promote religious tourism, the government has improved roads, transport facilities, and sanitation system here. The development of this type of infrastructure not only provides convenience to the devotees but also improves the standard of living of local residents.
- **Source of income:** Taxes, fees and other means received from pilgrims provide a major economic contribution to the municipal corporation, which provides funds for the development work of the city.
- **Improvement in services and facilities:** With the expansion of religious tourism, the level of health services, cleanliness, and other infrastructure also improves. This also provides better health services and facilities to the local people.

4. Conclusion

This study makes it clear that religious tourism is a significant contributor to economic and cultural development in Ayodhya. Despite fluctuations in tourist growth rates in recent years, Ayodhya has consistently attracted millions of pilgrims, thereby contributing significantly to regional economic development. The influx of domestic and foreign tourists has boosted demand for services such as accommodation, food and transport, thereby creating employment opportunities for local youth.

Additionally, the prosperity of the tourism sector has increased the demand for local products such as handicrafts and puja-samagri, thereby supporting artisans and small businesses. Given the growing interest in Ayodhya as a spiritual destination, improvements in infrastructure such as roads, transport facilities and sanitation by the government have also improved the quality of life of residents. Revenue generated from tourism-related taxes and fees has provided the local administration with the necessary resources for development work in the city, ensuring a sustainable economic base.

This research shows that religious tourism not only preserves and promotes the cultural heritage of Ayodhya but is also an important driver of economic progress and social upliftment, helping Ayodhya strengthen its identity as a spiritual and economic hub in Uttar Pradesh.

5. Suggestions

Ayodhya, as an ancient religious and cultural heritage, is currently moving towards economic advancement and cultural revival through religious tourism. It is necessary to develop this city not only as a tourist destination but also as a rich cultural center so that the tourists coming here can get better facilities and the local people get new employment opportunities. Some important policy suggestions are being given in this direction, which can give new direction and momentum to the tourism of Ayodhya.

- **Improvement in infrastructure for religious tourism:** Keeping in mind the increase in the number of tourists, it is necessary to improve the infrastructure. Convenient transportation, cleanliness, modern facilities for accommodation, and security arrangements are needed. Also, training programs can be conducted for employment of the local community.
- **Promote local craftsmanship and handicrafts:** Support local artisans and handicrafts to increase income through tourism. Brand local textiles, crafts, and products and provide them an opportunity to sell around attractive tourist destinations.
- **Integrate cultural tourism with religious tourism:** Emphasis on preserving the historical and cultural sites of Ayodhya and linking them with religious tourism. Include cultural sites in the Ramayana Circuit and other religious routes.
- **Adopt environmentally friendly policies:** It is important to take care of the environment at the tourist destination. Encourage plastic-free zones, recycling programs, cleanliness drives, and eco-friendly accommodation facilities so that tourism development does not harm the environment.
- **Priority to local businesses:** Give special incentives to small and local businesses so that a large part of the income from religious tourism remains with the local people. For this, they can be provided financial support, training, and market access by the government.
- **Organizing religious festivals:** Promote tourism by organizing religious and cultural festivals in Ayodhya. Celebrating Diwali, Ramnavami, and other festivals on a large scale can attract global attention.

- **Connect NRIs:** Use the religious identity of Ayodhya to connect NRIs to this project. This will also provide financial assistance and help in attracting foreign tourists.
- **Cultural education and awareness campaign:** Educate the local community and tourists about the importance of Ayodhya by conducting educational programs and awareness campaigns on its cultural and religious heritage.
- **Use of modern technology under the Smart City project:** Make tourism facilities available on digital platforms by connecting Ayodhya to the Smart City project. This will make it easier for tourists and create a systematic system.
- **Security and disaster management:** Strengthen disaster management and security system to ensure the safety of tourists at religious tourist places.

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Role of Religious Tourism in Sustainable Development of Uttarakhand

Dr. Swati Tamta[1], & Dr. Vivek Kumar[2]

ABSTRACT

Religious Tourism has been prevalent around the world since ancient times and has economic as well as cultural importance. It plays a significant role in developing countries such as India, which have a rich, multi-cultural and religious heritage. Religious Tourism must be promoted in a manner that is in tune with India's agenda to achieve SDGs. Uttarakhand, a state in northern India, is renowned for its spiritual heritage, natural beauty, and religious significance. Religious tourism, encompassing visits to holy sites, temples, and pilgrimage routes, plays a significant role in the state's socio-economic and environmental landscape. Here's an in-depth look at how religious tourism contributes to sustainable development in Uttarakhand. This study is divided into sections - First section discusses the methodology and data used, followed by a section on the significance and sustainability concerns of religious tourism in Uttarakhand. In the second section, the case of religious tourism economy in the hill states of Uttarakhand is discussed; and concludes.

Keywords: *Sustainable Development, Religious Tourism, Hill Tourism, Uttarakhand.*

Background

It is refers to meeting the needs of the present without compromising the ability of future generations to meet their own needs. In the context of Uttarakhand, it involves balancing economic growth with environmental conservation and social equity. Tourism in Uttarakhand encompasses a range of experiences, from adventure sports and nature excursions to spiritual retreats and cultural explorations. Legions tourism is a major aspect of Uttarakhand tourism industry, driven by its status as a sacred destination for Hindus and Buddhists Significant Religious Sites (Rawal & Sah, 2017).

Religious tourism, also generally referred to as faith tourism, is a form of tourism, where people take a trip individually or in groups for pilgrimage, missionary purposes (Sati, 2015). For e.g. the world's biggest form of group religious tourism takes place yearly at Hajj pilgrimage in Mecca, Saudi Arabia. According to Uttarakhand draft tourism visited the state as part of pilgrimages and

[1] Assistant Professor, Department of Economics, Shaheed Mahendra Singh Bhakuni Rajkiya Mahavidyalaya Dugnakuri (Banlekh), Janpad Bageshwar - Uttarakhand

[2] Assistant Professor, Department of Sanskrit, Shaheed Mahendra Singh Bhakuni Rajkiya Mahavidyalaya Dugnakuri (Banlekh), Janpad Bageshwar - Uttarakhand

religious visits while 43.6% of the tourists came for holidays and sightseeing. Religious tourism has a big future in Uttarakhand. Uttarakhand is richly gifted with ancient temples and religious festivals. Religions originating in India, be it Hinduism, Sikhism, Jainism or Buddhism, have a vivacious culture and spiritual philosophy. Together, they present a practical, alternative way of life as compared to the greediness and altercation widespread it the West.

Tourism is one of the vital industries and plays a important in achieving the socio-economic goals of a state. It is motivated by the innate urge of all human being for new experience, adventure, education, knowledge and entertainment. It is significant service-oriented segment which has made quick strides worldwide in terms of gross revenue and foreign exchange earnings. Tourism meets the varied interests and requirements of domestic and international tourists. It facilitates trade and commerce between diverse regions of countryside and also between different countries. As an outcome, over the years, it has acquired the position of a service industry.

Objective

1. Religious tourism contributes to sustainable development in Uttarakhand.
2. Aspect of Uttarakhand tourism industry.
3. Residents to raise living standards and social ties in communities**.**

Methodology

The present study is based on the secondary data published by various agencies and organizations. The present study makes use of data and information provided by, UNWTO, Ministry of Tourism, and Ministry of Statistics and Program me Implementation, Newspapers, Magazines, Books, Economic journals and Internet etc.

Cultural Preservation-

- **Conservation of Heritage:** Religious tourism contributes to the preservation of cultural and historical heritage. Pilgrimage sites often include ancient temples, rituals, and festivals which are maintained and celebrated due to the influx of tourists.
- **Promotion of Local Crafts:** Pilgrims often buy local crafts and souvenirs, which supports traditional artisans and encourages the continuation of local craftsmanship.
- **Char Dham Yatra:** A pilgrimage circuit that includes Yamunotri, Gangotri, Kedarnath, and Badrinath. This yatra is considered a sacred journey that attracts thousands of pilgrims annually.

Table 1: Number of pilgrims visited Char Dham Yatra.[1]

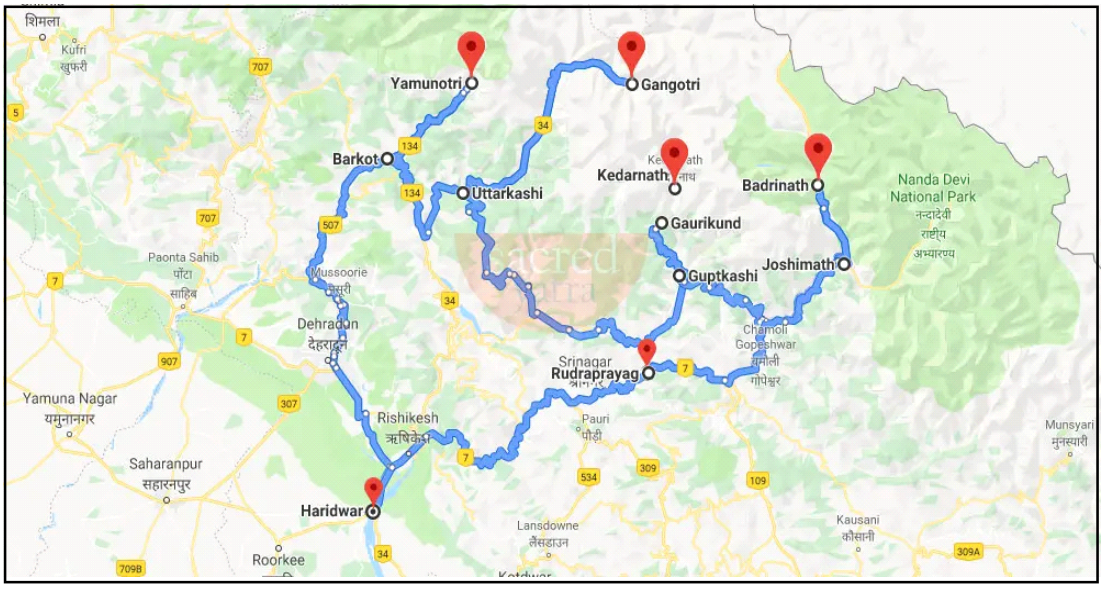
S.NO	Char Dham Name	Visited
1.	Kedarnath	2,46,820
2.	Badrinath	1,20,757
3.	Yamunotri	1,25,608
4.	Gangotri	1,12,508

Source: https://www.indiatvnews.com/news/india/char-dham-yatra-2024

[1] https://www.indiatvnews.com/news/india/char-dham-yatra-2024

- **Haridwar:** A major pilgrimage destination where the Ganges River leaves the Himalayas and enters the plains. The Ganga Aarti performed here is a key spiritual experience (Rawat, 1989).
- **Rishikesh:** Known as the "Yoga Capital of the World," is a hub for spiritual practices and retreats.
- **Hemkund Sahib:** A high-altitude Sikh pilgrimage site surrounded by beautiful landscapes.

Figure 1: Char Dham Yatra Route[2]



[2] https://www.sacredyatra.com/chardham-route-map

Char Dham Yatra 2024 experienced a significant influx of devotees, welcoming an impressive more than six lakh (6,40,000) visitors to Badrinath, Kedarnath, Gangotri, and Yamunotri within a mere ten days. Notably, Kedarnath Dham has seen a remarkable turnout of over 2.50 lakh devotees.

Impact of Religious Tourism

1. Positive Impacts:

- **Economic Benefits:** Boosts local economies through pilgrim spending on accommodation, food, and transportation.
- **Cultural Exchange:** Promotes the sharing of religious and cultural practices.
- **Spiritual Fulfillment:** Provides opportunities for personal growth and spiritual experiences.
- **Infrastructure Development:** Improving facilities to handle large crowds without damaging the environment.

- **Visitor Management:** Implementing systems to manage visitor flow and minimize environmental impacts.
- **Preservation Efforts:** Ensuring that religious practices and sites are maintained and respected (Sharma, 2019).

2. Negative Impacts:

- **Environmental Strain:** Large crowds can lead to littering, pollution, and damage to natural sites.
- **Overcrowding:** High visitor numbers can lead to congestion, especially during peak pilgrimage seasons.
- **Commercialization:** The commercialization of sacred sites can sometimes undermine the spiritual experience.

Economic Benefits

- **Revenue Generation**-Religious tourism generates significant revenue for Uttarakhand. Pilgrims and tourists spend money on accommodations, food, transportation, and souvenirs. This influx of money supports local businesses, including hotels, restaurants, and shops, thereby boosting the local economy.
- **Job Creation**-The tourism sector creates employment opportunities for residents. These jobs span various sectors, including hospitality, transport, and local crafts. For instance, temple management requires staff for maintenance, services, and security, while local artisans benefit from the sale of religious artifacts and souvenirs.
- **Infrastructure Development**-To accommodate the needs of tourists, infrastructure such as roads, bridges, and public facilities are developed or improved. This infrastructure not only benefits tourists but also enhances the quality of life for local residents.

Cultural Preservation

- **Heritage Conservation**-Religious tourism promotes the preservation of temples, sacred sites, and traditional practices. Efforts to maintain and restore historic temples and pilgrimage routes help conserve cultural heritage for future generations (Kumar & Singh, 2021).
- **Cultural Exchange**-Tourists' interest in religious practices fosters cultural exchange. Visitors learn about local traditions, rituals, and festivals, which can promote mutual understanding and respect among diverse communities.

Suggestions

- Launch a mobile app which will show distance and time to reach the destination and all about how to opt for the tour. Packages that are available and what all amenities are provided in it.

- Connectivity is the most important factor. Till now only road connectivity is there. Government should look into the feasibility of rail facility as well.
- Marketing is significant factor now days. It should be advertised on the digital media to increase awareness about the options available for religious tourism in Uttrakhand. Information on accessible tourism destinations and products in Uttrakhand may be collected and published in English as well as major Indian languages for wider diffusion. This will definitely increase the revenue.
- Developing integrated infrastructure for religious tourism development.
- Pricing of religious tourism products should be considered.

Conclusion

Uttarakhand offers a rich tapestry of experiences for tourists, from breathtaking natural landscapes to profound spiritual journeys. Balancing these opportunities with sustainable development practices is crucial for the long-term health of the region. By focusing on eco-friendly tourism, community involvement, and responsible visitor behavior, Uttarakhand can continue to thrive as a premier destination for both adventure and spiritual enrichment.

Religious tourism in Uttarakhand contributes significantly to the state's sustainable development by boosting the economy, preserving cultural heritage, supporting environmental conservation, and aiding community development. However, to maximize these benefits and mitigate potential negative impacts, it is crucial to implement effective management strategies and sustainable practices. This holistic approach ensures that the benefits of religious tourism are enjoyed by current and future generations while preserving the region's unique cultural and natural resources.

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Challenges in India: Tourism Sector

Savitri Yadav[1], Priya Chaturvedi[2] & Dr. Rajesh Singh[3]

ABSTRACT

The tourism industry plays a crucial role in India's economy. It supports various sectors including hospitality, transportation, and local crafts. Jobs in hotels, restaurants, and travel services are created, providing employment opportunities and contributing to local and national economic growth. It creates jobs, strengthens the local economy, contributes to local infrastructure development and can help to conserve the natural environment and cultural assets and traditions, and to reduce poverty and inequality. India has been ranked in the 10th position for the contribution of its travel tourism sector towards GDP. The contribution has been 6.8% of the total GDP.Additionally, for 2018–2028, the total contribution to GDP will be around 7.1% annually. Tourism Challenge is an annual opportunity for tourism industry professionals and volunteers to familiarize themselves with the outstanding attractions and neighborhoods in the region. As well as environmental pollution caused by travel and traffic, air pollution also causes damage to buildings and noise pollution is an issue in busy resorts with lots of night life. Pollution is also caused by tourists producing litter. This study is related to the tourism sector challenges in the tourism business management domain throughout the nation. In this research work, I have used a qualitative research approach, so that I must get the insight of the tourism sector challenges. It has been observed by the challenges faced by the tourism economy. These challenges need to be addressed in order to make the Indian economy stronger.

Keywords: *Tourism sector, Hospitality, Ttransportation and Local crafts etc.*

Introduction

The tourism industry plays a crucial role in mobilizing India's economy. Blessed with a wealth of diverse landscapes, rich cultural heritage, and numerous historical landmarks, India draws millions of visitors, both from within the country and abroad. Whether it's the vibrant urban centers like Delhi and Mumbai, spiritual retreats such as Varanasi and Rishikesh, or the serene natural beauty of Kerala's backwaters and the Himalayan Mountains, the nation offers a wide array of tourist experiences. As per the Ministry of Tourism's data, tourism accounted for nearly 6.8% of the country's GDP in 2019 and generated employment for over 39 million people, making it a critical sector for economic growth and job creation.

[1] Asstt. Professor in Management department, KIPM, Gorakhpur, (U.P.)

[2] Asstt. Professor in Management department, KIPM, Gorakhpur, (U.P.)

[3] Asstt. Professor in Management department, ITM, Gorakhpur, (U.P.)

LITERATURE REVIEW

The Role of Tourism in Economic Development

Tourism has been recognized as a powerful mobilizes of economic growth, particularly in developing countries. According to the World Travel and Tourism Council (WTTC), tourism is a key supporter to GDP and employment, often acting as a stimulus for infrastructure development and foreign exchange earnings. In India, the sector contributed nearly 6.8% to the national GDP and employed 8% of the workforce as of 2019, reflecting its pivotal role in the economy (WTTC, 2019). However, several scholars argue that India's tourism sector is under performing due to a series of structural challenges.

Over-tourism and Environmental Concerns

Another major challenge is over-tourism and the resulting environmental degradation at popular tourist destinations. India is home to 40 UNESCO World Heritage Sites, many of which suffer from over-crowding. The Taj Mahal, for instance, attracts millions of visitors annually, resulting in fatigue on local resources and damage to the surrounding environment (Verma, 2019). Over-tourism also threatens vulnerable ecosystems in areas like the Western Ghats and the Andaman Islands.

The environmental impact of tourism has led to calls for more sustainable practices. Sharma (2020) argues that eco-tourism could provide a solution to balancing tourism growth with environmental preservation. However, lack of awareness and insufficient regulatory oversight continue to hinder sustainable tourism development in India.

Workforce and Skill Development Issues

A skilled workforce is crucial for delivering high-quality tourism experiences. However, as Chakraborty (2018) notes, India's tourism and hospitality sectors suffer from a shortage of skilled labor, particularly in rural and semi-urban areas where tourism is growing. The lack of formal training programs and low wages in the sector have resulted in high employee turnover and inconsistent service quality, which ultimately diminishes the tourist experience.

Government initiatives such as the Hunar Se Rozgar Tak (HSRT) scheme have attempted to address these skill gaps by providing vocational training. Nonetheless, the training programs are often poorly coordinated and insufficiently tailored to the diverse needs of the industry (Sundararajan, 2021).

RESEARCH METHODOLOGY

Research Design

In this study we use qualitative research design, by using both secondary data analysis and case studies to explore the major challenges which are faced by India's tourism sector. The main aim is to provide a comprehensive understanding of these issues and propose actionable solutions. The

study is based on a combination of existing reports, government documents, academic literature, and industry-specific data to build a detailed analysis of the sector's shortcomings.

Data Collection Methods

1. **Secondary Data:** Government Reports: The primary sources of data include reports from the Ministry of Tourism, the World Travel & Tourism Council (WTTC), and the World Economic Forum's Travel & Tourism Competitiveness Index. These reports provide statistics on India's tourism performance, infrastructure status, employment figures, and international comparisons.
2. Industry Reports: Reports from tourism industry bodies, such as the Federation of Hotel & Restaurant Associations of India (FHRAI), and international bodies, including the United Nations World Tourism Organization (UNWTO), we also analyze to understand the global positioning of India's tourism sector.
3. **Case Studies**: Specific case studies of key tourist destinations such as Goa, the Taj Mahal, Kerala, and the Himalayan regions we analyzed to illustrate the on-ground challenges and potential strategies for overcoming them. Each case study highlights issues such as over-tourism, infrastructure problems, and sustainable tourism practices.
4. **Comparative Analysis:** The research also compares India's tourism sector with the neighboring countries like Thailand and Sri Lanka, focusing on their policies, infrastructure, and marketing strategies to identify areas where India can improve.

Data Analysis

The data collected through secondary sources we analyze using a qualitative approach recurring identify challenges that hinder the growth of the tourism sector. Key areas such as hospitality, transportation, infrastructure, environmental sustainability, workforce development, and regulatory frameworks were critically examined. A SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis was also conducted to assess India's current position in the global tourism market and identify opportunities for growth and development by sustainable practices.

Challenges in India's Tourism Sector

India has great potential for tourism; several challenges prevent the industry from growing as much as it could. These challenges range from poor infrastructure and environmental problems to a lack of skilled workers and complicated government rules. Below, we mention the main issues affecting India's tourism sector.

1. Poor Infrastructure

One of the biggest problems facing by tourism in India is the lack of good infrastructure. Many tourist spots, especially those in rural or remote areas, have bad roads, unreliable public transportation, and not enough hotels or guesthouses. While cities like Delhi and Mumbai have better infrastructure

but many smaller towns and villages, which could be great tourist attractions, are difficult to reach and lack basic facilities such as clean water, proper sanitation, and consistent electricity are also missing in many tourist place. Although the government has launched many initiatives to improve tourism infrastructure, progress has been slow, and many areas remain underdeveloped.

2. Overcrowding and Environmental Damage

Another issue is overcrowding at famous tourist attractions, which harms both the sites and the environment. For example, millions of tourists visit the Taj Mahal every year, causing damage to the monument and the surrounding area. Overcrowding is also a problem in places like the Himalayas and the Western Ghats, where too many tourists lead to pollution and environmental damage. Uncontrolled tourism also harms natural habitats, forests, and wildlife. There's a need to adopt sustainable tourism practices, which would help protect these areas while still allowing visitors to enjoy them.

3. Seasonal Tourism

Many tourist destinations in India are seasonal, meaning they only get visitors at certain times of the year. Hill stations like Shimla and Manali, for example, see large crowds in the summer but a rest of the year are quite. This creates problems for local businesses, which depend on tourism but struggle to survive during the off-season.Tourism that is concentrated in just a few months puts a lot of pressure on local resources during peak season, while the infrastructure and services remain underused for the rest of the year. Finding ways to attract visitors year-round is a key challenge for the industry.

5. Lack of Skilled Workers

India's tourism and hospitality industries face a shortage of skilled workers. Many tourism-related jobs, especially in rural areas, don't offer formal training or good wages, leading to high employee turnover and poor service quality. This, in turn, affects the overall tourist experience. Developing a well-trained workforce is essential for providing better services and improving tourist satisfaction.

6. Competition from Other Countries

India faces strong competition from neighboring countries like Thailand and Sri Lanka, which have developed their tourism industries more effectively. These countries offer better infrastructure, lower prices, and a wider variety of tourist experiences, attracting more international visitors. Even though India has a rich cultural heritage and diverse landscapes, it struggles to compete with countries that have better marketing strategies and a more developed tourism industry. India needs to improve its global presence and tap into niche markets like adventure tourism, and eco-tourism to remain competitive.

RESULT & DISCUSSION

Understanding the Challenges

The challenges in India's tourism sector are complex. Poor infrastructure, like bad roads and a lack of hotels, makes it hard for tourists to visit. When too many people visit popular places, it can hurt those sites reduce their charm. Additionally, many tourist spots only get visitors during certain seasons, which create problems for local businesses and resources.

Complicated rules and safety concerns make it difficult for tourists and businesses alike. The shortage of skilled workers affects the quality of service, which can lead to a less enjoyable experience for visitors. When you add in tough competition from nearby countries, it becomes clear that the tourism industry in India has a lot of challenges to overcome.

Implications for the Tourism Sector

These challenges can have serious consequences. Economically, if tourism is not performing well, it can mean less money for local businesses and governments, which hurts the economy as a whole. Communities that depend on tourism may face job instability, especially in areas that only get visitors during certain times of the year.

Environmental damage from tourism can also have long-lasting effects. It can hurt ecosystems and make life harder for local people who rely on those resources. Therefore, fixing these problems is crucial not just for tourism but also for sustainable development that helps local communities and protects the environment.

Proposed Solutions

To tackle these challenges, we need a multi-step approach:

1. **Improve Infrastructure:**

- The government should invest in better transportation, more hotels, and essential services in tourist areas. Public and private partnerships could help develop these areas more effectively..

2. **Encourage Year-Round Tourism:**

- Creating marketing campaigns that attract visitors during off-peak seasons can help balance out the tourist flow. Organizing events and activities during different times of the year can bring in more visitors.

3. **Simplify Regulations:**

- Making it easier for businesses to navigate rules and regulations can encourage more investment in tourism. A friendlier business environment will attract both local and foreign investments.

4. **Invest in Workforce Development:**

- Expanding training programs for tourism-related jobs can help develop a skilled workforce. Working with schools and industry leaders can ensure that training matches what the market needs.

5. Enhance Marketing Efforts:

- Creating a strong marketing strategy that showcases India's unique attractions can help attract international tourists. Focusing on special areas like adventure tourism or cultural experiences can help India compete better with other countries.

Future Scope Future research could explore specific case studies of successful tourism initiatives in India and other countries, focusing on best practices that can be adapted. Additionally, studies could look into the impact of digital marketing on tourism growth and how technology can improve visitor experiences. Examining the long-term effects of tourism on local communities and the environment could also provide valuable insights for sustainable development.

By addressing these challenges and focusing on solutions, India can unlock the full potential of its tourism sector, benefiting local communities and preserving its unique cultural and natural assets.

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Economics of Rangoli Folk Arts: A Study with Reference to Eighth Divya Deepotsav in Ayodhya

Dr. Sarita Dwivedi[1]

ABSTRACT

The art of Rangoli is a traditional Indian floor decoration, is believed to have originated in India during the pre-Aryan period, some 5,000 years ago. The earliest references to rangoli are found in Indian epics and treatises on painting, including the Chitra Lakshana and the Mahabharata. Dry rangoli traces back to Lopamudra's drawings of sacred symbols. The wet version is believed to originate from an instance in the Ramayana when Sita first fell in love with Lord Ram. She used ground rice paste to make patterns on the floor and offered a prayer to the goddess Gauri to grant Ram as her husband. An Attempt is also made to present ***an overview of the "Economics of Rangoli Folk Arts: A Study with reference to Eighth Divya Deepotsav in Ayodhya"****. The paper is divided into four Sections. Section first covers a brief Introduction on the theme. Second section deals with, Research Implications, Hypothesis and Methodology, Section third is related to Divya Deepotsava in Ayodhya and Economics of Rangoli Folk Arts: An Analysis. Finally, the paper concluded in the fourth section with some possible policy interventions for economic improvement of Rangoli folk artist life with behavioral analysis of the data.*

Keywords: *Rangoli, Divya Deepotsav, Folk Arts, Designs, Panchatatva Infrastructure, Economics, Lopamudra, Development, Ayodhya.*

Introduction

Rangoli, which means rows of colours, is drawn on the entrance and filled with colours during Diwali. Rangoli designs are created using the thumb and forefinger. It is drawn to welcome guests and different Gods and Goddesses and to bring joy into homes. Lopamudra was the wife of a sage called, Augustya Rishi. She also wrote 2 portions of the Rigveda (famous holy books). She and her husband lived in a remote place, away from others. People would describe them as hermits. Lopamudra wanted to help her husband in worshiping the gods, so she started to make rangoli, a decoration for the Yagyakunda. Yagyakunda is what we call a place of worship. Lopamudra asked the Panchatatva i.e. five elements –

- Sky
- Wind

1. Assistant Professor, Department of Fine Arts, Dr. Rammanohar Lohia Avadh University, Ayodhya, Uttar Pradesh (India)

- Water
- Earth
- Fire

She was able to collect blue from sky, green from water, black from soil, red from fire and white from wind. She then added these colours to the rangoli (made from ground rice, lentils, flowers and spices) which is why they look so beautiful today. Rangoli Colours Blue represents the sky and green represents the sea. Both colours bring calm and helps with using our imagination. These are good colours for story-telling. Black brings strength and stability. Red, the colour of fire or danger, represents the code of conduct the artist must follow. White represents peace and positivity and embodies all colours. All of these colours in Rangoli bring in elements that we wish for in the New Year, when celebrating Diwali. ***There are two types of Rangoli: dry Rangoli introduced by Lopamudra and wet Rangoli introduced from Mata Sita (from The Story of Rama and Sita). When Sita fell in love with Ram, she ground some rice and prepared rangoli and prayed to the Goddess Gauri (wife of Shiva) to grant Ram as her husband.*** The Rangoli prepared for Diwali is the dry Rangoli created by Lopamudra. In different parts of India, there are different stories surrounding the origin and use of Rangoli as given below are -

In Gujrat, when Lord Krishna (a supreme god, widely worshipped in India) settled down in Dhwarika, his wife,Rukmani, started the rangoli pattern. In Gujarat Rangoli is called Satiya because Krishna is the Satiya (partner) of Rukmani.

- West Bengal - Alpana
- Orissa – It is called Joti which is put in front of Lord Jaganath
- Chattisgarh - Chouk Purna
- Karnataka - Rangoli
- Maharastra - Sanskara Bharati
- Tamil Nadu - Kolam.
- Uttar Pradesh-Chouk Purna

Section: II

Research Implications, Hypothesis and Methodology

This study explores the religious, socio- economic implications of Rangoli Folk Arts in the economic growth of related artist. In-depth analysis has been done on religious folk arts based employment & Income generation for Rangoli artist. The present study provides the ample opportunities for the empirical research, data analysis, and gives the valuable suggestions for policy formulation regarding Rangoli Folk Arts Progress. The study of Economics of Rangoli Folk Arts: A Study with reference to Eighth Divya Deepotsav in Ayodhya is important not only for the academic purposes but also for the local communities and policy makers of the state to protect our religious traditional culture.

Review of Literature

The study revealed that Rangoli Folk Arts is a key driver of religious traditional Art protection and development in Ayodhya on the basis of Ramayana. It plays an important role in the development of the economy of Uttar Pradesh. Most of the Rangolis are made in Gujarat. In this context only geometrical compositions are made, Rangoli is a slightly modern form of Mandans. Rangoli symbols are also found in Harappa and Mohenjodaro. Rangoli is also one of the sixty-four arts described in Vatsayana's Kama Sutra. It is a very ancient folk art, the people of ancient times believed that artistic rangoli paintings protect our property and keep the village full of money. With this belief, they used to depict rangoli on various religious and social occasions, which was later accepted as custom. But they used to depict Rangoli, which later became accepted as a tradition. There are many such fasts and pujas in which Rangoli was made even before the era of Aryans.

Rangoli Folk Arts accelerates the capitalization in the regional economy. The study elaborated that the promotion of Rangoli Folk Arts infrastructure and related scheme on various festival occasion can help to accelerate the economy of Uttar Pradesh. The study evaluated that attention of policy makers in accelerating tourism by renovation of Kashi Vishvanath corridor and construction of Ram Mandir accelerates the economic growth through Artistic Folk Rangoli in Uttar Pradesh. Attractions of tourist places in Uttar Pradesh boost the economy by creating reinvestment and employment opportunities in the state with religious and traditional rangoli folk arts. (Agarwal, 2022). The study attempted to examine the implication of cultural mobilization on society, religion and community in Uttar Pradesh.

According to Anand Kumar Swami, the modern folk art of Bengal is related to the art of Mohenjodaro. According to scholar Gurudutt Sahay, the middle of the rangoli that Bengali women make was considered to be a representation of the lotus flower at the time of Mohenjodaro. Some scholars are of the opinion that Rangoli has come to our culture from the Austrian people like the Munda people, who used to live in our country many years before the arrival of Aryans. According to him, Rangoli has been prevalent since the agricultural era. People of the agricultural era believed that Rangoli has the magical effect of Gods and Goddesses, due to which the ghosts and spirits run away and the harvest is good.

Rangoli has been a symbol of religious and cultural beliefs. Rangoli is considered an important part of spiritual activities. This is the reason why altars are built in all types of Havan and Yagya and Rangoli is made from it. The tradition of cleaning the house and courtyard every morning and making rangoli by plastering it still exists in the villages, one of the reasons for which is the feeling of land purification and prosperity. Rangoli is also a kind of philosophy of life which teaches people the art of living in the present. Just as people know that this rangoli will be washed off tomorrow, still women make rangoli with full concentration, so that the purpose of today is fulfilled. In the same way, a person should stop worrying about tomorrow and live today with full devotion.

Research Gap

Several studies based on Rangoli Folk Arts development has been conducted by the various scholars on traditional social, religious, cultural and political issues in Ayodhya. There is no such

study focusing on the **Economics of Rangoli Folk Arts: A Study with reference to Divya Deepotsav in Ayodhya** Therefore, it is required to analyze the **Economics of Rangoli Folk Arts** & its role in the development of regional economy.

OBJECTIVE OF THE STUDY

To examine the Economics of the Rangoli Folk Arts in Eighth Divya Deepotsav in Ayodhya.

Hypothesis

H^1 – Positive Relationship between Rangoli Folk Arts and Artist Income & Employment.

H^2 –Government Policies Needed for Sustainable Improvement in Rangoli Folk Arts through modern innovation.

DATA AND METHODOLOGY

The present research study is based on primary and secondary data analysis. Primary data and information has been utilized based on behavioral observations with 200 hundred household survey in four zones of Ayodhya. The secondary data on various parameters have been utilized including official government statistics, reports from tourism boards, academic studies, and other relevant sources. The internet and various websites have also been utilized as the digital source of data.

Section: III

Divya Deepotsava in Ayodhya and Economics of Rangoli Folk Arts: An Analysis

In Ayodhya, Rangoli Chowk is called Purna, in which well-wishers are used. Rangoli is inspired by folk art of any region of India. For this reason, its elements are public and its objective is public welfare. Rangoli is made with auspicious symbols on special festivals. These symbols keep getting passed on from generation to generation. The main symbols of Rangoli are Kalash, fishes, lotus flower, mango leaves, swan, peacock, parrot, bird, vine, human figure etc. Rangoli made on special celebrations and festivals is easily available everywhere as a symbol of that celebration and festival. That is why it is popular among people of every class, like wood sawdust, rice flour, charcoal, burnt soil, powder of dried leaves etc. First of all, the background for Rangoli is cleaned and plastered and Rangoli is made on it, which is mostly made in the middle of the courtyard. The corners are decorated with vines and boots. There is a tradition of making Rangoli on the main gate, puja post and also on the altar of Yagya.

Rangoli Just as we make mandana on the occasion of Deepawali with the help of lime color, hirmich and ochre, similarly rangoli is made. The main difference between the two is that lime and ochre are used in the mandanas. While rangoli is made by mixing different types of clay colors well in water, mixing Fevicol in them by brushing. If Fevicol is not added to the colors, the colors will remain raw and will spoil them by getting on our hands and feet. The practice of making Rangoli is

no longer limited to just worship, fasting and festivals. In many places, women make rangoli at the entrance of the house every day with great passion and enthusiasm. Swastika, lotus, footprints of Goddess Lakshmi etc. are depicted in Rangoli, which are considered indicators of happiness, prosperity and good wishes. Rangoli has today become a part of modern families by preserving the customs and traditions from generation to generation. Apart from the rangoli made for the purpose of home decoration, the rangoli made is considered a symbol of human spirit. In this way it is a reflection of cultural sentiments.

The Divya Deepotsav was started in Ayodhya in the year 2017. With the beginning of the Deepotsav Artistic Rangoli, a symbol of auspiciousness, started being made on a large scale. With each Divya Deepotsav, fine arts expert teachers and research students made various technology based experiments. Various types of artistic and beautiful rangolis have been created. Inspired by the changing form of Rangoli art on the auspicious occasion of Divya Deepotsav Diwali, the Tourism Department, Uttar Pradesh Government, Lucknow also organized a funded competition for making artistic rangoli on the occasion of Divya Deepotsav, in which the creator of an excellent rangoli based on the title of Ram Katha will be given cash prize. In which the fine arts students and other artists showed great interest in the economics of folk rangoli art and people actively participated in the making of atractive Rangoli through different techniques, which mainly resulted in Rangoli of flowers, Rangoli of dry colors, Rangoli of lime and cow dung, Rangoli of paint, Rangoli of grains, Rangoli of lamps etc. were prominent.

"8th Deepotsav is the first 'Deepotsav' after the Pran Pratishtha of Ram Mandir in Ayodhya, and every effort has been made to give grandeur and divinity to this programme. Many things will be made to create new records this year. Apart from this, we will also perform Aarti with 1,100 diyas at the Sarayug Ghat with 1,100 Vedacharyas. That too will create a new record in the Guinness Book of World Records."Earlier, chief minister Yogi Adityanath extended an invitation for everyone to join the grand event and witness the record-breaking display of diyas.

The Economics of Folk Rangoli Art has become wider with every festival of lights. On the auspicious occasion of Diwali, almost every Hindu Sanatani family has been making rangoli in some form or the other in their homes, certainly today every house in the Avadh region has some or the other. In this form, Rangoli art is reaching as a symbol of auspiciousness, in which it is natural to be a businessman of Rangoli folk art. ***In the eighth Divya Deepotsav, 3D impact based beautiful rangoli was created in about 4225 square feet with about 81000 burning lamps, In which the expenditure incurred on the use of necessary major materials was approximately Rs 150,000 Only.***

If the cost involved in making the said rangoli is mixed with the Happiness Index, then it is definitely many times more than the cost involved in making the satisfaction achieved. If the social media based marketing of the grand rangoli made is assessed, then the cost involved in making it is definitely many times less or Cost appears negligible. In this perspective, one fact is clearly reflected that through this type of Rangoli creation, the artists doing Rangoli work get income and employment opportunities. Folk artists earn from ¹ 200 to ¹ 5000 for each artistic Rangoli work depending on the size of their Rangoli art creation. During the research survey, I brought 200 families of Ayodhya within the ambit of questionnaire based research who have been experts in making Rangoli art in some form or the other.

The present research paper is based on " Rangoli Folk Arts of Ayodhya City", in which Rangoli have been used to accept the sentiments of the people in the form of stories as well as to present the popular stories based on various festivals and festivals in visual form. In the presented research work, the availability of resources and its flexibility in the selected area has also been analyzed in the order of the subject by statistical methods. After the research problem, many important decisions are taken till analysis and selection, like what should be the research problem? Which technique should be used for analysis? How should the data be collected? How to test hypotheses etc. The presented research paper is based on "Rangoli Folk Arts" of Ayodhya city. In this we have compiled research material through interviews, literature chapters and self-survey photography.

In the research method, research material has been collected through interviews, visit to Ayodhya city and photography etc. In the interview, 200 selected families of Ayodhya city were interviewed which are related to Rangoli Folk Arts arts and they have information about the history, culture, civilization and art of Ayodhya. Also such families of the selected area who are involved in Rangoli Folk Arts were interviewed. They are earning their living by getting business from various fields. During the interviews, the required information was obtained by meeting the rural women of Ayodhya about the form, history and meaning of the Rangoli Folk Arts here. During the self-survey, photography of folk paintings was also taken for research, which reveals the complete form of Rangoli Folk Arts of Ayodhya.

The average size of the family in Ayodhya is 7.02 persons, in which the average of male, female and children below 10 years are 2.13, 2.17, 2.72 per family respectively. 0.98 acres of land holding is available to support this average family. During the survey, it was seen that the selected families in this area were benefited from the programs conducted for the commercialization of Rangoli folk arts. These people have accepted the importance of the currently developing form of Rangoli folk arts. From the point of view of employment and income generation, people have been getting employment throughout the year through various festivals of folk religion through Rangoli folk arts. On an average, 1.95 persons per family are employed in Ayodhya, in which the average of female employment (0.99) is higher than that of males (0.96). From the point of view of employment generation, Rangoli folk arts have been successful in generating employment. As a result of religious fairs and festivals, all the members of the family, men, women and children, remain engaged in some public work throughout the year.

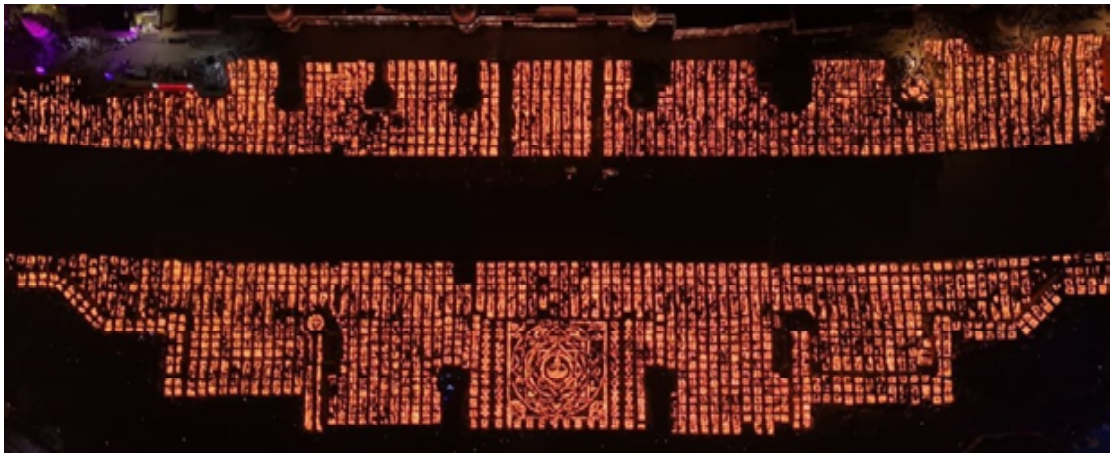
From the study of the areas, localities and families selected for the survey, it has been concluded that all the families surveyed in the selected localities are folk Rangoli images. Must have benefited in some way or the other from programs related to various disciplines of folk Rangoli art. It is clear that in Ayodhya, the average working days available per person in a year due to festivals, religious rituals, pujas, fasts etc. and fairs, haats, exhibitions and workshops is 150 days respectively. The people in this area are employed through folk Rangoli programs and for the remaining days, people work in their fields or at other places. Talking about the income in Ayodhya, an average income of Rs 33375 per person is earned in a year through the commercialization of various forms of folk Rangoli art, i.e. Rs 2781 per month. It is clear from the above explanation that in the Ayodhya region, various genres of Rangoli folk art have strengthened the ancient religious ideology on the surface, while the form of these arts has increased the income of the people by providing them employment opportunities. As a result, the standard of living of the people has improved.

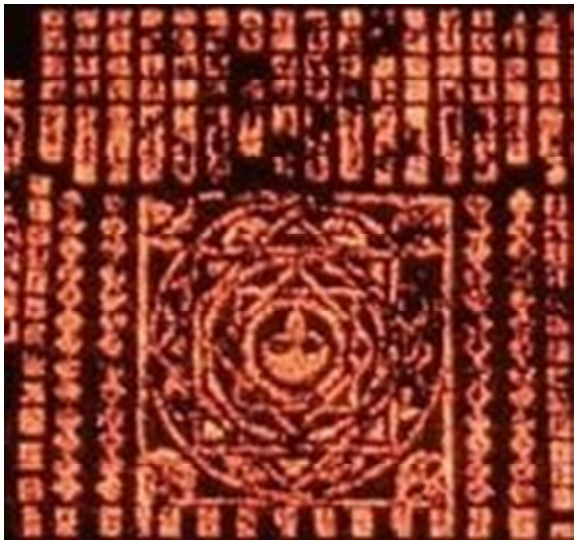
During the survey, when asked about the religious and mythological importance of the selected Rangoli folk art, 95 percent of the families said it was very important while 5 percent did not have any clarity. During the self-survey, when the selected families were asked about the relationship between agricultural produce and folk festivals, 65 percent of the families said that there was a positive relationship while 35 percent of the families did not give any logical answer about this relationship. During the survey, when people were asked about the importance of Rangoli folk art, 78 percent people accepted the importance of Rangoli folk art, while 22 percent people said that all the arts were important.

During the survey it was found that about 90% of the people get opportunity based income from rangoli making, which mainly includes flower rangoli, grain rangoli chowk purna, dry color rangoli, paint rangoli etc. During the survey, 40% people told that this is their ancestral profession, especially they belonged to Mali community. During the survey, the fact clearly came out that the percentage of female participants in Rangoli making work was around 95%. It is clear that the average employment received by women in creating Rangoli art was higher than that of men.

A grand Artistic Rangoli was made in the eighth Divya Deepotsav at Ghat No. 10, Ram Ki Pari, Ayodhya, in the shape of which about 81000 lamps were used. This rangoli was made 65 feet long and 65 feet wide. To make it, the entire area was divided into 169 blocks of 5^{ft} x 5^{ft}. This rangoli is perfection of Avadh folk art. In this rangoli, each shape made has its own meaning and importance. The circular shape is the symbol of the Entire Universe, the square shape is the symbol of Every House in the Universe and the lamps scattered on this shape are the symbols of all the living beings of the universe and the lamps in this rangoli are A shape has been made which shows that On the occasion of the Lord arrival the entire universe and all the living beings living here welcome you by lighting lamps, you do good to everyone, for welfare of everyone. In My direction with the cooperation of Fine Arts faculty & 150 students created this artistic Rangoli after a week of tireless efforts, this artistic Rangoli was the center of attraction of the eighth Divya Deepotsav.

Graphics of Artistic Rangoli created with Eighty one thousand (81,000) Burning Lamps





Source: 8th Divya Deepotsava, Ram ki Pari, Ayodhya, Uttar Pradesh-Dated: 30-10-2024 (Self Survey)

Main Features of "8th Deepotsav

- Deepotsav 2024, a five-day festival, celebrates Lord Rama's return to Ayodhya and draws millions of devotees and tourists, showcasing Ayodhya's cultural and spiritual significance.
- Over 30,000 volunteers are mobilised to support the lighting of 28 lakh diyas across 53 ghats, with prominent areas like New Ghat, Old Ghat, and Bhajan Sandhya being primary locations for the festivities. Chief Minister Yogi Adityanath, Union Minister Gajendra Singh Shekhawat, and other key officials are expected to attend, highlighting the event's significance.
- A team from Guinness World Records is overseeing the Deepotsav festivities, aiming to set two records: a 1,100-person Saryu Aarti and the lighting of 28 lakh diyas. This marks the first Deepotsav since the Ram Temple's construction. On Tuesday, a 30-member team led by Guinness World Records consultant began counting the diyas across the 53 ghats of the Saryu using drones.
- An elaborate Shobha Yatra is planned with 18 tableaus and artists from six countries and 16 Indian states participating, amplifying the event's cultural diversity.
- The 'Ek Diya Ram ke Naam' initiative encourages virtual diya lighting via the Divya Ayodhya app, while Ayodhya's growth in tourism and business adds a festive spirit to the celebrations.
- To ensure safety, around 10,000 security personnel, including undercover officers, have been deployed, and 17 key routes leading to Ram Ki Paidi are restricted to pass holders only. LED screens have been installed for live viewing, accommodating the crowds with arrangements for 5,000-6,000 people, while additional viewing points across the city ensure widespread access.

- Special low-soot lamps are being used to raise environmental awareness, and the Animal Husbandry Department has committed to lighting 1,50,000 "Gau Deep" for the occasion.

Section: IV

Conclusion and Suggestions:

Rangoli art has also changed with time. Rangoli is made in two ways – wet and dry. Among these, one is made by free hand and the other is made by connecting the dots. In Rangoli made with dots, first the design of the Rangoli is decided with the help of dots. After that the design is completed by joining the points. After that they fill them with the desired color. In rangoli made with free hands, shapes are made directly on the surface with ocher and chalk. It can also be made colorful with colors available in the market. Scientific developments and technological experiments are bringing radical changes in life. In such a situation, how can the field of Rangoli folk art remain untouched by these? Folk arts can prove to be very helpful in breaking superstitions and beliefs that hinder progress.

Only the psychological and cultural basis of folk arts can play an effective role in this direction. Folk arts should also be used at a non-commercial level as a medium to convey our cultural values to the general public. Efforts to establish Rangoli folk art at a commercial level are on the rise today. This will give fame and glory to folk art. In short, we should not only engage in displaying folk arts on external stage, but should also use them in the role of self-discovery, then the field of Rangoli folk art will definitely be filled with independent consciousness. There will be neither exploitation nor selfishness. Rangoli folk Art can develop only in a stress-free environment and its significance lies in being stress-free.

8th Divya deepotsava in Ayodhya is a historic first as after 500 years, Lord Ram is now in his abode in Ayodhya for Diwali. This is just the beginning and this beginning has to reach its logical conclusion. So by 2047, when the country celebrates 100 years of its independence, Kashi and Mathura must also shine like Ayodhya," This is why we are here today for this grand celebration,.The tableaux, which moved along the Ram Path, featured performances by classical dancers from across the country. Locals welcomed the procession, showering it with flower petals. Officials said that an order for the diyas has been placed with the local artisans. The Deepotsav will feature performances by artists from Myanmar, Nepal, Thailand, Malaysia, Cambodia, and Indonesia and a staging of Ram Lila from Uttarakhand.

Most of the people took the beautiful rangoli made in the eighth Divya Deepotsav in Ayodhya as the basis and made it in their homes. During the research survey, it was found that artistic rangoli is capable of generating employment and income, there is a need of marketing based commercialization of this art in which the role of government becomes important. If we have to make Rangoli art progressive by preserving it as our religious and cultural heritage, then by making it progressive with new innovations based on encouragement in the government policies, can be protected .The present Yogi government of the state is committed to preserving its religious, cultural and mythological Rangoli folk art, in which the Divya Deepotsav of Ayodhya is playing an important role.

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Prospects of Employment Generation Through Tourism Development in Uttarakhand

Swarnika Aggarwal[1], Dr. Anugrah Rohini Lall[2]

ABSTRACT

Uttarakhand's stunning landscapes and cultural heritage position it to leverage tourism for economic growth and job creation. This paper examines the opportunities and challenges in the state's tourism sector, focusing on sustainable and localized employment. Despite its potential, the sector faces challenges like environmental degradation, poor infrastructure, and seasonal fluctuations, making employment uncertain.

Using a mixed-methods approach, the study draws insights from local stakeholders. It finds that tourism offers significant employment, especially for women and youth, but requires strategic interventions. Key recommendations include improving infrastructure, promoting sustainable tourism, and developing local skill-building programs.

By addressing these challenges and capitalizing on its strengths, Uttarakhand can turn tourism into a key driver of job creation. Collaboration among the government, businesses, and communities is essential for achieving sustainable growth and preserving the region's heritage.

Keywords: *Tourism, Employment, Infrastructure, Seasonality, Uttarakhand*

1. INTRODUCTION

Tourism development is a crucial driver of economic growth and employment generation, particularly in regions rich in natural beauty and cultural heritage. Uttarakhand, located in the northern part of India, offers a unique landscape of the Himalayas, pilgrimage sites, and diverse wildlife, making it an attractive destination for domestic and international tourists. The state's focus on sustainable tourism development aims to create employment opportunities across various sectors, including hospitality, transportation, and local handicrafts. With a growing emphasis on responsible tourism, Uttarakhand seeks to balance economic benefits with environmental preservation, ensuring that tourism development does not compromise the region's ecological integrity. Employment generated through this sector has the potential to reduce migration from rural areas by providing

[1] Research Scholar (Economics), Department of Humanities and Social Sciences, Graphic Era Deemed to be University, Dehradun.

[2] Assistant Professor, Department of Humanities and Social Sciences, Graphic Era Deemed to be University, Dehradun.

local livelihoods, thus contributing to regional stability and economic resilience. By leveraging its natural and cultural assets, Uttarakhand can enhance its tourism infrastructure, promoting community-based tourism models that ensure a fair distribution of economic gains among local populations. These efforts align with sustainable development goals, fostering a tourism industry that supports long-term environmental stewardship while offering diverse employment opportunities to the residents. Exploring the prospects of employment generation through tourism development in Uttarakhand thus requires a comprehensive understanding of the interplay between sustainable practices and economic growth, emphasizing the importance of policy frameworks that support eco-friendly tourism while driving job creation.

2. LITERATURE REVIEW

Allan, M., Williams., Gareth, Shaw. (1988), In his Paper- Titled, "Tourism: candyfloss industry or job generator? The literature on tourism employment highlights its critical importance and the complexities involved in analysing it, particularly in the context of Uttarakhand. While official predictions often appear overoptimistic due to evolving industry dynamics, employment levels in tourism are inherently variable, influenced by both sectoral and regional factors. Seasonal fluctuations significantly impact retail turnover and employment stability, necessitating a deeper investigation into the employment trends within tourism-related sectors. Furthermore, the organization of production in the tourist industry adds another layer of complexity, emphasizing the need for comprehensive research to fully understand the multifaceted nature of employment generation through tourism development. Overall, the interplay of these factors underscores the necessity for further exploration into the nuanced employment landscape shaped by tourism in Uttarakhand and beyond.

Kukreti. (2010), In his pape Titled- Human Resource Practices in Hotels: A Study from the Tourist State of Uttarakhand, India. highlights a significant discrepancy between employee satisfaction and working conditions within the hotel industry. While employees report being satisfied with their compensation, they express considerable dissatisfaction with the working environment, which contributes to a high turnover rate. This situation is exacerbated by a lack of adequate training and persistent recruitment challenges, suggesting a critical need for improved human resource practices. Addressing these issues is essential not only for enhancing employee retention but also for fostering a more productive and positive work atmosphere in the hospitality sector. By prioritizing both compensation and working conditions, hotels can create a more sustainable workforce and improve overall operational performance.

Vishwambhar, Prasad, Sati. (2013).In his Paper- Titled- "Tourism practices and approaches for its development in the Uttarakhand Himalaya, India" .The study on tourism in the Uttarakhand Himalaya (UH) identifies several key conclusions. First, the region's natural landscapes and sacred sites, including the four dhams and popular hill towns, offer significant tourism potential. Second, tourism serves as a crucial economic driver, creating jobs and generating revenue through local services like dhabas and tea stalls. However, the influx of tourists has also led to socio-cultural

changes, diluting traditional values and disrupting local customs, particularly affecting women's access to natural resources. Additionally, the development associated with tourism has raised environmental concerns, including forest degradation and landscape alteration. The authors advocate for sustainable tourism practices that respect local cultures and align with the region's socio-economic needs, emphasizing the importance of balancing economic benefits with socio-cultural and environmental considerations.

Sustainable Development Under Changing Environment - The paper on sustainable development in Uttarakhand highlights the region's substantial economic potential, evidenced by a 382% increase in Gross State Domestic Product (GSDP) since 2000. While tourism has shifted towards mass tourism, inadequate infrastructure limits further growth. A sectoral approach is needed, as agriculture, despite being the primary occupation, contributes less to GSDP than the burgeoning service sector. Infrastructure challenges, particularly in transportation, hinder access to remote areas, impacting economic activities and health services. The paper recommends policies for social inclusion, improved infrastructure, and a multifunctional development model to optimize resource use. Additionally, although literacy rates are higher than the national average, slow growth in educational institutions calls for more investment. In summary, Uttarakhand's sustainable development potential requires targeted policies and infrastructure enhancements.

Raj, Kishor, Bisht.,Ila, Pant, Bisht., Bhuwan, Chandra, Joshi. (2022), In his Paper titled-

"Growth of micro, small and medium enterprises (MSMEs) in Uttarakhand" - The study on MSMEs in Uttarakhand uses data from the past ten years to analyse investment, employment generation, and regional variations. It highlights that fully plain regions show higher growth, while micro-scale industries are more effective in creating jobs with less capital. The data is categorized into fully hilly, plain, and semi-hill regions, revealing how geography influences MSME success. A linear programming model is proposed to maximize employment, offering practical insights for policymakers. Overall, the study emphasizes the crucial role of MSMEs in job creation and economic development, especially where large industries face geographical challenges.

Tourism development plays a pivotal role in creating employment opportunities, especially in regions like Uttarakhand, where natural and cultural attractions attract numerous visitors. As noted by Sharma (2022), the expansion of the tourism sector in Uttarakhand has led to a surge in demand for services such as hospitality, transportation, and guided tours, thus offering a wide range of job opportunities for the local population. The study emphasizes that tourism not only directly employs individuals in hotels and resorts but also indirectly supports livelihoods through increased demand for local products and services (Sharma, 2022).

Further, Singh and Verma (2021) highlight the significance of sustainable tourism practices in ensuring that the growth of this sector does not compromise the ecological balance of the region. Their research underlines that adopting eco-friendly initiatives, such as promoting homestays and community-based tourism, is vital for integrating local communities into the tourism value chain, thereby ensuring that economic gains are distributed equitably (Singh &Verma, 2021). Additionally,

the authors argue that these practices help in reducing out-migration by providing stable employment options, thus contributing to rural development in the state.

Mishra et al. (2020) provide an analysis of the potential of pilgrimage tourism in Uttarakhand, particularly in areas like Haridwar and Kedarnath. They argue that religious tourism has traditionally been a major driver of economic activities in these regions, offering seasonal but substantial employment opportunities (Mishra et al., 2020). Their study calls for better infrastructure and policies to extend the tourism season and maximize the economic benefits throughout the year.

Finally, a report by the Uttarakhand State Tourism Board (2023) emphasizes the importance of strategic planning and policy frameworks to enhance the employment potential of tourism. The report suggests that aligning tourism development with the state's environmental conservation goals is crucial for long-term sustainability, which in turn ensures that employment opportunities remain viable and beneficial for the local economy (Uttarakhand State Tourism Board, 2023).

3. METHODOLOGY

This study employs a secondary, descriptive research approach to explore the prospects of employment generation through tourism development in Uttarakhand. The methodology involves reviewing existing literature, government reports, and industry publications that provide insights into the role of tourism in shaping local employment opportunities. The focus is on understanding qualitative trends and the socio-economic impact of tourism, particularly the participation of women and youth in tourism-related jobs.

Data for this study are gathered from the following sources:

1. **Government Reports**: Documents from the Ministry of Tourism, Uttarakhand Tourism Development Board (UTDB), and other relevant state and national bodies are reviewed. These reports provide insights into tourism policies, development strategies, and their employment impacts.
2. **Academic Literature**: Peer-reviewed journals and books that discuss tourism development, employment trends, and regional case studies are utilized. Key sources include journals such as *Economic and Political Weekly* and *Tourism and Cultural Change*, along with books on sustainable tourism and mountain economies.
3. **Industry Publications**: Reports from organizations like the World Travel and Tourism Council (WTTC) and the Federation of Indian Chambers of Commerce & Industry (FICCI) are examined to understand industry perspectives on tourism's contribution to employment in Uttarakhand.
4. **Case Studies**: This research also incorporates case studies and qualitative analyses from non-governmental organizations and academic institutions. These case studies focus on community-based tourism and eco-tourism initiatives in Uttarakhand, highlighting how these programs have impacted local employment.

Here's a sample table you can include in your research paper, summarizing the **key insights** from different sources related to tourism and employment in Uttarakhand.

Table 1: Key Insights on Tourism and Employment in Uttarakhand from Secondary Sources

Source	Key Insights	Relevance to Employment
Ministry of Tourism, Government of India	Reports on tourist arrivals, policies for tourism growth, and regional employment data.	Highlights the direct and indirect jobs created by tourism in Uttarakhand.
Uttarakhand Tourism Development Board (UTDB)	Data on tourism initiatives, eco-tourism, adventure tourism, and rural tourism programs.	Focuses on local employment, including women's participation and rural community jobs.
World Travel & Tourism Council (WTTC)	Economic Impact Reports showing tourism's contribution to GDP and employment.	Provides a broader understanding of tourism's role in creating jobs across sectors like hospitality.
Federation of Indian Chambers of Commerce & Industry (FICCI)	Reports on the economic benefits of tourism and its potential to create sustainable jobs.	Discusses policy recommendations for increasing employment opportunities through tourism development.
National Sample Survey Office (NSSO)	Data on employment trends in India, with specific references to tourism-related jobs in the workforce.	Offers insights into the seasonal nature of tourism employment and its impact on youth and women.
Economic and Political Weekly (EPW)	Research articles on tourism development in mountain economies, including Uttarakhand.	Qualitative insights on demographic participation in tourism-related jobs, especially marginalized groups.

The analysis follows a descriptive approach, emphasizing qualitative insights into seasonal employment patterns, the involvement of local communities, and the participation of marginalized groups like women and youth. A comparative review of tourism-driven employment in other mountain regions is conducted to identify best practices that could be implemented in Uttarakhand.

By synthesizing findings from these secondary sources, the study provides a comprehensive understanding of how tourism contributes to job creation in Uttarakhand and offers recommendations for promoting sustainable tourism practices that can enhance employment while preserving the region's cultural and natural heritage.

5. RESULT AND FINDINGS

This section presents the key findings derived from a review of secondary sources, including government reports, academic literature, and industry publications. The focus is on understanding the role of tourism in employment generation in Uttarakhand, with particular attention to seasonal employment patterns, demographic impacts, and comparisons with other mountain regions.

4.1 Tourism as a Key Driver of Employment in Uttarakhand

Tourism has emerged as one of the most significant contributors to employment generation in Uttarakhand. The state's natural beauty, pilgrimage destinations, and adventure tourism activities attract millions of visitors each year, creating numerous direct and indirect job opportunities.

According to government reports, tourism accounts for a substantial percentage of jobs in sectors such as hospitality, transportation, and local crafts.

Key findings indicate that:

Direct Employment: Jobs directly related to tourism include hotel staff, tour guides, transport operators, and workers in restaurants. The hospitality sector, in particular, has seen steady growth due to the increasing number of tourists visiting the state.

Indirect Employment: Indirect employment is generated in related sectors like agriculture, handicrafts, and retail. Local artisans benefit from the demand for traditional crafts and souvenirs, while farmers and food producers supply local restaurants and hotels.

4.2 Seasonal Employment Patterns

The tourism industry in Uttarakhand is heavily influenced by seasonal fluctuations, leading to variations in employment opportunities throughout the year:

Peak Seasons: The summer months and the pilgrimage season see a significant surge in tourist arrivals, resulting in higher employment during these periods. Adventure tourism, such as trekking and rafting, also peaks during this time, creating temporary job opportunities for local youth and adventure guides.

Off-Seasons: During the monsoon and winter months, tourist numbers decline, leading to a reduction in employment opportunities, particularly in the hospitality sector. However, some areas benefit from winter tourism, particularly in destinations known for skiing and snow-based activities, such as Auli.

4.3 Demographic Impact: Role of Women and Youth

Tourism in Uttarakhand has played a crucial role in providing employment to marginalized groups, particularly women and youth:

Women's Participation: The tourism sector has opened up new opportunities for women, especially in areas like homestay programs, local handicraft production, and hospitality. In many rural areas, women manage guest accommodations or work in small family-run businesses, contributing to their household income. However, challenges remain, as women are often underrepresented in higher-paying, formal roles within the industry.

Youth Employment: Tourism has become an attractive source of employment for Uttarakhand's youth, particularly in adventure tourism, tour guiding, and transportation services. Many young people are engaged as seasonal workers during the peak tourist season, gaining valuable skills in customer service and entrepreneurship. However, long-term employment opportunities for youth remain limited due to the seasonal nature of the industry.

4.4 Comparative Analysis with Other Mountain Regions

A comparative analysis with similar mountain regions, such as Himachal Pradesh and Bhutan, reveals several best practices that could be adapted for Uttarakhand to enhance employment generation:

Community-Based Tourism: In Bhutan and Himachal Pradesh, community-based tourism initiatives have successfully empowered local communities by creating sustainable employment opportunities. These programs often focus on cultural preservation, eco-tourism, and homestay networks, which could be further developed in Uttarakhand to provide stable income for rural households.

Skill Development Programs: Himachal Pradesh has implemented several training programs for local youth in tourism-related sectors, such as hospitality management and adventure tourism. Uttarakhand could benefit from similar initiatives to ensure that the local workforce is well-equipped to meet the demands of the tourism industry, particularly during peak seasons.

4.5 Sustainable Tourism and Employment Opportunities

The findings suggest that sustainable tourism practices can help enhance employment opportunities while preserving Uttarakhand's natural and cultural heritage. Eco-tourism and responsible travel initiatives, such as trekking, wildlife tourism, and village tourism, have shown potential to create jobs without causing significant environmental degradation.

Eco-Tourism: Uttarakhand's eco-tourism programs, though still in development, offer opportunities for local communities to benefit from tourism while conserving their environment. Jobs related to wildlife conservation, forest trekking, and eco-lodges are increasing, providing employment that is less seasonal and more sustainable.

Adventure Tourism: As a growing sector, adventure tourism has significant potential for job creation. Training programs for local youth in activities like trekking, mountaineering, and river rafting could help boost year-round employment in the state.

4.6 Challenges and Opportunities

The findings highlight several challenges and opportunities related to tourism-driven employment in Uttarakhand:

Challenges: Seasonal employment patterns, underrepresentation of women in formal roles, and limited long-term job security for youth are notable challenges. Additionally, inadequate infrastructure and environmental concerns could hinder the growth of the tourism industry.

Opportunities: Expanding eco-tourism, promoting off-season tourism activities, and implementing skill development programs can help overcome these challenges and boost employment. Additionally, the promotion of sustainable tourism practices can ensure that the growth of the tourism industry benefits local communities while protecting Uttarakhand's natural resources.

4.7 SUMMARY OF FINDINGS

Tourism plays a critical role in employment generation in Uttarakhand, particularly in sectors like hospitality, transportation, and handicrafts. While the industry provides significant opportunities for women and youth, it is constrained by seasonal fluctuations and limited long-term employment prospects. By adopting best practices from other regions and focusing on sustainable tourism

development, Uttarakhand can enhance its tourism-driven employment potential while preserving its natural and cultural heritage.

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Exploring Tourism Opportunities and Overcoming Challenges in Uttar Pradesh and Uttarakhand

Ruchi Chhimwal[1]

ABSTRACT

Uttar Pradesh and Uttarakhand are the two prominent states in Northern India which offers a series of rich cultural heritage, historical and natural attractions and boost the tourism industry in these states. Uttar Pradesh with its iconic landmarks such as Taj Mahal (comes under the 7 wonders), The spiritual essence of Varanasi, Mathura, Vrindavan, Ayodhya and many more, Agra Fort etc attracts millions of tourists from all over the world. Uttarakhand also known "DEV BHOOMI" is a rich destination for nature loving and spiritual people. Jim Corbett National Park, Kedarnath, Badrinath, Hemkund Sahib, Mussoorie, Valley of Flowers etc are the attractions which compels people to pay a visit to these places. Due to the tourism industry these states enjoy a lot of benefits such as job creation, infrastructure development, huge revenue generation, world renownedment, extra schemes from the side of government etc. But it is said that 'with great opportunities comes great danger'. Despite the vast potential, both states face substantial challenges in maximizing their tourism benefits. Such as overcrowding at major sites, environmental pollution, harm to wildlife, sanitation problems, environmental challenges, damage to historical sites and many more. This paper aims to provide an overview of the tourism opportunities in Uttar Pradesh and Uttarakhand. What benefits they enjoy from being the heritage states of our country and what challenges they face in their day to day working. We will also study that how these challenges can be tackled so that both Uttar Pradesh and Uttarakhand can achieve a more balanced and substantial tourism industry where there is constant economic development while preserving their unique cultural and natural heritage.

Keywords*: Cultural & Historical heritage, Tourism, Economic Development, Benefits, Challenges, Opportunities.*

INTRODUCTION

As we all know Uttarakhand and Uttar Pradesh is well known for their cultural, historical, natural heritages including flora and fauna. They are a rich source of tourism including many attractions such as in Uttarakhand we have Badrinath, Kedarnath, Jim Corbett National Park, Hemkund Sahib, Valley of Flowers, Haridwar, Mussoorie and many more. The holy river Ganga

1. Vasanta College For Women, Rajghat, Varanasi (Banaras Hindu University), (U.P.) Email: Chhimwalruchi@gmail.com

has its origin from Garhwal region. Uttarakhand is topographically and spiritually very prosperous state. Lakhs and lakhs of tourists visit Uttarakhand each and every year. People come for peace, to enjoy the natural beauty and to get the essence of spiritual being by visiting the holy places. There are many adventurous places for people who love trekking, mountain climbing, river water rafting, cliff jumping and many more. In recent years around 5 crore people visited Uttarakhand for the purpose of exploring the place which created a huge revenue to the state government. Due to a center of attraction for the people all over the world Uttarakhand enjoys a lot of benefits such as special schemes for the construction of four lane roads from the side of central government, infrastructure development schemes for the hilly areas so that more and more people can reside, enhancing water and electricity facilities so that locals don't have to travel far away for fetching water, protecting the environment so that people can enjoy the natural habitats, job creation and many more but as we say, "the more the people the more chaotic it is". Being a place of heavy tourism Uttarakhand has to face a lot of challenges. Some of the challenges are due to construction of multiple roads, pressure on the mountains is increasing due to which we saw a number of accidents which happened during recent times. The problem of overcrowding is one major issue due to which natural calamities are often seen.

The problem of sanitation is also there because people are throwing their plastic wrappers, bottles here and there which are also harmful for the soil and natural environment, safety concerns and lack of marketing and promotional skills are also responsible for these challenges. For overcoming these difficulties the government is taking initiatives to control the degradation of environment and protecting the Mother Nature from the evils that are so much prevalent now days. Laws are being formed on the number of visitors, rules and regulations are also formed for certain spiritual places so that the dignity of these places is not hindered.

Same is for the state of Uttar Pradesh. Uttar Pradesh with a population of over 24 crore is not only the largest state of our country but also one of the most visited places by people all over the world. Uttar Pradesh is having a rich heritage for tourist attractions. Some of the places are such as Varanasi which is famous for its spiritual Kashi Vishwanath temple and also its historical relevance, UNESCO world heritage sites such as Taj Mahal and Agra Fort, Ayodhya, Vrindavan and many more attracts lakhs of people around the world annually. A total of 48 crore people visited Uttar Pradesh in the year 2023 with around 16 lakh foreign visitors. Uttar Pradesh tourism industry enjoys a number of opportunities from the state as well as the central government such as focus on the infrastructural development of the tourist destinations from time to time, preservation of the heritage art and cultural sites, providing incentives from the side of government, job creation and providing employment to a huge population of the state and many more. But there are some difficulties as well such as infrastructure deficiencies, lack of proper roads, accommodation facilities, safety and security concerns and many more. In this paper we will do detailed analysis of how these challenges can be tackled so that we can contribute to the sustainable development of these states so that more and more people can enjoy the beauty of their country.

OBJECTIVES OF RESEARCH

1. To scrutinize the tourism opportunities of Uttar Pradesh and Uttarakhand.

2. To examine how the tourism industry of these states faces challenges which hinder their growth.
3. To investigate contemporary government policies and initiatives to overcome these challenges and move towards sustainable development of these states.

RESEARCH METHODOLOGY

This research investigation is descriptive in nature with secondary data. The researcher has retrieved the data from thesis, research papers, reports published by Ministry of Tourism of the particular states.

MAIN SECTION

TOURISM OF UTTARAKHAND- With the passage of time the tourism sector of Uttarakhand has developed extensively. Earlier people were unaware of the places and also due to difficulty in reaching to these places is also one of the major reasons for the places to get unexplored. But as of now thanks to social media the tourism sector of Uttarakhand expanded enormously. According to the Uttarakhand's draft tourism policy, 44.2% of the domestic tourists visited the state as part of pilgrimages and religious visit while 43.6% of the tourists came for holidays and sightseeing. Tourist inflow to the state is doubled from 39.2 million visitors in 2018-19 to 74 million by the end of FY24. At present tourism contributes 4.4% to the state's gross state domestic product (GSDP) or about Rs. 14000crore. It is expected to grow by 12- 15% annually in the coming years.

TOURIST PLACES TO VISIT IN UTTARAKHAND

There are a number of tourist places to visit in Uttarakhand. Some of them are as follows-

1. Jim Corbett National Park- Located near Ramnagar, famous for night visit to watch tigers.
2. Badrinath and Kedarnath- Spiritual place
3. Hemkund Sahib- Spiritual place for Sikhs
4. Mussoorie- Famous tourist destination to enjoy Himalya beauty.
5. Valley of Flowers- For its beautiful plantation of flowers at a particular season.
6. Adventurous activities- Trekking, Cliff jumping, river rafting, mountain climbing.

TOURISM OPPORTUNITIES IN UTTARAKHAND

Now a days more than half of the population is engaged in corporate sector. Due to the busy schedules and hectic lifestyles people want a place free from pollution where there is peace and where they can enjoy for some days from there busy schedules. So, almost all of them whenever they get time plan a trip to Uttarakhand where they can enjoy all the beauty of nature and fresh their mind.

Earlier Uttarakhand was recognized for religious tourism, primarily the Char Dham Yatra, namely Gangorti, Yamunotri, Kedarnath, Badrinath. However, the tourism development board has diversified

its efforts by launching initiatives such as the Tehri Acro Festival which attracts a lot of tourists every year.

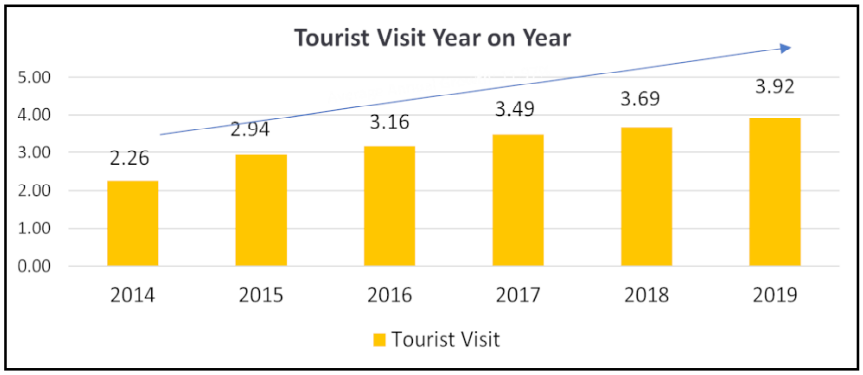
Uttarakhand is relying on improved road infrastructure from key markets such as Delhi.

Prime Minister Narendra Modi's dream project- reconstruction of the Kedarnath shrine area which was ravaged by the 2013 flash floods that killed thousands is scheduled for completion in the next one year. Under this project provision of four lane road is proposed.

Construction of rain shelter on temple road, a pilgrim ghat, medical facilities, convenience centers and sewage drainage system are going on in the Kedarnath region. Due to all these facilities the religious places are attracting more and more pilgrims.

Due to the popularity of these places across the world the construction of resort, home stay and hotels are on full swing. They are being incentivized by the state government to build more and more such places. Due to infrastructural development there is more and more job creation and a more and more people are getting employed.

Not only Indian Visitors, but also there is a huge increase in the number of foreign visitors. Recently, Virat Kohli and Mark Zuckerberg visited the holy place known as Neem Karoli Baba. Earlier this place was known by the locals only but due to their visit, now lakhs and lakhs of people visit this sacred place every year from all over the world. Tourism is also helpful in huge revenue generation as well.



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Earlier the local products of Uttarakhand such as shawls, pulses, squash, pickles, herbs, and hand knitted cloths of wool were sold in the state only. But as the development of tourism sector the number of people visiting these places increased and so the demand for these products not only in India but also in foreign countries. People are enjoying the popularity of their products worldwide which is also helping them to earn more.

CHALLENGES FACED BY TOURISM INDUSTRY IN UTTARAKHAND

High risk prone areas- Numerous earlier incidences of natural calamities prove that the state is very high in risk. For example- natural calamity of Kedarnath in 2013.

Improper arrangement of infrastructure- This is one of the challenges of the state due to unique geographical structure surrounded my mountains, forests and rivers.

Parking challenge- This is one of the major challenges of the tourism department because there a lack of space in hilly areas and due to overcrowding there is no place left to park cars and buses.

Seasonal in nature- The tourism of Uttarakhand is seasonal in nature due to which there is not a flow of regular income and sometimes people have to migrate from there places in search of jobs.

Lack of rail and air connectivity- There is no connectivity of railways and airlines due to which it is very difficult for the people to arrive at these places.

Shortage of accommodation facilities

Problem of management of solid waste

Lack of promotion of cultural integrity of the state and many more.

OVERCOMING THESE CHALLENGES

These challenges can be overcome by some of the initiatives taken by the central as well as the state government.

The use of sustainable practices at these tourist spots so that the environment is not polluted and the soil does not lose its fertility. Involvement of the local communities is also very helpful because those are the people who are already residing their and have soft corner for their state. Making of proper rules and regulations on the number of visitors who can visit any of the spiritual places at a set number. Overcrowding is not allowed in Kedarnath. To protect the dignity of these spiritual places making of reels, shooting is prohibited in these places. Skill development initiatives for the local people also started so that they don't have to migrate to different places in search of work.

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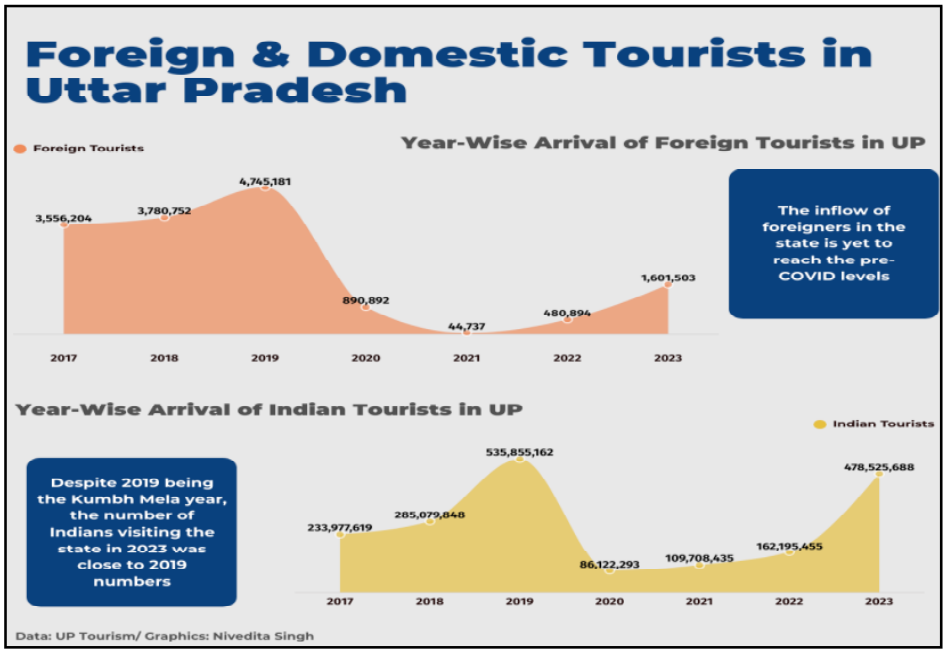
TOURISM OF UTTAR PRADESH-Uttar Pradesh is considered as one of the largest states in India with a population of 24.14 crores. Being the largest state, it is one of the most visited places by the tourist from all over the world. Around 49 crore tourists have visited Uttar Pradesh in the year 2023 with 47 crore Indian tourist and 2 crore foreign tourist. Uttar Pradesh government has taken a lot of initiatives for the development of tourism industry.



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TOURIST PLACES TO VISIT IN UTTAR PRADESH

There are a number of tourist places to visit in Uttar Pradesh. Some of them are as follows-

Varanasi- Kashi Vishwanath Temple, BHU campus, Sarnath, Ghats, Corridor

Ayodhya- Establishment of Ram Mandir

Agra- Taj Mahal, Agra Fort

Noida and Ghaziabad- Mathura, Vrindavan, Govardhan

Lucknow, Gorakhpur and many more.

TOURISM OPPORTUNITIES IN UTTAR PRADESH

Historical and Cultural Tourism

Agra: Known for its Mughal architecture and UNESCO World Heritage Sites, Agra is a popular tourist destination and is home to the Taj Mahal, Agra Fort, and Fatehpur Sikri.

Varanasi: A spiritual center along the Ganges River, Varanasi is one of the oldest towns in the world. It is well-known for its temples, ghats, and spiritual activities like Ganga Aarti and riverboat tours.

The capital, Lucknow, is well-known for its historical sites, including the British Residency and the Bara and Chota Imambara. The city's dance, music, and food make it a cultural hub as well.

Prayagraj (Allahabad): Known for hosting one of the world's biggest religious festivals, the Kumbh Mela, Prayagraj is also historically significant due to its Anand Bhavan and Allahabad Fort.

Lord Krishna was born at Mathura and Vrindavan, two towns that draw pilgrims from all over the world, particularly during the Holi and Janmashtami celebrations.

Wildlife and Eco Tourism

An important wildlife sanctuary, Dudhwa National Park is home to rhinoceroses, elephants, leopards, and tigers. It provides tours for birdwatching and jeep safaris.

Chandraprabha animals Sanctuary: This sanctuary, which is close to Varanasi, is well-known for its waterfalls, natural beauty, and animals, including wild boar, chinkara, and leopards.

Near Kanpur, the Nawabganj Bird Sanctuary is a birdwatcher's dream come true, particularly during the winter months when migratory species stop by.

Spiritual and Religious Tourism

Ayodhya: Home to temples like Ram Janmabhoomi and Hanuman Garhi, Ayodhya is a major pilgrimage destination and the birthplace of Lord Ram.

Sarnath: A major Buddhist pilgrimage site close to Varanasi, this is where Lord Buddha delivered his first sermon upon enlightenment.

Uttar Pradesh is also famous for its unique food which you can have in Lucknow and Varanasi. Due to so many people visiting Uttar Pradesh every year a huge of revenue generation is there. More and more people are getting jobs job to construction of new infrastructure for example, the construction of Ram Mandir in Ayodhya alone generated a revenue of over 100 million and employed a lot of people.

CHALLENGES FACED BY TOURISM INDUSTRY IN UTTAR PRADESH

Inadequate and sluggish infrastructure on distinct tourist places.

Deficient air, road and rail transportation connectivity to many of the tourist places.

Inefficient and ineffective availability of proper hotel rooms or accommodation.

Heavy shortage of specialized workers who can guide foreign visitors or understand their language.

Lack of proper sanitation at food stalls and hotels.

Hygienic washrooms are not available at these tourist places and separate washrooms for female are also not available.

Poor conservation of historical sculptures and sites.

Dignity and spirituality of religious sites are not maintained.

OVERCOMING THESE CHALLENGES

Creation and Strengthening of the Air Transportation System

New international airports are desperately needed to support the seamless growth and strengthening of the air transport system in the wake of the notable increase in foreign visitors to Agra and Kushinagar. The need for domestic airports is inescapable due to the rise in domestic travel to locations like Ayodhya, Varanasi, Mathura, Moradabad, Allahabad, and Gorakhpur.

Creation and Strengthening of the Road Transportation Network

It is necessary to rebuild all tourist destinations with insufficient and inefficient road transportation with well-connected highways and ring roads. This will allow for the construction of adorned six-lane and four-lane roads, which will eventually bring about a revolution in the road transportation system.

Growth and Strengthening of Bus Services

Given the influx of foreign visitors, especially from the European and Western worlds, UPSTDC can work with large corporations in the public-private partnership model to introduce luxury coach buses for the most popular tourist destinations. Additionally, the introduction of hip-offs and hip-on bus supplementary services can greatly aid in the promotion and growth of the tourism industry by opening up new business opportunities and job opportunities.

Development and Promotion of Handloom and Handicrafts By creating more design hubs, shilpgrams, and shilpbazars, the textile and leather industries in Kanpur, Aligarh's lock and hardware, Firozabad's glass industry, Moradabad's craft industry, Zordoji and inlay work of Agra, Varanasi's silk industry, Gorakhpur's terracotta production, and Lucknow's carpet industry—all of which have an international reputation due to their export businesses—can be explored in one or more ways.

CONCLUSION

A secondary study is done to explore the tourism industry of both Uttarakhand and Uttar Pradesh. How they have emerged from the earlier times. What are the places where people can pay a visit. Such as the cultural heritage, historical heritage, natural heritage, flora and fauna and many more. Apart from being the best places to visit these states have to face a lot of challenges as well in the tourism sector. They lack many basic facilities which make people's experiences not up to mark especially foreign visitors faces a lot of difficulties be it cultural, language problem and many more. The government of India and the state government along with their collaboration take many initiatives and implement many schemes for the development of tourism industry of these states so that more and more people can be employed and the problem of migration is also solved. These steps preserve

the natural and cultural habitat of both Uttarakhand and Uttar Pradesh and also move towards the sustainable growth of these states.

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अयोध्या नगरी के पर्यटन विकास में स्थानीय समुदाय की भूमिका

अनुजेन्द्र तिवारी[1] एवं प्रो. विनोद कुमार श्रीवास्तव[2]

सारांश

अयोध्या में राम जन्मभूमि पर भव्य मंदिर के भूमि पूजन से पहले जिस ढंग का सौहार्दपूर्ण सामाजिक माहौल बन रहा है उससे उम्मीद है कि राम मंदिर निर्माण के साथ ही साम्प्रदायिक समरसता का भी नया युग शुरु होगा। बाबरी मस्जिद के पक्षकार रहे मोहम्मद इकबाल ने भी सर्वोच्च न्यायालय के फैसले के बाद तमाम दबाव को नकराते हुए न्यायालय के निर्णय, देश की एकता और सामाजिक सद्भाव के पक्ष में अनुकरणीय मिसाल पेश की। उनकी तरह करोड़ों मुसलमानों ने भी सर्वोच्च न्यायालय के फैसले से राहत महसूस की। सुखदानुभूति हो रही कि केन्द्र सरकार ने राम मंदिर निर्माण शुरु होने के साथ ही अयोध्या के विकास हेतु नई योजना बनायी है। मुख्यमंत्री योगी आदित्यनाथ पहले ही रामनगरी के विकास की अलख जगा चुके हैं। उससे उम्मीद जगी है कि अयोध्या ने जन्मभूमि विवाद के कारण दशकों तक जो पिछड़ापन भोगा उससे अब उस संत्रास मुक्ति मिलेगी। प्रधानमंत्री नरेन्द्र मोदी और मुख्यमंत्री योगी आदित्यनाथ शुरु से ही अयोध्या के विकास के लिए फिक्रमंद रहे हैं। विश्वास किया जाना चाहिए की एकाध साल में राम मंदिर का निर्माण पूरा होते ही अयोध्या भी महान तीर्थ नगरी के रूप में सज संवर कर तैयार हो जायेगी और यहाँ रहने वाले जनमानस भी शिक्षा, स्वास्थ्य, सुरक्षा में गुणवत्ता हासिल करते हुए आनन्दानुभूति की चरमोत्कर्ष अवस्था प्राप्त करने में भी सक्षम हो सकेगा।

मुख्य शब्दावलियां (Keywords) *– अयोध्या का इतिहास, राम जन्मभूमि अयोध्या के प्रसिद्ध मंदिर, अयोध्या का आकर्षक, अयोध्या की संस्कृति, अयोध्या की धर्मशालायें, उत्तर दिशा में कल–कल करती माँ सरयू नदी, अयोध्या का अनोखा अनुभव, अयोध्या की स्थापत्य कला, अयोध्या की सामाजिक समसरता।*

1. प्रस्तावना

माननीय सर्वोच्च न्यायालय के न्यायमूर्ति रंजन गोगोई की अध्यक्षता वाली पांच सदस्यीय पीठ द्वारा फैसलोपरांत अयोध्या में भगवान श्रीराम के जन्म स्थान पर ही 09 नवम्बर 2019 को भव्य मंदिर निर्माण

1. शोधछात्र, अर्थशास्त्र एवं ग्रामीण विकास विभाग, डॉ0 राममनोहर लोहिया अवध विश्वविद्यालय, अयोध्या, (उ0प्र0)
2. आचार्य, अर्थशास्त्र एवं ग्रामीण विकास विभाग, डॉ0 राममनोहर लोहिया अवध विश्वविद्यालय, अयोध्या, (उ0प्र0)

का रास्ता साफ हो गया तदोपरांत केन्द्र में मोदी व राज्य में योगी सरकार होने के कारण अभिनव वर्षों में अयोध्या नगरी दीपोत्सव जैसा वृहद आयोजन कर वैश्विक पटल पर कीर्तिमान स्थापित करते हुए गिनीज बुक्स ऑफ वर्ल्ड रिकॉर्ड में लगातार में दो बार अपना दर्ज करा चुकी है। जब 05 अगस्त 2020 को माननीय प्रधानमंत्री भव्य मंदिर निर्माण हेतु भूमि पूजन के अवसर पर अयोध्या प्रस्थान कर रहे हैं तो निश्चित रूप से उनके हाथों द्वारा तीन हजार करोड़ रुपये विकासात्मक ढांचे पर खर्च करने की योजना है। जो मेगा प्लान कनेक्टिविटी सुन्दरीकरण इत्यादि के लिए खर्च किये जायेंगे।

जिसमें **''सबका साथ सबका विश्वास''** परिलक्षित होता दिख रहा है। समाज का हर वर्ग यातायात की दृष्टिकोण से टैक्सी, रिक्शा, ठेला, रेड़ी कुल्चे वालों की आर्थिक व सामाजिक समृद्धि तो होगी ही, साथ ही दिव्य दीपोत्सव होने के परिणाम स्वरूप वहीं माँ सरयू के घाट पर नित्य–प्रति आरती होने से मिट्टी के दीए से कुम्हार, तेल से तेली, बत्ती, जनेऊ व अनाज से कृषक लकड़ी के खड़ाऊ अथवा काष्ठकला से मुस्लिम, नदी में नौकायन करते हुए मल्लाह आये दिन विभिन्न सामाजिक संस्कारों के चलते महरिन, धोबी मंदिरों पर पुजारी, घाट पर पंड़ों, फूल–माला से माली के भी जीवन प्रत्याशा शिशु मृत्युदर तथा साक्षरता अर्थात् जीवन की भौतिक गुणवत्ता निर्देशन प्रत्यागम (PQLI) में सुधार होने साथ ही क्रय शक्ति समता, निवल आर्थिक कल्याण व मानव विकास सूचकांक (HDI) में वृद्धि देखी जा सकेगी।

2. साहित्य की समीक्षा (Review of Litrature)

संस्कृति स्कूल ऑफ बिजनेस, पुट्टा पार्थी श्री सत्या साई डिस्ट्रिक्ट आंध्रप्रदेश इंडिया के मैनेजमेंट डिपॉर्टमेन्ट के असिस्टेन्ट प्रो0 अभिषेक दीक्षित ने इंटरनेशनल जर्नल ऑफ क्रिएटिव रिसर्च थॉट्स (IJCRT) के अंतर्गत अपना शोध–पत्र The Ayodhya Opportunity: Economic implication Scenarios after the Ram Temple Construction in Ayodha: A Multi- Sectroal Analysis. (4 अप्रैल 2024) के माध्यम से अयोध्या के इतिहास से लेकर धार्मिक सामाजिक, राजनैतिक और सांस्कृतिक हिन्दुओं की जो लम्बे समय से आस्था व विश्वास का प्रतीक रहा है आज प्राथमिकता के दृष्टिकोण से जिस प्रकार अयोध्या की अर्थव्यवस्था प्रभु श्रीराम मंदिर अयोध्या में बन जाने से सुदृढ़ हो रही है उसका व्यापक प्रभाव प्रत्येक स्तर पर मंदिर डिजाइन और वास्तुकला से लेकर विनिर्माण प्रक्रिया द्वारा सेवा क्षेत्र में नौकरियों की संख्या में इजाफा होना, जमीन के कारोबार में वृद्धि पर्यटकों की संख्या में वृद्धि कहीं न कहीं अयोध्या के चौमुखी विकास के लिए वरदान साबित हो रही है।

तीन वर्षों की समय सीमा के साथ नागर शैली में 161 फीट ऊँचाई 10 एकड़ मंदिर का क्षेत्रफल तथा 57 एकड़ का मंदिर परिषद् मंदिर 2 लाख से अधिक ईटों व कंकरीट से आधारशिला बनने के साथ ही रंग मण्डप, नृत्य मण्डप, कुडू मण्डप, गर्भगृह और उसके बाद शिखर 360 स्तम्भों पर खडो हो आभा

बिखेर रहा है अयोध्या शहर में राम मंदिर बन जाने के उपरांत उद्यमी और निवेशक इसको भविष्य में लाभ के दृष्टिकोण से संगठित व असंगठित क्षेत्र में रोजगार का सृजन करके कहीं न कहीं भुना रहे हैं, राम मंदिर का सबसे बड़ा प्रभाव पर्यटकों की संख्या में आशातीत वृद्धि होने के साथ ही अर्थव्यवस्था में भी वृद्धि हो हुई है।

अयोध्या में घरेलू पर्यटकों के साथ ही अंतर्राष्ट्रीय पर्यटकों की संख्या में वृद्धि होने के कारण आवास, यातायात, स्थानीय कारोबार की मांग में बढ़ोत्तरी हुई है, यहीं नहीं अस्पताल में भी सेवाओं में वृद्धि करते हुए कार्मिकों की बढ़ोत्तरी देखी गयी है। सन् 2021 में जहां लगभग सवा तीन लाख पर्यटक अयोध्या आये थे। वहीं ऐतिहासिक और धार्मिक नगरी में प्रवेश कर राम जन्मभूमि हनुमानगढ़ी और कनक भवन में दर्शन पूजन किए।

अमेरिकन इनवेस्टमेंट बैंक जैफ्रीज के अनुसार पचास मिलियन पर्यटकों का आगमन अयोध्या में हुआ है। जिसके चलते उत्तर प्रदेश राज्य राजस्व में चार लाख करोड़ रुपये का पर्यटकों की आय से इजाफा हुआ है। एस.बी.आई. की रिसर्च रिपोर्ट के अनुसार राम मंदिर के शिलान्यास के उपरान्त 25 हजार करोड़ रुपये का राजस्व उत्तर प्रदेश सरकार को वैश्विक स्तर पर हो सकता है।

जनवरी 2024 ऑन लाइन ट्रैवल एंजेसी के द्वारा रिपोर्ट यह बताती है कि दिसम्बर, 2023 से लेकर जनवरी 2024 तक हवाई यात्रा के किराये में 10 प्रतिशत की वृद्धि देखी गई है, राम मंदिर केवल मंदिर की बिल्डिंग मात्र नहीं है, यह एक बहुत बड़ी परियोजना है जो आधारभूत विकास जैसे सड़क, बिजली, पानी, इत्यादि अच्छे होंगे राज्य सरकार मास्टर प्लान 2031 के अंतर्गत इसे विश्व स्तरीय शहर बनने के लिए कटबद्ध है। विशेष रूप यहां पर भविष्य में आध्यात्मिक विश्वविद्यालय, ग्रीन फील्ड टाउनशिप, और अर्बन फॉरेस्ट बनने वाले हैं।

राज्य सरकार ने आधारभूत संरचना के विकास के लिए अयोध्या में 133 करोड़ रुपये आवांटित किए हैं। जिससे आधारभूत सुविधाएं जैसे स्ट्रीट लाइट, रोड का निर्माण आदि, कार्य हो रहा है। अयोध्या में प्रवेश करते ही म्यूराइल और धार्मिक पेंटिंग, अयोध्या की दीवारों व लाई ओवर की दीवारों में आध्यात्म का बोध कराते हुए त्रैता युग की झलक दृष्टिगोचित करती हैं।

अयोध्या रेलवे स्टेशन के पुर्नविकास के क्रम में 240 करोड़ रुपये से अत्यधिक लागत लागकर आधुनिक सुख–सुविधाओं को देखते हुए लिट, एक्सकेलेटर, फूड प्लाजा, दुकानें, विश्राम कक्ष, चाइल्ड केयर रूम, प्रतीक्षालय, इत्यादि का निर्माण कर इसका नाम अयोध्या धाम रेलवे स्टेशन किया गया। जहां 10 से 15 रेलगाड़ियां प्रतिदिन आती हैं।

दिसम्बर 2023 में महर्षि बाल्मीकि अंतर्राष्ट्रीय हवाई अड्डा का उद्घाटन होते ही वैश्विक स्तर पर अयोध्या में आवागमन की सुविधा सुगम होते ही वैश्विक स्तर के होटल जैसे ताज, रेडिसन, और आई.

टी.सी. बनने लगे, जो रोजगार के साथ ही आय के सृजन के द्योतक हैं। अयोध्या में पर्यटकों के आने से सेवा क्षेत्र में भी काफी 1.5 से 2 लाख तक की संख्या प्रत्यक्ष अथवा परोक्ष रूप से योगदान दे रही है। अगल चार से पाँच वर्षो में उपभोक्ता वस्तु, फूड सर्विस, माल, होटल, फूड एण्ड बेवरेज, डेली ईसेशियल हेल्थ केयर, विर्निमाण बैकिंग सेवा में बढ़ोत्तरी होने से होटल स्टॉफ हाउस किपिंग, शेफ कुक बहुभाषी गाइड, हॉस्पिटलिटी, ट्रैवल एंजेसी और पर्यटक क्षेत्र में 20 हजार से 25 हजार नियमित और टेम्परोरी जॉब में वार्षिक इजाफा होगा। यही नहीं अयोध्या के आसपास सीमावर्ती जिलों में भी विकास का नित्य न्यूतम आयाम देखने को मिल रहा है।

3. भौगोलिक अवस्थिति (Geographical Persistence)

अयोध्या नगरी भारत के उत्तर प्रदेश राज्य में अयोध्या मण्डलान्तर्गत अयोध्या जनपद में स्थिति है। अयोध्या नगरी मर्यादा पुरुषोत्तम भगवान श्री रामचन्द्र जी की जन्मस्थली होने के परिणाम स्वरूप ऐतिहासिक एवं पुरातात्त्विक महत्व का पर्यटन स्थल है। जो सरयू नदी (जिसको पूर्व दिशा में घाघरा के नाम से जाना जाता है) के किनारे स्थित है। यह नगरी उत्तर प्रदेश की राजधानी से 142 किमी. पूरब दिशा में 26.800 उत्तरी अक्षांश एवं 82.200 पूर्वी देशांतर पर स्थित है। समुद्र तल से ऊंचाई 98 मीटर (305 फिट) है।

4. उद्देश्य (Objective of the study)

मंदिर निर्माण शुरू होने के बाद देश विदेश के पर्यटक व श्रद्धालु बहुत बड़ी संख्या में अयोध्या आयेंगे उस अंतर दृष्टि से अयोध्या नगर का आकार छोटा था यहां श्रद्धालुओं के ठहरने सहित अन्य सुविधायें न के बराबर थीं। इसी वजह से नव्य अयोध्या की आवश्यकता महसूस की गयी। जहाँ श्रद्धालुओं के आवश्यकतानुरूप सुविधाएं उपलब्ध कराने की कोशिश। 400 हेक्टेयर वाली नई अयोध्या के भीतर संतो के आश्रम के साथ ही आवासीय कालोनी, मॉल रेस्टोरेंट आदि भी होंगे अतः उक्त शीर्षक रखने के लिए निम्नलिखित उद्देश्य रहे–

अ. आजीविका के स्रोतों का अध्ययन करना।
ब. रोजगार की स्थिति का आंकलन करना।
स. आय सृजन का परिगणन करना।
द. आय सृजन का परिगणन करना।
   1. आर्थिक पक्ष
   2. सामाजिक पक्ष–
      A. धर्म

B. जाति

C. वर्ण

य. अयोध्या नगरी में उद्योगों की स्थापना से आम जनमानस पर शिक्षा, स्वास्थ्य, रोजगार में होने वाला गुणवत्ता सम्बन्धी सुधार।

र. आर्थिक संचलनोंपरांत अयोध्या का परिदृश्य रहन–सहन, शिक्षा–दीक्षा, खेल–मनोरंजन, बीमा बैकिंग, पर्यटन परिवहन, व्यायाम, चिकित्सा, ईंधन इत्यादि से।

5. महत्व (Improtance of the study)

पौराणिक नगरी एवं भगवान श्रीराम की जन्मस्थली होने के नाते अयोध्या नगरी का आदिकाल से ही अपना अप्रतिम महत्व रहा है, किन्तु जब भव्य राम मंदिर का शिलान्यास हो रहा है तो 400 हेक्टेयर क्षेत्र में अयोध्या बसाने की योजना बनायी जा रही है। राम मंदिर पूजन तैयारियों के बीच मांझा बरहटा में भूमि के अंश निर्धारण की प्रक्रिया के उपरान्त 251 मीटर प्रभु श्रीराम की मूर्ति स्थापित की जानी है जिसकी उद्घोषणा माननीय योगी जी पूर्व में ही कर चुक हैं। 83 हेक्टेयर की भूमि इसके लिए प्रस्तावित की गयी है, भूमि को खरीदने हेतु 100 करोड़ रुपये का प्रावधान है जिसमें करीब 200 किसान लाभान्वित होंगे। किसी भी अनहोनी अथवा विवाद से बचने हेतु राजस्व विभाग की टीम सामंजस्य के साथ पैमाइश में जुटी हुई है, जिससे आर्थिक व सामाजिक रूप से प्रभावित कृषक को समुचित मुवाबजा मिल सके, जो कि प्रभु श्रीराम के सामाजिक समरसता का प्रतीक है, आदर्शों पर चलने हेतु उत्प्रेरित करता है। मूर्ति के बेसमेन्ट में एक म्यूजियम भी स्थापित किया जायेगा, इस म्यूजियम में भगवान विष्णु के सभी अवतारों की जानकारी होगी जो पौराणिकता के साथ–साथ शिक्षा जगत को भी आलोकित करते हुए आपसी सौहार्द प्रेम एवं भाईचारा का संदेश देगी।

6. शोध परिकल्पना (Hypothesis)

अयोध्या में भव्य राम मंदिर निर्माण के शुभारम्भ के साथ ही अयोध्या तस्वीर एवं तकदीर भी बदलने जा रही है। अयोध्या विश्व पटल पर छाने को तैयार है। राम मंदिर निर्माण के साथ ही अयोध्या का धार्मिक गौरव शीर्ष पर पहुंचेगा ही इसके साथ में अयोध्या विश्वपटल पर भी अवलोकित होगी। अयोध्या के सरयू घाट, परिक्रमा मार्ग, राम युग के साक्षी पौराणिक कुण्डों को सहेजने के साथ ही सुन्दर रूप प्रदान किया जायेगा। मंदिर निर्माण शुरू होने के साथ अयोध्या के विकास की गति भी तीव्र होगी। अगले 2 से 3 वर्षों में अयोध्या इस तरह हो जायेगी कि पूरी दुनिया इस ओर आकर्षित होने पर विवश होगी।

अयोध्या को प्रधानमंत्री द्वारा दी जाने वाली आर्थिक व सामाजिक गतियों में 200 करोड़ रुपये की लागत से सीता झील, 400 एकड़ भूमि पर नव्य अयोध्या का निर्माण, दर्शननगर–टेढ़ी बाजार पर दो

ओवरब्रिज 56 करोड़ का निःशुल्क वाटर कनेक्शन, राम नगरी में डिजिटल म्यूजियम, अयोध्या–काशी के मध्य रेलवे स्टेशनों का कायाकल्प अयोध्या में पौराणिक धरोहरों के संरक्षण की योजना, सरयू घाटों से लेकर परिक्रमा मार्ग का सुन्दरीकरण अयोध्या के चौराहों और प्रवेश मार्गों का सुन्दरीकरण होना है।

उक्त को आधार मानते हुए प्रसन्नता सूचकांक बेहतर होने के साथ ही लोग रोजगार में संलग्न होंगे। परिणाम स्वरूप आर्थिक विकास व कल्याण होगा क्योंकि आद्य युग मुं दुनिया सिर्फ समृद्धि नहीं चाहती खुश भी रहना चाहती है अर्थात् मंदिर को सर्विस इंडस्ट्री की तरह हम देख सकते हैं, जिसमें रोजगार + खुशी + इकोफ्रेंडली समाहित है।

7. अनुसंधान प्रविधि (Reserarch methodolgy)

साक्षात्कार, डाटा संकलन, सहभागी अवलोकन, आब्जर्वेशन प्रविधि का प्रयोग करते हुए वास्तविकता के धरातल पर शोध कार्य को अंतिम लक्ष्य तक आजीविका के प्रस्तर का प्रगणन करने के उपरान्त गरीबी का आंकलन करना व लोगों के जीवन की गुणवत्ता के उच्चीकरण अथवा निम्नीकरण की जानकारी जुटाना है।

8. क्षेत्र का निर्धारण (Research area)

अयोध्या नगरी के भौगोलिक एवं जनांकिकीय परिदृश्य को छूते हुए आर्थिक अवस्थापना के विकासानुक्रम में नगर निगम के 60 वार्डों की समस्त परियोजना का समारोहण।

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- बा0 रा0 बालकाण्ड 100/53 गीता प्रेस गोरखपुर
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THEME 5

Climate Change and Environmental Degradation: A Global Challenge

The Dynamics of ESG (Environmental, Social, and Governance) Reporting in Bluechip Companies: An In-depth Analysis of Challenges, Strategies, and Impact

Abhishek Tripathi[1] & Dr. Vishal Saxena[2]

ABSTRACT

Environmental, Social, and Governance (ESG) reporting has become an essential practice for bluechip companies to showcase their commitment to sustainability and value creation for stakeholders. This paper examines the evolving landscape of ESG reporting among bluechip firms, highlighting the challenges they face, the strategies employed, and the broader implications of their efforts. Bluechip companies encounter numerous obstacles in ESG reporting, including difficulties in data collection, lack of standardized metrics, stakeholder engagement, and the complexity of complying with varied regulations. These issues are often exacerbated by their large-scale operations and global presence. To address these challenges, companies are implementing tailored strategies, such as integrating ESG principles into core business activities, utilizing advanced technology for data management, fostering transparent communication with stakeholders, and collaborating with industry peers to enhance standardization. The benefits of robust ESG reporting extend beyond regulatory compliance, affecting corporate reputation, investment attractiveness, risk mitigation, talent acquisition, and innovation. Companies that excel in ESG reporting strengthen their brand, secure better access to capital, and align their business strategies with societal and environmental needs. Moreover, effective ESG reporting contributes to global sustainability objectives by fostering greater corporate accountability and governance. This study synthesizes existing literature, case studies, and empirical data to offer valuable insights into the ESG reporting practices of blue-chip companies. Understanding the challenges, strategies, and outcomes of ESG reporting can help stakeholders recognize its critical role in promoting sustainable value creation and guiding the future of corporate governance.

Keywords: *Bluechip Companies, ESG Reporting, Sustainable Practices, Corporate Governance, Stakeholder Engagement.*

1. Research Scholar, Armapore PG College, CSJM University, Kanpur, (U.P.)
2. Assistant Professor, Armapore PG College, Kanpur, (U.P.)

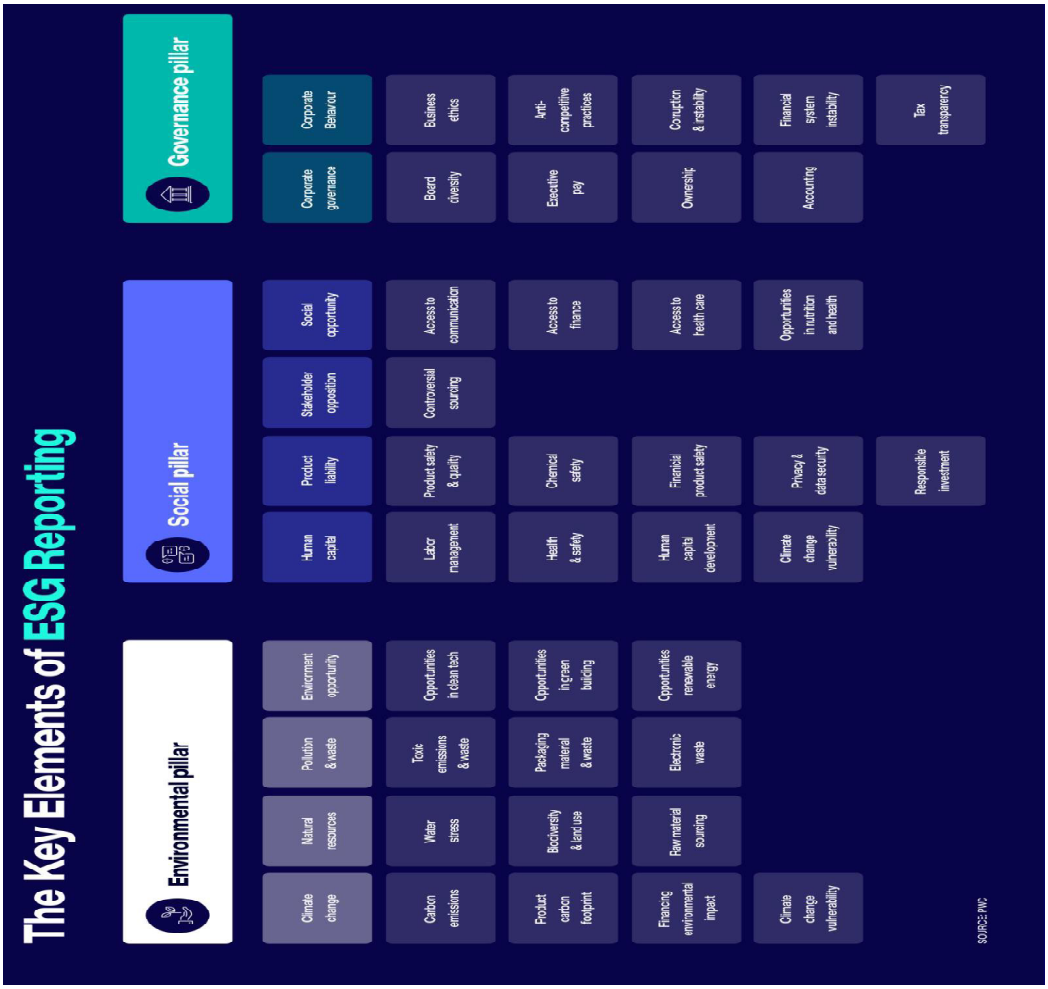
Introduction

In the contemporary landscape of corporate governance and sustainability, Environmental, Social, and Governance (ESG) reporting has emerged as a critical mechanism for bluechip companies to navigate their responsibilities towards stakeholders, society, and the environment. Historically, the primary focus of corporations has been on maximizing shareholder value, often at the expense of broader societal and environmental concerns. However, as global challenges such as climate change, social inequality, and ethical lapses have come to the forefront, there has been a fundamental shift in the expectations placed upon corporations. Bluechip companies, characterized by their market leadership, significant market capitalization, and global reach, are particularly scrutinized regarding their environmental impact, social initiatives, and governance practices. In response to mounting pressure from stakeholders, including investors, consumers, employees, and regulators, bluechip companies are increasingly recognizing the imperative to integrate sustainability into their core business strategies and operations.

ESG reporting serves as a conduit through which bluechip companies communicate their sustainability efforts, progress, and performance to stakeholders. It goes beyond traditional financial reporting by providing comprehensive insights into a company's environmental footprint, social initiatives, and governance practices. By disclosing ESG-related information, companies demonstrate transparency, accountability, and commitment to sustainable development. The significance of ESG reporting for bluechip companies lies not only in its ability to meet stakeholder expectations but also in its potential to drive long-term value creation and risk management. With growing awareness of environmental degradation, social injustices, and governance failures, investors are increasingly incorporating ESG factors into their investment decisions. Bluechip companies with robust ESG performance stand to benefit from enhanced access to capital, reduced cost of capital, and greater resilience to market volatility. Despite its evident benefits, navigating ESG reporting poses several challenges for bluechip companies. From data collection and standardization issues to stakeholder engagement and regulatory compliance, companies encounter multifaceted hurdles in effectively reporting their ESG performance. The complexity of global operations, disparate reporting frameworks, and evolving stakeholder expectations further exacerbate these challenges. In light of these challenges, bluechip companies are compelled to adopt innovative strategies to enhance their ESG reporting practices. By integrating sustainability into their business processes, leveraging technology for data analytics, and fostering stakeholder engagement, companies can overcome barriers to ESG reporting and unlock opportunities for value creation and competitive advantage.

This paper seeks to explore the landscape of ESG reporting in bluechip companies, shedding light on the challenges they face, the strategies they employ, and the impact of their reporting practices. Drawing on a synthesis of existing literature, case studies, and empirical evidence, the paper aims to provide comprehensive insights into the dynamic nature of ESG reporting and its implications for corporate governance, sustainability, and stakeholder value creation. Ultimately, by understanding the complexities of ESG reporting and its significance for bluechip companies, stakeholders can better appreciate the role of corporations in driving positive societal and environmental outcomes while delivering sustainable long-term returns.

The Significance of ESG Reporting



ESG reporting serves as a mechanism for bluechip companies to transparently communicate their efforts towards sustainable development and responsible business practices. It encompasses a wide range of factors, including carbon emissions, diversity and inclusion, supply chain management, labor practices, and board diversity, among others. By disclosing

ESG-related information, companies not only enhance transparency but also enable stakeholders, including investors, customers, employees, and regulators, to make informed decisions.

The significance of Environmental, Social, and Governance (ESG) reporting for Indian blue-chip companies cannot be overstated, as it plays a pivotal role in shaping their reputation, investor perception, and long-term sustainability. Let's delve into this significance further, illustrating with examples from prominent Indian blue-chip companies:

Environmental Significance

Indian blue-chip companies operate in diverse sectors, ranging from heavy industries to technology and finance, each with its unique environmental footprint. For instance, Tata Motors, one of India's leading automobile manufacturers, has been actively working towards reducing its carbon emissions and promoting sustainable mobility solutions. Through its ESG reporting initiatives, Tata Motors communicates its efforts to develop electric and hybrid vehicles, invest in renewable energy, and optimize manufacturing processes to minimize environmental impact.

Similarly, in the renewable energy sector, Adani Green Energy, a flagship company of the Adani Group, exemplifies the environmental significance of ESG reporting. Adani Green Energy has emerged as a key player in India's transition towards renewable energy, with a focus on wind, solar, and hybrid power projects. Through its ESG disclosures, the company showcases its commitment to renewable energy adoption, carbon emissions reduction, and environmental conservation, thereby attracting investors and fostering stakeholder confidence.

Social Significance

Indian blue-chip companies are increasingly recognizing the importance of addressing social issues such as poverty, education, healthcare, and gender equality through their business operations and CSR initiatives. For example, Hindustan Unilever Limited (HUL), a subsidiary of Unilever, has been at the forefront of driving social impact in India. HUL's ESG reporting highlights its initiatives aimed at improving sanitation, hygiene, and livelihoods in rural communities through programs like Project Shakti and Swachh Aadat Swachh Bharat. By transparently reporting on its social initiatives and outcomes, HUL demonstrates its commitment to creating shared value and positively impacting society.

In the financial sector, HDFC Bank, one of India's largest private sector banks, exemplifies the social significance of ESG reporting. HDFC Bank's ESG disclosures encompass a wide range of social initiatives, including financial inclusion, education, healthcare, and disaster relief. Through its various CSR programs and partnerships with non-profit organizations, HDFC Bank actively contributes to community development and social welfare, as evidenced in its ESG reports. By integrating social impact metrics into its reporting framework, HDFC Bank reinforces its reputation as a responsible corporate citizen and strengthens stakeholder trust.

Governance Significance

Effective governance practices are fundamental to maintaining trust, transparency, and accountability within Indian blue-chip companies. Robust governance frameworks and ethical conduct are essential for safeguarding shareholder interests and mitigating risks. Reliance Industries Limited (RIL), India's largest private sector company, exemplifies the governance significance of ESG reporting. RIL's ESG reports provide stakeholders with insights into its governance structure, board composition, risk management practices, and compliance with regulatory requirements. By transparently disclosing its governance practices and performance metrics, RIL reinforces investor confidence and enhances its reputation as a reliable and ethical corporate entity. In summary, ESG

reporting holds immense significance for Indian blue-chip companies, serving as a platform to showcase their environmental stewardship, social responsibility, and governance excellence. Through transparent and comprehensive ESG reporting, these companies not only enhance their reputations but also attract investors, strengthen stakeholder relationships, and drive sustainable value creation for society and the environment.

The objectives of this Study

- Investigate the challenges faced by Indian blue-chip companies in implementing effective ESG reporting practices and analyze the strategies they employ to address these challenges.
- Evaluate the impact of ESG reporting on corporate reputation, access to capital, risk management, and innovation in Indian blue-chip companies. Provide actionable insights to enhance reporting effectiveness.
- Contribute to the understanding of ESG reporting in the Indian context, enriching academic discourse and promoting stakeholder engagement for sustainable business practices.

Research Methodology

The research will adopt a qualitative approach to explore the topic of "Navigating ESG Reporting in Indian Blue-Chip Companies: Challenges, Strategies, and Impact." Qualitative research allows for an in-depth understanding of the complexities and nuances inherent in ESG reporting practices within Indian blue-chip companies.

Literature Review: A comprehensive review of existing literature will be conducted to gain insights into the theoretical framework, key concepts, and empirical findings related to ESG reporting in the context of blue-chip companies. Academic journals, industry reports, government publications, and relevant websites will be consulted.

Document Analysis: Annual reports, sustainability reports, and other relevant documents published by Indian blue-chip companies will be analyzed to understand their ESG reporting practices, initiatives, and performance metrics. This analysis will help in corroborating findings from interviews and literature review.

Companies Sampling: Bluechip companies will be selected purposively based on their existence, industry participation, and involvement in ESG reporting within Indian blue-chip companies. Efforts will be made to ensure representation from diverse sectors, including manufacturing, IT, finance, and energy.

Company Selection: A purposive selection of Indian blue-chip companies will be made to analyze their ESG reporting practices. Companies will be chosen based on factors such as market capitalization, industry representation, and availability of ESG disclosure data.

Thematic Analysis: Data from interviews, literature review, and document analysis will be analyzed thematically to identify patterns, themes, and relationships related to challenges, strategies, and impact of ESG reporting in Indian blue-chip companies. NVivo or similar qualitative data analysis software may be used to facilitate the analysis process.

Cross-Case Analysis: Comparative analysis will be conducted across selected Indian blue-chip companies to identify similarities, differences, and best practices in ESG reporting. This analysis will provide insights into the effectiveness of different strategies and their impact on corporate performance and stakeholder engagement.

Limitations: The qualitative nature of the research may limit the generalizability of findings to other contexts beyond Indian blue-chip companies. The availability and reliability of data from interviews and document analysis may vary depending on participants' willingness to disclose information and the quality of published reports.

Challenges in ESG Reporting for Bluechip Companies

Despite the evident benefits of ESG reporting, bluechip companies encounter various challenges in its implementation: Data Collection and Standardization: Gathering relevant data across diverse operations and geographies can be complex and resource-intensive. Moreover, the absence of standardized metrics and reporting frameworks complicates comparability and benchmarking.

Example: Reliance Industries Limited (RIL)

RIL operates in various sectors, including energy, petrochemicals, telecommunications, and retail, with complex supply chains and diverse operations. The conglomerate faces challenges in collecting standardized ESG data across its business units and subsidiaries. For instance, measuring carbon emissions across its refineries, chemical plants, and retail outlets requires robust data collection mechanisms and standardization protocols. Despite its efforts to enhance transparency through ESG reporting, RIL faces challenges in harmonizing ESG metrics and aligning them with global reporting standards.

Example: Mahindra & Mahindra (M&M)

M&M, a prominent Indian automobile manufacturer, faces challenges in collecting and standardizing ESG data across its diverse operations, including automotive, farm equipment, and aerospace. With manufacturing facilities and supply chains spanning multiple locations, M&M must ensure consistency and accuracy in reporting environmental metrics such as water usage, waste generation, and emissions. Despite its efforts to enhance ESG transparency through initiatives like the Mahindra Sustainability Framework, M&M encounters challenges in harmonizing ESG data collection methodologies and aligning them with global reporting standards.

Stakeholder Engagement: Engaging with diverse stakeholders to understand their ESG priorities and concerns requires proactive communication and collaboration.

Example: Infosys Limited

As one of India's leading IT services companies, Infosys operates in a highly competitive and dynamic industry, serving clients across various sectors and geographies. The company engages

with diverse stakeholders, including clients, employees, investors, and local communities, to understand their ESG priorities and concerns. Infosys conducts regular stakeholder consultations, surveys, and feedback sessions to gather insights on environmental sustainability, social impact, and governance practices. However, balancing the interests of different stakeholders and addressing their varied expectations poses challenges for Infosys in effectively managing stakeholder engagement processes.

Example: ITC Limited

ITC, a leading Indian conglomerate with interests in fast-moving consumer goods (FMCG), hotels, paperboards, and agribusiness, prioritizes stakeholder engagement as part of its ESG reporting efforts. The company engages with a wide range of stakeholders, including farmers, suppliers, distributors, employees, and investors, to understand their perspectives on environmental sustainability, social responsibility, and governance practices. Through initiatives like the ITC Social Investments Program and Sustainable Development Goals (SDGs) alignment, ITC demonstrates its commitment to stakeholder engagement despite challenges in managing diverse stakeholder expectations and interests.

Regulatory Compliance: Adhering to evolving regulatory requirements and reporting standards poses compliance challenges for multinational bluechip companies operating in different jurisdictions.

Example: Tata Consultancy Services (TCS)

TCS, India's largest IT services company, operates globally with clients in diverse industries, each subject to different regulatory requirements related to ESG reporting. While TCS voluntarily discloses ESG information through its annual sustainability reports, compliance with emerging regulatory frameworks remains a challenge. The company must navigate varying reporting requirements across jurisdictions, such as the EU Non-Financial Reporting Directive and SEBI's BRR guidelines, while ensuring consistency and accuracy in its ESG disclosures. This regulatory complexity poses challenges for TCS in aligning its ESG reporting practices with evolving standards and expectations.

Example: State Bank of India (SBI)

As India's largest public sector bank, SBI operates in a highly regulated environment, with strict regulatory requirements governing financial reporting and disclosure. While SBI voluntarily discloses ESG information through its sustainability reports and CSR initiatives, compliance with emerging regulatory frameworks remains a challenge. The bank must navigate evolving reporting standards, including SEBI's BRR guidelines and the Reserve Bank of India's (RBI) sustainability initiatives, while ensuring consistency and accuracy in its ESG disclosures. This regulatory complexity poses challenges for SBI in aligning its ESG reporting practices with statutory requirements and industry best practices.

Resource Constraints:

Example: Larsen & Toubro (L&T)

L&T, India's leading engineering and construction conglomerate, operates in sectors such as infrastructure, power, and defense, with extensive project portfolios and operations across the country. Despite its commitment to sustainability, L&T faces resource constraints in implementing robust ESG reporting processes. The company must allocate sufficient resources towards data management systems, employee training, and stakeholder engagement initiatives to enhance the quality and comprehensiveness of its ESG disclosures. However, limited resources and competing priorities pose challenges for L&T in scaling up its ESG reporting efforts effectively.

Example: Bharat Petroleum Corporation Limited (BPCL)

BPCL, one of India's largest oil and gas companies, faces resource constraints in implementing robust ESG reporting processes due to the capital-intensive nature of its operations and volatile market conditions. Despite its commitment to sustainability, BPCL encounters challenges in allocating sufficient resources towards data management systems, employee training, and stakeholder engagement initiatives. Limited budgets, competing priorities, and fluctuating oil prices pose challenges for BPCL in scaling up its ESG reporting efforts effectively while maintaining financial viability and competitiveness in the industry.

Materiality and Relevance: Example: HDFC Bank

As one of India's largest private sector banks, HDFC Bank serves a diverse customer base and operates in a highly regulated environment. The bank faces challenges in identifying and prioritizing material ESG issues relevant to its business operations and stakeholders. While HDFC Bank discloses ESG information through its annual sustainability reports and CSR initiatives, determining the materiality of ESG factors remains subjective and context-dependent. The bank must continually reassess the relevance of ESG issues, such as financial inclusion, climate risk, and governance practices, to ensure that its reporting remains credible, transparent, and aligned with stakeholder expectations.

Example: Titan Company Limited

As India's leading manufacturer of watches, jewelry, and eyewear, Titan Company faces challenges in identifying and prioritizing material ESG issues relevant to its business operations and stakeholders. While Titan voluntarily discloses ESG information through its sustainability reports and CSR initiatives, determining the materiality of ESG factors remains subjective and context-dependent. The company must continually reassess the relevance of ESG issues such as responsible sourcing, product sustainability, and supply chain transparency to ensure that its reporting remains credible, transparent, and aligned with stakeholder expectations in the consumer goods industry.

Strategies for Effective ESG Reporting

To address these challenges, bluechip companies adopt several strategies:

Integration into Business Processes: Embedding ESG considerations into core business operations ensures that sustainability becomes integral to decision-making and strategic planning.

Example: Mahindra & Mahindra (M&M)

M&M, a leading automobile manufacturer in India, has integrated ESG considerations into its business processes to drive sustainability across its operations. The company's "Rise for Good" philosophy emphasizes environmental responsibility, social impact, and ethical governance. M&M's ESG strategy includes initiatives such as developing fuel-efficient vehicles, promoting renewable energy solutions, and enhancing community engagement through its CSR programs. By embedding sustainability into its core business strategy, M&M demonstrates its commitment to creating long-term value for stakeholders while mitigating environmental and social risks.

Mahindra & Mahindra (M&M) has a comprehensive approach to Environmental, Social, and Governance (ESG) reporting. They have a dedicated sustainability section on their website where they disclose their ESG performance to stakeholders. Here are some key highlights from their ESG initiatives:

Sustainability Reporting: M&M started disclosing their ESG performance in 2008, focusing on the triple bottom line: People, Planet, and Profit1.

Carbon Neutrality: The Mahindra Group has committed to becoming carbon neutral by 20401.

Renewable Electricity: M&M has achieved 45% renewable electricity usage, with a significant solar plant going online in Parbhani, Maharashtra1.

Water Positive: The group has become water positive, indicating that they replenish more water than they consume1.

Carbon Pricing: M&M was the first Indian company to adopt an internal carbon price of $101.

EP100 Commitment: They were the first global company to commit to doubling energy productivity, achieving this goal in a record time of 4 years1.

Dow Jones Sustainability Index (DJSI): M&M was the first Indian auto company to be a part of the DJSI World Index1.

Carbon Disclosure Project (CDP): Mahindra Lifespaces ranked in the leadership category of the CDP Climate1

Technology Adoption: Leveraging advanced analytics and reporting platforms facilitates data collection, analysis, and visualization, streamlining the ESG reporting process.

Example: Wipro Limited

Wipro, a global IT services company headquartered in India, utilizes technology to enhance its ESG reporting capabilities and transparency. The company leverages digital platforms and data analytics tools to collect, analyze, and report ESG data effectively. Wipro's ESG dashboard provides stakeholders with real-time insights into its environmental footprint, social initiatives, and governance

practices. By embracing technology-driven solutions, Wipro demonstrates its commitment to innovation, efficiency, and accountability in ESG reporting, thereby enhancing stakeholder trust and engagement.

Example: Tech Mahindra

Tech Mahindra, a leading IT services company, leverages technology for data collection, analysis, and reporting to enhance the effectiveness of its ESG reporting efforts. The company utilizes advanced analytics, artificial intelligence, and cloud computing technologies to automate data collection processes, identify ESG trends, and generate actionable insights. Through its ESG digital platform, Tech Mahindra streamlines the reporting process, improves data accuracy, and enhances stakeholder transparency. By harnessing the power of technology, Tech Mahindra demonstrates its commitment to innovation and sustainability while driving efficiency and cost savings in ESG reporting.

Stakeholder Engagement: Establishing robust communication channels with stakeholders fosters transparency and trust, enabling companies to address concerns and gather feedback effectively.

Example: Tata Consultancy Services (TCS)

TCS, India's largest IT services company, prioritizes stakeholder engagement as a key component of its ESG reporting strategy. The company engages with a wide range of stakeholders, including clients, employees, investors, and local communities, to understand their ESG priorities and concerns. TCS conducts regular stakeholder consultations, surveys, and feedback sessions to gather insights on environmental sustainability, social impact, and governance practices. By fostering open dialogue and collaboration with stakeholders, TCS strengthens trust, transparency, and accountability in its ESG reporting efforts.

Example: Larsen & Toubro (L&T)

L&T, a leading engineering and construction conglomerate, prioritizes stakeholder engagement as part of its ESG reporting strategy. The company engages with diverse stakeholders, including employees, suppliers, customers, and local communities, to understand their ESG priorities and concerns. Through initiatives like the L&T Sustainability Report and Stakeholder Dialogues, L&T fosters open communication, transparency, and trust, ensuring that stakeholder feedback informs its ESG reporting practices. By actively engaging with stakeholders, L&T demonstrates its commitment to accountability, responsiveness, and shared value creation, thereby enhancing its reputation and stakeholder relationships.

Leadership and Governance: Example: Infosys Limited

Infosys, a leading IT services company, exemplifies leadership and governance excellence in ESG reporting through its robust governance structures and transparent disclosures. The company's board oversight committees, including the Sustainability Committee, oversee ESG-related risks, opportunities, and performance metrics. Infosys publishes annual sustainability reports, aligns its ESG goals with global frameworks such as the UN Sustainable Development Goals (SDGs), and

conducts regular audits to ensure compliance with regulatory requirements and industry best practices. By demonstrating strong leadership and governance in ESG reporting, Infosys sets a benchmark for transparency, accountability, and responsible business conduct in the Indian IT sector and beyond.

Here are some key highlights from Infosys's ESG journey: ESG Report 2022-23: Infosys has published its ESG Report for 2022-23, which reflects the company's approach, journey, and outcomes. The report emphasizes Infosys's commitment to sustainability, responsible business practices, and stakeholder engagement.

Notable achievements include: Carbon Neutrality: Infosys has been carbon neutral for four consecutive years and is on its journey to net zero emissions.

CDP Climate Leadership: The company has been recognized for climate leadership by CDP for seven consecutive years.

Ethical Company: Infosys has been recognized as the world's most ethical company by Ethisphere for three years in a row.

Green Certified Space: Infosys boasts 28.9 million square feet of the highest-level green certified space.

Renewable Energy: Around 57.90% of electricity for Infosys's India operations comes from renewable sources.

Social Impact: Infosys has empowered over 114 million lives through Tech for Good programs in e- governance, healthcare, and education12.

ESG Priorities:

Infosys aligns its ESG efforts with three core priorities:

Environmental: The company focuses on mitigating GHG emissions, reducing energy consumption, managing water, and embracing clean tech.

Social: Infosys aims to develop people by creating meaningful opportunities for all. Governance: The company prioritizes the interests of all stakeholders through its core values2. Leadership Perspectives:

Nandan Nilekani, Co-founder and Chairman of Infosys, emphasizes the integration of ESG factors into the company's operations.

Salil Parekh, Chief Executive Officer, highlights Infosys's aspiration to be a well-governed model organization that leverages technology for good.

N. R. Narayana Murthy, Founder of Infosys, underscores the importance of living in harmony with the context in which the company operates2.

Stakeholder Engagement:

Infosys engages with various stakeholders, including clients, employees, investors, partners, academia, and local communities.

Through continuous and responsible engagement, Infosys balances stakeholder expectations with its sustainability strategy.

The company strives to create a sustainable future for all stakeholders 2.

Example: HDFC Bank

HDFC Bank, one of India's leading private sector banks, exemplifies leadership and governance excellence in ESG reporting through its strong governance structures and transparent disclosures. The bank's board oversight committees, including the CSR Committee and Risk Management Committee, oversee ESG-related risks, opportunities, and performance metrics. HDFC Bank publishes annual sustainability reports that provide comprehensive insights into its environmental, social, and governance initiatives. By demonstrating proactive leadership and governance in ESG reporting, HDFC Bank sets a benchmark for transparency, accountability, and responsible banking practices in the Indian financial sector.

Impact of ESG Reporting

The impact of ESG reporting extends beyond compliance and reputation management:

Brand Value and Reputation: Demonstrating a commitment to sustainability enhances brand value and reputation, driving customer loyalty and market differentiation. ESG reporting plays a crucial role in shaping the reputation of Indian blue-chip companies by demonstrating their commitment to sustainability, transparency, and responsible business practices. Companies with robust ESG reporting frameworks often enjoy enhanced credibility and trust among stakeholders, including investors, customers, employees, and regulators.

Examples:

Tata Group: Tata Sons, the holding company of Tata Group, publishes annual sustainability reports highlighting its ESG initiatives across various subsidiaries, including Tata Motors, Tata Steel, and Tata Consultancy Services. The group's commitment to environmental sustainability, social development, and ethical governance has earned it a reputation as a responsible corporate citizen both in India and globally.

Infosys: Infosys, one of India's largest IT services companies, is renowned for its transparent ESG reporting practices. The company publishes detailed sustainability reports that provide stakeholders with insights into its environmental performance, social impact, and governance practices. Infosys's commitment to sustainability has strengthened its reputation as a trustworthy and ethical business partner.

Access to Capital and Cost of Capital: Companies with robust ESG performance attract a broader investor base and benefit from lower capital costs due to enhanced risk management and long-term sustainability.

Effective ESG reporting can enhance Indian blue-chip companies' access to capital and reduce their cost of capital by attracting socially responsible investors and mitigating ESG-related risks.

Investors increasingly consider ESG factors in their investment decisions, favoring companies with strong ESG performance and transparent reporting practices.

Examples:

Reliance Industries Limited (RIL): RIL's comprehensive ESG reporting has helped the company attract investments from ESG-focused funds and institutional investors. By disclosing its environmental initiatives, social programs, and governance practices, RIL has demonstrated its commitment to sustainable development, thereby reducing its cost of capital and improving investor confidence.

HDFC Bank: HDFC Bank's transparent ESG reporting practices have positioned it as a preferred investment destination for socially responsible investors. The bank's focus on financial inclusion, community development, and ethical governance has enabled it to access capital at favorable terms, strengthening its financial resilience and competitive position in the banking sector.

Competitive Advantage and Market Differentiation:

ESG reporting can confer a competitive advantage to Indian blue-chip companies by differentiating them in the market, attracting customers, and fostering brand loyalty. Companies that prioritize sustainability and responsible business practices often outperform their peers in terms of market share, revenue growth, and customer satisfaction.

Examples:

ITC Limited: ITC's ESG reporting and sustainability initiatives have helped the company differentiate its products and services in the market. ITC's focus on sustainable agriculture, renewable energy, and waste management has resonated with environmentally conscious consumers, driving sales and market share growth across its FMCG and agribusiness divisions.

Mahindra Group: The Mahindra Group's commitment to sustainability and ESG reporting has positioned it as a leader in the Indian automotive and manufacturing sectors. Mahindra's focus on electric vehicles, green technologies, and social impact initiatives has enhanced its brand reputation and customer loyalty, giving it a competitive edge in the market.

Risk Management and Resilience: ESG reporting enables companies to identify and mitigate environmental, social, and governance risks, safeguarding their long-term financial performance.

ESG reporting enables Indian blue-chip companies to identify and mitigate ESG-related risks, ensuring business continuity and long-term resilience in a rapidly changing environment. By proactively addressing environmental, social, and governance risks, companies can safeguard their reputation, financial performance, and stakeholder trust.

Examples:

Tata Power: Tata Power's ESG reporting practices have enabled the company to identify and mitigate risks associated with climate change, regulatory compliance, and stakeholder activism. By

investing in renewable energy, carbon reduction initiatives, and community engagement programs, Tata Power has enhanced its resilience to market volatility and regulatory uncertainty.

Larsen & Toubro (L&T): L&T's transparent ESG reporting has helped the company manage risks related to project delays, supply chain disruptions, and reputational damage. Through its focus on safety, ethics, and governance, L&T has built a culture of risk awareness and accountability, mitigated potential ESG-related liabilities and enhanced its reputation as a reliable and responsible business partner.

Innovation and Business Growth:

ESG reporting encourages Indian blue-chip companies to innovate and develop sustainable business models that create value for society and the environment. By integrating ESG considerations into their strategic decision-making processes, companies can identify new market opportunities, drive product innovation, and foster long-term business growth.

Examples:

Tech Mahindra: Tech Mahindra's ESG reporting practices have spurred innovation in digital technologies, sustainability solutions, and social impact initiatives. The company's focus on renewable energy, digital inclusion, and ethical AI has positioned it as a leader in responsible innovation, driving business growth and market expansion globally.

Adani Group: The Adani Group's ESG reporting initiatives have catalyzed innovation in renewable energy, infrastructure development, and sustainable supply chains. By investing in solar power, port modernization, and community development projects, the Adani Group has diversified its business portfolio and unlocked new growth opportunities in India's rapidly evolving ESG landscape.

Conclusion

ESG reporting has emerged as a cornerstone of corporate governance and accountability, particularly for bluechip companies with significant social and environmental footprints. While challenges persist, effective strategies and proactive engagement can help companies navigate the complexities of ESG reporting and harness its potential to drive sustainable value creation. As stakeholders increasingly demand transparency and accountability, ESG reporting will continue to play a pivotal role in shaping corporate behavior and fostering a more sustainable future. In the intricate landscape of Indian blue- chip companies, the journey towards effective Environmental, Social, and Governance (ESG) reporting represents a pivotal opportunity and a formidable challenge. These companies stand as pillars of India's economic growth, wielding significant influence over various sectors and playing crucial roles in shaping the nation's trajectory. As the world increasingly prioritizes sustainability and responsible business practices, the role of ESG reporting becomes paramount for these entities.

Consider, for instance, the stalwart Tata Group, an embodiment of Indian corporate excellence. With its diverse portfolio spanning steel, automobiles, power, and more, Tata Group exemplifies a

commitment to sustainability through its robust ESG reporting practices. Through comprehensive sustainability reports, Tata Group entities showcase their efforts towards carbon reduction, renewable energy adoption, and community development. By transparently disclosing their ESG performance, these companies bolster their reputation as responsible corporate citizens, earning the trust and confidence of stakeholders and attracting socially conscious investors. Similarly, Infosys, a juggernaut in the Indian IT sector, stands as a beacon of leadership in ESG reporting. Through meticulous annual sustainability reports, Infosys offers stakeholders a glimpse into its environmental impact, social initiatives, and governance practices. This commitment to transparency not only fosters trust among investors and customers but also sets a benchmark for corporate accountability in the Indian IT industry. Infosys's embrace of ESG reporting underscores the company's recognition of the interconnectedness between business success and societal well-being.

In the renewable energy sector, Adani Green Energy emerges as a shining example of ESG reporting done right. As a subsidiary of the Adani Group, Adani Green Energy's disclosures highlight its strides in expanding renewable energy capacity, reducing carbon emissions, and promoting sustainable development. The company's transparent reporting practices have not only attracted investments from ESG-focused funds but have also positioned it as a leader in India's renewable energy transition. Adani Green Energy's commitment to sustainability serves as a testament to the financial benefits of prioritizing ESG performance. Furthermore, HDFC Bank, a cornerstone of India's banking sector, demonstrates how responsible banking practices can be integrated into ESG reporting. Through its annual sustainability reports, HDFC Bank showcases its initiatives to promote financial inclusion, support small businesses, and enhance environmental sustainability. The bank's leadership in responsible banking not only garners recognition from stakeholders but also underscores the business case for aligning financial performance with ESG goals.

In essence, the live examples of Tata Group, Infosys, Adani Green Energy, and HDFC Bank illuminate the profound significance of ESG reporting in the context of Indian blue-chip companies. By embracing transparency, accountability, and sustainability, these companies not only fortify their reputations but also drive tangible value creation for stakeholders. As ESG reporting continues to evolve, Indian blue-chip companies must seize the opportunity to lead by example, inspire industry-wide change, and forge a more resilient and sustainable future for India and beyond.

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Climate Change and Jal Jeevan Mission: Adapting to a Changing Environment

Anamika Choudhary[1]

ABSTRACT

This research explores the intersection of climate change and the Jal Jeevan Mission, a government initiative aimed at providing clean drinking water to rural households in India. It investigates the potential impacts of climate change on the mission's goals and effectiveness, such as altered rainfall patterns, rising temperatures, and increased water scarcity. The study analyzes adaptation strategies and measures that can be implemented to ensure the sustainability of the Jal Jeevan Mission in the face of a changing climate. Additionally, it examines the role of technology, community engagement, and policy interventions in enhancing the resilience of rural water systems.

Keywords: *Jal Jeevan Mission, Climate change, adaptation strategies, sustainability, community engagement.*

Introduction

Climate change is a pressing global challenge with far-reaching implications for water resources, agriculture, and human health. India, with its vast rural population, is particularly vulnerable to the impacts of climate change, including altered rainfall patterns, rising temperatures, and increased water scarcity. These changes pose significant challenges to the government's ambitious **Jal Jeevan Mission**, which aims to provide clean drinking water to every rural household in the country by 2024.

The Jal Jeevan Mission is a critical initiative to address the water crisis in rural India, but its success is contingent upon its ability to adapt to the changing climate. Climate change-induced water scarcity, pollution, and extreme weather events can undermine the sustainability of the mission's goals. Therefore, it is imperative to investigate the potential impacts of climate change on the Jal Jeevan Mission and develop effective adaptation strategies to ensure its long-term success.

This research aims to contribute to a better understanding of the complex interplay between climate change and the Jal Jeevan Mission, providing valuable insights for policymakers, researchers, and practitioners involved in water resource management and rural development.

1. Associate Professor, Department of Economics, DSMNRU, Lucknow, (U.P.)

Objectives:

1. **Assess the potential impacts of climate change** on the goals and effectiveness of the Jal Jeevan Mission.
2. **Identify and analyze adaptation strategies** that can be implemented to mitigate the adverse effects of climate change on the mission.
3. **Evaluate the role of technology** in enhancing the resilience of rural water systems in the context of climate change.
4. **Examine the importance of community engagement** in adapting to climate change and ensuring the success of the Jal Jeevan Mission.
5. **Assess the effectiveness of existing policies and identify potential policy interventions** to address the challenges posed by climate change to the mission.

Hypotheses:

1. Climate change will have a significant impact on the availability and quality of water resources in rural India, thereby affecting the achievement of the Jal Jeevan Mission's objectives.
2. Adaptation strategies such as water conservation, rainwater harvesting, and the development of drought-resistant crops will be crucial in mitigating the negative effects of climate change on the mission.
3. The adoption of innovative technologies like solar-powered water purification systems and early warning systems for extreme weather events can enhance the resilience of rural water systems.
4. Community participation and engagement are essential for the successful implementation and sustainability of climate change adaptation measures within the Jal Jeevan Mission.
5. Existing policies may not be sufficient to address the challenges posed by climate change to the Jal Jeevan Mission, and new policy interventions may be necessary to ensure its long-term success.

Literature Review

Climate Change and Water Resources:

- **IPCC Reports:** The Intergovernmental Panel on Climate Change (IPCC) has consistently highlighted the significant impacts of climate change on water resources, including changes in precipitation patterns, increased water scarcity, and rising sea levels.
- **Regional Studies:** Numerous studies have examined the specific impacts of climate change on water resources in India, such as altered monsoon patterns, glacial melting, and increased frequency of droughts and floods.

- **Water Scarcity:** Researchers have investigated the growing water scarcity crisis in India, particularly in rural areas, and the implications for agriculture, livelihoods, and human health.

Jal Jeevan Mission and Climate Change:

- **Policy Analysis:** Studies have analyzed the government's Jal Jeevan Mission and its potential to address the water crisis in rural India. However, few have explicitly examined the mission's vulnerability to climate change.
- **Adaptation Strategies:** Some research has explored potential adaptation strategies for water resource management in India, but their applicability to the Jal Jeevan Mission has not been extensively studied.
- **Technology and Innovation:** Researchers have investigated the role of technology, such as rainwater harvesting, solar-powered water purification systems, and early warning systems, in enhancing water security and resilience.

Community-Based Approaches:

- **Participatory Development:** Studies have emphasized the importance of community-based approaches in water resource management, including participatory planning, implementation, and monitoring.
- **Social Equity:** Research has highlighted the need to address social equity and inclusion in water resource management, particularly in marginalized communities.

Policy Interventions:

- **Water Governance:** Studies have examined the role of effective water governance and policy frameworks in addressing water scarcity and promoting sustainable water use.
- **Climate Financing:** Research has explored the need for increased climate finance to support adaptation measures in developing countries like India.

Knowledge Gaps:

While existing literature provides valuable insights, several knowledge gaps remain:

- **Specific Impacts:** More research is needed to quantify the specific impacts of climate change on the Jal Jeevan Mission, including changes in water availability, quality, and demand.
- **Integration of Adaptation Strategies:** Studies are required to develop and evaluate integrated adaptation strategies that combine technological, institutional, and community-based approaches.
- **Policy Implications:** Further research is necessary to identify and assess the effectiveness of policy interventions to address the challenges posed by climate change to the Jal Jeevan Mission.

Methodology

Research Design

This research will employ a **mixed-methods research design** to combine quantitative and qualitative data collection and analysis techniques. This approach will provide a comprehensive understanding of the complex interplay between climate change and the Jal Jeevan Mission.

Data Collection

Quantitative Data:

- **Secondary Data:** Existing data on climate change projections, rainfall patterns, temperature trends, and water availability in India will be collected from government agencies, research institutions, and international organizations like the IPCC.
- **Survey Data:** A survey will be conducted among rural households, local government officials, and community leaders to gather information on their experiences with water scarcity, the impact of climate change, and their perceptions of the Jal Jeevan Mission.

Qualitative Data:

- **Key Informant Interviews:** In-depth interviews will be conducted with experts in climate change, water resource management, rural development, and government officials involved in the Jal Jeevan Mission.
- **Case Studies:** Case studies of selected rural communities will be conducted to explore the specific impacts of climate change on water availability, access, and quality, as well as the effectiveness of adaptation strategies.

Data Analysis

Quantitative Data Analysis:

- **Statistical Analysis:** Statistical techniques, such as correlation analysis, regression analysis, and time series analysis, will be used to analyze quantitative data and identify trends and relationships between climate variables and water availability.

Qualitative Data Analysis:

- **Thematic Analysis:** Qualitative data will be analyzed using thematic analysis to identify key themes and patterns related to the impacts of climate change, adaptation strategies, and community experiences.

Ethical Considerations

- **Informed Consent:** Participants will be informed about the research objectives, their rights, and the potential risks and benefits of participation.
- **Confidentiality:** Participant data will be kept confidential and anonymized to protect privacy.
- **Ethical Guidelines:** The research will adhere to ethical guidelines established by relevant research institutions and government bodies.

Limitations

- **Data Availability:** Access to reliable and up-to-date data on climate change and water resources in rural India may be limited.
- **Generalizability:** Findings may not be generalizable to all regions of India due to variations in climate, geography, and socio-economic conditions.
- **Time Constraints:** The research may be subject to time constraints, which could limit the depth and breadth of data collection and analysis.

By employing a mixed-methods research design and addressing potential limitations, this study will provide a comprehensive and rigorous analysis of the intersection between climate change and the Jal Jeevan Mission.

Findings

Climate Change Impacts:

- **Altered Rainfall Patterns:** Climate change is leading to more frequent and intense droughts and floods, affecting the availability and reliability of water sources.
- **Rising Temperatures:** Increased temperatures are contributing to higher rates of evaporation and increased water demand, exacerbating water scarcity.
- **Increased Water Scarcity:** Many rural regions in India are experiencing severe water scarcity due to climate change, posing challenges to the Jal Jeevan Mission's goal of providing clean drinking water to all households.

Adaptation Strategies:

- **Water Conservation:** Implementing water conservation measures, such as reducing water wastage, promoting efficient irrigation practices, and using water-saving technologies, is essential for mitigating the impacts of climate change.
- **Rainwater Harvesting:** Capturing and storing rainwater can help supplement water supplies during dry periods and reduce dependence on groundwater.
- **Drought-Resistant Crops:** Promoting the cultivation of drought-resistant crops can reduce water demand and improve agricultural resilience.
- **Technology Adoption:** Innovative technologies like solar-powered water purification systems, early warning systems for extreme weather events, and remote sensing for water resource monitoring can enhance the resilience of rural water systems.

Community Engagement:

- **Participatory Planning:** Involving local communities in the planning and implementation of adaptation measures can increase their ownership, participation, and effectiveness.
- **Capacity Building:** Providing training and capacity building to communities on water resource management, climate change adaptation, and sustainable practices can empower them to take action.

Policy Interventions:

- **Water Governance:** Strengthening water governance institutions and policies can improve water resource management and ensure equitable distribution.
- **Climate Financing:** Increasing investments in climate change adaptation measures, including water infrastructure and community-based initiatives, is crucial.
- **Policy Coherence:** Ensuring policy coherence across different sectors, such as agriculture, energy, and environment, is essential for effective climate change adaptation.

Overall, the research findings highlight the urgent need for a comprehensive and integrated approach to address the challenges posed by climate change to the Jal Jeevan Mission. By implementing a combination of adaptation strategies, promoting community engagement, and strengthening policy frameworks, it is possible to ensure the long-term sustainability of the mission and improve the lives of millions of rural Indians.

Conclusion

This research has explored the complex interplay between climate change and the Jal Jeevan Mission, a critical initiative to provide clean drinking water to rural households in India. The study has identified several potential impacts of climate change on the mission's goals and effectiveness, including altered rainfall patterns, rising temperatures, and increased water scarcity.

To ensure the sustainability of the Jal Jeevan Mission in the face of a changing climate, a range of adaptation strategies and measures are necessary. These include water conservation, rainwater harvesting, the development of drought-resistant crops, and the adoption of innovative technologies like solar-powered water purification systems and early warning systems.

Community engagement plays a vital role in the success of climate change adaptation efforts. By involving local communities in planning, implementation, and monitoring of adaptation measures, it is possible to enhance their ownership, participation, and resilience.

Policy interventions are also crucial for addressing the challenges posed by climate change to the Jal Jeevan Mission. Government policies should prioritize water conservation, sustainable water management, and investment in climate-resilient infrastructure. Additionally, increased climate finance is needed to support adaptation measures in rural India.

In conclusion, this research highlights the urgent need for a comprehensive and integrated approach to address the challenges posed by climate change to the Jal Jeevan Mission. By implementing a combination of adaptation strategies, promoting community engagement, and strengthening policy frameworks, it is possible to ensure the long-term sustainability of this critical initiative and improve the lives of millions of rural Indians.

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A Comparative Analysis of Solar Power Generation Efficiency in India

Ayushi Gupta[1] & Dr. Sweta Kumari[2]

ABSTRACT

The research paper titled "A Comparative Analysis of Solar Power Generation Efficiency in India" aims to assess and compare the efficiency of cumulative solar power generation across various states in India. It highlights the significant disparities in solar energy production despite comparable sunlight exposure across regions. The study seeks to identify the key factors influencing these variations, including environmental, economic, policy, and technological determinants. By employing a secondary data analysis approach, the research synthesizes existing data to provide insights into which states are effectively harnessing solar energy and the challenges faced by others. The findings are intended to inform stakeholders and policymakers, optimizing resource allocation and enhancing the overall efficacy of solar power utilization in India. The paper underscores the importance of understanding these disparities to support India's transition towards sustainable and renewable energy sources, particularly in the context of global efforts to mitigate climate change.

***Keywords**: Solar Power Generation, Efficiency, Renewable Energy, Comparative Analysis.*

INTRODUCTION

Solar energy is the radiation from the Sun capable of producing heat, causing chemical reactions, or generating electricity. The total amount of solar energy received on Earth is vastly more than the world's current and anticipated energy requirements. If suitably harnessed, solar energy has the potential to satisfy all future energy needs. (Definition by BRITANNICA)

India's energy sector has experienced a paradigm shift with the increasing focus on renewable energy sources, particularly solar power. As part of its commitment to reducing carbon emissions and addressing climate change, India has made significant strides in the adoption of solar energy, aiming to achieve 280 GW of installed solar capacity by 2030. However, despite its ambitious targets and abundant solar potential, the efficiency of solar power generation varies substantially

1. Research Scholar, Department of Applied Economics, Prof. Rajendra Singh (Rajju Bhaiya) University, Prayagraj, (U.P.) Email: ayushiagrhari@gmail.com
2. Asst. Professor, Department of Applied Economics, Prof. Rajendra Singh (Rajju Bhaiya) University, Prayagraj, (U.P.) Email: shwt0010@rediffmail.com

across different states and regions. *This variation is influenced by a multitude of factors, including geographical conditions, policy frameworks, infrastructural investments, and local market dynamics.*

This paper aims to achieve two key objectives. First, it seeks to assess and compare the efficiency of cumulative solar power generation across different states of India. By doing so*, it will provide insights into which states are harnessing solar energy most effectively and the specific challenges faced by others.* Second, it aims to identify the key factors influencing the variation in solar power generation efficiency across regions. *This includes examining environmental, economic, policy, and technological determinants, offering a holistic understanding of the variations in solar energy performance across the country.*

In recent years, the quest for sustainable and renewable energy sources has gained momentum across the globe. India, with its diverse geographical and climatic conditions, presents a unique landscape for solar power generation. *Despite the country's vast potential, the efficiency of cumulative solar power generation varies significantly across different states and regions.*

Understanding these disparities is crucial for optimizing resource allocation, formulating targeted policies, and ultimately enhancing the overall efficacy of solar power utilization in India. By investigating the underlying factors contributing to these variations, this study aspires to offeractionable insights for stakeholders and policymakers in the renewable energy sector.

Solar power, a renewable energy source, is harnessed through various installations, including ground-mounted solar, rooftop solar, hybrid solar, and off-grid solar. Ground-mounted solar projects involve large-scale arrays of solar panels installed on the ground, often in solar farms. Rooftop solar systems are smaller in scale and are installed on the roofs of buildings, providing a sustainable energy solution for residential and commercial properties. Hybrid solar systems combine solar energy with other renewable sources or traditional energy grids to ensure a reliable power supply. Off-grid solar systems operate independently of the grid, making them ideal for remote locations or areas with unreliable grid connections.

LITERATURE REVIEW

1. ***Rajvikram Madurai Elavarasan and GmShafiullah (2020)*** in their research paper '*A Comprehensive Review on Renewable Energy Development, Challenges, and Policies of Leading Indian States With an International Perspective' found out that* India's energy demand is projected to more than double by 2030, necessitating a significant transition to renewable energy (RE) sources to meet Sustainable Development Goals (SDGs) and combat climate change. Leading states like Karnataka, Gujarat, and Tamil Nadu are at the forefront, contributing substantially to India's total RE capacity of 86.76 GW as of February 2020. However, challenges such as inadequate policies and regulatory frameworks hinder further development.
2. ***Jingbing Sun et al (2024)*** in their article *'The role of solar energy in achieving net-zero emission and green growth: a global analysis'* explores sustainable development and achieving net-zero emissions by assessing the impact of solar energy adoption on carbon emissions in 40 high and upper middle-income nations and 22 low and lower middle-income countries from 2000 to 2021. They applied Dynamic GMM (generalized method of moments) analysis, which

reveals substantial potential in mitigating emissions, with a 1% increase in solar energy consumption corresponding to a 0.25% reduction in wealthier nations and a 0.10% reduction in lower-income countries.

3. ***Bashria A.A. Yousef et al (2024)*** in their research paper *'The contribution of concentrated solar power (CSP) to the sustainable development goals (SDGs): A bibliometric analysis'* identify the scientific production and its evolution related to concentrated solar power (CSP) and provides an overview of system hybridization towards accessing their role in achieving the SDGs. They found that hybrid CSP systems directly and indirectly contribute to the SDGs. For example, hybrid CSP power is directly related to SDGs 7 Affordable and Clean Energy, 8 Decent Work and Economic Growth, 9 Industry, Innovation and Infrastructure, 11 Sustainable Cities and Communities, and 12 Responsible Consumption and Production.

OBJECTIVES OF THE RESEARCH

1. To comprehensively compare and assess the efficiency of cumulative solar power generation across different states of India.
2. To identify the factors influencing the variation in cumulative solar power generation efficiency across different regions of India.

RESEARCH METHODOLOGY

This research employs a secondary data analysis approach to find out comparative analysis of Solar Power Generation Efficiency across various states. Secondary data analysis involves the systematic collection, review, and synthesis of existing data from various sources to address the research objectives. This method is particularly suitable for this study as it allows for the utilization of a wide range of data that has already been collected, processed, and published by other researchers, government agencies, and organizations.

DATA INTERPRETATION

Table 1 shows the state-wise installed capacity of solar power in India reflects a significant commitment to renewable energy through various initiatives, notably the PM-Surya Ghar Yojna (Rooftop Solar Initiative). The total installed capacity across all states and Union Territories amounts to 69,185.7 MW, with ground-mounted solar contributing 13,889.67 MW and hybrid solar systems adding 2,590.95 MW.

Gujarat leads with an impressive installed capacity of 9,851.29 MW, followed closely by Rajasthan at 20,047.17 MW. Other notable contributors include Karnataka with 8,189.36 MW and Tamil Nadu with 8,179.87 MW. States like Andhra Pradesh and Maharashtra also show substantial figures, with capacities of 4,321.76 MW and 4,354.38 MW respectively.

TABLE 1: State-wise installed capacity of Solar Power in India as on 31.08.2024

No.	STATES / UTs	Solar Power				
		Ground Mounted Solar	PM-Surya Ghar Yojna (Rooftop Solar Initiative)	Hybrid Solar Comp.	Off-grid Solar/ KUSUM	Solar Power Total
		(MW)	(MW)	(MW)	(MW)	(MW)
1	Andhra Pradesh	4321.76	217.37	0.00	88.34	4627.47
2	Arunachal Pradesh	1.27	6.68	0.00	6.70	14.65
3	Assam	126.00	43.80	0.00	9.44	179.24
4	Bihar	146.06	71.89	0.00	21.28	239.23
5	Chhattisgarh	776.60	96.99	0.00	390.73	1264.32
6	Goa	0.95	44.72	0.00	1.41	47.08
7	Gujarat	9851.29	4195.07	610.95	87.90	14745.21
8	Haryana	266.80	703.14	0.00	902.68	1872.62
9	Himachal Pradesh	79.91	20.73	0.00	34.58	135.22
10	Jammu & Kashmir	2.49	39.92	0.00	27.78	70.19
11	Jharkhand	21.00	92.22	0.00	58.15	171.37
12	Karnataka	8189.36	603.42	0.00	36.55	8829.33
13	Kerala	323.21	882.23	0.00	24.93	1230.37
14	Ladakh	6.00	1.80	0.00	0.00	7.8
15	Madhya Pradesh	3624.22	402.00	0.00	102.04	4128.26
16	Maharashtra	4354.38	2487.73	0.00	541.23	7383.34
17	Manipur	0.60	6.36	0.00	6.08	13.04
18	Meghalaya	0.00	0.21	0.00	4.07	4.28
19	Mizoram	22.00	1.96	0.00	6.35	30.31
20	Nagaland	0.00	1.00	0.00	2.17	3.17
21	Odisha	419.16	56.37	0.00	40.97	516.5
22	Punjab	886.27	408.16	0.00	81.35	1375.78
23	Rajasthan	20047.17	1269.59	1980.00	805.45	24102.21
24	Sikkim	0.52	5.12	0.00	1.92	7.56
25	Tamil Nadu	8179.87	747.56	0.00	65.99	8993.42
26	Telangana	4360.49	447.54	0.00	8.71	4816.74
27	Tripura	5.00	4.78	0.00	10.48	20.26
28	Uttar Pradesh	2700.02	265.10	0.00	315.03	3280.15
29	Uttarakhand	298.40	273.71	0.00	19.96	592.07
30	West Bengal	117.70	67.13	0.00	13.14	197.97
31	Andaman & Nicobar	25.05	4.59	0.00	0.27	29.91
32	Chandigarh	6.34	66.43	0.00	0.81	73.58
33	Dadar & Nagar Haveli/ Daman & Diu	12.64	33.82	0.00	0.00	46.46
34	Delhi	9.84	269.85	0.00	1.46	281.15
35	Lakshadweep	2.45	0.00	0.00	2.52	4.97
36	Pondicherry	0.88	50.68	0.00	0.18	51.74
37	Others	0.00	0.00	0.00	45.01	45.01
	Total (MW)	**69185.70**	**13889.67**	**2590.95**	**3765.66**	**89431.98**

Source: mnre.org.in

In contrast, several states have minimal contributions; for instance, Goa has only 0.95 MW and Arunachal Pradesh has a mere 1.27 MW installed capacity. Additionally, areas like Nagaland and Meghalaya report no significant solar power installations.

The data highlights the on-going efforts in India to harness solar energy as part of its broader strategy to increase renewable energy sources and reduce reliance on fossil fuels. The diverse capacities across states indicate varying levels of investment and infrastructure development in solar technology.

Table 2: Solar Power (Cumulative): 89.43 GW

- Ground Mounted Solar Plant: 69.19 GW
- Grid Connected Solar Rooftop: 13.89 GW
- Hybrid Projects(Solar Component): 2.59 GW
- Off-Grid Solar: 3.76 GW

Source: mnre.org.in

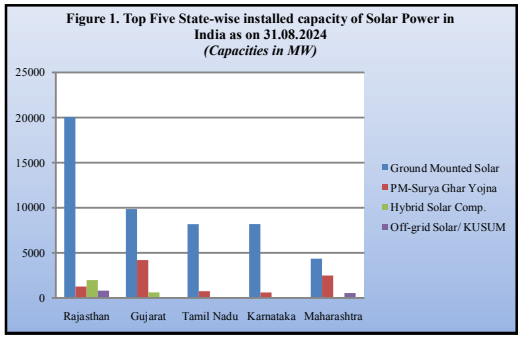
Table 3.Top Five State-wise installed capacity of Solar Power in India as on 31.08.2024

(Capacities in MW)

S. No.	*STATES / UTs*	*Ground Mounted Solar*	*PM-Surya Ghar Yojna*	*Hybrid Solar Comp.*	*Off-grid Solar/ KUSUM*	*Solar Power Total*
1.	**Rajasthan**	20047.17	1269.59	1980.00	805.45	**24102.21**
2.	**Gujarat**	9851.29	4195.07	610.95	87.90	**14745.21**
3.	**Tamil Nadu**	8179.87	747.56	0.00	65.99	**8993.42**
4.	**Karnataka**	8189.36	603.42	0.00	36.55	**8829.33**
5.	**Maharashtra**	4354.38	2487.73	0.00	541.23	**7383.34**

Source: mnre.org.in

	Achievements (1st April 2024-31st August 2024) FY 2024-25 *(Capacities in MW)*	Cumulative Achievements (as on 31.08.2024) *(Capacities in MW)*
Solar Power Cumulative	7618.36	89431.98



Source: based on Table 3

According to Table 3, August 31, 2024, the top five states in India with the highest installed capacity of solar power are as follows: Rajasthan leads with a total capacity of 24,102.21 MW, which includes 20,047.17 MW from ground-mounted solar installations, 1,269.59 MW from the PM-Surya Ghar Yojna, 1,980 MW from hybrid solar components, and 805.45 MW from off-grid solar/KUSUM initiatives.

Gujarat follows with an installed capacity of 14,745.21 MW. This comprises 9,851.29 MW from ground-mounted solar, 4,195.07 MW from the PM-Surya Ghar Yojna, 610.95 MW from hybrid solar components, and 87.9 MW from off-grid solar/KUSUM.

In third place is Tamil Nadu, which has a total capacity of 8,993.42 MW, consisting of 8,179.87 MW from ground-mounted solar, 747.56 MW from the PM-Surya Ghar Yojna, and 65.99 MW from off-grid solar/KUSUM.

Karnataka ranks fourth with an installed capacity of 8,829.33 MW, including 8,189.36 MW from ground-mounted solar and 603.42 MW from the PM-Surya Ghar Yojna.

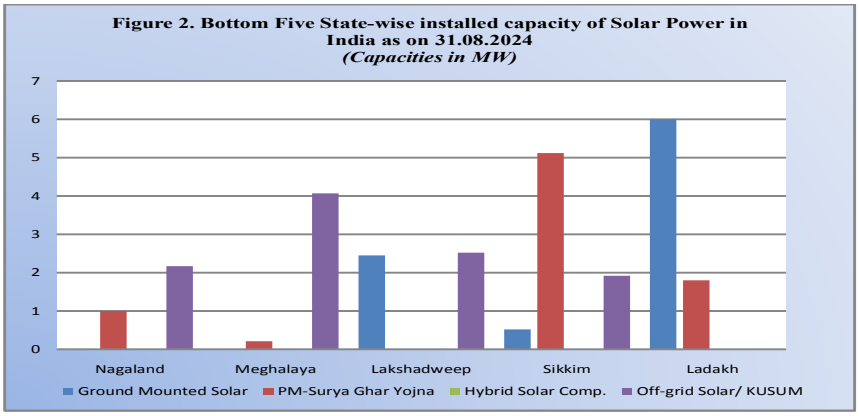
Finally, Maharashtra has a total capacity of 7,383.34 MW, which includes 4,354.38 MW from ground-mounted solar, 2,487.73 MW from the PM-Surya Ghar Yojna, and 541.23 MW from off-grid solar/KUSUM.

Table 4.Bottom Five State-wise installed capacity of Solar Power in India as on 31.08.2024

(Capacities in MW)

S. No.	*STATES / UTs*	*Ground Mounted Solar*	*PM-Surya Ghar Yojna*	*Hybrid Solar Comp.*	*Off-grid Solar/ KUSUM*	*Solar Power Total*
1.	**Nagaland**	0.00	1.00	0.00	2.17	**3.17**
2.	**Meghalaya**	0.00	0.21	0.00	4.07	**4.28**
3.	**Lakshadweep**	2.45	0.00	0.00	2.52	**4.97**
4.	**Sikkim**	0.52	5.12	0.00	1.92	**7.56**
5.	**Ladakh**	6.00	1.80	0.00	0.00	**7.8**

Source: mnre.org.in



Source: based on Table 4

Table 4 provides data on the installed capacity of solar power across various states and Union Territories (UTs) in India as of August 31, 2024. It categorizes the solar installations into several types: Ground Mounted Solar, PM-Surya Ghar Yojana, Hybrid Solar Comp., and Off-grid Solar/ KUSUM.Among the states listed, **Nagaland** has a total installed capacity of **2.17 MW**, with **1 MW** from the PM-Surya Ghar Yojana. **Meghalaya** shows a total capacity of **4.07 MW**, primarily from off-grid sources. **Lakshadweep** has a total of **2.52 MW**, all derived from ground-mounted solar installations. **Sikkim** reports a total of **7.56 MW**, with significant contributions from hybrid solar systems and PM-Surya Ghar Yojna. Lastly, **Ladakh** has a total installed capacity of **7.8 MW**, with notable contributions from ground-mounted solar.

RE capacity addition during July 2024 has been 2191.72 MW (Solar – 1733.66 MW, Wind – 419.06 MW, Small Hydro- 31.50 MW, Others- 7.50 MW)

Solar Power generation during July 2024 as compared to July 2023 has increased by 22.77 % on All India Basis except Karnataka.

FINDINGS

India had a total installed solar power capacity of 89,431.98 MW.

The majority of this capacity (69,185.7 MW) came from ground-mounted solar plants.Grid-connected solar rooftops contributed 13,889.67 MW, hybrid solar projects represented 2,590.95 MW, and off-grid solar installations made up 3,765.66 MW of the total capacity.

These findings highlight the progress India has made in expanding its solar energy capacity. The data also reveals variations in the types of solar projects being implemented across different states.

Between April 1, 2024, and August 31, 2024, India added 7,618.36 MW of solar power capacity.

This data highlights the significant progress India has made in expanding its solar energy infrastructure. The substantial capacity additions within a five-month period in 2024 further underscore the country's commitment to renewable energy development.

Rajasthan has the highest total solar power capacity (24102.21 MW) among the listed states.This capacity comes from a variety of sources, including ground-mounted solar, the PM-Surya Ghar Yojna, hybrid solar, and off-grid solar or KUSUM projects.

Gujarat has the second highest total solar power capacity (14745.21 MW), with a significant contribution from both ground-mounted solar (9851.29 MW) and the PM-Surya Ghar Yojna (4195.07 MW).

Tamil Nadu and Karnataka follow closely in terms of total solar power capacity with 8993.42 MW and 8829.33 MW, respectively. Both states primarily rely on ground-mounted solar projects for their capacity.

Maharashtra has a total solar power capacity of 7383.34 MW, with notable contributions from both ground-mounted solar (4354.38 MW) and the PM-Surya Ghar Yojna (2487.73 MW).The data suggests that these states are making significant strides in solar energy development.

Ladakh has the highest from the lowest total solar power capacity (7.8 MW) among the listed states/UTs, driven by its significant ground-mounted solar capacity (6 MW).

Lakshadweep has the second highest from the lowest share of its total solar power capacity from ground-mounted projects (2.45 MW out of 4.97 MW).

Sikkim has the highest from the lowest capacity for the PM-Surya Ghar Yojna, a program for rooftop solar installations on residential buildings, with 5.12 MW.

Meghalaya leads from the lowest in off-grid solar or KUSUM (KisanUrjaSurakshaevam Utthaan Mahabhiyan) projects with a capacity of 4.07 MW.

Nagaland has least of all kinds. The data suggests that these states/UTs are focusing on different aspects of solar energy development.

Through this research, we aim to contribute to the broader discourse on renewable energy efficiency in India and provide valuable policy recommendations to improve solar power generation across states, ultimately supporting India's transition towards a more sustainable and energy-efficient future.

Rajasthan's dominance in solar power installation is primarily due to several key factors. *The state receives abundant solar irradiation throughout the year, thanks to its high amount of sunlight and minimal cloud cover, making it an ideal location for solar power generation.* Additionally, *Rajasthan has vast tracts of barren land, particularly in its desert and arid regions, which are well-suited for large-scale solar projects. These lands are often less valuable for other agricultural or industrial uses, making them attractive for solar development.*

The Rajasthan government has also played a crucial role by implementing policies and initiatives to promote solar power, such as offering land at concessional rates, providing financial incentives, and streamlining the approval process for solar projects. Furthermore, the state has conducted numerous competitive auctions for solar projects, attracting significant investment from both domestic and international developers, which have helped drive down the cost of solar power generation.

Nagaland's low installed solar capacity can be attributed to several factors. Geographical constraints such as the state's hilly terrain and dense forests make land acquisition and infrastructure development for large-scale solar projects difficult. Additionally, the state experiences relatively higher levels of cloud cover compared to some other regions, which can reduce solar irradiation and the efficiency of solar panels. Furthermore, inadequate funding and investment in solar projects can hinder their development and growth.

Socioeconomic factors contribute as well, with Nagaland's smaller population and industrial base leading to lower overall energy demand and a reduced need for solar power. The state may also still rely on traditional energy sources like firewood and biomass, which can limit the adoption of solar power. Moreover, Nagaland has significant hydropower potential, which may be a more viable and attractive option for meeting its energy needs.

CONCLUSION

As of August 31, 2024, India had a total installed solar power capacity of 89,431.98 MW, with ground-mounted solar plants contributing the largest share (69.19 GW), followed by grid-connected solar rooftops (13.89 GW), hybrid solar projects (2.59 GW), and off-grid solar installations (3.76 GW). Rajasthan led the country with the highest installed capacity (24,102.21 MW), followed by Gujarat (14,745.21 MW), Tamil Nadu (8,993.42 MW), Karnataka (8,829.33 MW), and Maharashtra (7,383.34 MW), making up a significant portion of the total capacity. Among specific project types from the lowest, Sikkim led in rooftop solar capacity under the PM-Surya Ghar Yojna (5.12 MW), Meghalaya in hybrid solar projects (4.07 MW), and Nagaland in off-grid solar or KUSUM projects (2.17 MW). Ladakh stood out for having the highest solar power capacity among union territories (7.8 MW), while Lakshadweep had the highest share of ground-mounted solar capacity (2.45 MW out of 4.97 MW). India's solar power expansion continues to be driven by a mix of large-scale ground-mounted plants and various specialized solar initiatives.

LIMITATION

The provided data, while informative, presents limitations for a comprehensive research paper on India's solar power expansion. Firstly, the data is limited to a specific point in time (August 31, 2024), and does not capture the dynamic nature of solar power installations and growth rates. Secondly, the analysis primarily focuses on cumulative installed capacity and regional distribution, neglecting factors such as project efficiency, cost-effectiveness, and grid integration challenges. Additionally, the data does not delve into the impact of solar power on energy security, environmental sustainability, and socio-economic development. Finally, the analysis does not consider future trends, policy implications, or potential barriers to further solar power expansion in India. To address these limitations, a comprehensive research paper would require a broader dataset, in-depth analysis of various factors, and a forward-looking perspective on India's solar power future.

SUGGESTIONS

The provided data on India's solar power capacity offers several avenues for research. Potential research directions include: (1) analysing the factors driving the growth of solar power in different regions of India, such as government policies, technological advancements, and economic incentives; (2) examining the impact of solar power on India's energy mix and its contribution to reducing greenhouse gas emissions; (3) investigating the challenges and opportunities associated with integrating large-scale solar power into the grid; (4) assessing the potential of rooftop solar and off-grid solar installations in meeting India's energy needs, particularly in rural areas; and (5) comparing India's solar power development with other countries and identifying best practices for future expansion.

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Waste to Best: A Study of Wheat Stalk Handicraft Under One District One Product (ODOP) in Uttar Pradesh

Deepika Sahu[1] & Dr. Nishi Mishra[2]

"The roadmap of progress will not be decided by the government alone but by the nation. Viksit Bharat has to be built only through Sabka Prayas"

—Sri Narendra Modi, Prime Minister of India

ABSTRACT

Burning of crop residual causes the environmental degradation and adversely affecting humans. The present paper aims to investigate the innovative methods and strategies for transforming waste materials into high-quality and unique products under ODOP, with a focus on sustainability, resource efficiency and economic viability. It is also aims to find the answer that How the best products can be transformed using the waste material? The present study is a qualitative research work mainly focusing on the rare handicrafts being produced under ODOP in Uttar Pradesh. Based on observation method, both the primary and secondary data and information have been used to satisfy the objective of the study. According to the results of the study, it is found that under One District One Product, handicrafts along with the districts are playing an effective role in reducing unemployment and poverty by creating new employment and income opportunities in the state. Encouragement of the production of traditional goods will be helpful in achieving the vision of Viksit Bharat @2047.

Keywords: *Crop Waste, Environment, ODOP, Wheat Stalk, Sustainability, Uttar Pradesh.*

1. INTRODUCTION

Indian economy is an agricultural economy where different types of crops are being produced in different states according to the geographical conditions. Uttar Pradesh is a state located in the plains of India, where wheat, rice, sugarcane, pulses, oilseeds, potatoes and other food grains and commercial crops are grown according to the climate suitable for agriculture. After harvesting,

[1] Research Scholar, Department of Economics, Pt. Deen Dayal Upadhyay Govt. Girls P.G. College, University of Lucknow, Lucknow, (U.P). Email: ds.ecophd@gmail.com

[2] Assistant Professor, Department of Economics, Pt. Deen Dayal Upadhyay Govt. Girls P.G. College, University of Lucknow, Lucknow, (U.P). E-mail: nishimishra.3006@gmail.com

some of the crop residues are used for various purposes, but most of the residues are burnt in the fields.

Burning of crop residues causes emission of various types of harmful pollutants which causes air pollution, water pollution as well as negative impact on the soil productivity. Due to the burning of crop residues, the atmosphere gets polluted and as a result, human health is greatly affected. Burning of crop residues releases large amounts of Carbon Dioxide, Methane and other Greenhouse gases. Due to which the temperature of the soil increases and as a result the nutrients required for production from the fields get depleted. The temperature in the atmosphere is continuously increasing rapidly, which is having adverse effects on human life. Given the increasing adverse effects of crop residue burning, it is necessary to adopt eco-friendly residue management practices to protect the environment and human health.

1.1 One District One Product (ODOP)

India's concept of **"One District One Product" (ODOP)** is based on the Japanese business development concept "One Village One Product (OVOP)" which aimed to encourage localised products and services to upgrade the standard of living of the local people and for making the presence of local contribution in nation building.

Uttar Pradesh is the first state to execute the **"One District One Product"** scheme in 2018 to reinforce to the traditional industries, enable the people to gain expertise in one product, value addition of the product and improvement in the growth of GSDP of the state.

1.2 ODOP & Bahraich District

Bahraich district is located on the river bank of Ghaghara in the north-eastern part of Uttar Pradesh. It has the international boundary with the Nepal on north side. Economy of the district is mainly depends upon agriculture. Main food grain crops, such as; wheat, rice, pulse, and mustard and other commercial crops like sugarcane are being produced in the district. The Wheat Stalk Handicraft is the main product of Bahraich under One District One Product (ODOP). Craftsmen make unique artwork with wheat stalk in the district. This product has been highly appreciated at national and international level. Artisans are creating the new opportunities of employment and earnings in the district. On the initiative of the District Magistrate of Bahraich district, artists have also trained jail inmates to make artworks from wheat stalks.

2. REVIEW OF LITERATURE

The study revealed that the products in the eastern region of Uttar Pradesh have not affected the people well engaged in production of handicrafts under One District One Product. It is required to promote the artisans for the manufacturing of traditional products. It is suggested that the demand side measures can be profitable for the handicraft producers in the state (Misra, et.al, 2022). The

study attempted to identify the enterpreneurial performance, growth trends of women's entrepreneurship in the micro-enterprises in India in the post-pandemic era. According to the study, the entrepreneurial activities of female entrepreneurs vary by the place, organization and other variables (Yadav, et. al., 2022). Organizing the resources and empowering the women is the main aim of sustainable economy. The promotion of handicraft production through Atmanirbhar Bharat Abhiyan and Skill development is the way to achieve our goal of creation of new employment opportunities and poverty reduction in Uttar Pradesh as well as at national level (Yadav, et.al., 2021). The study recommended to address the issues of home based workers for their critical situation and challenges facing at the work place like payment, availability of work, wage rates, market related information, financial support and training facilities for skill development among the workers (Nandi, et.al., 2006).

3. RESEARCH GAP

Limited studies have been conducted by few researchers in this particular field. Therefore, it is required to explore the nature and significance of the rare handicraft products and to investigate the innovative methods and strategies for transforming the crop waste into high-quality and unique products under ODOP, with a focus on sustainability, resource efficiency and economic viability and to analyze the economic contribution of such rare handicraft products under one district one product (ODOP).

4. OBJECTIVE OF THE STUDY

The main objective of the present study is:

- To investigate the innovative methods and strategies for transforming waste materials into high-quality unique products under ODOP, with a focus on sustainability, resource efficiency and economic viability.

5. RESEARCH QUESTION

The study is mainly concerned to answer the following question:

- How the best products can be transformed using the waste material?

6. RESEARCH METHODOLOGY

The present study is based on qualitative observation using both the primary and secondary information and data analysis. In Uttar Pradesh, Bahraich district has been selected for the present study. The primary data and information on various parameters has been obtained from the artisans using observation and telephonic conversation. Secondary data has been obtained from various reports, journals and using various websites as digital sources of data collection.

Based on observation, case study method has been adopted to solve the objective of the study and to answer the research question stated in the present study.

7. RESULTS AND DISCUSSIONS

7.1 Wheat Stalk Handicrafts

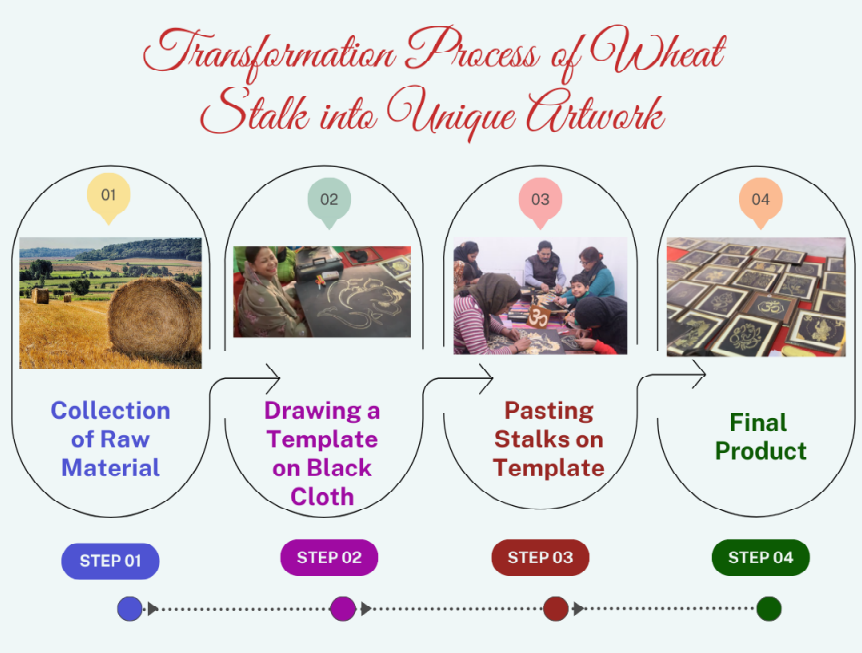
The wheat stalk handicrafts are the example of Snob Effect in economics. These are the rare handicraft paintings made by using the waste material of wheat crop. Wheat stalk handicraft product has gained immense popularity among the people in Bahraich district. Artists in Bahraich district create a unique artwork using wheat stalks. With time, the shine of this art is increasing and three artists of Bahraich district have also been awarded for this handicraft.

Figure 1: Paintings made by artisans using wheat stalk

Source: https://odopup.in/en/article/bahraich

7.2 Transformation Process of Wheat Stalk into Unique Artwork

Figure 2: Transformation process of wheat stalk into unique artwork



Source: Created by authors

There is no cost of raw material for the artifacts made from wheat stalk because at the time of wheat harvesting, wheat residues are easily available in large quantities which have to be maintained well. The whole art is like Jugaad made of junk. The artist draws a template on black satin cloth and pastes the stalks on it very minutely. While making the artwork, it is intricately decorated in a frame and carefully pasted using Fevicol or Feviquick, after which it is left to dry. After drying, a wonderful artwork is obtained. The artefacts made from wheat stalks shine like gold. As it gets older it becomes more golden. It takes about two days to two months to make a painting from the stalks (Figure 2).

7.3 Generation of employment and income through artworks

Wheat stalk handicraft providing new opportunities for income and livelihood among the artisans of Bahraich district. Along with their own employment, the artists of the district are also providing employment and income opportunities to other people. Artists making artworks are earning around Rs. 10 to 12 thousand per month.

7.4 Relevance in International Market

Handicrafts made from wheat stalks in India have brought alive a new world of art in the international markets. This skill of the artists of Bahraich district has been liked at the international level from Sydney to America and Dubai. The price of these paintings ranges from ¹ 200 to ¹ 20,000. These artefacts made of wheat stalks are presented by artists in exhibitions across the country.

In Bahraich district, the handicrafts made from wheat stalks are being appreciated not only at the national and international level. In fact, artists have also received many awards for this. In 2013, Yunus Khan was given the Kalanidhi Award by the Governor of Haryana. Before this, he and his wife Gadika were awarded the State Award by the Uttar Pradesh Government.

8. CONCLUSION

Artists in Bahraich district are creating new employment opportunities by using crop residues. According to the results of the study, it is found that under One District One Product, handicrafts along with the districts are playing an effective role in reducing unemployment and poverty by creating new employment and income opportunities in the state. The government is encouraging farmers to make various types of products using crop residues. Artefacts are being made using crop residues, compost, cardboard, fuel and unique handicrafts using wheat stalks.

9. SUGGESTIONS

Burning of crop residues has a negative impact on the environment and human life. To resolve this, it is suggested that this is an effective initiative through which new dimensions of economic progress along with environmental protection can be created.

To manufacture eco-friendly products using crop residues, production can be encouraged in different districts under One District One Product (ODOP). It is advocated that the production can also be encouraged by the government by providing equipments and technical assistance on subsidy

basis. Production can be encouraged by providing training to people through skill development programs at the Block and Gram Panchayat level. Production using crop residues can also be encouraged through e-NAM portal and online medium for sale at local level and in national and international markets. It is also urged that government agencies and research institutions should prepare the database regarding the circulation, total production, export, and raw material and training facilities for different products being produced under ODOP in Uttar Pradesh.

Prime Minister Shri Narendra Modi has envisioned making India a developed country by 2047 ('Viksit Bharat @2047: Voice of Youth'). To fulfill this, the products made from crop residues will make an unprecedented contribution in making the country a developed nation by reducing unemployment and poverty by creating new dimensions of employment and income along with environmental protection.

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Renewable Energy and Climate Change: An Overview

Dr. Amit Kumar Sharma[1] & Anam Fatma[2]

The use of conventional fossil fuels (coal, oil, natural gas, etc.) has altered the Earth's energy balance since the Industrial Revolution, releasing significant volumes of greenhouse gases and causing global warming. Since 1850, global temperatures have risen by about 1 degree Celsius, sea levels have risen by nearly 20 cm, and extreme weather events have become more frequent and severe due to greenhouse gases emitted by human activities. The issue of energy supply and use is not only related to global warming, but also to environmental problems such as air pollution, acid precipitation, ozone depletion, forest destruction and radioactive emissions. As a result, the significance of clean energy for societal advancement has gained prominence. The most crucial element of clean energy is thought to be renewable energy, which can be used to reduce environmental effect, produce the least amount of secondary waste, and satisfy the needs of social and economic, and sustainable development. If economic growth is to continue in course of recent decades, by 2050, renewable energy sources will be required to provide most of the energy due to issues such as depletion of fossil fuel reserves and greenhouse gas emissions. Therefore, reducing the use of fossil fuels and switching to renewable energy sources has become an urgent need to mitigate climate change and protect the environment. Therefore, reducing the use of fossil fuels and switching to renewable energy sources has become an urgent need to mitigate climate change and protect the environment.

Review of Literature

- **Christian Von Zabeltitz (1994)**, "Highlighted that electricity generation from sources like coal, oil, and natural gas has been responsible for approximately one-third of global greenhouse gas emissions".
- **According to Jacobson et al. (2015) and Sovacool et al. (2016)**, "Highlight the potential of renewable energy to mitigate climate change by reducing greenhouse gas emissions."
- According to the **International Energy Agency (IEA)**, "The global renewable energy supply will increase from 28.7% in 2021 to 43% in 2030".

1. Assistant Professor, Department of Economics, DDU Gorakhpur University, Gorakhpur, (U.P.)
2. Research Scholar, Department of Economics, DDU Gorakhpur University, Gorakhpur, (U.P.)

- According to the **World Health Organization (WHO)**, "Around 99 percent of people worldwide breathe air that is polluted and poses a health risk and more than 13 million people die from preventable environmental causes, such as air pollution, each year. Transitioning to renewable energy can mitigate these health risks."

The paper is divided into **Five Sections**. **Section (I)** deals with Renewable Energy Sources and their Benefits; **Section (II)** explains Climate Change Disruption and their Effects on Human Health; **Section (III)** discusses Integration into Present and Future Energy Systems; **Section (IV)** discusses The Inter-linkage between Renewable Sources of Energy and Climate Change and Technological Solution (Geoengineering). In the last, **Section (V)** provides Conclusion along with Suggestions.

Section (I)

Renewable Energy Sources:

Renewable energy comes from sources that are naturally replenished on a human timescale, such as solar, wind, hydro, geothermal, and biomass. Unlike fossil fuels, which are finite and release greenhouse gases when burned, renewable sources produce little to no emissions. These sources are:

1. **Bioenergy:** A range of biomass feedstock's, such as agricultural, animal, and forest wastes; short-rotation forest plantations; energy crops; the organic portion of municipal solid waste; and other organic waste streams, can be used to manufacture it..
2. **Direct Solar Energy:** These technologies use solar radiation to create electricity through photovoltaic (PV) and concentrating solar power (CSP), thermal energy (heating or cooling via passive or active methods), direct lighting, and possibly even fuels for potential use in transportation and other applications.
3. **Geothermal Energy:** It makes use of the thermal energy that can be obtained from the Earth's interior. Geothermal reservoirs are used to extract heat using wells or other methods. Hydrothermal reservoirs are naturally sufficiently hot and permeable reservoirs; enhanced geothermal systems (EGS) are sufficiently hot reservoirs that have been boosted through hydraulic stimulation.
4. **Hydropower:** It uses the energy that water moves from higher altitudes to lower altitudes to produce power. Hydropower projects span a range of project sizes and include run-of-river, in-stream, and dam projects with reservoirs. Hydropower can now service both dispersed rural demands and massive centralized metropolitan needs because to its variety. Technologies for hydropower are advanced.
5. **Ocean Energy:** It is derived from the potential, kinetic, thermal and chemical energy of seawater, which can be transformed to provide electricity, thermal energy, or potable waterfall ocean technologies—tidal barrages accepted—are still in the demonstration and pilot project stages, and many of them call for more research and development.
6. **Wind Energy:** It captures the airs kinetic energy. The main way that climate change mitigation

is being applied is through the production of power from enormous wind turbines that are either offshore or on land, either in freshwater or the ocean. Technologies for onshore wind energy are now being produced and used extensively.

Benefits of Renewable Energy:

1. **Reduced Greenhouse Gas Emissions:** Using renewable energy reduces reliance on fossil fuels, which are major sources of CO_2 and other greenhouse gases.
2. **Sustainability:** These resources are abundant and can be replenished naturally, making them more sustainable in the long term.
3. **Energy Independence:** Countries can reduce their dependence on imported fuels by investing in local renewable resources.
4. **Economic Growth:** The renewable energy sector creates jobs and can stimulate economic growth.
5. **Job Opportunities:** Particularly in the production and installation of renewable energy systems, renewable energy technologies have the potential to boost economic expansion and create jobs. For instance, the expansion of the solar power industry has resulted in the creation of a large number of jobs in the fields of solar panel manufacturing and system installation.
6. **Economic Sense:** Renewable energy can create jobs in manufacturing and installation, and can help diversify energy supply and reduce dependence on imported fuels.
7. **Reliability Benefits:** Renewable energy can improve the reliability, security, and resilience of the power grid.
8. **Local Community Benefits:** Renewable energy can help address gender inequality and create economic development in local communities.

Section (II)

The Climate Change Disruptions:

Climate change is our most serious problem today and, including many other environmental concerns, has reached crisis level. Climatologists have evidence of global warming and that the cause of it is due to human activity and not natural processes.

There is a direct link between more carbon dioxide (CO_2) in the atmosphere and a warmer planet. Burning of fossil fuels (coal, oil, gas) releases CO_2 which is a greenhouse gas, into the atmosphere. Greenhouse gases have the property of absorbing solar radiation so that it does not escape into space and warms the planet.

The climate crisis causes suffering to many people across the world and to non-human animals. Many ecosystems are breaking down and there are problems of water shortage, soil depletion, ocean acidification, as well as heat waves, droughts, wildfires and floods. These problems will increase as the planet warms and there will be further suffering worldwide. As humans have caused

the problem, the question arises whether we should feel responsible and have an obligation to correct the damage done?

Effects of Climate Change on Human Health:

Rising temperatures, an increase in the frequency of natural disasters, and altered weather patterns are all having a negative influence on human health as a result of climate change. The following are some of the main ways that human health is being impacted by climate change:

1. **Heat-related Illnesses:** Dehydration, heat exhaustion, and heat stroke are among the conditions that are more likely to occur when temperatures rise. This is especially true for groups who are more susceptible, like the elderly, kids, and those who already have health issues.
2. **Respiratory Issues:** An increase in respiratory issues, including asthma and other respiratory allergies, is also associated with climate change. This is brought on by an increase in pollen and the dispersal of airborne contaminants.
3. **Mental Health:** As a result of natural catastrophes, the loss of homes and livelihoods, and heightened stress, anxiety, and trauma, climate change is also having a significant negative influence on mental health.
4. **Malnutrition:** The impact of climate change on food security is causing malnutrition and nutritional inadequacies, especially in groups that are already at risk.
5. **Water-borne Illnesses:** Because of increasing flooding and water source contamination, climate change is also associated with an increase in water-borne illnesses including cholera and typhoid fever.
6. **Heart Illness:** Because of the increased heat stress and heightened air pollution, climate change is also associated with a rise in heart disease.
7. **Infectious Diseases:** Because of the increased exposure to ticks, mosquitoes, and other vectors, climate change is also associated with an increase in infectious diseases such West Nile Virus, Hantavirus, and Lyme disease.
8. **Cancer:** Because of the immune system disruption and increased exposure to toxins, climate change is also associated with a rise in cancer cases.
9. **Health Disparities:** Since low-income and communities of colour are more susceptible to the health effects of climate change, climate change is also making these inequities worse.
10. **Access to Basic Needs:** Climate change can make it harder to access food, clean water, and sanitation.

Section (III)

Integration into Present and Future Energy Systems:

The size of the integration problem can vary depending on the features of various renewable energy resources. Geographically, some RE resources are widely dispersed. While integration

opportunities for some, like large-scale hydropower, are limited by geographic location, they can be more centralized. Certain RE resources are erratic and unpredictable. Certain alternatives to fossil fuels have differing technical requirements and lower physical energy densities.

It is possible to integrate renewable energy at a faster pace into the majority of current energy supply systems and end-use sectors, which will increase the share of RE. However, this will present a number of new problems. It is anticipated that the proportion of RE in a portfolio of low-GHG emission technologies would increase.

The expenses and difficulties associated with incorporating larger proportions of renewable energy sources into an established energy supply system are contingent upon several factors, including the current RE share, the kind and accessibility of RE resources, system characteristics, and future system development and evolution.

All kinds of electrical systems, from massive, interconnected grids at the continental scale to tiny, standalone systems and individual buildings, can incorporate renewable energy. The flexibility of the generating mix, network infrastructure, energy market designs and institutional regulations, demand location, demand profiles, and control and communication capabilities are all important system features. It can be more challenging to combine wind, solar PV energy, and CSP without storage than geothermal energy, dispatchable hydropower, biofuels, and CSP with storage.

A portfolio of complimentary RE technologies is one way to lower the costs and risks associated with RE integration. Additional solutions include better tools for short-term forecasting, system operation, and planning; electricity demand that can adjust to supply availability; energy storage technologies, such as storage-based hydropower; and changed institutional arrangements. Complementary flexible generation and more flexible operation of current schemes are also possible. Electricity network transmission (including interconnections between systems) and/or distribution infrastructure may need to be strengthened and extended, partly because of the geographical distribution and fixed remote locations of many RE resources.

Section (IV)

The Inter-linkage between Renewable Sources of Energy and Climate Change:

In recent years new organizations and institutions have been established to deal with climate change. The United Nations Framework of the Convention on Climate Change (UNFCCC) has been set up and it has an annual COPs (Convention of the Parties) meeting where leaders (Environmental Minister) of many countries in the world discusses the goals for reducing carbon dioxide emissions and have come to some agreements. There is no international organization that can enforce the policies that have been made. A system of carbon offsetting with carbon credits to reward countries for cutting emissions has been introduced but it is questionable if carbon offsetting is successful as a means of reducing emissions. This process is called Greenwashing.

Researchers, inventors and entrepreneurs have turned their attention to developing new ‘green’ or renewable technology. Often the new technology is presented as solving the problem, but we need to examine these claims carefully and see whether the new technology is entirely ethical, or we may make the mistake of continuing to live extravagantly and cause further warming. The most

popular of the renewable energy sources are solar energy and wind farms. These are much cleaner sources of energy than fossil fuels and already widely used. But they may only be cleaner in use and should be used economically. Some types of solar panels use extremely toxic materials and there can be a problem of leakage. Further, transportation of the parts for manufacture and the shipment of the finished product cause more environmental damage. Solar farms are being set up now and they can be massive and take up land better used for agriculture or wildlife. A better choice would be to place solar panels on roof tops.

Wind farms disturb wildlife wherever they are placed. Birds and bats can be killed in large numbers if the turbines are poorly placed. Recent research has shown that the death of birds of prey caused by wind turbines has an indirect effect on the rest of the ecosystem because the prey. Offshore wind farms cause damage to sea life. The manufacturing of the turbines emits a great deal of CO_2 so there needs to be a limit on the number of wind farms in any area. Our need for energy will always damage the environment to some extent as there is no such thing as clean energy. How much damage do we tolerate? Can we continue to use excessive amounts of energy from various sources, or do we need to cut down our consumption of energy so that we reduce the damage to the environment?

Researches shows that battery cars, or electric cars, are said to be an improvement on internal combustion cars. But battery cars cause more damage to the environment than petrol cars both in the manufacturing process and in the use of batteries. Batteries need to be recharged, so the use electric cars will not out down carbon emissions until all energy is produced by renewals. The use of public transport rather than individual vehicles might reduce damage to the environment.

Other sources of energy being explored are the use of hydrogen and nuclear fusion, but these are in the early stages of development. Fusion power is not a possibility for at least another ten years, by which time much more damage may be done to the planet.

Technological Solution (Geoengineering) and Climate Change:

Geoengineering is the large-scale intervention in the Earth's climate system to reduce climate change of the atmosphere. The most suitable form of climate engineering is solar geo-engineering or solar radiation management. Could political groups utilize the systems to dominate other political groups? Carbon dioxide removal (CDR) deliberately reduces the amount of CO_2 in the atmosphere either by capturing at source or by direct air capture. CDR is already being used at some manufacturing plants. Carbon capture and storage (CCS) is the technology most favoured although it is still expensive, and the amount captured this way will not be enough to solve the problem of global warming. It would be dangerous to rely on carbon capture. The captured carbon needs to be buried in geological for nations, but this can cause seismic disturbance and there are not enough areas in the world for sufficient carbon to be buried. Carbon storage has been used instead to further oil and gas extraction.

The threat of significant negative impacts from climate change and failure to successfully conclude binding international agreements on restraining greenhouse gas emissions, has precipitated proposals for geoengineering (intentionally manipulating the climate in response to climate change). Two main forms of geoengineering have been suggested: those that remove carbon dioxide from the atmosphere (e.g., carbon capture and storage technology, afforestation, and ocean fertilization)

and those that reduce the amount of solar radiation reaching earth by blocking or reflecting sunlight (e.g., space or dessert mirrors, cloud whitening, injecting sulphur aerosols into the stratosphere).

Section (V)

Conclusion and Suggestions:

Since our extreme energy demands are the driving force for the global warming, the human race now has to learn to moderate material civilisation. As the concept of renewable energy has come to the force as a strategic sustainable energy formation process for the whole world since last three decades, but it has gained enormous interest during recent years. Renewable Energy is referred to clean sources of energy that generates lower environmental impact in relation to conventional energy sources like fossil fuels.

Global Climate Change is an alarming problem now a day. Although the impact of global climate change is definite on human health and environment, therefore, it is difficult to predict the change. Many people start realizing that there is unpredictable change in global climate. It is a key barrier for attaining sustainable development, while more than half of the global climate change is caused by the increasing concentrations of GHG emissions and contributed mainly by the energy sector.

Renewable Energy, which is generally originated from natural sources, like sunlight, wind, rain, tides, plants, algae, geothermal heat those are naturally renewable as well as environmentally friendly and more sustainable. In current scenario there are a number of global environmental issues. These problems are continuously growing range of pollutants, hazardous and ecosystem degradation over wider areas. The most significant ones are- acid rain, stratospheric ozone depletion and global climate change. Recently a variety of potential solutions to the current economic problems associated with the harmful pollutant emissions has evolved. By the effective use of renewable energy resources we can slow down the problem of climate disruptions.

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Trends in Contribution to Renewable Energy Production: A Special Reference to India

Dr. Amit Kumar Sharma[1] & Nikhil Kumar[2]

ABSTRACT

The evolution of renewable energy production in India from 1991 to 2024 has been marked by significant milestones, with the country emerging as a global leader in renewable energy deployment. This paper provides a comprehensive analysis of the trends in renewable energy production in India over this period. It examines the policy shifts, technological advancements, and investment patterns that have shaped the renewable energy sector. The study also highlights India's contributions and challenges in the renewable energy domain, offering insights into its role within the broader national context.

Keyword: *Renewable Energy, Resources, Trends, Analysis, Government Policy.*

Introduction

Energy affects all the economies of the world along with the changes in the world. Energy is the foundation of the modern industrial economy which is an essential component for almost all human activities which is used for cooking, heating water, lighting, health, food production, storage, education, industrial production, transportation and other important services. Modern energy services are a powerful engine of economic and social development whose access and use makes the economy developed. The available resources of energy in the world and the ability to pay for it largely reflect the state of the economy, but today how a country is obtaining energy is very important because in the last few years the incidence of climate change has increased, the main reason for which is global warming. The energy sector plays an important role in global warming or greenhouse gas emissions, so it is necessary that to reduce climate change, reduce the cost of generating energy or provide cheap and sustainable energy and to run the economy continuously, clean energy is needed and that option can be obtained from renewable energy. Renewable energy also helps in achieving net zero carbon emissions and Sustainable Development Goal 7 targets.

Energy is a vital input for economic growth and development.He quality and cost of energy provision can greatly impact economic output. For example, power outages can negatively affect

1 Assistant Professor, Department of Economics, DDU Gorakhpur University, Gorakhpur. (U.P.)
Email- amitddugkp1@gmail.com

2. Research Scholar, Department of Economics, DDU Gorakhpur University, Gorakhpur, (U.P.)
Email- nk1085525@gmail.com

productivity, and increased electricity costs can decrease profit margins. To balance economic growth with climate goals, we can: Scale up energy efficiency, Increase investments in renewable energy, and Phase down fossil fuels. There has been a sustained increase in renewable installed capacity in India and, at COP 26, India announced a goal to increase its "non-fossil-fuel" capacity to 500 GW by 2030.

Renewable energy refers to energy derived from natural processes that are continuously replenished. Unlike fossil fuels, which are finite and contribute to environmental degradation, renewable energy sources are sustainable and have a lower environmental impact.

Types of Renewable Energy:

Solar Energy: Captured from sunlight using solar panels and converted into electricity or heat.

Wind Energy: Generated by wind turbines that converts kinetic energy from the wind into electrical power.

Hydro Power: Produced by harnessing the energy of flowing water, typically from rivers or dams.

Biogas Power: Derived from organic materials such as plant and animal waste, which can be burned or converted into bio fuels.

Thermal Power: Utilizes heat from the Earth's interior to generate electricity or provide direct heating.

Benefits of Renewable Energy

- **Environmental Impact:** Significantly reduces greenhouse gas emissions and air pollution compared to fossil fuels.
- **Sustainability:** Renewable sources are naturally replenished, ensuring a continuous supply of energy.
- **Economic Growth:** Creates jobs in manufacturing, installation, and maintenance of renewable energy systems.
- **Energy Security:** Reduces dependence on imported fuels and enhances energy independence.

India's Energy Scenario

India is the third-largest consumer of energy in the world, and its energy demand is projected to grow significantly in the coming decades. As a signatory to the Paris Agreement, India has committed to reducing its carbon emissions intensity and increasing the share of non-fossil fuels in its energy mix. Primary Energy Consumption: India is the world's third-largest energy consumer, with primary energy consumption more than doubling since 2001. The country's renewable energy sector has experienced rapid growth over the past decade, driven by favorable government policies, declining technology costs, and growing investment. This paper focuses on the trends in renewable energy production in India, with special emphasis on solar, wind, hydro, and biomass energy. However, there is a significant push towards increasing the share of renewable energy.

Growth and Evolution of Renewable Energy in India

Historical Overview

India's journey toward renewable energy adoption began in the **1980**s with the establishment of the Ministry of Non-Conventional Energy Sources (now the Ministry of New and Renewable Energy, MNRE). Initially, the focus was on small-scale renewable projects and rural electrification. However, the real transformation in India's renewable energy sector came in the early **2000s**, with the launch of large-scale solar and wind energy initiatives. The Jawaharlal Nehru National Solar Mission (JNNSM), introduced in **2010**, marked a turning point for the solar industry, setting ambitious targets for solar energy production. The renewable energy sector now contributes approximately **40%** of India's total installed energy capacity. Solar and wind energy dominate this sector, followed by hydro and biomass energy. The following sections examine each renewable energy source in detail and discuss its contribution to India's energy landscape.

- Ambitious Targets: India has set ambitious targets for renewable energy, aiming to achieve **175 GW** of renewable energy capacity by 2022 and **450 GW** by 2030.
- Solar and Wind Power: Solar and wind energy are the primary drivers of renewable energy growth. India has become one of the largest markets for solar power, with substantial investments in large-scale solar projects.
- Hydropower and Biomass: Hydropower remains a significant part of the renewable energy mix, while biomass energy is also being promoted, particularly in rural areas.

Literature Review

Existing studies have shown that environmental regulation and technological innovation can influence the energy demand in developed and emerging economies (dey & Sreenivasulu, 2022). IRENA (2018) shows that feed-in tariffs (FITs) and feed-in premiums (FIPs) played a significant role in supporting renewable energy projects around the world by offering a stable income to generators and improve the returns of renewable energy projects. According to a study by IRENA (2016) when doubling the renewable energy share in the final global energy mix, the global GDP is projected to grow in 2030 between 0.6% and 1.1%, if the reduction of CO2 emissions is one of the essential impacts of increasing renewable energy. Several studies use various methodologies to estimate employment generated by renewable energy. GIZ (2012) estimated that 2,500 direct jobs generated within the framework of national sustainable energy programmes. Government at the centre constantly takes various strategic policy initiatives to increase share of renewable energy to reduce dependence on energy import and ensure energy security (Kar and Sinha 2014).

Objectives of the study:

- To analyze the trends/growth and comparative status of Renewable Energy Production from 2014 to 2017.
- Effect of policies on Renewable Energy Resources (RERs) Production.

Methodology

This study is basically descriptive in nature and it is based on secondary data. Required data collected from various publications of government of India and other organizations such as This study is basically descriptive in nature and it is based on secondary data. Required data collected from various publications of government of India and other organizations such as ministry of new and renewable energy (2014 to 2024) & Mospi - Energy Statistics**.** Data taken yearly (annual Report) from 2014 to 2024. The relevant data in concern to trends of Renewable Energy Production (Install Capacity) from 2014 to 2024.The formula is:

Indices value for negative indicator = (maximum Value-Xi)/(Maximum Value-Minimum Value) * 100

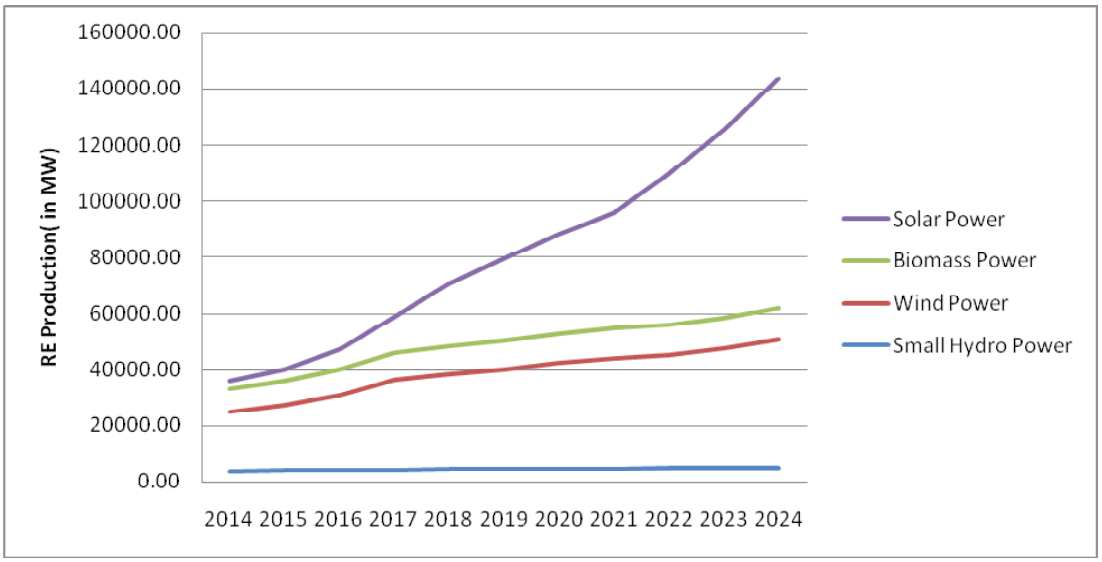
This formula used for ranking of RERs.The indices Value for each indicator lies between the range of 0 to 1. Which show indices value near to 0 called rank 1 and indices value 1 called last Rank.

Table No.1

Year	Small Hydro Power	Wind Power	Biomass Power	Solar Power	Total Capacity (RE)
2014	3803.68	21042.58	8181.42	2821.91	35849.59
2015	4055.36	23354.35	8546.85	3993.53	39950.09
2016	4273.47	26777.40	8916.63	7123.89	47091.38
2017	4379.85	32279.77	9116.05	12782.52	58588.19
2018	4485.80	34145.00	9674.42	22346.21	70651.44
2019	4593.15	35625.96	10095.70	29097.18	79412.00
2020	4683.16	37743.75	10221.15	35607.24	88255.30
2021	4786.81	39247.05	10533.51	41236.02	95803.39
2022	4848.90	40357.58	10682.36	53996.54	109885.38
2023	4944.30	42633.13	10802.04	66780.34	125159.81
2024	5003.25	45886.51	10941.15	81813.60	143644.51

Sources- Ministry of New and Renewable Energy & Mospi - Energy Statistics)
*Excluding Big Hydro Electric Project
** RE- Renewable Energy, RERs- Renewable Energy Resources, MW-Mega Watt

Figure No.1: Trend line representation of Resources of Renewable Energy Production:



Trend Analysis of Renewable Energy Resources (2014-2024)

In the Figure No.1 graphically revealed illustrates the capacity trends of four renewable energy sources: Small Hydro Power, Wind Power, Biomass Power, and Solar Power from 2014 to projected values for 2024. Here's a detailed analysis of the trends:

Small Hydro Power:

The capacity has increased from 3803.68 MW in 2014 to 5003.25 MW in 2024. The growth is steady but relatively slow, indicating a consistent yet modest expansion over the years.

Wind Power:

Wind power capacity has grown significantly from 21042.58 MW in 2014 to 45886.51 MW in 2024.The trend shows a strong upward trajectory, with particularly rapid growth from 2016 onwards, reflecting increased investment and development in wind energy.

Biomass Power:

Biomass power has increased from 8181.42 MW in 2014 to 10941.15 MW in 2024.

The growth is steady but not as pronounced as wind or solar power, indicating moderate expansion in this sector.

Solar Power:

Solar power shows the most dramatic increase, from 2821.91 MW in 2014 to 81813.60 MW in 2024.The growth is exponential, especially from 2016 onwards, highlighting a significant shift towards solar energy as a major renewable source.

Overall Trends:

All four power sources have shown growth over the years, with solar and wind power experiencing the most significant increases. The data suggests a strong trend towards renewable energy, with solar power leading the way in terms of growth rate. This trend reflects a global shift towards cleaner energy sources, with investments likely focusing more on solar and wind technologies.

Table No.2 of 5 year differences decade (2014-2024)

Year	2014	Index Value	Rank	2019	Index Value	Rank	2024	Index Value	Rank	% Change (2014 to 2024)
Small Hydro Power	3803.68	0.9461	3	4593.15	1	4	5003.25	1.0000	4	31.54
Wind Power	21042.58	0.0000	1	35625.965	0.00	1	45886.51	0.0000	2	118.07
Biomass Power	8181.42	0.7059	2	10095.7	0.822686111	3	10941.15	0.8548	3	33.73
Solar Power	2821.91	1.0000	4	29097.18	0.210383394	2	81813.6	-0.8788	1	2799.23
Total Capacity(RE)	35849.59			79412			143644.51			300.69

The table No.2 shows a comparative analysis of the indices values for different power sources (Small Hydro Power, Wind Power, Biomass Power, and Solar Power) over the years 2014, 2019, and 2024. Here are the key observations:

Small Hydro Power:

Capacity increased from 3803.68 MW in 2014 to 5003.25 MW in 2024, a growth of 31.54%.The indices value remained relatively stable, indicating consistent performance but lower growth compared to other sources.

Wind Power:

Significant growth from 21042.58 MW in 2014 to 45886.51 MW in 2024, with a percentage change of 118.07%.Maintained the highest rank in 2014 and 2019, dropping to second in 2024, indicating strong competition from solar power.

Biomass Power:

Capacity increased from 8181.42 MW to 10941.15 MW, reflecting a 33.73% growth. The indices value improved, but it remained in third place throughout the years.

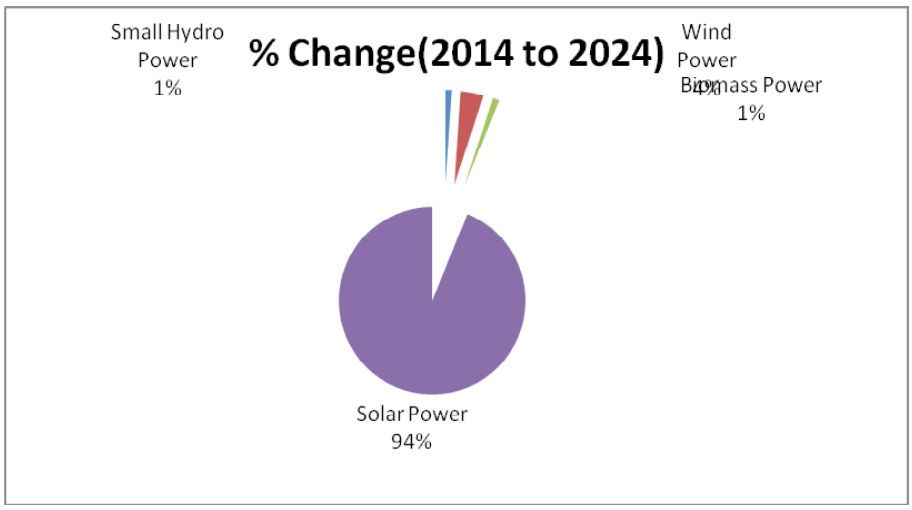
Solar Power:

Exhibited extraordinary growth, with a percentage change of 2799.23% from 2014 to 2024.Despite a low indices value in 2019, it ranked first in 2024, indicating a significant leap in capacity.

Total Capacity (RE):

The total capacity of renewable energy resources increased from 35849.59 MW in 2014 to 143644.51 MW in 2024, a remarkable growth of 300.69%.

Figure No.2 Percentage Change of RERs over the period (2014-2024)



Analysis of the pie chart

The pie chart titled "% Change (2014 to 2024)" illustrates the percentage change in the contribution of various renewable energy sources over the decade. Here are the key insights:

Solar Power

Dominant Growth: Solar power shows a remarkable increase, accounting for **94%** of the total change. This highlights the significant investments and policy support for solar energy in India.

Solar city per state-approved and approved setting up 57 solar parks of 39.28 GW across the nation. The government is also giving a push to Floating PV Projects.

Wind Power

Moderate Growth: Wind power contributes **4%** to the total change. While it has grown, its increase is modest compared to solar power.

Small Hydro Power and Biomass Power

Minimal Growth: Both small hydro power and biomass power each account for **1%** of the total change. This indicates limited expansion in these sectors over the decade.

Overall, the chart underscores the substantial growth in solar power, reflecting its pivotal role in India's renewable energy landscape.

Sustainable Development: The focus on renewable energy is not only about reducing carbon emissions but also about ensuring energy security and supporting sustainable economic growth.

Conclusion:

Figure No.1 shows the trend analysis highlights a significant shift towards solar and wind energy, driven by technological advancements, policy support, and increasing demand for sustainable energy solutions. The data suggests that by 2024, solar power will likely be the leading source of renewable energy, while wind power will also play a crucial role. Small hydro and biomass power, while important, may need to innovate or adapt to keep pace with the rapid growth of other renewable sources.

In 2014 coming force a new Government and take action for Renewable Energy production, Clean Energy etc.

Prime Minister Narendra Modi highlighted India's significant progress in solar energy, noting a 32-fold increase in capacity over the past decade. He expressed confidence in achieving the 500 GW renewable energy target by 2030. Modi emphasized democratizing technology and empowering developing countries to support green energy investments.

In the **Table No.2** Shows The data indicates a robust growth trajectory for renewable energy resources, particularly solar and wind power. Solar power's dramatic increase in capacity positions it as a leading source of renewable energy by 2024. Wind power remains a strong contender, while small hydro and biomass power show steady but slower growth. The overall trend reflects a significant shift towards renewable energy, aligning with global sustainability goals.

Policy Framework and Government Initiatives:

AatmaNirbhar Bharat

PLI scheme in Solar PV manufacturing with financial outlays of INR 24,000 Cr introduced under AatmaNirbhar Bharat. Imposition of Basic Customs Duty of 25% on Solar Cell & 40% on Solar PV Modules w.e.f. 01.04.2022.

National Solar Mission

The Jawaharlal Nehru National Solar Mission is one of the key pillars of India's renewable energy policy. Its ambitious targets, coupled with financial incentives, have accelerated the growth of the solar sector.

National Offshore Wind Energy Policy

The government has also launched the National Offshore Wind Energy Policy, aimed at harnessing the vast potential of India's coastline for wind energy production. Offshore wind projects are expected to play a crucial role in achieving India's renewable energy targets.

New National Biogas and Organic Manure Programme (NNBOMP)

The Ministry of New and Renewable Energy has been supporting installation of biogas plants in the country through the following schemes:

Small size biogas plants (1-25 m3 bio gas per day) under New National Biogas and Organic Manure Programme) under the Biogas based Power Generation (Off-Grid) and Thermal Energy Applications Programme (BPGTP); and Large size biogas plants, biogas plants under Programme on Energy from Urban, Industrial, Agricultural Wastes/ Residues and Municipal Solid Waste (**Waste to Energy Scheme**).

Green Energy Corridor

To improve grid infrastructure and facilitate the integration of renewable energy, the government introduced the Green Energy Corridor project. This initiative focuses on building transmission lines and substations dedicated to evacuating renewable energy.

Future Outlook

Energy Transition: India is poised to play a crucial role in the global energy transition, with plans to invest heavily in advanced energy solutions such as clean hydrogen, energy storage, and carbon capture.

Reduce India's total projected carbon emission by 1 bn tonnes by 2030, reduce the carbon intensity of the nation's economy by less than 45% by the end of the decade, and achieve net-zero carbon emissions by 2070.

Challenges and Opportunities-

- **Infrastructure and Investment**: The above picture and analysis show that significant progress has been made, but as the country moves from developing to developed, the demand for energy increases tremendously, which requires development of infrastructure, integration of energy sources and attracting the required investment remains a challenge..
- **Technological Advancements**: The above picture and analysis show that significant progress has been made, but as the country moves from developing to developed, the demand for energy increases tremendously, which requires development of infrastructure, integration of energy sources and attracting the required investment remains a challenge.

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An Analysis of India's Approach to Curb the Problem of Climate Change

Dr. Ganesh Kumar[1]

ABSTRACT

Nowadays, on account of the growing awareness of the environmental crisis the issues like global warming, climate change, disaster management and sustainable development are assigned top priority in national and international agendas. Climate change a serious global phenomenon, tremendously affecting the entire world. Due to the rising population and greed for quick economic growth, the circumstances are becoming worse. Moreover, due to the climate change the intensity and frequency of disasters are increasing and its threatening effects are increasing day by day which resulting in impending threats for life on the planet. If it is not controlled immediately by the efforts of all countries worldwide, it will boom its effects and cause end of life on the earth. The world has faced a lot of difficulties due to the climate change. Hence realising the forthcoming danger, most of the countries in the world do not shy away in making several plans, polices and alliance to tackle the problem of climate change and simultaneously emphasising the need of sustainable development. India is no exception. India is implementing several programmes and policies to deal with the problem. Indeed, India has consistently played an active role in negotiations and established itself as a coalition-builder worldwide. The basic purpose of India's all these attempts is to tackle the problem prudently and creating a track for achieving overall development.

Introduction

Climate change is not a recently developed phenomenon; it has been going on since antiquity and will go on continuously. As per the contemporary global situations, climate change is the undesirable change in current climate situation due to several natural and anthropogenic activities which produces adverse effects on climate. The United Nations Framework Convention on Climate Change (UNFCCC) defines Climate Change as: "A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time period". Furthermore, according to the UNFCCC "Adverse effects of climate change" means changes in the physical environment or biota resulting from climate change which have significant deleterious effects on the composition,

1. Associate Professor & HOD, Department of Economics, ACC Wing, Indian Military Academy, Dehradu (U.K.)
Email: Saini_ganesh@rediffmail.com

resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare.

In recent time it has been evident that the main causes of climate change are due to human activities involved in emission of Green House Gases (GHGs). Human in their relentless pursuit of progress, comfort and security have put enormous pressure on nature particularly post industrial revolution. Since the advent industrial revolution in 1750, CO2 and other heat trapping gases in the atmosphere have a detrimental impact on the climate change. The emission of these gases have increased the GHGs and caused earth's surface temperature to rise. The primary human activity which is affecting the amount and rate of the climate change is GHGs emission from the burnings of fossils fuels.

The world has seen a lot of difficulties due to the climate change. Hence realising the forthcoming danger, every country of the world is making several plans, polices and alliance to tackle the problem of climate change and simultaneously make efforts to move towards sustainable development. India is no exception. It is also facing challenges of climate change; therefore, the country is vehemently implementing several programmes and policies to deal with the problem of climate change. The basic objective of Indian attempts is to combat the problem of climate change wisely and achieving sustainable development. Moreover, it is a known fact that if a country tries for sustainable development with disaster management, consequently the problem of climate change will be automatically controlled. Consequently, in order to deal with the problem of climate change Government of India has developed an institutional framework with constitutional and legal base. Nevertheless, dealing with climate change is no rocket science. It is is a gradual process which takes time; policies need to be formulated, institutions to be established to deal with the problems growing over time and influenced by the new ideas, national and international experience, global initiative and events of the time. India's domestic strategy for addressing climate change is embedded in many of its social and economic development programmes. Although "The National Action Plan on Climate Change" and "India's Nationally Determined Contribution" are very significant actions to combat climate change, which has been substantially analysed in this paper. Indeed, in the global level India has consistently played an active role in negotiations and established itself as a coalition-builder worldwide. The basic objective of this paper is to analyse the above cited two important attempts to tackle the problems produced by the climate change.

(A) National Action Plan on Climate Change

In 2007, The Intergovernmental Panel on Climate Change (IPCC) published its fourth assessment report on climate change that warned of a dangerous increase in frequency and intensity of extreme weather events, especially in tropical and sub-tropical countries. The IPCC report was accompanied by the Bali Action Plan – an outcome of the global climate meeting in Bali, Indonesia in 2007, urging countries to set up climate action. It mandated developed nations to support climate action in developing countries. In response to these developments and the increasing extreme weather events faced domestically, the Indian Government in 2007 established The Prime Minister's Council on Climate Change (PMCCC). The PMCCC, in coordination with other government departments/ Ministries, designed and published National Action Plan on Climate Change (NAPCC) and formally

launched by Government on June 30th 2008. The NAPCC include both adaptation and mitigation measures to combat climate change. The implementation of NAPCC is designed to take place through eight National Missions. These missions form the core of climate action plan and incorporate long-term strategies for achieving India's key goals in the context of climate change. To decentralize and realisation of NAPCC the central government called upon state governments to prepare their own State Action Plan on Climate Change (SAPCC), which have now been prepared for almost all states and Union Territories across India.

Principle of NAPCC

In order to achieve sustainable development, reducing adverse impact of climate change, adaptation and mitigation in all action and welcoming all international cooperation to combat climate change, the NAPCC is guided by the following principles:

1. Protecting the poor and vulnerable sections of society through an inclusive and sustainable development strategy, sensitive to climate change.
2. Achieving national growth objectives through a qualitative change in direction that enhance ecological sustainability, leading to further mitigation of GHG emissions.
3. Devising efficient and cost-effective strategies for end use demand side management.
4. Deploying appropriate technologies for both adaptation and mitigation of GHG emissions extensively as well as at an accelerated pace.
5. Engineering new and innovative forms of market, regulatory and voluntary mechanisms to promote sustainable development.
6. Effecting implementation of programmes through unique linkages, including with civil society and local government institution and through public private partnership.
7. Welcoming international cooperation for research, development, sharing and transfer of technologies enabled by additional funding and a global IPR regime that facilities technology transfer to development countries the UNFCCC.

Missions under NAPCC

Under the NAPCC government has initiated several activities, schemes, programmes for protecting the ecosystem and implementing conservation which have a direct/indirect impact on combating climate change. The broad police initiatives to combat climate change are supplemented by action of state government, Non-governmental Organization, initiatives of private sector and other stakeholder. There are eight missions forming the core of the NAPCC which represent multi-pronged, long term and integrated strategies for achieving key objectives to combat climate change. All these missions are institutionalised and implemented by their respective nodal ministries, and inter-alia, focus on adaptation and mitigation to combat the adverse impacts of the climate change.

1. National Solar Mission
2. National Mission for Enhanced Energy Efficiency

3. National Mission on Sustainable Habitat
4. National Water Mission
5. National Mission for sustaining the Himalayan Ecosystem
6. National Mission for a Green India
7. National Mission for sustainable Agriculture
8. National Mission on Strategic Knowledge for Climate Change

(B) India's Nationally Determined Contributions (NDCs)

As per the Article 4, paragraph 9 of the Paris Agreement, each party is required to establish NDCs. NDCs represent short to medium term targets and typically include measure for both adaption and mitigation action and are required to be updated every five years. Each update is required to be more ambitious to combat climate change. The Paris Agreement provides a framework for financial, technical and capacity building to all parties to combat climate change. Thus, Government of India has submitted its first NDCs on October 2, 2015 to UNFCCC. The NDCs are prepared after the careful consideration of national circumstances and the principle of common but differentiated responsibilities and respective capabilities. The NDCs comprised eight goals and reflect all issues of mitigation, adaptation, finance, technology transfer and capacity building to combat climate change. These NDCs are on the following areas: Sustainable lifestyles, Cleaner Economic Development, Reduce Emission intensity of GDP, Increase the share of Non-Fossil Fuel Based electricity, Enhancing Carbon sink (forests), Adaptation, Mobilizing Finance, Technology Transfer and capacity Building. In NDC-2015 three goals have quantitative targets up to 2030 namely, cumulative electric power installed capacity from Non-Fossil sources to reach 40 percent, reduce the emissions intensity of GDP by 33 percent to 35 percent compared to 2005levels and creation of additional carbon sink of 2.3 to 3 billion tones of CO2 equivalent through additional forest and tree cover.

Furthermore, in August 2023, India has submitted her updated NDCs. The updated NDCs seek to enhance India's contributions towards achievement of the strengthening of global response to the threat of climate change, as agreed under the Paris Agreement. As per the updated NDCs, India now stands committed to reduce emissions intensity of its GDP by 45 percent by 2030, from 2005 level and achieve about 50 percent cumulative electric power installed capacity from Non-Fossil sources by 2030. Details of submitted of updated NDCs are as follow:

1. To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, including through a mass movement for 'LIFE'– 'Lifestyle for Environment' as a key to combating climate change
2. To adopt a climate friendly and a cleaner path than the one followed hitherto by others at corresponding level of economic development.
3. To reduce Emissions Intensity of its GDP by 45 percent by 2030, from 2005 level.
4. To achieve about 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030, with the help of transfer of technology and low-cost international finance including from Green Climate Fund (GCF).

5. To create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030.
6. To better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.
7. To mobilize domestic and new & additional funds from developed countries to implement the above mitigation and adaptation actions in view of the resource required and the resource gap.
8. To build capacities, create domestic framework and international architecture for quick diffusion of cutting-edge climate technology in India and for joint collaborative R&D for such future technologies.

Hence, in October 2023 India has achieved following two targets of NDCs-2015 well ahead of the time. Firstly to reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level, secondly to achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel-based resources by 2030. These targets have been achieved well ahead of the time. As on 31st October 2023; the cumulative electric power installed capacity from non-fossil fuel-based energy resources is 186.46 MW, which is the 43.81 percent of the total electric power installed capacity and the emissions intensity of its GDP has been reduced by 33 percent between 2005 and 2019.

Conclusion and Suggestions

Climate change is one of the main environmental challenges world is facing today. India, since a developing country, is facing many problems due to climate change. India has always been sensitive to the significance of climate and has been doing continuous efforts for the conservation of environment by making various provisions in laws. In the contemporary world India is a significant player in formation of climate policy. India has been developed an institutional framework to deal with the problem of climate change and started many programmes and policies. Among all these programmes NAPCC is a significant movement to deal with the problem of climate change. The NAPCC include both adaptation and mitigation measures to combat climate change through eight specified missions. India's submitted NDCs show India determination and efforts to address the problem of climate change. But NAPCC facing many challenges like budgetary support are limited, monitoring system are ineffective, rapidly growth of population etc,. It is clear that initiative to prevent climate change in the form of NAPCC and NDCs are started but, most important of these initiatives must be continuous and sustainable and every individual of country will need to contribute to combat climate change.

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Environmental Degradation is a Global Challenge: An Analysis

Dr. Mahendra Singh Chauhan

Introduction

Environmental degradation refers to the deterioration of the natural environment due to human activities and natural processes, leading to the depletion of resources such as air, water, and soil, and the destruction of ecosystems. It is one of the most pressing global challenges of our time, affecting the well-being of humans, wildlife, and the planet as a whole. The consequences of environmental degradation are far-reaching and interconnected, with significant implications for climate change, biodiversity loss, and human health.

Environmental degradation is a critical global issue that threatens the planet's health and the well-being of all living beings. Defined as the deterioration of the natural environment due to human activities and natural processes, it encompasses the depletion of essential resources like air, water, and soil, as well as the destruction of ecosystems. This degradation is driven by several key factors, including deforestation, pollution, climate change, and the overexploitation of natural resources, loss of biodiversity disrupts ecosystems and food security, while pollution adversely affects human health and contributes to respiratory diseases and waterborne illnesses. Moreover, climate change exacerbates these issues, leading to extreme weather events and forcing communities to migrate, creating environmental refugees.By fostering a collective commitment to protecting our planet, we can mitigate the impacts of environmental degradation and work towards a healthier, more resilient world for future generations. The time for action is now, as the stakes for our environment—and humanity—could not be higher.

Key Causes of Environmental Degradation

1. **Deforestation:** Forests play a critical role in maintaining ecological balance by absorbing carbon dioxide, regulating the water cycle, and providing habitats for countless species. However, large-scale deforestation for agriculture, urbanization, and industrial activities has led to the loss of biodiversity, soil erosion, and increased greenhouse gas emissions.
2. **Pollution:** Air, water, and soil pollution are major contributors to environmental degradation. Industrial emissions, vehicle exhaust, and the improper disposal of waste lead to air and water

1. Professor, Department of Geography, Radhey Hari Govt. P.G. College Kashipur, (U.S. Nagar) Uttarakhand (U.K)
Email: mahendra.jan25@gmail.com

contamination, harming ecosystems and human health. Plastic pollution in oceans, for example, poses a significant threat to marine life.

3. **Climate Change:** Human-induced climate change, primarily caused by the burning of fossil fuels, is accelerating environmental degradation. Rising global temperatures lead to extreme weather events, melting glaciers, and rising sea levels, which in turn affect ecosystems, agriculture, and livelihoods.
4. **Overexploitation of Natural Resources:** The unsustainable extraction of resources such as minerals, fossil fuels, and freshwater has led to resource depletion, habitat destruction, and environmental degradation. Overfishing, for instance, has caused significant declines in fish populations and disrupted marine ecosystems.
5. **Urbanization and Industrialization:** Rapid urbanization and industrialization, especially in developing countries, have increased the demand for land, energy, and resources, leading to the destruction of natural habitats, air and water pollution, and a higher carbon footprint.

Global Impacts of Environmental Degradation

- **Loss of Biodiversity:** The degradation of ecosystems has resulted in the extinction of numerous species and the loss of biodiversity. This not only disrupts ecosystems but also affects food security, as many crops rely on pollinators and healthy ecosystems.
- **Climate Displacement:** Rising sea levels, desertification, and extreme weather events caused by climate change are forcing communities to migrate, creating environmental refugees and exacerbating global inequalities.
- **Health Implications:** Pollution and environmental degradation are closely linked to public health issues. Poor air quality contributes to respiratory diseases, while contaminated water sources lead to waterborne diseases, affecting millions of people, especially in developing nations.

Solutions and Global Efforts

Addressing environmental degradation requires collective action at the local, national, and global levels. Some key approaches include:

- **Sustainable Development:** Promoting sustainable practices in agriculture, industry, and urban planning can help reduce the impact of human activities on the environment. This includes the use of renewable energy, eco-friendly technologies, and resource-efficient methods.
- **Conservation Efforts:** Protecting and restoring ecosystems, such as reforestation initiatives and the creation of protected areas, can help preserve biodiversity and maintain ecological balance.
- **International Agreements:** Global cooperation is essential to tackle environmental degradation. Agreements like the Paris Climate Accord and the Convention on Biological Diversity aim to reduce greenhouse gas emissions, conserve biodiversity, and promote sustainable development.

- **Public Awareness and Education:** Educating people about the importance of environmental protection and encouraging responsible behaviour can lead to a more sustainable future. Grassroots movements, environmental campaigns, and the involvement of civil society are crucial in driving change.

The Government of India initiatives to protect the environment:

- **National Action Plan on Climate Change (NAPCC):** Launched in 2008, this plan includes eight missions focusing on solar energy, energy efficiency, sustainable agriculture, and more.
- **Swachh Bharat Abhiyan:** This cleanliness campaign aims to promote sanitation and waste management across urban and rural areas.
- **Green India Mission:** Aims to enhance ecosystem services by increasing forest cover and restoring degraded ecosystems.
- **National Biodiversity Action Plan:** Focuses on the conservation of biodiversity and sustainable use of its components.
- **Pradhan Mantri Ujjwala Yojana:** Provides clean cooking fuel to households, reducing dependence on traditional biomass and improving air quality.
- **Plastic Waste Management Rules:** Regulations to reduce plastic use and encourage recycling.
- **Renewable Energy Initiatives:** Significant investment in solar and wind energy to reduce carbon emissions and promote sustainable energy sources.
- **Afforestation Projects:** Various schemes aimed at increasing forest cover and restoring degraded land.

Self-contribution for save environment

There are many ways individuals, communities, and organizations can help combat environmental degradation. While it may seem like a daunting global issue, small, meaningful actions taken collectively can make a significant difference. Here are some key steps that can help:

1. Reduce, Reuse, and Recycle

- **Minimize Waste:** Reducing waste is one of the most effective ways to help. Try to cut down on single-use plastics, unnecessary packaging, and disposable products.
- **Reuse Products:**Opt for reusable items such as cloth bags, water bottles, and containers instead of single-use plastics.
- **Recycle Properly:** Ensure that recyclable materials like paper, glass, and metals are disposed of correctly. Support and advocate for recycling programs in your community.

2. Conserve Water and Energy

- **Save Water:** Simple actions like fixing leaks, using water-efficient appliances, and turning off taps while not in use can conserve water. Collecting rainwater or using greywater for irrigation also helps.

- **Use Energy Wisely:** Reduce energy consumption by turning off lights and appliances when not in use, using energy-efficient devices, and relying on natural light whenever possible. Opt for renewable energy sources like solar panels if you can.

3. Adopt Sustainable Transportation

- **Use Public Transport or Carpool:** Reducing the number of vehicles on the road decreases carbon emissions. Public transport, biking, or carpooling are effective alternatives.
- **Walk or Bike More:** Walking and cycling not only reduce your carbon footprint but also improve health and well-being.
- **Consider Electric Vehicles:** If possible, switch to electric or hybrid vehicles that have lower emissions.

4. Support Sustainable and Ethical Products

- **Choose Eco-Friendly Products:** Support brands and companies that use sustainable practices, such as environmentally responsible sourcing, minimal packaging, and green manufacturing processes.
- **Buy Locally and Organically:** Purchasing locally produced food reduces the carbon footprint from transportation and supports sustainable farming practices.
- **Reduce Meat Consumption:** Livestock farming has a large environmental impact. Reducing meat consumption, even a few times a week, can significantly lower your carbon and water footprint.

5. Participate in Conservation Efforts

- **Plant Trees and Green Spaces:** Reforestation and tree-planting campaigns help restore ecosystems, improve air quality, and reduce carbon in the atmosphere. Participate in local tree-planting events or start your own.
- **Support Habitat Restoration Projects:** Get involved in efforts to protect and restore natural habitats, such as wetlands, coral reefs, or forests.
- **Volunteer for Environmental Organizations:** Many non-profits focus on conservation, recycling programs, wildlife protection, and education. Volunteering or donating to these groups can help amplify their impact.

6. Raise Awareness and Advocate for Change

- **Educate Others:** Spread the word about environmental issues and the importance of sustainable living. Engage with your community, schools, or workplace to promote green practices.
- **Engage in Environmental Activism:** Support environmental policies by voting for leaders and laws that prioritize sustainability. Join or support grassroots campaigns to protect the environment and push for stricter regulations on industries contributing to degradation.

7. Reduce Carbon Footprint

- **Limit Air Travel:** Air travel has a high carbon footprint. Consider alternatives like trains for shorter distances or video calls instead of flying for meetings.
- **Offset Carbon Emissions:** If travel or emissions are unavoidable, consider carbon offset programs that invest in environmental projects like reforestation or renewable energy.

8. Support Renewable Energy

- **Install Solar Panels:** If possible, install solar panels at home to generate clean energy and reduce dependence on fossil fuels.
- **Support Clean Energy Policies:** Advocate for policies that promote renewable energy development, such as wind, solar, and hydropower.

9. Contribute to Research and Innovation

- **Support Environmental Research:** Contributing to scientific research can help develop new technologies and methods to fight environmental degradation. You can donate to organizations conducting environmental research or support eco-friendly innovations.
- **Encourage Innovation in Your Workplace:** Promote and adopt sustainable practices within your work environment. Encourage the use of green technologies, waste reduction programs, and sustainable office supplies.

10. Practice Mindful Consumption

- **Avoid Fast Fashion:** The fashion industry is a significant contributor to pollution and waste. Buy quality, long-lasting clothing, support ethical brands, and reduce the overall consumption of clothes.
- **Limit Overconsumption:** Be mindful of the resources you use, whether it's food, water, or goods. Avoid unnecessary purchases and aim for minimalist, sustainable living.

Conclusion

Environmental degradation is a pressing global challenge that threatens the health of our planet and the well-being of all living beings. Driven by factors such as deforestation, pollution, climate change, and overexploitation of resources, this degradation has far-reaching consequences, including biodiversity loss, climate displacement, and public health issues.To address this crisis, collective action is imperative at all levels. Sustainable practices, conservation efforts, international cooperation, and public awareness are key to mitigating the impacts of environmental degradation. By adopting eco-friendly habits, supporting green initiatives, and advocating for sustainable policies, individuals can play a significant role in creating a healthier and more resilient future for generations to come.

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Renewable Energy Sources for Sustainable Development: An Analysis

Dr. Sandeep Kumar[1], Dr. Amit Kumar Sharma[2] & Anam Fatma[3]

Introduction

Energy is required for every society with a view to meeting the basic needs, so the insecurity of its supply can creep-up the work of a nation's economy. Now-a-days, two issues regarding energy are drawing attention to the sustainability researchers. One is how to assure energy supplies in a sustainable manner which has low environmental impacts and low emissions capacity, and the other one is barriers to sustainable energy development and identifying the most efficient way of addressing such barriers. An outline is provided for reconstructing the agenda of sustainable development in such a way that the issues of agenda must be consistent with the goals and values of sustainability

One of the most committed and known researchers on the sustainable energy topic is Jeremy Rifkin, who is speaking about the third industrial revolution and his core idea claims 'the creation of a renewable energy regime, loaded by buildings, partially stored in the form of hydrogen, distributed via an energy internet—a smart inter-grid—and connected to plug in zero emission transport'. In accordance with his thinking, it is possible to set up some useful features or needed pillars for the third industrial revolution:

- Shift to renewable energy (solar, wind, hydro, geothermal, ocean waves and biomass);
- Transform buildings as power plants;
- Deploy hydrogen and other storage technologies in every building and throughout the infrastructure to store intermittent energies;
- Use internet technology to transform the power grid of every continent into an energy-sharing inter-grid that acts just like the internet;
- Transition the transport fleet to electric, plug-in and fuel cell vehicles that can buy and sell electricity on a smart continental interactive power grid. These pillars, using Distributed Renewable Energy (DRE) systems, represent promising steps towards Sustainable Energy for All.

1. Professor & Head, Department of Economics, DDU Gorakhpur University, Gorakhpur. (U.P.)
2. Assistant Professor, Department of Economics, DDU Gorakhpur University, Gorakhpur. (U.P.)
3. Research Scholar, Department of Economics, DDU Gorakhpur University, Gorakhpur. (U.P.)

Consequently, recent years have received considerable attention by scientist and policy makers due to their growing preferences for renewable energy strategies and the way to sustainable development. Therefore, renewable energy which is generally originated from natural resources, like sunlight, wind, rain, tides, plants, geothermal heat those are naturally renewable as well as environmentally friendly and more sustainable.

Review of Literature:

- **Christian Von Zabeltitz (1994)**, "Highlighted that electricity generation from sources like coal, oil, and natural gas has been responsible for approximately one-third of global greenhouse gas emissions".
- According to **Jacobson et al. (2015) and Sovacool et al. (2016), "**Highlight the potential of renewable energy to mitigate climate change by reducing greenhouse gas emissions."
- According to the **International Energy Agency (IEA)**, "The global renewable energy supply will increase from 28.7% in 2021 to 43% in 2030".
- According to the **World Health Organisation (WHO)**, "Around 99 percent of people worldwide breathe air that is polluted and poses a health risk and more than 13 million people die from preventable environmental causes, such as air pollution, each year. Transitioning to renewable energy can mitigate these health risks."
- According to **International Energy Agency**, "Renewable energy could be generated naturally such as solar energy, wind energy, hydropower and bio-fuel energy and so on that characterized as low level of carbon and GHGs emission."
- According to **Al Alwani & Al Kenani (2022)**, "Energy in generally considered as one cause of existence and it has many shapes according to its usages i.e. thermal, mechanical, chemical, nuclear and others. It characterized as transformational energy from one shape to another by adopting simple or complicated techniques as in transferring the chemical into electrical ones."
- According to **Hussain et al., (2021); Al Mahmadi, (2017)**, "Renewable energy has its further dimensions toward achieving sustainable development through encouraging the private project investments that leads to independent economy than achieving social prosperity."
- According to **International Energy Agency**, "Renewable energy is a unique sample of infinity which is considered as sustainable energy that paved the path towards achieving the target (when it announced earlier in 2015) that every human by the year (2030) has the right to live in peace and prosperity."

This paper is divided into Six Sections. Section (I) Importance of Renewable Resources for Sustainability; Section (II) explains Sustainability Indicators and Renewable Resources; Section (III) discusses Climate Change, Energy and Sustainable Development; Section (IV) discusses The Renewable Energy Contributions and Sustainable Development. Section (V) explains The Role of Renewable Energy Technologies in Achieving Sustainable Development and Benefits of Renewable Resources. In the last, Section (VI) provides Conclusion along with Suggestions.

Section (I)

Importance of Renewable Resources for Sustainability:

Environmental performs four important functions for economy: (i) The environment supplies renewable (e.g. Forests, fishes, etc) and non-renewable (e.g. fossil fuels) resources; (ii) The environment assimilates wastes; (iii) The environment provides us life support services such as the maintenance of genetic diversity and stabilization of the ecosystem and (iv) The environment provides us with various environmental services like providing space for recreation and scenery and wildlife for aesthetic enjoyment. The first function is crucial for survival of human economy.

This problem is more prominent for non-renewable resources which are depleting rapidly and there is clear need to develop alternative renewable resources for future security. When ecological economists established the fact that there are limit to growth and environmental crisis has been arrived, it provided a new challenges to the world that how development should be carried out because there is a trade-off between environmental goods and environmental quality. It provided the basis of new concept of development later on established on Sustainable development.

Inter-generational equity is core idea of sustainable development. To make development sustainable, deliberate efforts are required to get the desired results because sometimes efficiency does not ensures equity. There are three important approaches of sustainability:

(I). Hartwick- Solow Approach: According to this approach sustainability requires maintaining real consumption flow overtime with given resource endowment. It is based on weak indicators of sustainability where to ensure sustainability total stock of N_K and M_K should be non-declining over time. Here, Hartwick clearly explained that for sustainability, the rent/income realised from sale of non- renewable resources should be invested in the development of renewable resources. Here, important message is that for sustainability resources conservation is important and we have to develop more and more new renewable resources as an alternative tool to exhaustible resources.

(II). The Ecological Economics Approach: This approach assumes that N_K and M_K are complementary and sustainability requires non-declining stock of natural resources over time. It is based on strong sustainability index.

The above two approaches clearly defines that to maintain sustainability optimum use of a natural resources and their conservation is essential.

(III). The Safe Minimum Standard Approach: The safe minimum standard approach traces its origin to the work of three pioneering and eminent natural resource economists, Ciriacy-Wantrup (1952), Krutilla (1967) and Bishop (1978). It began as a practical guide to natural resource management under conditions of extreme uncertainty, such as the preservation of individual species (e.g., the Pacific Northwest spotted owl or the African elephant). It was argued that irreversibility would be a key issue to consider for problems of this nature, meaning that beyond a certain threshold (or critical zone) the exploitation of natural resources may lead to irreversible damage. For example, the Pacific Northwest spotted owl would be declared extinct if its population dropped beyond a certain minimum and this minimum is greater than zero. Therefore, in managing natural resources of this nature, it is extremely important not to extend resource use beyond a certain safe minimum

standard (SMS). Otherwise, the social opportunity cost of reversing direction might become 'unacceptably large'. However, it is important to note that considerable uncertainty exists regarding both the cost and the irreversibility of particular human impacts on the natural environment. Thus, in this sense, uncertainty is central to the concept of the safe minimum standard.

Section (II)

Sustainability Indicators and Renewable Resources

It decides strong and weak sustainability indicator which explains importance of natural resources for sustainable development. There are two categories of sustainability indicators:

A. **Monetary Indicators:** Some monetary indicators are:

(i)- Environmental Adjusted Net Domestic Product (EDP): This indicator of sustainability was developed under the sponsorship of the United Nations. The EDP per capita is computed by deducting environmental costs from net domestic product and dividing it by the total population of the nation under consideration. Understood this way, EDP per capita is equivalent to the standard notion of GDP per capita except that it is calculated after accounting for both the deprecation of manmade capital and the costs to the environment associated with the normal performance of an economy on the basis of production and investment activities at an aggregate level:

$$EDP/P = (NDP-Ec)/P$$

Where, Ec and P represent environmental cost and population, respectively. The environmental costs include: expenditures on environmental damage controls, the depletion of exhaustible resources, and the degradation of environmental assets. It is important to note, however, that environmentally adjusted national income accounts do not automatically guarantee sustainability. Sustainability has the additional requirement that capital stocks (natural and manufactured) are kept intact. In other words, the reinvestment of depreciated and depleted capital stock must occur.

(ii)- Environmentally Adjusted National Income Accounting (GS): This environmentally adjusted indicator of sustainability was developed under the sponsorship of the World Bank (WB) and has been utilized by many countries as a policy guide for their sustainability initiatives. This indicator operates within the general framework of the SNA and uses environmental statistics from the satellite accounts of The System of Integrated Environmental Economic Accounting (SEEA). The main idea behind the genuine savings as an indicator of sustainability is straightforward and it is imputed using the following formula:

$$GS= (GDP-C) - d_m - d_n + h_e - e_d$$

Where,

GDP = C+Ig, Consumption plus Gross Investment

GDP-C = gross domestic investment, Ig

dm = the depreciation of manmade (produced) capital

dn = the value of resource depletion (energy, minerals and forests are included)

he = the value of investment in human capital. This represents one of the unique features of GS because the standard national accounting treats expenditures on human capital as consumption. On the other hand, estimates of genuine savings treat human capital as investment (a factor that would increase the productive capacity of a nation), therefore it should be added in above Identity. The World Bank uses current education expenditure as a proxy for the value of the investment in human capital.

e_d = Imputed value of environmental degradation. This variable is subtracted out from gross saving (GDP-C) to adjust for the welfare loss of people and producers who have been negatively affected by environmental pollution. The World Bank estimates health effects (reduced mortality due to particular emissions) and damages caused by CO_2, emissions to impute the value of environmental degradation on a global basis.

(iii)- The Index of Sustainable Economics Welfare (ISEW): Herman Daly (an economist) and John Cobb (a theologian) conceived the basic idea of what is now known as the index of sustainable economic welfare (ISEW) in their book, For the Common Good (1989). The aim of this index has been to combine the economic, ecological and social aspects of human endeavors, which are often separated. Furthermore, the ISEW is used as an indicator of economic performance in the same way as GDP, EDP and GS, but has the added benefit of being used as a yardstick for measuring economic wellbeing.

Since ISEW aims to measure sustainable economic with welfare, its mode of analysis is based entirely on consumption. This is because the theoretical foundation of ISEW is based, not on the concept of Hicksian income, but on Irvin Fisher's concept of income and capital (Lawn 2003).

In summary, ISEW per capita is computed the following way:

$$\mathbf{ISEW/P= [\alpha\ (PCE) + D]/P}$$

Where the variables PCE, α, and P represent personal consumption expenditures, the parameter used for weighing income inequality, and population, respectively. D represents an amalgamation of a number of benefits and costs that include the following: the difference between the expenditure on consumer durables and the service flows from consumer durables+ the services obtained from the provision of publicly provided capital goods+ the services provided by unpaid domestic labor- the defensive social and environmental costs- the sum of the allowances for the depletion of exhaustible resources, the overuse of renewable resources, and the external costs to future generations arising from long term environmental damages. It is important to note that for the ISEW to meet the condition of sustainability, capital stock needs to be kept intact. Note also that in the calculation of the ISEW all values are measured in monetary terms and using data generated using the general framework taken from the SNA. In this sense, ISEW can only be an indicator of weak sustainability.

In the calculation of all these indicators of sustainability natural resources are important variables and the depreciation accounting and provisions for maintenance is important.

The Concept of Sustainable National Income gives importance to natural resources because it is considered that in a financial year in the process of income generation, a lot of natural resources are used and pollution is created. So, scarcity of resources should be counted. Here,

Sustainable National Income (SNI) = NNI-DNc-EDE

Where, EDE = Environmentally Defensive Expenditure

DNc = Depreciation of Natural Capital

B. Physical Indicator of Sustainability (Ecological Footprint, EFP): This indicator includes renewable resources in the definition. EFP is demand for productive land for renewable resources to survive and to adjust waste and emission by an average person. Supply side is availability of productive land. In this concept importance of renewable resources is clearly evident because natural resources are not included in definition because they are non-growing. Available data reveals that since 1975 ecological deficit (D>S) started and it is growing continuously since then.

Section (III)

Climate Change, Energy and Sustainable Development

The energy sector is very important. It is crucial for development activity. Energy demands are always growing and on the supply side energy resources (non-conventional resources such as fossil fuels) are limited and they also produce greater amount of CO_2 in the atmosphere. Where renewable energy resources is very crucial due to two reasons: (i) As alternative resources in the phase of continuous declining conventional energy resource such as oil, gas, coal; (ii) To reduce emission of GHGs specially CO_2 in the context of global warming in 2019. In India total CO_2 equivalent emission of GHGs was 2647 Million Tonne which was 115% more than 1994. In this emission in 2019, 77% came from energy sectors from fossil fuels especially as a result of such activities of energy sector in the emission of 2647 Million Tonne CO_2 contribution was 79%. So it is clear that for less dependency on exhaustible resources and to reduce the emission of CO_2, for better climate policy to development of renewable energy resources is essential.

In the second phase of Kyoto Protocol in the Paris Agreement which has provided a new insight. At COP 21 (2016) in Paris, on 12 December 2015, Parties to the UNFCCC reached a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future. The Paris Agreement builds upon the Convention and – for the first time – brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. As such, it charts a new course in the global climate effort.

The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the agreement aims to increase the ability of countries to deal with the impacts

of climate change, and at making finance flows consistent with a low GHG emissions and climate-resilient pathway. To reach these ambitious goals, appropriate mobilization and provision of financial resources, a new technology framework and enhanced capacity-building is to be put in place, thus supporting action by developing countries and the most vulnerable countries, in line with their own national objectives. The Agreement also provides for an enhanced transparency framework for action and support.

The Paris Agreement requires all Parties to put forward their best efforts through Nationally Determined Contributions (NDCs) and to strengthen these efforts in the years ahead. This includes requirements that all Parties report regularly on their emissions and on their implementation efforts. There will also be a global stocktake every 5 years to assess the collective progress towards achieving the purpose of the agreement and to inform further individual actions by Parties.

Section (IV)

Renewable Energy Contributions and Sustainable Development:

In order to assure a better future for everyone, sustainable development attempts to balance economic, social, and environmental factors. The objective is to make sure that development's i.e. social, economic, and environmental components are interconnected and mutually supportive of one another. By better technological development (renewable energy use) we can achieve sustainable development targets. The most important ways are:

1. Reducing Emissions of Greenhouse Gases (GHGs
2. Improving Energy Security
3. Providing Energy Access
4. Promoting the Growth of Rural Areas:
5. Creating Job Prospects:

Section (V)

The Role of Renewable Energy Technologies in Achieving Sustainable Development:

Renewable energy sources for sustainable development come from natural and consistent energy flow in the environment. Renewable energy technologies play a crucial role in sustainable development by reducing greenhouse gas emissions, improving energy security and providing access to energy to communities that previously lacked it. **Bio-Energy**: Derived from biological sources, bio-energy can be used to generate electricity, heat, cook, and produce biodiesel for transportation. Bio-energy has great potential to minimize greenhouse emissions and ensure sufficient fuel supply in the future.

- **Direct Solar Energy**: Direct solar energy is a term used to describe all renewable energy sources for sustainable development that make use of direct sunlight. Ocean, Thermal and Wind energy leverage solar energy once it is absorbed in the Earth and transformed into other forms. Solar energy makes the use of solar irradiance to produce electricity to meet the lighting needs.
- **Hydropower**: One of the crucial renewable energy sources for sustainable development, hydropower is generated by manipulating the elevation of water from a higher to a lower level. The energy is harnessed to produce electricity or move turbines. Powered by mature technologies, hydropower does not involve the production of any greenhouse gas and is therefore termed a green source of energy.
- **Wind Energy**: Ever since the arrival of wind energy, it has taken center place and become one of the most reliable renewable energy sources for sustainable development. Wind energy focuses on harnessing the kinetic energy from flowing air and is primarily used to move large turbines and produce electricity.
- **Geothermal Energy**: Obtained from the interior part of our planet as a source of heat, geothermal energy is a reliable renewable energy source for sustainable development. While the Earth's crust has heat in abundance, the heat is unequally distributed.
- **Tidal Energy**: Waves on the ocean surface are created with the passage of wind. The higher the intensity of the wind and the longer the intensity is sustained, the energy production increases significantly. The ocean accounts for 71% of the global surface and has the potential to meet the power requirements of the world population. Energy can be obtained from oceans with the help of thermal differences between shallow and deep seawater, wind, tides, and waves.

Benefits of Renewable Energy Sources: There are several benefits of renewable energy sources:

(i) Renewable energy sources like wind, solar, and hydropower don't produce air pollutants or greenhouse gases. They have much less environmental impact compared to other sources of energy i.e. fossil fuels, etc.

(ii) Like fossil fuel power plants, renewable energy systems don't produce toxic waste or require large amounts of water for cooling.

(iii) Renewable energy sources are naturally refilled.

(iv) Unlike oil, coal, and gas, which are finite, renewable sources will always be available, ensuring a sustainable supply of energy for future generations.

(v) Renewable energy prices are less variable than fossil fuels, which are subject to market fluctuations and geopolitical tensions (Political-Military Conflicts).

(vi) The renewable energy sector creates jobs in manufacturing, installation, maintenance, research and boosting local economies.

(vii) Technological innovation is one of the key advantages of renewable energy technologies.

(viii) Communities can develop their own renewable energy projects, creating local ownership and benefits.

(ix) The push for renewable energy drives innovation and technological advancements, leading to more efficient and effective green energy solutions.

(x) Renewable energy can be used for electricity, heating, cooling, and even transportation, offering adaptable energy solutions.

(xi) Growing demand for renewable energy technologies attracts investments which is beneficial for leading to further economic development.

(xii) Renewable energy significantly cuts down on carbon emissions, helping to mitigate climate change.

Section (VI)

Conclusion and Suggestions

Sustainable Energy Development Strategies typically involve three major technological changes: energy savings on the demand side, efficiency improvements in the energy production, and replacement of fossil fuels by various sources of renewable energy. Consequently, large-scale renewable energy implementation plans must include strategies of how to integrate the renewable sources in good energy systems influenced by energy savings and efficiency measures. Renewable energy is considered an important resource in many countries around the world but on a global scale where less than 15 percent of primary energy consumption is renewable energy and the major part is hydro power and wood fuels in developed countries. Two major challenges of renewable energy strategies for sustainable development can be identified. The one is to integrate a high share of recurring resources into the energy system, especially the electricity supply. The other is to include the transportation sector in the strategies.

Although there is a high level of demand towards renewable energy usages, but still it is out of expectation. Energy is the dominant contributor to climate change, accounting for around 60% of total global GHG emissions. Many organizations and unions have to sacrifice more efforts toward encouraging these kinds of projects, polices and legislations have to be formed into structured ones that is helpful for sustainable development.

In order to attain the economic, social and environmental benefits renewable energy sources offer an integrated set of activities such as Research & Development, technology assessment, standard development and technology transfer should be conducted and required. In order to develop sound policies, policy makers need to understand the relative environmental impact of alternative energy sources, including the impact of these technologies compared to fossil fuel technologies and ways to improve energy efficiency which will be very useful for sustainable development of a country.

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Unveiling the Trade-Off: Reassessing the Economic Analysis of Economic Development and Carbon Emissions in India

Ms. Anjali Mishra[1] & Dr. Reena Yadav[2]

ABSTRACT

The relationship between the environment and economic growth has been hotly debated among economists and policymakers since the 1990s. Transitioning to a low-carbon economy presents a significant challenge for traditional resource-dependent economies. India, as an emerging economy heavily reliant on coal, which accounts for 55% of the country's energy needs and is a key driver of industrial growth achieving development and poverty eradication goals will lead to increased gas emission. coal-fired power plants contribute 40% of fossil fuel emissions and 13% of ambientPM 2.5 each year, resulting in severe health disorders. ***The Environmental Kuznets hypothesis*** *is based on Kuznets's (1995) hypothesis concerning income inequality and economic development. When it reaches an optimum level of income, economic growth provides environmental improvements, reflecting an "****inverted U" shape****. The objective of this study is to analyze the trade-off between economic growth and carbon emissions, and the aim is to examine the impact of carbon emissions on per capita GDPtoachieve the target of net zero emissions by 2070. This study seeksto understand the implications of the Kuznets hypothesis in the Indian context. The results of this study show that per capita GDP has a greater impact on carbon emissions than per capita income and the Kuznets curve. The relationship between per capita income and carbon emissions shows a positive correlation, reflecting the Kuznets hypothesis from 2017-18 to 2019-20.*

Keywords*; Environmental Kuznets curve, Energy Transition, Per capita GDP, Traditional resources, PM 2.5*

INTRODUCTION

Being one of the world's fastest-growing economies, annual per capita carbon emission is only about one-third of the global average. India aims to become "**Viksit Bharat**" by 2047 to achieve "net zero carbon emission" by 2070 to eradicate of poverty and guarantee basic well-being to all its citizens. This guides the country's intervention for high and robust economic growth, which is

1. Research scholar, Department of Economics, JTGDC, Prayagraj. (U.P.)
2. Assistant Professor, Department of Economics, JTGDC, Prayagraj. (U.P.)

inclusive and environmentally sustainable. Despite these efforts, 1.7 million people die every year due to stroke, heart disease, lung cancer, and chronic respiratory disease, as a result of outdoor air pollution which is the highest rate in G20 nations.(**Institute for Health Metrics and Evaluation, 2020)**. Many studies projected that the Indian population will increase by 18% by 2050 and become more urbanized, with a 52.8% urbanization rate, making it the world's most populated country by 2023. According to **IEA.2021 reports**, India accounts for nearly 18% of the global population but uses only 6% of the world's primary energy. For example, India's per capita energy consumption is 0.6 tonnes of oil equivalent, which is only one-third of the global average. However, because of its large population, India was the 3rd largest national emitter in 2020 behind China and the United States, emitting 2.4 gigatons of carbon dioxide. **(Crippa et al., 2021, JRC/IEA/PBL 2022 Report).**

Population growth leads to an increased demand for goods and services, which in turn requires more energy for production. The rising energy consumption contributes to economic growth and improved living standards, but it also harms the environment, leading to issues like global warming and climate change. These environmental problems harm the global economy. Currently, the world is facing these dangerous challenges that pose a threat to humanity. Since the beginning of the Industrial Revolution in the early 1850s & 1950s, energy plays a crucial role in the production process**. (Stern & Kander, 2012; Ellabban, et al.,2014; Wei Shanxiang, et al.,2023).**

Developing countries will suffer the most from climate change due to their vulnerability and underdevelopment, leading to inefficient natural resource use and the need to prioritize economic growth. While not the cause of the problem, they have acknowledged the necessity of reducing greenhouse gas emissions through their **Nationally Determined Contributions (NDCs)** and are seeking resources from developed countries at a reasonable cost.

TABLE-1: GLOBAL SHARE OF ENERGY EMISSION WORLDWIDE

Countries	Global Share (in Percentage)
China	29.2
United nation	11.2
India	7.3
EU 27	6.7
Russia	4.8
Brazil	2.4
Rest of world	38.4

Source; data taken from JRC Science for policy report,2023

Theoretical studies suggest that there are two extreme and opposite perspectives regarding the trade-off between economic growth and environmental quality. In the short run, there is a trade-off as economic activities increase, leading to environmental degradation due to the extraction of natural resources (Kuznets curve). During this initial period, it is essential for a cleaner environment, even if it causes negative economic growth. Developing and underdeveloped economies often face this phase, while developed nations have already phased out and are enjoying high economic growth. The second perspective is that economic growth is essential for the abatement of environmental damage, particularly in the long run. Developed nations align with this view.(**F.A.G. Den Butter &**

H. Verbruggen, 2024). The first method is correct in one way or another, GNP for environmental change, called environmentally adjusted GNP, green GNP. Today need a new approach that balances both environmental quality and GDP growth.

The table above shows the six countries with the largest energy emissions in 2022. Together, they account for 50.1% of the global population, 61.6% of global GDP, and 63.4% of global fossil fuel emissions **(IEA, 2022).** The rest of the world contributes38.4% of the total emissions. According to reports, energy emissions decreased during the COVID-19 pandemic in 2020 but increased by 1.4% in 2022 compared to the previous year, out of the countries that contribute more than 1% to the total global greenhouse gas emissions.

OBJECTIVES

1. To study the trade-off between economic growth and carbon emission in India
2. To analysis the impact of per capita GDP on carbon emission.

LITERATURE REVIEWS

Wang Q., Li Y. & Li R. (2024),In their study, they examined how AI affects ecological footprints, carbon emissions, and energy transitions using data from 67 countries. They found that AI significantly reduces ecological footprints and carbon emissions while promoting energy transitions. The impact of AI varies with industrial sector promotion, trade openness, AI development level, and energy transition depth. This study provides a scientific foundation for policymakers to develop a sustainable AI management framework.

A study conducted by **Minha B.T et al.,(2023)**, explained the relationship between carbon emissions, economic growth, renewable energy consumption, foreign direct investment (FDI), and urban population in Vietnam from 1990 to 2018. The study used the autoregressive distributed lag (ARDL) bounds testing technique and the Granger causality model to analyze the long-run and causal relationships among the variables and found that these factors significantly impact carbon emissions. Their results also supported the Environmental Kuznets curve theory, indicating that CO2 emissions increase with economic growth up to a certain point, reflecting the optimum level, after which they decrease.

According to the **Climate Transparency Report, (2023)**, G20 members collectively account for about 85% of global GDP and are responsible for approximately three-quarters of global emissions. India ranks as the 4th largest contributor among G20 nations. As a result, G20 members bear the greatest responsibility for climate action.

Another report by **DELOITTE,FICCI,(2023)**, India is committed to reaching net-zero emissions by 2070. Reducing the emission intensity of its GDP by 33-35 percent by 2030 and generating 50 percent of its electricity from non-fossil fuel sources. Meeting this target by 2070 means that emissions will peak around 2040 and then follow a faster-declining trajectory, with 5-10 percent of remaining emissions to be offset through carbon sequestration.

A significant portion of this investment needs to come from the private sector.The public sector cannot work in isolation. Partnership between these sectors will be crucial, as both are dependent on each other. The energy transition is a "higher-hanging fruit" that no one party in isolation can achieve.**(IRENA 2023)**

A study by **Kiesecker M.J., Nagaraju K.S. et, al.,(2023)**, Focused on the importance of renewable energy is crucial for reducing emissions and limiting global warming to 1.5°C. However, the expansion of renewable energy infrastructure in India faces significant land use conflicts, particularly with agricultural lands and biodiversity-rich ecosystems. It also emphasized the need for sustainable land use to meet these targets and suggested planning approaches to identify "go-to" areas for renewable energy, utilizing converted lands, and adopting policies to address land use impacts.

Li. W, Chen Z. et al.,(2023),theirstudy focused onChinese cities intending to find a balance between carbon emissions and economic development in the Yangtze River Delta. The researchers used a multi-objective particle swarm algorithm combined with the TOPSIS method to optimize land use allocation. Their goal was to maximize GDP, minimize carbon emissions, and maximize land-use suitability. The study found that Jiangsu had the highest carbon emissions in the region, primarily from energy consumption and industrial land use.

In another study by **Slamersak A. et al.,(2022),** The achievement of the targets set in the Paris Agreement requires a transition to a low-carbon energy system, which will lead to a significant decrease in available energy (10-34% decline in net energy) and a substantial increase in carbon emissions (70-395Gt CO_2).

A shift to a green economy could lead to higher per capita income and reduce the environmental footprint by almost 5% in 2050. According to **ILO reports (2022)**, it is estimated that the green economy might generate 24 million (2.4 crore) jobs globally by 2030, making green skills crucial to the transition to a green economy.

Qatar's economic growth is primarily driven by the oil and gas sector, resulting in high CO2 emissions. Researchers **Shannak Sad and ContestabileMarcallo, (2022)**, studied the impact of carbon emissions on Qatar's GDP from 1970 to 2018. Their results indicate a trade-off between economic growth and carbon emission, showing an N-shaped relationship. The study emphasizes the necessity of energy conservation, efficiency, and renewable energy to achieve cost-effective carbon emission reduction.

In the energy transition, climate change agendas play a vital role in India. It is a strategic and continuous process for countries dependent on fossil fuel sources. Both demand and supply-side factors are affecting this shift. Increasing energy consumption demand causes an increase in emissions, and the limited availability of fossil fuels increases the import bill. Conventional hydrocarbon fuels, especially oil and gas resources, have faced various geopolitical vulnerabilities, leading to an economic burden. That's why transitioning to cleaner energy sources is crucial for reducing dependency and emissions. **Janardhanan K.N.,(2016)**

Karedla Y., Mishra R., et al., (2021), In their study to examine the impact of economic growth, trade openness, and manufacturing on CO2 emissions in India,researchers used

anautoregressive distributive lag (ARDL) bounds test approach.Theyemployed annual time series data from World Development Indicators spanning from 1971 to 2016.The study found that there is a long-run relationship between CO2 emissions and the other variables.

The G20 nations consist of the world's most developed and emerging economies, which make up more than 80% of global GDP, 75% of international trade, and 60% of the global population. Together, these nations are responsible for emitting 76% of the world's greenhouse gas emissions. In 2022, the G20's greenhouse gas emissions increased by 1.2%. These economies collectively account for about 75 to 80% of global greenhouse gas emissions. It's worth noting that all but one of the top 10 carbon-emitting countries are G20 members**.(Global Energy Review: CO2 Emissions in 2021, 2022; India CLIMATE TRANSPARENCY REPORT: COMPARING G20 CLIMATE ACTION).**

Despite implementing commitments under the Paris Agreement, India is expected to see a 50% rise in carbon dioxide emissions by 2040, largely from infrastructure, buildings, and vehicles yet to be built, presenting a significant opportunity for emission trajectory change.**(Economic Survey 2022-23)**

Between 2005 and 2016, India reduced its emissions intensity by 24%. As of February 2023, renewable energy sources, including large hydro, contributed to about 41% of India's total installed capacity. The country ranks fourth globally in total renewable energy capacity**. (blended finance for climate investments in India)**

RESEARCH METHODOLOGY

This paper primarily relies on descriptive data to assess the trade-off between per capita income and energy emissions in the Indian context. To accomplish this, we gathered time series data from various sources such as JRC, RBI Handbook statistics, and the website of NITI AAYOG. To test the null hypothesis that there is no relationship between energy emissions and per capita income, we conducted alog-log regression analysis.

$H_{0:}$ there is no relationship between per-capita income & energy emission

$H_{1:}$ there is a relationship between per-capita income & energy emission.

$H_{0:}$there is no impact of Per Capita GDP on carbon emission

$H_{1:}$there isthe impact of Per Capita GDP on carbon emission

TABLE: 2.1: Sector-wise primary energy supply in 2023 (in Percentage)

SOURCE	PERCENTAGE
coal	59.34
oil	28
gas	6.45
renewable	2.16
hydro	1.65
Nuclear	1

Source; data taken from the website of NITI AAYOG

The table above illustrates the distribution of energy supply in India. Coal and oil collectively account for 80% of the energy supply. Coal is the primary source, providing over 50% of the energy, driven largely by demand from the industrial and power sectors. Oil is the second largest contributor, responsible for 75.81% of energy emissions in 2019, according to NITI AAYOG. Currently, renewable energy sources make a relatively minor contribution, as various studies indicate. These studies suggest that coal-based power generation should peak by 2040 and decrease by 99% between 2040 and 2060.

FIGURE: 2.1

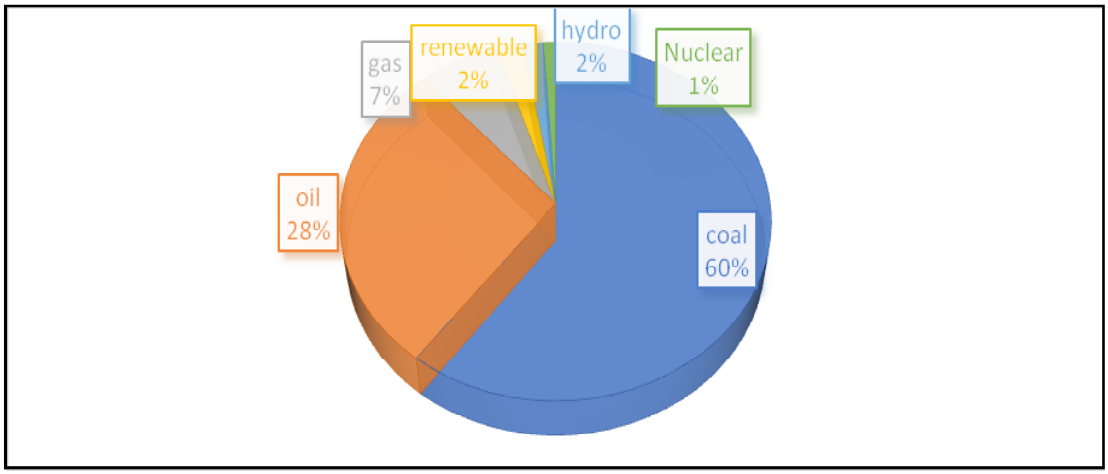


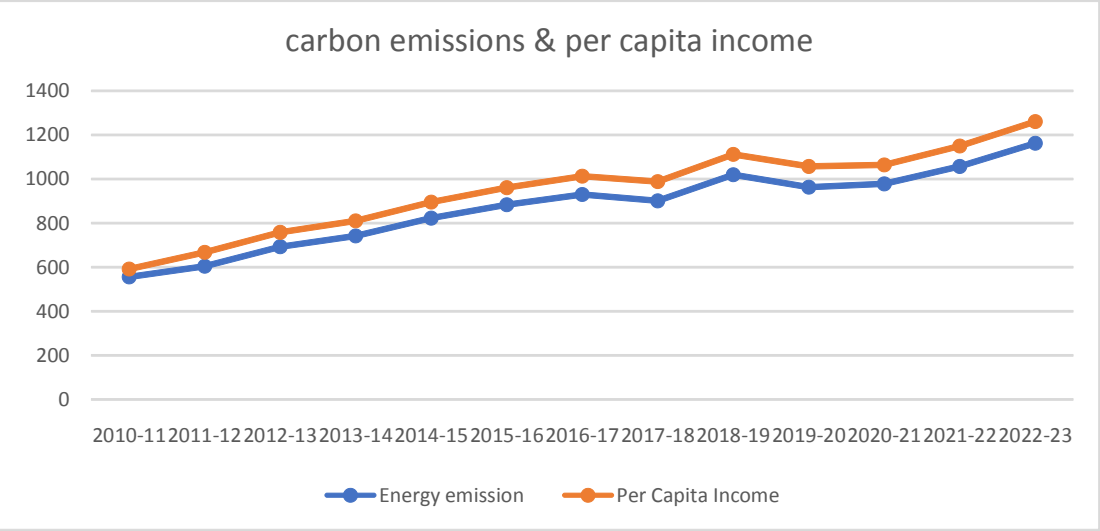
TABLE 3: Relationship between the carbon emission and Per capita income and Per capita GDP

Year	Energy emission (Mt CO_2)	Per Capita Income (PCI) (In Rs. thousand)	Per capita GDP (GDP/Total population) (in US$)
2010-11	555.59	36.202	1377.11
2011-12	604.03	63.462	1449.6
2012-13	692.71	65.538	1434.02
2013-14	741.7	68.572	1438.06
2014-15	822.51	72.805	1559.86
2015-16	883.21	77.659	1590.17
2016-17	929.84	83.0003	1714.28
2017-18	900.86	87.586	1957.97
2018-19	1019.66	92.133	1974.38
2019-20	962.79	94.42	2050.16
2020-21	978.04	86.054	1915.55
2021-22	1057.15	92.583	2250.18
2022-23	1162.36	98.374	2366.31

Source; Data taken from RBI handbook statics, Website of NITI AAYOG &Statista

In this table,carbon emissions represent the environmental factor while per capita Income is used as an indicator of economic development on the other hand Per capita GDP reflects the supply side of an economy, essentially representing the average economic output per person & well-being of the country'scitizens on the other side Per capita reflects the demand side of the economy shows individual earning orpurchasing power of any economy.The above table shows that as per capita income increases, so do energy emissions. From 2010-11 to 2022-23, as per capita income and per capita GDP increased, carbon emissions also increased. However, during the pandemic when economic activities temporarily decreased, both per capita income and GDP declined, but carbon emissions increased. After the pandemic, per capita income and GDP increased, but the rate of increase was much lower compared to carbon emissions.

FIGURE 3.1



The graph depicted above illustrates a consistent increase in both energy emissions and per capita income. Per capita income is a widely accepted indicator of economic development. A higher per capita income reflects greater growth in a nation, which in turn demands more natural resources and leads to increased emissions. The graph indicates an inverted **"U Shape"** from 2017-18 to 2019-20, reflecting the **Kuznets Curve**. The largest share of energy emissions comes from CO2 emissions from fuel combustion. Power generation is the largest contributor at 45%, followed by the industry and transport sectors at 31% and 12%, respectively. However, industrial emissions intensity has declined over time, reflecting effective policies to improve industrial energy efficiency over the years. **(Transparency Report,2022)**

DATA ANALYSIS & FINDINGS

To investigate the Kuznets hypothesis in the Indian context,the trade-off between economic growth and carbon emission, firstly we create the Null- hypothesis to test the stationarity in time

series data (Carbon Emission, Per capita Income & Per Capita GDP), use the Argumented Dickey-Fuller test and find that the data has no unit root, therefore, we reject the Null hypothesis and accept the alternative hypothesis. After that,we conducted the log-log regression analysis using carbon emission as a dependent variable and Per capita Income & Per capita GDP, as the independent variable.

Theoretical framework,

Ln(Energy Emission)= $\alpha+\beta$ ln(PCI)+ error……(1)

Ln(Energy Emission)= $\alpha+\beta$ ln(Per Capita GDP)+ error…….(2)

Findings

(1)

Dependent Variable: ENERGY_EMISSION___MT_CO2
Method: Least Squares
Date: 10/04/24 Time: 22:28
Sample: 1 13
Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PER_CAPITA_GDP____IN_ US$	0.497234	0.064605	7.696486	0.0000
C	-12.65715	116.5238	-0.108623	0.9155

R-squared	0.843385	Mean dependent var	870.0346
Adjusted R-squared	0.829147	S.D. dependent var	179.7288
S.E. of regression	74.28974	Akaike info criterion	11.59446
Sum squared resid	60708.62	Schwarz criterion	11.68138
Log-likelihood	-73.36400	Hannan-Quinn criter.	11.57660
F-statistic	59.23590	Durbin-Watson stat	1.230954
Prob(F-statistic)	0.000009		

(2)

Dependent Variable: ENERGY_EMISSION___MT_CO_2
Method: Least Squares
Date: 10/04/24 Time: 22:28
Sample: 1 13
Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PER_CAPITA_INCOME__IN_RS	9.825478	1.127604	8.713587	0.0000
C	100.3307	90.25450	1.111642	0.2900

R-squared	0.873456	Mean dependent var	870.0346
Adjusted R-squared	0.861953	S.D. dependent var	179.7288
S.E. of regression	66.77779	Akaike info criterion	11.38126
Sum squared resid	49052.01	Schwarz criterion	11.46817
Log-likelihood	-71.97817	Hannan-Quinn criter.	11.36339
F-statistic	75.92661	Durbin-Watson stat	1.717243
Prob(F-statistic)	0.000003		

In E-views software,a single log regression was run for the analysis of the relationship between carbon emissions and two independent variables: PCI and Per capita GDP. The regression results showed that when PCI increases by 1%, carbon emissions increase by 0.49%, with an adjusted R^2 of 0.82. This means that 82% of the variances in the model are explained by the independent variable. The low probability (prob) F-Statistic indicates that the model is highly significant, with a very low chance of error at 99.99%. The Durbin–Watson value indicates that there is no autocorrelation in this model.In the second equation, where carbon emissions are the dependent variable and Per capita GDP is the independent variable, the beta value wasfound to be 9.82. This implies that when Per capita GDP increases by 1%, carbon emissions increase by 9.82%. Per capita GDP has a high impact on carbon emissions compared to Per Capita Income.

CONCLUSION & SUGGESTIONS

the transition to a low-carbon economy is a necessity today due to climate change caused by human activities. Extreme weather events are having a significant impact on economic output. Understanding the socioeconomic impacts of the coal phase-out in India is crucial for strategizing policies towards an inclusive and sustainable transition.But it is essential to reduce dependency on fossil fuels and transition to renewable energy, which is the future for the coming generations.

A green economy offers a path to achieving sustainable growth by creating employment and income through both public and private investment, as it cannot be achieved solely by the government or the private sector. This paves the way for reduced carbon emissions and pollution, improved energy and resource efficiency, and the conservation of environmental quality. The transition towards green growth aims to shift the world in a new direction of development that ensures economic stability and sustainability while promoting a cleaner environment. The journey towards green growth is not an immediate process that can be achieved with a single decision at a high level. Instead, it requires a long and transformative process, **VACLAV SMIL (2014)……"** each widespread transition from one dominant fuel to another has taken 50 to 60 years**"…...(economic survey,2023-24**) energy transition on a nation or global scale are a constitutionally lengthy process, shift from conventional energy sources to non-conventional sources required of dedication.

Achieving this change will not be easy, but it is necessary if we want to achieve sustainable development goals, require a balanced approach, often called 'green growth,' as a strategy for sustainable development with low carbon emissions. The production and consumption pattern of energy use in any economy is crucial to understandingthe determinants of final demand and consumption of products and services. India's dependence on fossil fuels is a major factor in also poses challenges for the sustainable development targets and the country's ambition to achieve a $30 trillion economy by 2070. However, it is also committed to ensuring that its consistent growth path is well-equipped to deal with environmental challenges along with its goal of achieving net zero emission by 2070.

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Topic Economic Strategies for Addressing Environmental and Climate Change

Prachi Garg Sangal [1]

ABSTRACT

Financial strategies for environmental and climate change are critical to global efforts to mitigate the negative impacts of these events. Integrating environmental sustainability into financial planning involves a range of approaches that balance development with ecological protection. Key strategies include using carbon rating methods, such as taxes on carbon and cap-and-trade systems, to encourage cutsin greenhouse gasespollution.

Moreover, governments and global organizations are promoting investments in sustainable energy and energy conservation that not just lower carbon emissions Along with boost economic development by generating new jobs and employment opportunities. Eliminating subsidies for fossil fuels is essential for the transition from capitalism to socialism. In addition, adopting green financing measures, such as green bonds and efficient investment funds, encourages private capital for climate-related projects.

Economic plans also involve developing infrastructure that can withstand the effects of climate change, minimize exposure to climate risks, and maintain long-term economic stability,Regulations guarantee that initiatives addressing climate shifts are both efficient and well-balanced.The function of social policy is just as crucial, including supporting the shift of employees from high-carbon sectors and aiding the move towards a sustainable economy.

Keywords: *Environmental sustainability, Climate change mitigation, Carbon pricing, Renewable energy, Green finance Sustainable development, Carbon taxes, Cap-and-trade*

Introduction

Addressing the environment and change in climate is one of the most urgent modern world issues. As global temperatures rise and ecosystems face unprecedented pressure, the need for effective and sustainable solutions has never been greater. The economic dimension of this challenge is far-reaching because Factors and outcomes of change in climate are interconnected with the global economic system

Introduction of business strategies for addressing Ecological and change in climateand explore the participation of entrepreneurship, public and private investment, and policy implications in

[1] Research Scholar, Maa Shakambari University. Email: gprachi3006@gmail.com

assisting the shift to a low-income economy. In this context, mechanisms of carbon pricing such as taxes on carbon and Carbon trading schemeshave become important tools to lower downthe carbon emissions. At the same time, investing in renewable energy, energy efficiency, and green technologies increases innovation and thus creates more jobs. International cooperation under agreements such as the Paris Agreement is essential to align national policies with international climate goals. In addition, social policies that promote change for workers and communities affected by the transition to fossil fuels are vital for sustainable governance in society during the financial transition.

Review of literature

A literature review on business strategies to address the environment and climate change reveals several studies that highlight the complexity and diversity of this global challenge. Researchers and policy makers have focused on the integration of business tools, management systems, and business solutions to decreases the negative effects of climate change while encouraging sustainable development.

One example of this is carbon pricing, which contains carbon taxes and emissions trading schemes. Many studies, such as those by **Nordhaus (2007) and Stiglitz et al. (2017),** suggest that this process can work well at the environmental cost of carbon emissions, thereby encouraging the reduction of greenhouse gas emissions. Studies show that carbon pricing can encourage innovation in low-carbon technologies and shift consumption patterns to more sustainable options.

Renewable energy and green investment: The transition to renewable energy is another area of focus. Studies by **Stern (2006) and IRENA (2019)** show the importance of investing in renewable energy as a way to decarbonize the economy. Research shows two benefits of such investments: reducing dependence on fossil fuels and stimulating economic growth by creating jobs and stimulating technological innovation output. However, issues such as high start-up costs and policy uncertainty are still issues that need to be addressed through policy and financial support.

Green Finance and Sustainable Investment: Green money has become an important tool for funding climate-related projects. Scholars such as **Zenghelis (2014) and Campiglio (2016)** have explored the role of green bonds, sustainable investment funds, and other financial instruments To facilitate the shift to a low-cost economy. The data suggest that aligning financial markets with environmental goals is critical to unlocking the investments needed to meet global climate goals.

Global Cooperation and Policy Frameworks: International agreements, particularly the Paris Agreement, are often considered important for international cooperation in efforts to combat climate change. Studies by **Keohane and Victor (2016) and Falkner (2016)** discuss the importance of multi-stakeholder cooperation in national policy and the importance of ensuring that low emission reductions are fair and profitable.

Social and Economic Impacts: The relationship between the transition to a green economy is also an important area of research. As discussed by authors such as **Newell and Mulvaney (2013)** and **Healy and Barry (2017)**, the literature on the concept of "transition" points to the need to ensure that the shift away from fossil fuels does not adversely affect the health workers and communitiesas it is the damage to carbon-intensive industries caused by fossil fuels. These studies

highlight the importance of policies that promote reciprocity, social protection and diversification of economics in reducing the transition costs.

Challenges and Criticisms: Despite widespread support for economic strategies to combat climate change, the literature also highlights a number of challenges and criticisms. Issues such as policy inertia, financial insecurity, and unbalanced distribution of costs and benefits across regions and groups have been repeatedly raised.

In summary, the document on business strategies to combat environment and change in climate provides a general viewof the various tools and methods available. It emphasizes the need for a comprehensive approach that combines economic, social and environmental objectives to address climate change issues.

Objectives of the study

The objectives of this study on economic strategies for addressing environmental and climate change are as follows:

1. **Analyze the Efficiency of Carbon Pricing Approaches**

   To evaluate how carbon taxes and cap-and-trade systems affect the reduction of greenhouse gas emissions and the advancement of low-carbon technologies.

2. **Analyze the Role of Renewable Energy and Green Investments:**

   To examine how the investments in renewable energy, energy efficiency, and green technologies help to sustainable economic growth and efforts to reduce the climate change.

3. **Examine the Impact of Green Finance:**

   To explore how the effective green finance tools, like green bonds and sustainable investment funds, are helping in mobilizing the capital for climate-related initiatives.

4. **Study the Importance of Global Cooperation and Policy Frameworks:**

   To understand how international agreements such as the Paris Agreement help to align with the nationaleconomic policies and coordinate global efforts to address the change in climate

Research Methodology

The process of researchon the financial strategies to combat with the environment and change in climate will involve a combination of quantitativeand qualitative methods. This approach helpsin the better understanding of thecompetitiveness,effectiveness and impact of various business strategies in mitigating climate change and encouraging sustainable development. The main points of the research process are summarized below:

1. Literature Review

- **Objective:** To establish a theoretical foundation and identify gaps in existing research on economic strategies for climate change.

- **Approach:** A systematic review of academic journals, policy papers, reports from international organizations (e.g., IPCC, IEA), and relevant case studies. This review will help synthesize current knowledge on topics such as carbon pricing, renewable energy investments, green finance, global cooperation, and just transitions.

2. Case Study Analysis

- **Objective:** To examine real-world examples of economic strategies implemented in different regions and their outcomes.
- **Approach:**Selected case studies from various geographical areas and economic contexts for example renewable energy initiatives in Germany, green bond programs in China. These case studies will be analyzed to understand the various factors contributing to their success or failure, with a focus on policy design, implementation challenges, and socio-economic impacts.

3. Quantitative Data Analysis

- **Objective:** To evaluate the statistical relationship between economic strategies and key environmental and economic indicators.
- **Approach:** Collection and analysis of secondary data from sources such as the World Bank, IMF, UNFCCC, and national databases. Key indicators include carbon emissions, GDP growth, renewable energy adoption rates, green investment flows, and employment trends in green industries. Statistical methods such as regression analysis and econometric modeling will be used to identify patterns and correlations.

4. Surveys and Interviews

- **Objective:** To gather insights from stakeholders involved in implementing and managing economic strategies for climate change.
- **Approach:** Conduct surveys and semi-structured interviews with policymakers, industry experts, financial institutions, and representatives from civil society organizations. The survey will focus on perceptions of the effectiveness of different strategies, barriers to implementation, and recommendations for improvement. Interviews will provide qualitative insights and contextual understanding of the issues identified in the quantitative analysis.

5. Comparative Policy Analysis

- **Objective:** To compare the effectiveness of different policy frameworks and economic strategies across countries and regions.
- **Approach:** Comparative analysis will be conducted to evaluate how different policy designs (e.g., different carbon pricing models, renewable energy subsidies) perform in various economic and political contexts.

6. Scenario Analysis

- **Objective:** To explore potential future outcomes based on different economic strategies and policy interventions.
- **Approach:** Develop scenarios that project the environmental and economic impacts of various strategies over time, using modeling tools such as Integrated Assessment Models (IAMs). Scenarios will consider different assumptions about technological advancements, policy shifts, and global cooperation.

7. Policy Recommendations

- **Objective:** To provide evidence-based recommendations for enhancing the effectiveness of economic strategies in addressing climate change.
- **Approach:** Synthesize findings from all research components to develop practical recommendations for policymakers, businesses, and international organizations. These recommendations will focus on optimizing existing strategies, addressing identified challenges, and ensuring a just and inclusive transition to a low-carbon economy.

8. Validation and Peer Review

- **Objective:** To ensure the rigor and credibility of the research findings.
- **Approach:** The study will undergo peer review by experts in environmental economics, climate policy, and related fields. Feedback will be incorporated to refine the analysis and conclusions.

This mixed-method approach will provide a robust and nuanced understanding of the economic strategies available for addressing environmental and climate change, offering valuable insights for policymakers and stakeholders globally.

Analysis of the study

The analysis of this research on business strategies to combat the environment and climate change will include a detailed analysis of the data collected and the insights gained from the various research methods. The focus will be organized around the main objectives of the study and each contribution will contribute to a better understanding of the effectiveness, challenges and impacts of different business strategies. The main points of the analysis are as follows:

1. Evaluation of Carbon Pricing Mechanisms

- **Quantitative Analysis:**
- The research will use regression models and econometric analyses on the effect of carbon pricing mechanisms, such as carbon taxes and cap-and-trade systems, on greenhouse gas emissions. Key changes include lower carbon prices, reduced emissions, and economic indicators such as GDP growth.

- Comparative analysis across countries and regions will identify factors affecting the effectiveness of these systems, including business models, design and implementation.
- **Qualitative Analysis:**

Information from case studies and interviews will be used to explore political and social issues associated with the use of carbon pricing. The audit will consider public acceptance, trade-offs and the role of governance in ensuring compliance and effectiveness.

2. Impact of Renewable Energy and Green Investments

- **Quantitative Analysis:**

  Statistical analysis will be used to assess the relationship between investment in renewable energy and key economic indicators such as job creation, energy security and lower carbon emissions. The study will also assess the cost-effectiveness of renewable energy compared to fossil fuels.

- **Qualitative Analysis:**

  Research articles on renewable energy implementation will be reviewed to identify best practices, barriers to adoption, and the role of government support in stimulating capital. Interviews with industry experts will provide further detail on the challenges and opportunities of renewable energy measurement.

3. Effectiveness of Green Finance Instruments

- **Quantitative Analysis:**

  The research will use data on capital flows, project outcomes and market performance to analyses the growth and impact of green finance instruments such as green money and working capital. The analysis will identify how green money contributes to security and change.

- **Qualitative Analysis:**

  Interviews with financial institutions, policymakers and investors will provide insight into the challenges of doing business with environmental goals. The analysis will explore issues such as green water cleanup, regulatory issues and the need for transparency and accountability in green finance.

4. Global Cooperation and Policy Frameworks

- **Comparative Policy Analysis:**

  The research will compare the outcomes of different legal models, focusing on the Paris Agreement and other international climate agreements. The review will examine how these processes are reflected in national policies and the extent to which they support international cooperation.

- **Scenario Analysis:**

  Future scenarios will be developed to predict the outcomes of various international engagements. The review will consider international agreements at various levels and their potential impacts on global emissions, economic growth and climate security.

5. Social and Economic Implications of a Just Transition

- **Quantitative Analysis:**

  Data on employment, income distribution and social indicators will be analyzed to assess the impact of the impact of transitioning to a green economy on various groups of people. The analysis will focus on identifying which activities and communities are most affected by the changes and how effective social policies are in reducing the negative impacts.

- **Qualitative Analysis:**

  Interviews and case studies will be used to explore the human sources of change, including the experiences of workers in carbon-intensive industries and the effectiveness of these recovery and social protection programs.

Data collection table based on the survey

I D	Age	Sector	Carbon Pricing	Renewable Energy	Green Finance	Challenges	Recommendations
001	45	Energy	Effective	Strong Support	Moderately Effective	Policy Inertia	Increase carbon price
002	34	Finance	Ineffective	Neutral	Highly Effective	Financial Risk	Strengthen regulations
003	52	Government	Highly Effective	Strong Support	Effective	Lack of Coordination	Enhance cooperation
004	29	NGO/Non-Profit	Moderately Effective	Strong Support	Moderately Effective	High Costs	Increase awareness
005	41	Academia	Neutral	Strong Support	Highly Effective	Public Acceptance	Just transition policies

Suggestions

Here are some suggestions for improving the performance of economic policies to address environmental and change in climate:

1. Increase Carbon Pricing Levels:

- **Suggestion**Increase the carbon tax rates or lower the caps in cap-and-trade systems to more effectively cut emissions and promote the use of clean and green technologies.
- **Rationale:**Higher carbon prices create stronger financial motivations for consumers and businesses to lower their carbon footprint.

2. Enhance Global Cooperation:

- **Suggestion:**Enhance international agreements such as the Paris Agreement by various countries for ensuring to set more ambitious emission reduction goals and uphold their commitments.
- **Rationale:**Climate change is a worldwide challenge that demands collaborative actions from nations to make a substantial difference.

3. Expand Investment in Renewable Energy:

- **Suggestion:**Boost public and private funding for renewable energy projects such as solar, wind, and hydropower to speed up the shift to a low-carbon economy.
- **Rationale:** Greater investment in renewable energy can decreases the dependence on the fossil fuels thus create jobs, and helps to stimulate economic growth.

4. Strengthen Green Finance Regulations:

- **Suggestion:**Enforce more rigorous regulations to guarantee transparency and accountability in green finance, prevent greenwashing, and ensure that funds are truly allocated to sustainable projects.
- **Rationale:**Well-defined and enforced standards in green finance can enhance investor trust and channel more capital into effective climate action.

5. Support a Just Transition:

- **Suggestion:** Develop and implement the policies that support communities'workersand affected who are affected by the shift from carbon-intensive industries, such as retraining programs and social safety nets.
- **Rationale:** Ensuring that the transition to a green economy is fair and inclusive which will help to the maintain social equity and political support for climate change policies.

Findings and Results

The analysis of the study on economic strategies for addressing environmental and climate change yields several key findings and results. These insights are drawn from the literature review, case studies, quantitative data analysis, surveys, and interviews.

1. Effectiveness of Carbon Pricing Mechanisms

- **Findings:**
- Carbon pricing strategies, including carbon taxes and cap-and-trade systems, have been effective in reducing the greenhouse gas emissions in various countries. For instance, regions with higher carbon prices, like Sweden and the European Union, have seen important declines in carbon emissions.

- o However, the effectiveness varies based on the level of carbon price, the scope of the covered emissions, and the complementary policies in that place.

- **Results:**

- o Countries with well-designed carbon pricing systems have experienced more substantial emissions reductions compared to those which have lower or poorly implemented carbon prices.
- o The effectiveness of carbon pricing is enhanced when combined with supportive policies, such as subsidies for renewable energy and energy efficiency programs.

2. Impact of Renewable Energy Investments

- **Findings:**

- o Investments in renewable energy have led to substantial growth in clean energy capacity and have contributed to job creation and economic growth. Countries like Germany and China have seen positive outcomes from their renewable energy policies

- **Results:**

- o Renewable energy investments have demonstrated positive economic impacts, including job creation in the clean energy sector and a reduction in dependency on fossil fuels.
- o The success of renewable energy projects is influenced by government policies, technological advancements, and market conditions.

3. Effectiveness of Green Finance Instruments

- **Findings:**

- o Green finance instruments, such as sustainable investment fundsand,green bonds have moved significant capital for various climate-related projects. They have facilitated investments in renewable energy, energy efficiency, and climate adaptation projects.
- o However, challenges such as greenwashing and a lack of standardized reporting and certification have affected the credibility and impact of green finance

- **Results:**

- o Green finance has effectively directed funds toward sustainable projects but requires stronger regulations and standards to enhance transparency and prevent greenwashing.
- o The growth of green finance instruments is positively correlated with increased investor interest and commitment to sustainability.

4. Global Cooperation and Policy Frameworks

- **Findings:**

- o International agreements like the Paris Agreement have played animportant role in addressing global cooperation and setting on various climate targets. However, varying levels of

commitment and compliance among countries have influenced the overall effectiveness of these frameworks.

- Successful implementation of global agreements often depends on national policies, financial support, and international collaboration.

- **Results:**

- Global cooperation frameworks have facilitated progress in climate action but require enhanced commitment and accountability mechanisms to achieve global climate goals.
- Countries that align their national policies with international agreements tend to achieve better outcomes in reducing emissions and promoting sustainability.

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Sustainability and Common Property Resources

Prof. Sandeep Kumar[1] & Anuragini Srivastava[2]

ABSTRACT

Sustainability with respect to common property resources is a fundamental linkage between economic viability, which is a core pillar for sustainable development, along with safeguarding the environment, and social equality. It focuses on the responsible use and protection of the natural environment through conservation actions. It refers to the diverse actions which aims to conserve, protect, and create a more sustainable environment while ensuring the optimal use of resources. Significant portion of natural resource contributes to common property resources. Natural resources that are shared by a community or group of people are referred to as ***common property resources (CPRs).*** *These resources have ill-defined property rights, and the use by one individual diminishes the availability for other the individuals. These resources are often subject to degradation or depletion due to the* ***"tragedy of commons"****, where each individual acts in his own self-interest resulting in over-exploitation of the resource. Common property resource directly or indirectly play an important role in enhancing and stabilizing the income, employment and sustenance of village community. It promotes natural resource base on which economic activities are possible. Common property resource play a pivotal role in environmental and ecological balance and such resources are essential for the economy's existence and prosperity.*

In this context, this study tries to critically explore the problems faced on the path to sustainable development, the significance of natural resources for the human economy, and the relevance of common property resources for the rural community. It also analyzes the implications of CPR degradation over time, as well as management methods for ensuring their conservation and survival.

Keywords: *Sustainability, Natural resource, Common property resources, Management, tragedy of commons, Property rights.*

INTRODUCTION

The Millennium Ecosystem Assessment Synthesis Report (2005) highlighted two significant observations:

- "Over the past 50 years, humans have modified ecosystems more fast and profoundly than at any other point in human history, mainly growing demands for food, fresh water, timber,

1. Prof. and Head, Department of Economics, D.D.U. Gorakhpur University, Gorakhpur. (U.P.)
2. Research Scholar, Department of Economics, D.D.U. Gorakhpur University, Gorakhpur. (U.P.)

fiber, and fuel. This has resulted in a substantial and largely irreversible diminution in the diversity of life on Earth."

- "The changes that have been made to ecosystems have contributed to substantial net gains in human wellbeing and economic development, but these gains have been achieved at growing costs in the form of the degradation of many ecosystem services, increased risks of non-linear changes, and the exacerbation of poverty for some groups of people. These problems, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems".

The bottom line of **the Millennium Ecosystem Assessment(2005)** findings is that human activities are depleting Earth's natural, putting such burden on the environment that the capacity of the planet's ecosystem to sustain future generations can no longer be taken for granted. Economic progress has come at the expense of impaired biological diversity and severly under-mined natural systems. What is needed now is a change in the production methods and consumption behavior to one that is environmentally sustainable. In other words, what is needed is sustainable development-development that lasts.

➢ Hartwick-solow sustainability-

It basically represents the neoclassical perspective on the economics of sustainable development, and one of its defining characteristics is the assumption that human capital(basic economic infrastructure, such as machines, buildings, knowledge, etc) and natural capital(stocks of environmentally provided assests such as soil, forest, wetland preserves, water, fishing grounds, etc) are substitutes. Thus, natural capital may not be considered an absolute necessity or a binding constraint on sustainability. For this reason, the Hartwick-Solow approach is recognized as the weak sustainability criterion.

➢ Ecological economics sustainability-

It presumes that the sustainability of ecological systems is a prerequisite to sustainable human economic development, and it views human and natural capital are complements. The strong sustainability criterion is an alternative phrase often used to describe the ecological economics sustainability approach.

➢ Safe minimum standard approach to sustainability-

Has as its central theme the uncertainty associated with irreversible environmental damage and its implications for long term resource management. Thus, the main focus is not so much on whether human and natural capital are substitutes or complements, but rather on resource management decisions under conditions of uncertainity and irreversibility.

It's common to refer to the 1970s as the environmental decade. It was undoubtedly an impetus for the global awakening to environmental issues. The United States established the **Environmental Protection Agency (EPA) as** an entirely new federal agency in the same year. During the 1970s, a number of books and articles were published warning the public about the impending scarcity of

natural resources. The phrase "sustainable development" gained momentum in the early 1980s when it was applied to address global environmental issues (e.g., loss of biodiversity, ozone depletion, global warming, deterioration of natural resource, etc). A research on sustainable development was commissioned by ***the United Nations organization of World Commission on Environment and Development.*** The result of this led to the 1987 release of ***the Bruntland Commission Report, 'Our Common Future'.*** According to this research, **sustainable development is development that satisfies current demands without undermining the capacity of future generations to meet their own.**

The present paper focuses on the integration of sustainability and the effective management of common property resources which is crucial for maintaining ecological balance, ensuring resource availability, and fostering a fair and resilient society. The paper is divided into five sections. **Section (I)** explains common property resources and its relevance for the rural economy; **Section (II)** discusses CPR governance and management policy framework; **Section (III)** explains challenges in managing common property resource; **Section (IV)** focuses on the environmental impact of exploitation of common property resources. In the last **Section (V)** provides recommendation with conclusions.

SECTION (I)

INTERPRETATION OF COMMON PROPERTY RESOURCES AND ITS RELEVANCE FOR THE RURAL ECONOMY:

Common property resources make up a significant portion of natural resources. Large rural populations and high population pressure are characteristics of developing nations.These economies rely extensively on locally accessible natural resource base or "commons," for a variety of needs, including firewood, fodder, fishing, water for irrigation, and cattle grazing. ***Natural resources that are shared by a community or group of people are commonly referred to as common property resources.*** When they are not managed sustainably, these resources frequently become susceptible to deterioration or depletion. Since ownership rights are not clearly stated, it is a natural resource that belongs to the community, to which every member possess the right to access and usage according to particular prerequisites. **Divisibility** and **non-exclusivity (limited exclusion is plausible)** are features associated with common-pool resources. Divisibility signifies that when one group consumes part of a resource, it reduces the amount available to other groups, whereas non-exclusivity means that they can be used by anyone. ***The Tragedy of the Commons***, written by ***Garret Hardin*** in ***1968***, provided extensive documentation of the commons' depletion.

The fundamental theme of Hardin's narrative is that herdsmen who share a pasture and are driven by their own self-interest will ultimately overpopulate their herds and ruin the common resources. Self-interest drives every herdsman to increase the number of herds grazing without restriction. When rational actions are combined, they might produce irrational implications. This results in the tragedy. Hardin states, **"Ruin is the destination toward which all men rush."**

Common property resource are essential for the rural economy and support the local people in several ways.

- Shrubs and fuel wood for heating and cooking are available.
- Grass, shrubs, and leaves serves as food for animals.
- Bamboo, small timber and palm leaves for construction.
- A range of fruits, vegetables, and seafood to sustain themselves, primarily during lean phase;
- Non-timber supplies including nuts, medicinal oils, and etc.

The primary source of biomass fuel for rural communities are resources obtained from common land. Fuel collection is a common practice for women, who benefit from it in terms of economic empowerment and home assistance.

In rural economies and approach to life as a whole common property resources are necessary for providing fuel, food security, income, and other essentials. They are especially significant for the underprivileged in rural areas, landless farmers, and other marginalized groups in the society. Village pastures, grazing areas, rivers, ponds, canals & irrigation channels, waste lands, etc. are all included in CPR. The rural poor have historically earned their economic sustenance from the resources of common land.

SECTION-(II)

GOVERNANCE AND MANAGEMENT POLICY FRAMEWORKS

Managing and making efficient use of resources that are open to several people, such as pastureland, fisheries, forests, and water bodies, is known as *sustainable use of common property resources, or CPRs.* The main obstacle is that of preventing exploitation, which could end up in *the "tragedy of the commons," or the loss of resources.* The following are the essential practices for the long-term management of CPRs:

- **Community Management:** Preserving local resources is usually of great significance to local communities. Through community-based management, those who utilize resources can establish standards, keep a check on usage, and levy charges for overuse.
- **Well-Defined constraints:** Setting up limits and determining who has access to these resources can prevent ambiguities and conflicts.
- **Collective Decision Making:** Everyone participating can make contributions in the formulation of rules using inclusive decision-making processes, strengthening the likelihood that those rules will be maintained.
- **Monitoring and Enforcement:** To ensure compliance and to handle violations it is essential to carry out regular assessment of utilization of resources and robust rule implementation.
- **Flexible Governance:** Governance frameworks are required to be capable to change in order to satisfy the requirements of the community and conform to the availability of resources.
- **Incentives for Sustainable Use**: Rewarding users who obey guidelines is a potential method to provide incentives for sustainable use while encouraging responsible behavior.

- **Education and Awareness Campaigns:** Promoting a culture of stewardship in communities is achieved by educating individuals about the potential benefits of sustainable resource management.
- **Access to other Resources:** CPRs can be preserved by easing the burden on shared resources through the provision of additional resources or opportunities for revenue.

When combined, these methods can effectively manage CPRs and ensure that they continue to benefit future generations as well as present.

SECTION-(III)

CHALLENGES IN MANAGING COMMON PROPERTY RESOURCES:

Non-exclusivity ***(limited exclusion is feasible) and*** **divisibility** ***(these resources have ill-defined property rights) are features associated with the common-pool resources.*** Divisibility signifies that when one group consumes a portion of a resource, it diminishes the amount available to the other groups, whereas non-exclusivity indicates that they can be utilized by everyone. **The Tragedy of the Commons,** ***written by Garret Hardin in 1968, provides extensive documentation of the depletion of the commons.*** CPRs are more commonly subjected to damage, unsustainable exploitation, and conversion to other uses. This makes the ***issues of food availability, rural-urban migration, poverty in rural areas, and the expansion of slums in urban areas worse.*** In 1968, Hardin attempts to explain the excessive use of CPRs by referring to it as the "Tragedy of the Commons." Individual users in CPRs are encouraged to maximize their share by utilizing the resource as rapidly as possible—that is, before other users do—which leads the resource to be *depleted in an unsustainable way.* As a result, each user imposes an external cost on all other users in the form of decreased resource availability. This is because when a resource is owned by everyone, there is no incentive for anybody to save it for future use.

Common property resources are accessible to many people or groups. The **free rider problem** *occurs when people use the resources disproportionately without making contributions to their sustainability or maintenance, ultimately resulting into overuse and degradation.* It also creates a lack of motivation for contributing because it is difficult to prevent individuals from utilizing the resources because those who do not contribute continue to reap benefits from them.

APPLICATION OF GAME THEORY TO COMMON PROPERTY REOURCES:

Theory in CPR management uses non-cooperative game theory to assess the strategic interaction of agents or stakeholders sharing the same finite CPR. In many cases, the ***"delimma of resource conservation"*** is an element of the CPR management decision-making process. The study focuses on the application of the prisoner's dilemma in the two-person strategic game, where defection (non-cooperative behavior) is the dominant strategy. *The "Tragedy of the Commons" by Hardin is similarly based on this theory.* **P** stands for **participation (or cooperation strategy)** and **D** for **defection (or non-cooperation play)** in the following table.

Villager 2

	P/D	Participate(P)	Defect(D)
Villager 1	Participate(P)	(6,6)	(0,12)
	Defect(D)	(12,0)	(3,3)

Consider a grazing land where two local people let their farm animals go. For the same amount of time and resources, a villager can pasture more livestock, but eventually it becomes unsustainable for the commons. Therefore, each villager must choose between participating (P) and defecting (D). Villager 1's action should be shown horizontally, while Villager 2's action should be shown vertically. There exist four probable results for the decision-making process, based on the distinct behaviors taken by each villager. Their incentive is (6,6) if both villagers keep a manageable quantity of cattle (that is, they are harvesting resources sustainably while helping to preserve the commons). However, in the event that one of them abstains from playing (as long as the other plays), the defector's payoff rises to 12 and the participant's payoff falls to zero, meaning that (0, 12) or (12, 0). Thus, the villagers are always inclined to overgraze or free-ride (defect). Mutual defection or free riding, where each villager gets a payment of only 3, hence ending up the dominant strategy equilibrium (D, D).

Mancur Olson (1965) defined such type of outcome as ***individual rationality leading to group irrationality***. In this case, cooperation is unsustainable. **The villagers are both faced with an actual concern that if he joins in and his opponent withdraws, he would be forced to accept zero compensation(case of prisonner's delimma).**They choose the flaw (D, D) to be safe because they both feel threatened by it. Thus, the unique pure strategy (D, D) with payoff (3,3) is the result. ***This is not socially or Pareto optimal, but it is the mutually best response strategy, or Nash equilibrium.***

Therefore, a lack of institutional supervision could encourage people to overuse the earth's resources. Strong authority (i.e., the top-down method of "governing the commons") combined with long-term resource management objectives, i.e., the state penalizing private parties for not protecting CPRs, may prevent such over-exploitation.

SECTION-(IV)

ENVIRONMENTAL IMPACT OF COMMON PROPERTY RESOURCES:

- **Depletion of natural resources:** Unsustainable production and consumption techniques substantially decrease the amount of natural resources available.
- **Limited efficacy of adaptation**: Farmers in arid areas might find it more challenging to adjust to environmental disturbances if CPR disruptions occur.
- **Greater use of natural resources:** Rising population, advancements in technology, and other things might result in greater utilization of natural resources. This can involve excessive pumping of groundwater along with rapid forest destruction.

- **Decreased Ecosystem Services:** Clean water, flood control, and pollination are just a handful of the ecosystem services that are adversely affected by CPR degradation. These services are vital for both the environmental stability and human well-being.
- **Deforestation and climate change:** Uncontrolled logging and communal forest land conversion are key factors responsible for deforestation, resulting in climate change by releasing stored carbon into the atmosphere.
- **Loss of biodiversity**: Since species can not recover from excessive exploitation, overharvesting of CPR frequently results in destruction of habitat and a loss of biodiversity.
- **Land Degradation and Soil Erosion**: Unsustainable land-management practices, that include overgrazing, deforestation, and inefficient land management, erode the soil, which leads to desertification and fertility loss.

SECTION-(V)

CONCLUSION

In the face of high economic expansion and rising global population, efficient administration of resources is essential. This study examines at the idea of sustainable resource management along with methods to make sure resources will serve future generations as well as present ones. Beyond adhering to the regulations of the organization, people can also contribute to resource conservation through their own initiatives. Several individuals believe that natural resources are necessary for expansion of the economy. Sustainable resource management fosters economic growth by assuring a steady flow of resources for economic activities. It promotes environmental protection by reducing waste and pollution. The rural economy mostly depends upon Common Property Resources (CPRs), which have substantially strengthened the village economies and local communities in general. Excessive utilization and degradation of these natural resources ultimately leads to the increased pressure on these resources. The decline in the number of goods implies an overall decrease in biodiversity in common property resources. But as industrialization has progressed, utilization of resources has grown considerably. However, there were times when the exploitation of resources has surpassed the rates at which they naturally regrow. Since 1970, the total amount of natural resources exploited has exceeded threefold, threatening the livelihoods of those who depend on them and deteriorating the ecosystem's health

More precisely stated, the efficient and sustainable use of natural resources aims to mitigate the absolute poverty of the world's poor by offering robust, long-lasting livelihoods that reduce environmental degradation, resource depletion, and various other issues. Many environmental activists has pointed out that we have a moral obligation to keep our planet in good order for future generations. In other words, we must preserve a better environment for future generations by safeguarding natural resources and preserving the ability of the entire ecosystem to replenish themselves. By embracing sustainability, recognizing its importance, and overcoming its difficulties, we open up prospects for a better world.

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Climatic Changes and their Effects on Agricultural Economics

Rajesh Kumar Chaurasiya[1] & Pradeep Kumar[2]

ABSTRACT

The climate change effect through global warming increases the average atmospheric temperature and it has become a mega trend changing the global future significantly. Therefore, climatic change is a worldwide status because various factors of the natural and manmade resources symbolize the climatic conditions. It has a lot of significant a long-term change happening in global climatic systems which are visible all over the world. Direct solar radiations like heat energy are striking the earth's surface is being trapped by Green House Gases. The agricultural sector is associated with climatic conditions. The economic losses from natural disasters are rising globally, and the agriculture sector is highly vulnerable to these disasters. Most parts of South Asia are surrounded by agricultural fields that have a capacity for the production of foods and the basic needs of human societies. These parts are also affected by the climatic conditions and its cause impact on agricultural fields. Increasing global temperature due to the emission of enormous amounts of greenhouse gases from various sources is the cause of climate change and impacts. All these factors are directly or indirectly associated with the community's economy. Therefore, the economy can be balanced with balancing climatic changes.

Key words: *Climate change; Global warming; Agricultural fields; Economy*

Introduction

Climatic changes, agriculture, and economics are intensely interconnected with global processes. Therefore, a small change in climate affects agriculture adversely decreasing the production rate which is directly or indirectly related to the economics. Climate change effect through the global warming phenomenon increases the average atmospheric temperature, which has become a mega trend changing the global future significantly. Some national and international agencies have been confirmed that global warming is an international issue; and the United Nations Environment Programme (UNEP) and World Meteorological Organization (WMO) also declared that Carbon dioxide (CO) is the principal cause of climate change because of its highest contribution in global warming. Its cause affects the climatic changes that are associated with the production of crops.

[1] Department of Economics

[2] Department of Zoology, Government Degree College, Sukrauli, Kushinagar, 274207, (U.P.) India.
Email: pkumar_gpu@yahoo.co.in

Maximum parts of the Indian economy are based on the productivity of the crops. However, a global climatic variation in agriculture is imperative to adapt (Fraser et al., 2008) farming and to enhance agricultural production.

Climatic Change and Global Status

The climatic change has been global status because various factors of the natural and manmade resources have a symbol for the climate change. Therefore, a lot of significant long-term changes are happening in global climatic systems which are visible all over the world. The direct solar radiations like heat energy are striking on earth's surface is being trapped by Green house gases such as carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, etc., resulting in atmospheric temperature increase. Specifically, the CO levels are at peak and its concentration has reached up to 410 ppm at present, which is a principal cause of the warming effect. Global warming or climate change impacts include rising sea levels, more frequent extreme weather conditions, changes in precipitation, and expansion of deserts as well. However, geographical and phenological shifts occur due to the modification in ecological construction through global climate change (Van den Bossche and Coetzer, 2008; Slenning, 2010). The world has been facing various environmental problems for the last 15 years (Sathaye, 2007). Environmental problems are caused by climatic variations like cyclones, devastating floods, droughts, heat waves, storms, melting of glaciers, changes in pattern and rate of precipitation, diseases in agricultural productivity, shortage of fresh water, damage to the ecosystem and environment, etc., are indicators of climate change, and South Asian countries were adversely affected for the past few years. There is a necessity of take possible actions to overcome these negative changes. Islam and Nazrul, (2008) reported that in Bangladesh around 68,51,147 people were affected due to a tidal wave of heavy storm of about 150 km/hr with a 20-feet height. It also causes their impacts on Indian agriculture and production which is associated with the Indian economy.

Climate Change and Loss of Agriculture-related to the Economy

The economies of some countries are based on the production of agricultural products. Agricultural sector is associated with climatic conditions. The economic losses from natural disasters are rising globally, and the agriculture sector is highly vulnerable to these disasters. According to the United Nations Office for Disaster Risk Reduction (2018), disaster-hit countries experienced direct economic losses to the tune of about US$ 2908 billion during 1998–2017 that was total losses, about 77 percent were due to climate-related disasters. Several researchers have noted that climate change and its impacts have been more pronounced in the agriculture sector in recent past years. The government of India has been an economic survey (2018) and estimated that the annual loss of US$ 9-10 billion was due to the adverse effects of climate change.

Impacts of Climate Change in South Asia and India

Most parts of South Asia are surrounded by agricultural fields that have a capacity for the production of foods and the basic needs of human societies. These parts are also affected by the climatic conditions and its cause impact on agricultural fields. However, right from the Himalayas

to the coastal South Asian countries must always be prepared to combat the effects of global warming (Stern, 2006). As predicted, the South Asian zones may experience a warming effect of 2° to 6° C during the 21 century (Ravindranath, 2007). Some species of agricultural plants are very sensitive concerning temperature; their flowering and fruiting depend on the atmospheric temperatures. Specifically, the Indian sub-continent and other continents are highly vulnerable to all kinds of existing climate change issues. The amount of water, the flow of winds, heat waves, etc are major factors that affecting the production of agricultural products. Some factors are as follows-

(A). Droughts: It is a major factor for agriculture and social sectors. Therefore, part of South Asia, including Rajasthan in India and some regions of Pakistan, are dry regions that are facing severe drought. However, due to frequently occurring different kinds of droughts such as late-onset, middy season and terminal of India's agriculture areas are under rain-fed conditions. Western Rajasthan, parts of Haryana, Madhya Pradesh, Maharashtra, Uttar Pradesh, and Southern Bihar, Northern parts of Andhra Pradesh, Southern Gujarat, and Karnataka are regularly facing dryness, and these regions are highly vulnerable to drought (Bhadwal et al., 2007). The arid and semi-arid zones are vulnerable to the losses of economic activities and livelihoods due to the changes in the rate of precipitation. In some parts the production of agricultural products decreases at a very low level due to the droughts and communities facing big economic problems.

(B). Floods: It is the biggest and major problem of India due to the mismanagement of the river system. India has various climatic conditions and rain conditions that why some parts of India suffer from flood causing agricultural losses. It also has an impact on communities. About 20 million people faced a similar problem in Mumbai in 2005. In 2008, millions of people were forced to live in shelter-houses in Bihar due to floods. In Delhi and Haryana, millions worth of properties were destroyed when the Yamuna River was flooded above the danger level in 2008. Worst floods ever affected Kerala (a South Indian state) in 2018 due to unusually high rainfall. Millions of people were evacuated from their places. As predicted by Computer Science Engineering the western semi-arid zones of India will receive maximum rainfall than normal, while the central parts of India will experience rainfall reduction of 10 to 20 per cent during winter by 2050. A few years back, Chennai city experienced high levels of floods, and the same city in 2019 was the worst hit with a severe drinking water crisis leading to large-scale migrations. These entire phenomenons are responsible for the greater economic losses.

(C). Heat waves: It is very important factors which are related to vegetation and the position of the sun. Due to global warming, heat waves are day by day increasing and causing an impact on vegetation. The frequency and intensity of heat waves are rising in India adversely affecting all allied sectors of agriculture including dairy, poultry, fishery, etc. Low water availability coupled with heat waves has severe consequences on the food security of the country. However, a drinking water crisis for humans and livestock besides the drying of long-standing horticulture orchards was seen. India and its neighboring countries experienced a severe and longest heat wave from mid-May to mid-June. However, Chiru in Rajasthan state, India documented a record of high temperature up to 50.8° C (123.4° F), which is almost missed by a fraction of a degree i.e., 51.0° C (123.8° F) highest set in 2016. As of 12 June 2019, the second largest heat wave period (32 days) ever was documented.

Impacts of Climate Change on Agriculture Sectors

(A). Crops field: An average of 30 percent decrease in crop yields is expected by the mid-21 century in South Asian countries. North Indian states and Bangladesh are highly susceptible due to erratic changes in rainfall and temperature (World Bank, 2008). Climatic changes driven by increasing Green House Gases possibly affect the yield and productivity of crops from region to region. According to the Met Office (United Kingdom's National Weather Service), the normal crop yield is anticipated to decrease by 50 percent in Pakistan. For example, in India, an increase in temperature by 1.5° C and a decrease in the precipitation of 2 mm reduce the rice yield by 3 to 15 percent (Ahluwalia and Malhotra, 2006). The production of maize in European countries is expected to increase by 25 percent in ideal hydrologic conditions. The drastic climatic change alter the progressive stages of pathogens that eventually affect the growth and yields of crops severely, and also could lead to an increase in pest and insect population, ultimately devastating the overall productivity.

(B). Horticulture: High temperature induces moisture stress conditions leading to sunburn and cracking symptoms in fruit trees like apricots, cherries, and apples. The vegetable crops when exposed to extremely high temperatures are subject to very high transpiration losses, and it also limits fruit set in citrus fruits. High temperatures cause burning or scorching effect of blossoms, predominantly on young trees. The fruit setting stage of navel oranges is recorded to be severely affected by high temperatures during flowering (Davies, 1986). The temperature enhancement at the ripening stage causes fruit burning and cracking in litchi plantations (Kumar and Kumar, 2007). Most of the vegetable crops are severely affected by flooding, particularly tomatoes.

(C). Fishery: Temperature plays a very important role in the fishery sector which is required for the breeding and development of the fish. Therefore rising environmental temperature may cause seasonal improvement in the growth and development of fish, but increases the risks to the populations living beyond the thermal tolerance zone (Morgan et al., 2001). The rise in temperature of 1° C will affect the mortality of fish and its geographical distribution (Vivekanandan et al., 2009). The temperature rises of 0.37° C to 0.67° C alter the pattern of monsoon seasonal variations, eventually shifting the breeding period of Indian main carp from June to March in West Bengal and Orissa's fish hatcheries.

Conclusions

Global climate change, its causes, and its impacts are one of the most emerging issues in the science and technology domain. In India, about 70 percent of the population is directly or indirectly associated with agriculture and sub-sectors, which are expected to be met from this sector. However, India is a tropical country and it's facing various natural disasters like droughts, floods, cyclones, and heat waves, etc, which have become threats to sustainable development. Increasing global temperature due to the emission of enormous amounts of greenhouse gases from various sources is the cause of climate change and impacts. All these factors are directly or indirectly associated with the community's economy. Therefore, the economy can be balanced with balancing climatic changes.

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Environmental Constraints for the Terracotta Artisans of Gorakhpur: A Case Study of Aurangabad Village

Rashmee Rai[1] & Dr. Surendra Kumar Gupta[2]

ABSTRACT

Gorakhpur is situated in the eastern part of Uttar Pradesh in India near Nepal border. Recently, Gorakhpur Terracotta was given the G.I. Tag. It indicates that Gorakhpur region of U.P. will be recognized as the origin place of its unique Terracotta art. The word Terracotta come from Italian dictionary meaning "Baked – earth".Terracotta itself is an ancient art practiced since the dawn of civilization in India. It is the art of making tradition sculptures like idols of gods and goddesses, intricately carved diyas, pots etc. Terracotta product of Gorakhpur is famous all over the country because no chemical is used in the soil and the colour & everything is completely hand –made as well as more than 1000 varieties of terracotta product designed by local artisans. Moreover, it considerably supports rural economy and sustains the poor. In Gorakhpur, this art has been practiced from hundreds of years and so many families in villages like Aurangabad, Gularia are engaged in this art and the soil used for terracotta product is "Kabis" a special type of soil found in the pound of Aurangabad, area of Gorakhpur. Also Kabis soil found only in month of May & June because rest of the months the ponds are filled with water. The process of making terracotta product is first shaped, after that fired it until it become hard. The raw material used for this craft is a type of soil available locally and it give natural colour to terracotta products & the colour of terracotta does not fade for years. The purpose of the study is to analyse that what are the environmentalconstraints beforethe terracotta artisans in making of terracotta product from the availability of raw material to the delivery of product. The study is experimental in nature and based on primary data.Data collected from field survey of Aurangabad village of Gorakhpur district.

Keywords: *Gorakhpur, Terracotta, Environmental Constraint, Artisans.*

Introduction

Gorakhpur is located in eastern part of Uttar Pradesh, close to Nepal border. It is one of the largest district of Uttar Pradesh that come under Gorakhpur division. Gorakhpur Terracotta was

[1] Research Scholar, Department of Economics, DDU Gorakhpur University, Gorakhpur. (U.P.)
Email: rashmirai613@ gmail.com

[2] Assistant Professor, Department of Economics, DDU Gorakhpur University, Gorakhpur. (U.P.)

given the G.I. (Geographical Indication) in 2020 by the Geographical Indication registry under the department for promotion of the industry and internal trade (DPIIT). Now Gorakhpur is recognized as the place of origin on its unique terracotta art. The terracotta art of Gorakhpur is old traditional art form, where the terracotta artisans make different type of animal figure like goat, ox, elephant, etc. Majorly Hauda elephant, five face Ganesha, Single face Ganesha, Elephant table is famous. Kabis clay is used for terracotta product which found in pound of Aurangabad (a small village is at distance 19 km from Gorakhpur & special in production of terracotta toys). Aurangabad is a village in Gorakhpur district of Uttar Pradesh and well known for its terracotta products. There are many terracotta artisans in the village who created terracotta products. Terracotta work is traditionally done by Prajapati caste in Aurangabad and artisans use special type of clay and design to match their skills. Terracotta artisans of Aurangabad are not aware about modern tools &techniques, they still practicing the traditional method of craft but the Government is trying to improve the situation of artisans and also provide free stalls at exhibition, provide loan, financial assistance and reimburse travel expenses.

Literature Reviews

Dr. Farozan and Deepika Kumari (2024), analyse the issues and challenges of terracotta artisans of Aurangabad village of Gorakhpur Districts and give recommendation for the problems and give some suggestion for the development of terracotta industry in Aurangabad village of Gorakhpur.

Pritam Bhattacharjee (2021), examine the socio economic, demographic, and cultural profile of artisan's community in Panchmura village located in Bankura district of West Bengal. This research also emphasis on major challenges and difficulties of this Terracotta industry and their possible recommendation.

Sana (2018), briefly explained the process of pottery making in Aurangabad village of Gorakhpur of district and paper concludes the main issues and challenges of craftsmen and discussed the conversation with terracotta workers. The study is mainly focused on various tools, skill, knowledge of materials, work style of artisans.

Shashi Prakash Mishra and Dr. Abdul Jilani Mansuri (2016),examines the characteristic features of Indian red clay pottery industry and study the present situation of Indian red clay pottery industry related to availability of raw materials, production system, product diversification, marketing strategy and also recommend proper suggestion for the development of Indian red clay potter industry.

Objectives:

1. To analyse the Environmental Constraints faced by Terracotta artisans of Aurangabad village of Gorakhpur District
2. To identify the other problems faced by terracotta artisans of Aurangabad village of Gorakhpur district.

Methodology:

The study is experimental in nature& mainly based on primary data. Primary data has been collected from Aurangabad village of Gorakhpur district which is famous for special Kabis clay. The logic behind selection of Aurangabad village out of 5 village of Gorakhpur district is that, this area has rich in a type of clay known as "Kabis Clay" that is very use full in making terracotta products & it provide natural colour to terracotta products. Aurangabad village of Gorakhpur district is also very famous around the world for its terracotta products. Total number of household (26) of terracotta artisans have been selected for the interview to analyse Environmental Constraints faced by them in making terracotta products. Total 51 respondents has been taken for interview. In this study both male and female are taken as respondent to know Environmental Constraints in making terracotta products. The information regarding Environmental Constraints has been collected by the structured Interview Schedules which have 9 question mainly related to Environmental Constraints.

Analysis & Discussion

For the analysis of environmental constraints,nine questions have been asked through interview schedule to terracotta artisans of Aurangabad Village of GorakhpurDistrict. The following tables aretrying toanalyse that how environmental constraints effect the terracotta artisans in making of terracotta product in context of availability of raw material as well as to the delivery of product.

Table 1: Effect of Change in Weather on making process of Terracotta

Response of Artisans	Frequency	Percent
Yes	41	80.4
No	10	19.6
Total	51	100.0

Source: Field Survey

Table 1 representsthe Effect of Change in Weather on making process of Terracotta. As per the response given by the artisans, 80 % artisans face the problem due to change in weather condition, and it effects the production process of terracotta. According to them they face lot of problem in winter season. In winter, both hands and clay are very cold, which makes it very difficult for artisans to shape the clay as well drying the product is also a problem in front of artisans. Some artisans said that they face some problems in summers toobecause due to excessive sunlight, the clay items get cracked when they dry them in the sun. Whereas 19 % respondent said that weather change does not have any significant impact on making process of terracotta because they have proper shelter inside which they can continue their work in both summer & winter season.

Table 2: Effect of Change in rain pattern on availability of raw material of Terracotta

Response of Artisans	Frequency	Percent
Yes	31	60.8
No	20	39.2
Total	51	100.0

Source: Field Survey

Table 2 representsthe problem in getting the raw material for making terracotta due to change in rainfall pattern. As per the responses of the artisans, 60 % artisans faces the challenge in getting the soil during rainy season because during this season ponds and pitts which has the Kabis soil are overflowed with water. Due to which they have to arrange the soil at higher cost from someone who already stored the soil in pre monsoon season which increase the cost of production and makes the terracotta products more expensive. Whereas 20% artisans said that they do not face any problem as they collect and store soil for the entire year.

Table 3: Effect of change in temperature on making process of Terracotta

Response of Artisans	Frequency	Percent
Yes	42	82.4
No	9	17.6
Total	51	100.0

Source: Field Survey

Table 3 represents that does changing temperature causes any problems in the terracotta making process. The responseshow that 82% artisans face the problem in making process and most problems are during summers because they don't have proper shelter, so they have to make their things in open &due to excessive heat, clay item cracked when they dried in the sun, there is problem lighting the furnace. Working in extreme sunlight has a very bad effect on their health and they have to face many kinds of diseases which effect the productivity of terracotta product. Whereas 17 % artisans said they don't face any problem due to change in temperature because they have shelter and they dry their product under the shelter.

Table 4: Effect of change in weather on quality of raw material of Terracotta

Response of Artisans	Frequency	Percent
Yes	12	23.5
No	39	76.5
Total	51	100.0

Source: Field Survey

Table 4represents effect of change in weather on quality of raw material of terracotta. The response show that, 76 % artisans don't face any type of problem in quality of raw material due to change in weather because they store raw material inside and the quality does not deteriorate.But 24 % artisans said they face few problems due to change in weather because they don't have proper place to keep the raw material.

Table 5: Effect of delay or lack of rain on availability of Kabis Clay

Response of Artisans	Frequency	Percent
Yes	31	59.8
No	20	38.2
Total	51	100.0

Source: Field Survey

Table 5 represents theeffect of changing pattern of rainy season on availability of Kabis clay. The response show that 58 % artisans are effected & facing problem in getting the Kabis clay. During rainy season the ponds get filled with water which makes difficult to get the Kabis soil from the pond whereas 39 % artisans said that they do not face any problem because they already store the kabis clay for the entire year.

Table 6: Fuel used for making terracotta products

Response of Artisans	Frequency	Percent
Dry Dung	51	100.0

Source: Field Survey

Table 6 represents the fuels used by terracotta artisans to bake terracotta products. The response show that all the artisans used dry dung to bake the terracotta products. All the terracotta artisans of Aurangabad use dry dung for baking terracotta products which is not good for the environment as it produces lot of smoke as well as this is also not good for the health of the artisans.

Table 7 : Effect of change in weather on availability of fuel

Response of Artisans	Frequency	Percent
Yes	34	66.7
No	17	33.3
Total	51	100.0

Source: Field Survey

Table 7 represents the effect of change in weather on availability of fuel. The response show that 67% artisans face problems due to change in weather. According to response of artisans,they face mostly problems in rainy and winter seasons. In rainy season, prices of dry drunk increased due to increase in demand and reduced supply the same problem face in winter season because of the lack of sunshine, the dry dunk do dry up and the supply reduces by this cost of production increases. Whereas 33% artisans said change in weather has not majorly effect on availability of fuel because they store fuel for the whole year in some safe place.

Table 8: Effect of change in weather on making and transporting of terracotta

Response of Artisans	Frequency	Percent
Yes	41	80
No	10	20
Total	51	100.0

Source: Field Survey

Table 8 represents theeffect of change in weather on making and transportation of terracotta product. The response show that 80 % artisans face the problems due to change in weather in making process and transportation of terracotta products. Terracotta artisans face most problem during rainy and winter seasons. During rainy season, they face difficulty in making terracotta

items from clay because they don't have proper place & shelter. There is problem in drying the prepared items and also a lot of problem in storing the already prepared itemsduring rainy season as well as it is very difficult to take the prepare terracotta items to market during rainy season. Whereas 20 % of the artisans said change in weather do not effect the making and transportation of terracotta products because they have proper place & shelter in which they keep their products. They have proper transportation means through which they can carry their goods safely to the market.

Table 9 : Effect of G.I tag on Demand of the Terracotta Products

Response of Artisans	Frequency	Percent
Yes	37	72.5
No	14	27.5
Total	51	100.0

Source: Field Survey

Table 9 represents theeffect of G.I. tag on Demand of the Terracotta products. The response shows that 72 % of artisans feel that after getting the G.I tag, the demand for terracotta products has increased more than before as well as after getting the G.I tag the terracotta products got distinct identity and the terracotta product marketed globally. Whereas 27 % artisans said that there has been no significant change in their demand after getting G.I Tag.

II.Other Problems faced by terracotta artisans of Aurangabad village of Gorakhpur District.

To identify the problems faced by terracotta artisans of Aurangabad village of Gorakhpur district, few questions were places in front of them.

1. What are the main challenges they are facing in making terracotta product.
2. Do they get any support from government and other non-government organization.

On the bases of their response the main problems they are facing now a days are –

The financial condition of terracotta artisans of Aurangabad Village are not very satisfactory and they are fully depend on old technologies for making the product. And young generation are also not interested to carry forward their family business because of low income. The young migrate to urban areas for the other alternate job options. Lack of market strategy is main problem of artisans because they compel to sold their product to middlemen and brokers at very low rate. Now days online market are very popular platform to sold their product but they don't have much idea of online marketing and depend on local market.

Many of the artisans of Aurangabad said that after terracotta got the GI tag, they get proper financial assistance & loan from the government.

Conclusion

The survey of Aurangabad village of Gorakhpur district show that environmental constraints effect the artisans in making of terracotta product from the availability of raw material to the delivery of product. After analysis it conclude that arrange adequate space for preservation is very large problem in front of terracotta artisans and most of the artisans have lack of suitable space to keep their terracotta product safe. It is really very difficult task for terracotta artisans to maintain and preserve the terracotta products in a proper safe place from weather. The government of Uttar Pradesh has taken a proper step to helped terracotta artisans in several ways like providing financial assistance to terracotta artisans under Mati Kalaa Scheme and The Punjab & Sind Bank provide loans to terracotta artisans under the One District One Product Scheme of Uttar Pradesh initiative. The One District One Product initiative encourage the production of indigenous products in the state including terracotta.

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Problems of Climate Finance: An Indian Perspective

Sandeep Kumar[1] & Nikhil Kumar Gautam[2]

Introduction

Catastrophic outcomes of climate change are intensifying across the globe rapidly. Most of the climate change impacts are unprecedented, however, some impacts like sea level rise and loss of cryosphere, may even be irreversible over the next hundred to thousand years as per **Intergovernmental Panel on Climate Change (IPCC)** reported in 2021. In its latest report, IPCC has laid out a clear roadmap that is, if we can halve emissions by 2030, we stand a 50% chance of achieving the 1.5! goal of the **Paris Agreement**.

As countries prepare to undertake climate actions that they had committed in Paris, it is becoming clear that significant investments would be required to meet these ambitious goals. Andpolicies would need to be backed by financial commitments if countries are to "reduce their emissions, decarbonize their economies, and adapt to the impacts of climate change." Climate Finance is an essential element of action against climate change, which includes climate related financial flow both within and between countries dedicated to climate mitigation and adaptation.

In the way to combat climate change, India has envisioned an expensive path ofmonumental energy shift. It wouldinvolve the scaling up renewable energy installations, modernizing infrastructure, and improving energy efficiency across sectors. To meet its renewable energy targets, India requires formidable capital investment in solar, wind, hydro, and other clean energy supporting technologies. India is differently positioned in the discourse for climate finance as a developing country; it has been an active advocate for climate finance at international forums and yet, as a growing economy, it must also meet the challenges of financing through internal flow between the sectors. The **Economic Survey of India** (2015) has argued that at least US $ 2.5 trillion would be require for meeting India's climate change targets between now and2030 and international climate is necessary to meet the difference over what can be made available from domestic sources.

This paper describes the *status quo* of climate finance in India, and examines its necessity, scope, and challenges for its access. Paper also explains the limitation of international climate finance mechanisms and country's effort on the national front to counter the problems by mobilizing domestic financing structure.Paper concludeswith the suggestions and way forward tolubricateclimate financefrom domestic and international front.

[1] Professor & Head, Department of Economics, DDU Gorakhpur University, Gorakhpur (U.P.)

[2] Asst. Professor,Department of Economics, Sant Vinoba P.G. College, Deoria (U.P.)

The Concept of Climate Finance

In general, Climate Finance includes climate related financial flow both within and between countries dedicated to climate ambition, more specifically to the actions of climate mitigation and adaptation.Although there is no single definition of climate finance, the **United Nations Framework Convention on Climate Change (UNFCCC)** Standing Committee on Finance provides the closest one, *"Climate Finance aims at reducing emissions and enhancing sinks of greenhouse gases and aims at reducing vulnerability of, and maintaining and increasing the resilience of, human and ecological systems to negative climate change impacts."*

This definition of climate finance represents the flow of funds to all activities, programmes or projects intended to address climate change by both mitigation and adaptation, in all economic sector, anywhere across the world. Concept of climate finance is embedded in the principle of **Common but Differential Responsibilities (CBDR)** in international climate change policy. Through the years, the CBDR principle has taken on different meanings, but at its very core, it establishes that although all countries have a shared responsibility towards climate change. Yet these responsibilities differ due to the nature and magnitude of the farm caused by industrialized countries in their development process over the year. To formalize the adoption of the principle, it has been enshrined in the legal framework of the UNFCCC and recognized in international agreements such as the **Kyoto Protocol** and the Paris Agreement.

The term of climate finance is also frequently associated with international diplomacy on climate change. In this context, climate finance implies *"new and additional financial resources"* provided by developed countries to developing country so that they can meet the full and incremental costs of climate change and decarbonized. Copenhagen commitment of US$ 100 billion by developed countries has been enshrined under "new and additional financial resources" and considered under Article 9 of the Paris Agreement.

Historical Background and Current Trends of Climate Financing

After the recognition of anthropogenic Climate Change impacts globally and sought the collectively way to tackle it, countries and agencies has recognized the necessity of establishing dedicated financial mechanism to stream line financial support for developing countries under the UNFCCC. It was proposed that exiting international entities such as the **GlobalEnvironmental facility (GEF)**, established in 1991, should be entrusted withoperating these mechanisms. Consequently, in 1994, the GEF was designated as an operational entities of the UNFCCC financial mechanism, providing critical financial assistance to developing countries to address environmental challenges.

At COP16 in 2010, the **Green Climate Fund (GCF)**was established as the financing vehicle for developing countries within the global climate architecture.In 2011, it was further designated as another operating entity of the mechanism along with the GEF. The Standing Committee on Finance was established in the same year to assist the COP in exercising its functions regarding the mechanism, enhancing coordination in the delivery of climate finance, and **Measurement, Reporting, and Verification (MRV)** of support provided to developing countries.

In the realm of climate finance commitments, in 2009, developed countries committed to mobilizing US$ 100 billion annually by 2020 to address the needs of developing countries. In 2015, it was decided that developed countries would continue their existing collective mobilization goal through 2025, and before 2025, a new collective quantified goal will be set from a flow of US$ 100 billion per year.

Since 2015, the **Organization for Economic Cooperation and Development (OECD)** has been tracking the climate finance flows from developed to developing countries. The OECD data serves as the primary mode of tracking progress on the achievement of the US $100 billion climate finance goal. In 2021, OECD put forth a forward-looking analysis that stated that the US $100 billion goal 'could be met' in 2023. As of November 2023, OECD put out a statement stating that the goal had already been met in 2022, however, there is no verified or conclusive publicly available data to match this claim.

On 16th November 2023, OECD released its latest analysis presenting the aggregate trends in annual climate finance that has been provided and mobilized by developed countries for developing countries between 2013 and 2021. This report highlighted these points regarding flow of climate finance:

- The total climate finance provided and mobilized by developed countries for developing countries in 2021 was US $89.6 billion, marking a 7.6% increaseover 2020. Yet, this remains US $10.4 billion short of the annual goal of US $100 billion.
- A large part of the US $89.6 billion comprised public climate finance (which consisted bilateral and multilateral sources). Between 2013 and 2021 it almost doubled from US $38 billion to US $73.1 billion.
- Adaptation finance decreased by 14% in 2021 to US $4 billion. However, cross-cutting finance (that which supports adaptation and mitigation efforts) increased from US $6 billion in 2020 to US $11.2 billion in 2021.
- The mobilized private climate finance amounted to US $14.4 billion in 2021, 16% of the total (comparable data are only available from 2016).
- Finance for mitigation continued to represent 60% of the total climate finance provided and mobilized in 2021, while adaptation comprised 27% and cross-cutting 13%.
- Between 2016 and 2021, energy, transport and storage, agriculture, forestry and fishing, and water supply and sanitation were the leading sector that saw climate finance investments.
- Climate finance from developed countries (bilateral and multilateral channels) between 2016 and 2021 reached US $73.1 billion. However, the trend of loans dominating this component continued. Loan represented comprised over two-thirds of the total, amounting to US $49.6 billion, while grants were under 30% at US $20.1 billion, and equity investments remained marginal. The dominance of loans rather than more affordable, inexpensive sources of finance from developed countries has remained a contentious issue.

However, the real support of climate finance by developed countries is far low than they reported. A report presented by OXFAM named as ***"Climate Finance Shadow Report 2023"***shows that the

finance provided by developed countries are majorly in the form of loansand very less as grants. Loans become burden at developing countries in the inflationary economic scenario. Report also claimed that most of the finance is provided for mitigation and very little finance is available for adaptation purposes.

In the case of India, available resources to the government are, however, limited, and inadequate to address both sets of challenges. India, therefore needs to mobilize large amounts of funds both domestically and internationally. The Government of India is already spending close to 2.6 % of its GDP on adaptation but is still left with a funding gap of 38 billion US dollars for effective climate action. India has been able to articulate a clear case for international aid for undertaking low carbon development, adaptation to climate impacts and building climate resilience of local communities through the **Intended Nationally Determined Contributions (INDCs)**. At present, however, the most important source of climate finance in India is the funds raised domestically by the government and routed through the national and subnational budgets.

Policy Response and Dedicated Institutions for Climate Finance in India

In India, the first institutional response to the climate change came early as 2008 when the then Prime Minister Dr. Manmohan Singh appointed PM's Council on Climate Change to coordinated and oversee India's climate response. Prime Minister's Council on Climate Change had 26 members with representatives from **Ministry of Environment, Forests and Climate Change (MoEFCC)**, **Ministry of Finance (MoF)**, **Ministry of External Affairs (MoEA)**, **Ministry of Agriculture (MoA)**, **Ministry of Water Resources (MoWR)**, **Department of Science & Technology (DST)**, and **Ministry of New and Renewable Energy (MoNRE)**. Each of these ministries and departments play an important role in determining and executing India's Climate interventions.

The next important institutional response came in the form of **Climate Change Finance Unit (CCFU)**, which was established in 2011in the **Department of Economic Affairs (DoEA)** in the MoF. CCFU is the nodal agency for all matters pertaining to climate finance in the MoF. It is the nodal agency that represents MoF in all climate finance platforms – national and international, guides **MoEFCC** on climate finance issues in the international negotiations, and analyzes the commitments of various **UNFCCC** signatory countries and their relevance for India. While it was expected that **CCFU** would play main climate finance coordinating role in the country, this is, however, far from truth. There are several channels of climate finance in the country, funding different policies and interventions and many of them are independent of any control by the government, driven largely by the priorities of the donor.

India's climate policy is located within the framework provided by the **National Environment Policy, 2006**, which promotes sustainable development within the constraint imposed by ecology and imperative of social justice, On 30th June 2008, the PM came out with **National Action Plan on Climate Change (NAPCC)** from India. The NAPCC brought a sharper focus on climate change interventions, articulating India's road map to achieve sustainable development in the context of climate change. The NAPCC comprises of eight national Missions. These are: 1) **National Solar Mission**, 2) **National Mission for Enhanced Energy Efficiency**, 3) **National Mission on Sustainable Habitat**, 4) **National Water Mission**, 5)**National Mission for Sustaining the**

Himalayan Eco-system, 6) **National Mission for a Green India**, 7) **National Mission for Sustainable Agriculture** and 8) **National Mission on Strategic Knowledge for Climate Change**. Each national mission works under the purview of a nodal ministry. The MoEFCC is the nodal agency, which coordinates and supervises the overall climate policy formulation in India. It helps various ministries and agencies to mainstream climate concern in their work. It is supported in its role by the MoEA, which plays an important role in climate negotiations, and MoF and CCFU within it.

In 2009, the state governments were asked by the MoEFCC to formulate**State Action Plan on Climate Change(SAPCC)** in line with the priorities of NAPCC since the plans and priorities outlined in NAPCC need to have resonance at the state level be effective. Currently all the States have their own SAPCC, which are approved and operational.

Climate Finance in India

India is uniquely positioned in the discourse of climate finance as a developing country. It has been an active advocate for climate finance at international forums and yet, as a growing economy, it must also meet the challenges of financing through internal flow between the sectors. As a voice of action for the global south at international forums, the country has advocated for the need for just transitions as well as pointed out the developed countries' additional responsibility in providing support to the developing **at Least Developed Countries (LDCs)**. At COP26 to the UNFCCC held in Glasgow, United Kingdom (UK), the country representative highlighted that the transfer of climate finance and low cost climate technology have become more important for the implementation of climate actions by developing countries amidst the net-zero promises made by several countries

India's original NDC estimated that the country's climate action would require US $2.5 trillion for 2015-2030, US $170 billion per year. India will need cumulative investment of US $ 10.1 trillion to significantly scale up its climate transition and achieve net zero emission by 2070. This prompts the need for innovation financial solutions. India's sector specific financial institutions will be pivotal in facilitating the necessary flows of green finance to enable low-carbon transition.

In recent time, climate action finance in India is gaining momentum, but of course the available funds remain inadequate for a smooth low-carbon transition. Broad trends of climate finance flows show that government budgets, domestic banks, and financial institutions fund most of the climate action in the country. Tomeet climate goals, it is critical to mobilize large-scale private sector investments that also have synergies with development action.

National Banks and **Development Finance Institutions (DFIs)** have played important roles in increasing climate finance in power and urban infrastructure sector since 2010. They have facilitated financial structuring of markets, co-invested with private actors, and partnered with national and international policymakers to promote favorablepolicies. Private finance has been invested in equity and debt with attractive risk-adjusted returns emerging, particularly in the energy sector.

In recent years, there has also been a growing interest in sustainable finance, which has helped raise funding for green projects. An estimated US $43 billion has been raised in labelled and unlabeled green bonds in India between 2014 and 2023, with domestic power producers accounting for 80%

of these bonds. Aware of this growing interest in sustainable finance, the Indian government in 2023 issued the first two tranches of **sovereign green bonds** worth INR 80 billion each (approximately US $2 billion), joining 43 other governments that have raised such debt (Hussain and Dill, 2023). Climate finance literature classifies funding sources into private and public, and domestic and international.

Domestic public finance is the most prominent source of climate finance in India. The government finances climate action through direct budgetary allocations, taxes, subsidies, market mechanisms to leverage private finance, and by facilitating and supplementing climate funds. Climate funds are usually associated with national climate missions and receive finances from cess collections besides direct budgetary allocations. In 2017-18, 85% of total green finance in India came from domestic sources, with budgetary outlays forming 18% and Public Sector Undertaking (PSUs) funding accounting for 12% of the total tracked green finance (Sinha et al. 2020). In 2019 and 2020, green finance tracked across three sectors – clean energy, energy efficiency, and clean transport – was US $44 billion per annum (CPI, 2022). Around 87% and 83% of this finance was raised domestically in 2019 and 2020, respectively. Of this 60% came from private finance and 40% from public finance through budgetary allocations and PSUs.

Trends in government climate finance flows from 2014 onwards show a steady focus on climate mitigation through renewable energy and rural electrification (Singh, 2017). Climate adaptation has been supported through interventions in agriculture and water sectors, through increased allocation to the MoEFCC.

Apart from direct budgetary allocations, the government also finances climate action through market-based mechanisms, which have facilitated large-scale renewable energy deployment. Regulatory schemes like the **Perform Achieve and Trade (PAT)**, **Renewable Energy Certificates (RECs)**, **Renewable Purchase Obligations (RPOs)** and **Feed-in-Tariff (FIT)**have improved energy efficiency and supported investments in low-carbon generation. Despite some drawbacks, the PAT mechanism has helped to reduce energy intensity in energy-intensive industries like cement and fertilizers. In India, FITs are set by the **State Electricity Regulatory Commissions (SERCs)** and use long-term agreements and guaranteed pricing tied to costs of production, to protect producers from risks and sustain their interest in the renewable energy market. Other financial instruments include the tax-free infrastructure bonds of US $ 794 million, introduce in 2015 to support renewable energy projects. Such market-based policies have reduced tariffs of solar and wind energy and improved the competitiveness of renewable energy.

Challenges of Climate Finance in India

In India, Climate finance still needs to be fully mainstreamed into the investment processes due to gaps in technology and capacity. And it must also be tracked more effectively to highlight opportunities to mobilize finance and fulfil investment potential. Given the sheer size of the investment requirement, both public and private investment flows must be mobilized. Major challenges that India has faces in climate financing can be summarize in following points:

- Inadequate Private Sector Engagement:

- Funding Gap
- Funding Biases
- Missed Target.
- Disproportionate Funding Allocation
- Global North and South Disparities
- Dependence on Coal
- Implementation Frameworks

Addressing these challenges require a concerted effort from both domestic and international stakeholders to ensure that India can meet its climate goals while counting its economic development.

Conclusion and Way Forward

India has been taking the lead in raising the issue of climate finance at the UNFCCC and in other multilateral forums, and always maintained that climate finance should be new and additional. India is already implementing its climate action policy as NAPCC and state wise SAPCCs, which requires financing continuously. India's original NDC estimated that the country's climate action would require US $2.5 trillion for 2015-2030, US $170 billion per year. India will need cumulative investment of US $ 10.1 trillion to significantly scale up its climate transition and achieve net zero emission by 2070. To meet its renewable energy targets, India requires formidable capital investments in solar, wind, hydro, and other clean energy supporting technologies. However, the available resources are limited and inadequate to address both climate actions – mitigation and adaptation.

For the NDC targets, there is need to expend the additional finance sources like funds from private sector involvements, funds from Multinational Development Banks, bilateral and multilateral transfers from developed countries(Technology and Finance).Commitment of yearly US$ 100 billion must be fulfil by developed countries in upcoming years and so called 'loss & damage' fund must be operationalized. So, then climate finance in India will be satisfactory further.

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Climate Change and India's Initiative

Ved Prakash Mishra[1] & Saurabh Mishra[2]

ABSTRACT

Humanity is now facing what may be the biggest challenge to its existence: irreversible climate change brought about by human activity. Our planet is in a state of emergency, and we only have a short window of time to enact meaningful change. Climate change is expected to bring about major change in freshwater availability, the productive capacity of soils, and in patterns of human settlement, we can say that there may be multifaceted impact of climate change in its totality. Further, different views, issues and mitigation measures are discussed particularly in Indian scenario. In this direction, the "National Action Plan on Climate Change" was set by Indian Prime Minister which encompasses a broad and extensive range of measures, and focuses on eight missions, which will be pursued as key components of the strategy for sustainable development. These include missions on solar energy, enhanced energy efficiency, sustainable habitat, conserving water, sustaining the Himalayan ecosystem, creating a "Green India," sustainable agriculture and, finally, establishing a strategic knowledge platform for climate change. Finally, different steps/approaches pertaining to green, eco-friendly and sustainable technology has been discussed in order to mitigate the impact of global environmental damage originating from increased industrialization and hence appropriately address this global disaster which is being the root cause of North-South debate and global environmental politics.

Keywords *climate change; green house gases; Kyoto Protocol; civil conflict; sustainable; green technology*

Introduction

Attention to climate change as a global challenge to sustainable development has reemerged in recent years. The debate has reached the highest political levels, as evidenced by the participation of 80 heads of State or government at the High-Level Event on Climate Change convened by the Secretary-General of the United Nations on 24 September 2007. According to the Intergovernmental Panel on Climate Change (ICCP), the warming of the global climate system is unequivocal, and human activities are contributing to it. Both mitigation and adaptation measures are needed to diminish the risks associated with climate change.

1. Assistant Professor, Iswarsaran P.G. College, University of Allahabd, (U.P.) Email-vedmishra0802@gmail.com
2. Research Scholar, Iswarsaran P.G. College, University of Allahabd, (U.P.) Email:saurabhmishraau123@gmail.com

It is also increasingly recognized that climate change is a sustainable development issue and not just an environmental problem. Climate change impacts pose threats to the economic, social and environmental dimensions of sustainable development in almost all countries, climate change mitigation and adaptation polices have an impact on other sustainable development goals, and progress towards achieving other sustainable development goals can contribute to both climate change mitigation and adaptation. Global climate change is of prime concern at global scale in present era of science of technology (Zhang and Liu, 2012). In the present era of Science and Technology, due to the rapid pace of industrialization and urbanization, quantity of natural resources as well as quality of global environment has been altered seriously (Rai, 2008a; Rai, 2008b; Rai and Tripathi, 2009). According to Environmental Protection Agency-USA, (USEPA), with increasing population, more and more countries are facing the problem of global environmental change originating from large expansion of industrial sector. Hand in hand, population growth will cause a rapid increase in number of industries preparing agro-chemical to sustain agriculture as well as will uplift the industrial demand for resources. Economic globalization constitutes integration of national economies into the international economy through trade, direct foreign investment (by corporations and multinationals), short-term capital flows, international flows of workers and humanity generally, and flows of technology: phenomena defined and treated more fully below. Economic globalization is the favoured target of many of the critics of globalization. It is distinct from other aspects of globalization, such as cultural globalization (which is affected by economic globalization) and communications (which is among the factors that cause the deepening of economic globalization). Aforesaid factors resulted in global environmental change. If the views of the Intergovernmental Panel on Climate Change (IPCC) are an accurate gauge of world scientific opinion, then the majority of scientists believe that anthropogenic global warming has either already begun or will become manifest in the very near future, with average global temperatures predicted to rise by 1.5-4.5°C by the middle of next century (IPCC, 1990). Despite an incomplete understanding of the processes at work, there is considerable agreement that this warming will be the result of increased releases and atmospheric accumulation, since the industrial revolution, of carbon dioxide (CO2), nitrous oxide (N20), methane (CH4) and chlorofluorocarbons (CFCs) the primary greenhouse gases (GHGs). Anticipation in some quarters of a host of negative consequences of such warming has led to ever louder calls to initiate strong policy actions to curtail GHG emissions (Wirth and Lashof, 1990).

Some economic strategies for addressing climate change and environmental issues include:

Market-based Approaches

These include tradable permits and emission taxes, which can incentivize polluters to reduce emissions.

Circular Economy

This strategy can help reduce the demand for virgin materials, which can slow down nature degradation. It can also help improve resilience to climate shocks by increasing reuse, repair, and refurbishment.

Watershed Management

This strategy focuses on preserving or restoring vegetated land cover and managing stormwater runoff.

Urban Development

Cities account for more than 70% of global greenhouse gas emissions, so global sustainability depends on urban policies.

Sustainable Development

The UNECE supports the implementation of the Sustainable Development Goals (SDGs) by developing frameworks for managing natural resources.

Low-carbon Energy Sources

Switching from fossil fuels to low-carbon energy sources can help sustain production levels while reducing emissions.

Government Action

The government can dictate specific measures to reduce environmental harm, such as prohibiting highly-polluting industries.

Some of the key initiatives taken by the Central Government are as follows:

International Solar Alliance (ISA)

It's not unusual for temperatures to hit 48 degrees celsius in India's hottest regions, such as Rajasthan. The place becomes nearly uninhabitable for humans. But the region is undoubtedly ideal for one of the biggest solar farms in India. Launched in 2015, the International Solar Alliance is a solar power development project in collaboration with France. ISA is an alliance of the "sunshine countries" to utilise solar energy efficiently. The alliance was formed with solar energy-rich countries to reduce the dependency on non-renewable sources of energy like fossil fuels.

One Sun, One World, One Grid Project

The idea of the One Sun, One World, One Grid (OSOWOG) project was first proposed by honourable Prime Minister Mr. Narendra Modi during the first assembly of the International Solar Alliance in 2018. Through OSOWOG, the programme aims to provide energy to about 140 countries by a common grid that transfers solar power. The project acts as one of the solutions to many of our global problems in the energy sector. The United Kingdom jointly launched the OSOWOG initiative in partnership with ISA and the World Bank Group.

India's climate Nationally Determined Contributions

In 2015, **India** released its Nationally Determined Contributions (NDCs). Back then, the key targets were mainly to increase the cumulative electric power installed capacity from non-fossil sources to 40 percent, and reduce the emissions intensity of GDP by 33 to 35 percent compared to 2005 levels, by 2030. These targets were well overachieved. For example, India's carbon emissions had already reduced by 24 percent by 2016 as compared to 2005 levels. Thus, India revised its NDC in 2022 with new targets in place.

The key highlights of India's updated NDCs include:

- Target to reduce the emissions intensity of India's GDP by 45 percent by 2030;
- Achieve about 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030; and
- Prime Minister Modi's global initiative to combat climate change—'Lifestyle for the Environment (LiFE) Movement'.

The targets are raised significantly higher than before and accommodate the "Panchamrit"—goals presented by PM Modi at COP26—which are to raise the non-fossil fuel-based energy capacity of the country to 500 GW by 2030; to reduce the total projected carbon emissions by one billion tonnes between now and the year 2030; and to achieve net zero emissions by the year 2070. This NDC serves as a first-of-its-kind step in the journey of realising the goal of net zero, and deeply focuses on improving the share of renewables in the energy sector. It is complemented by several government schemes at home such as PM-UJJWALA, PM-KUSUM, and PM-UJALA yojana, and internationally like the "One Sun, One World, One Grid initiative". Taking a step further, at COP27, India submitted its Long-Term Low Emission Development Strategy (LT LEDS) to UNFCCC, which included plans for rapid expansion of green hydrogen production, three-fold increase in nuclear capacity by 2032, 20 percent ethanol blending in petrol by 2025, and more. With this, India joins the select list of fewer than 60 parties that have submitted their LT LEDS and shows India's readiness to fulfil its climate pledges. While all these steps portray the bold climate leadership of India, but certain areas remai unaddressed.

Climate Investments

The 2022-23 Union Budget announced sovereign green bonds under the government's overall market borrowings in 2022-23, which will be used to raise funds for climate-friendly infrastructure. This is a great milestone accomplished to attract scalable capital for green projects in India. However, when compared with several developed and even developing countries, this move has come slightly late. It will be crucial to continue increasing the size of green bonds in the coming years to realise its true impact and further explore blue bonds to enhance climate action via investments in ocean ecosystems. Moreover, there is a significant need to mainstream climate change in India's budget across sectors.

Although India has only 2.4 percent of the world's land area and is using only 6.1 percent of the world's primary energy, it supports around 18 percent of the global human and the largest livestock

population in the world. The actions India is taking to support climate action while over 228.9 million Indians live in poverty are unparalleled. However, looking at the magnitude of the challenge staring at us, more needs to be done. To go the extra mile, international climate finance (grants and concessional loans) can play a very significant role. At COP27, India pushed for climate finance (including implementing the annual funding from the floor of US$100 billion), but the progress has been slow. India must take a leading role in helping operationalise the finance and stocktaking mechanisms of the UNFCCC and the historic loss and damage fund adopted at Sharm el-Sheikh. Ambition and prioritisation of climate action in national policies coupled with fuelling international cooperation can help India overcome the climate crisis and ambitiously lead global climate action to safeguard the future of our planet.

Swachh Bharat Mission

The Swachh Bharat Mission is another landmark initiative by the Honourable Prime Minister, Mr. Narendra Modi. The initiative covered 4,041 statutory towns to clean the streets, roads, and infrastructure of India and provide sanitation facilities for every household. Under the initiative, all villages, districts, and gram panchayats in India declared themselves "open defecation free" by 2nd October 2019, on the 150th birth anniversary of Father of the Nation, Mahatma Gandhi. The initiative helped build over 100 million toilets in rural India.

COP26 Glasgow Summit

While addressing the world leaders at the annual conference of United Nations COP26 in Glasgow, the Hon'ble Prime Minister of India listed five commitments of India to combat climate change. The announcements were:

- India will achieve a target of net zero emissions by the year 2070.
- By 2030, India will meet 50 percent of its energy requirements from renewable sources.
- India will decrease the total projected carbon emissions by one billion tonnes by 2030.
- India will take its non-fossil energy capacity to 500 GW by the end of 2030.
- The nation will reduce carbon intensity by more than 45% by 2030.
- Climate Tech & Indian startups

Climate tech is a solution that involves providing new and feasible solutions to combat climate change. Climate tech includes finding ways to minimise greenhouse gas emissions and offering environment-friendly alternatives to existing technologies.

According to the Economic Survey 2021-22, India is the third-largest startup ecosystem in the world, In terms of how holistic the overall growth has been, startups in India have spread over 56 industries, with the top 5 being IT services, Healthcare & Lifesciences, Professional & Commercial Services, Education, and Agriculture.[source] Climate tech is one of the latest additions to this list, as several startups have emerged that are focusing on India's climate crisis.

The Current Scenario

With people becoming increasingly aware of climate change, the Indian government has also shifted its focus to the climate crisis. At the 26th session of the Conference of the Parties (COP26), India presented five nectar elements (Panchamrit) as its climate action:

- Reach 500 GW of Non-fossil energy capacity by 2030.
- Generate fifty percent of India's energy requirements from renewable energy by 2030.
- Reduce total projected carbon emissions by one billion tonnes from now to 2030.
- Reduce the carbon intensity of the economy by 45 percent by 2030, over 2005 levels.
- Achieve the target of net zero emissions by 2070.
- The government has already started taking the necessary steps in the right direction to combat climate change. As a result, the climate-tech sector is experiencing a huge boom.

The Impact

Today, several investors (both angel investors and venture capitalists) prefer to do business with companies that value the planet and offer solutions to ease the ongoing climate crisis. Although it takes a lot of effort to generate sufficient traction and attract investors, climate tech startups have an obvious advantage with them. This is the reason why they appear as a better option to investors, as compared to others.

Typically, investors prefer to put their money into ideas that promise potential and can effectively address a few of the most common real-world problems. The climate-tech domain is just the right fit, with plenty of opportunities. And the focus of these startups is on the environment, which is a plus!

If you are running a climate-tech startup, you should visit the Startup India website today to get a host of benefits, from tax exemption to showcase opportunities. Startup India is a nationwide platform where you can connect with industry experts and other startup founders for knowledge sharing and finding opportunities that help your business scale.

Climate change is expected to affect the human well being in many different ways such as capital, ecosystem, disease and migration. Irrespective of the importance of the issue, it is not clear how to compute the value with the current state of the art of economics. A meaningful development involves at least transformation from agricultural to a nonagricultural economy reducing the dependence on agriculture. Since most of the labor force—about 70%—directly and indirectly depends on the sector for livelihood and employment, it is when this sector is more productive and ensures food self-sufficiency that it will release the necessary labor and capital for the manufacturing and service sectors. In the context of the current debate about climate change, it is necessary to show, far from beinginactive in India, that considerable actions in terms of policies, programs and projects are being taken. Technology transfer can speed up the modernization process and additional funds can accelerate government in energy conservation. However, policies for poverty alleviation must be given priority.

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Evaluation of the Progress of EIA in India, New Challenges

Vinay Kumar Pandey[1] & Prof. Sandeep Kumar[2]

ABSTRACT

The "Environmental Impact Assessment (EIA)" is an essential instrument globally employed to assess the possible environmental impacts of planned projects or developments.

EIA was first introduced in India in 1978 with regard to the various river valley projects all over the country and later expanded to include various other developmental procedures in its scope.

The environment protection rule 1986, warrant for the imposition of certain restrictions on the construction/ expansion/ modernization of specific projects without prior approval from the Central, State, or Union Territory level Environmental Impact Assessment Authority (EIAA) constituted under the Environment Protection Act, 1986.

As per the EIA notification, 1994, EIA was made mandatory for the expansion or modernization of any activity if pollution load is to exceed the existing one or a new project listed in schedule 1.

In suppuration of the EIA notification 1994, another EIA notification was introduced by the Ministry of Environment and Forest (MoEF) on 14th September, 2006. The objective of EIA Notification 2006 was to address the limitations of EIA Notification (1994), easing EIA process and making it decentralised.

In this continuation a draft notification 2020was brought which details asreduced time for public hearing, post clearance compliance, post-facto clearance, financial penalty for non-compliance, no public reporting for non-compliance etc.

The objective of this paper is to analyse the environmental impact assessment in India since its inception till date and give suggestive measures for sustainable development.This paper is exploratory in nature and based on secondary data from different government publicationespecially MOEF&CC, Govt of India, Ministry of statistics and program implementation, Govt of India, various articles and research papers.

The sole idea of EIA is to promote economic development without compromising the environmental quality and the ecology of the region where the project is proposed but This paper finds that in last 30 years since the formal inception of EIA, in 1994, the process of EIA clearance has been made easier, prioritizing economic development and consequences are not encouraging on environmental front.

Keywords: *EIA, Sustainable Development, MOEF&CC*

1. Research Scholar, Department of Economics, DDU, Gorakhpur. (U.P.)
2. Professor and Head, Department of Economics, DDU, Gorakhpur. (U.P.)

Introduction

Environmental Impact Assessment (EIA) is a crucial tool used worldwide to evaluate the potential environmental consequences of proposed projects or developments. It involves a systematic process of identifying, predicting, evaluating, and mitigating the biophysical, social, and other relevant effects of development activities prior to their implementation. EIAs aim to ensure sustainable development by providing decision-makers with comprehensive information on potential impacts, thereby enabling informed choices that balance economic, social, and environmental considerations. Through stakeholder consultation and scientific analysis, EIAs help minimize adverse effects on ecosystems, biodiversity, and local communities while promoting responsible resource management and long-term environmental stewardship.

Objective of this paper is to critically analyse the progress of EIA in India since its inception in 1994 till date and observe the new challenges for sustainable development.

In this light the paper is divided into 4 sections. Section 1 details the definition and importance of EIA,Section 2, the process of EIA, section 3 details the progress and evaluation of EIA in India, section 4 details, the conclusion.

Methodology

This paper is exploratory in nature and based on secondary data from different government publication especially MOEF&CC, Govt of India, Ministry of statistics and program implementation, Govt of India, various articles and research papers.

Section 1

Definition:

As the UK department of environment puts it, an EIA, "is essentially a technique for drawing together, in a systematic way, expert qualitative assessment of a project's environmental effects and presenting the results in a way which enables the importance of the predicted effects and scope for modifying or mitigating them, to be properly evaluated by the relevant decisions making body, before a decision is taken."

EIA can be broadly defined as the systematic identification and evaluation of the potential impacts of proposed projects, plans, programs or legislative actions related to physical, chemical, biological, cultural and socioeconomic componentsof the total environment (Canter, 1996).

Importance of EIA:

The importance of Environmental Impact Assessment (EIA) cannot be overstated in today's world where sustainable development is a critical goal. EIAs play a crucial role in several ways:

1. **Early Identification of Impacts**: EIAs identify potential environmental, social, and economic impacts of proposed projects before they are implemented. This early identification allows decision-makers to modify project plans to avoid or minimize negative impacts.

2. **Informed Decision Making**: By providing comprehensive information about potential impacts and mitigation measures, EIAs empower decision-makers to make informed choices that balance development needs with environmental protection and societal concerns.
3. **Public Participation**: EIAs involve public consultation and stakeholder engagement, ensuring that local communities, indigenous groups, and other stakeholders have a voice in the decision-making process. This promotes transparency and accountability in development projects.
4. **Promotion of Sustainable Development**: EIAs promote sustainable development by integrating environmental, social, and economic considerations into project planning and decision-making. They help ensure that development activities do not compromise the ability of future generations to meet their own needs.
5. **Legal and Regulatory Compliance**: In many countries, EIAs are a legal requirement for certain types of projects. Compliance with EIA regulations helps ensure that projects adhere to environmental laws and standards, reducing legal risks and potential liabilities.
6. **Protection of Ecosystems and Biodiversity:** EIAs assess potential impacts on ecosystems, biodiversity, and natural resources, helping to protect valuable natural assets and sensitive habitats.

Overall, EIAs contribute to responsible and sustainable development by fostering better planning, reducing environmental risks, and safeguarding the well-being of communities and ecosystems.

Section 2

EIA Process

EIA involves the steps mentioned below. However, EIA process is cyclical with interaction between the various steps.

- **Screening:** The project plan is screened for scale of investment, location and type of development and if the project needs statutory clearance.
- **Scoping:** The project's potential impacts, zone of impacts, mitigation possibilities and need for monitoring.
- **Collection of baseline data:** Baseline data is the environmental status of study area.
- **Impact prediction:** Positive and negative, reversible and irreversible and temporary and permanent impacts need to be predicted which presupposes a good understanding of the project by the assessment agency.
- **Mitigation measures and EIA report:** The EIA report should include the actions and steps for preventing, minimizing or by passing the impacts or else the level of compensation for probable environmental damage or loss.
- **Public hearing:** On completion of the EIA report, public and environmental groups living close to project site may be informed and consulted.
- **Decision making:** Impact Assessment Authority along with the experts consult the project-in-

charge along with consultant to take the final decision, keeping in mind EIA and EMP (Environment Management Plan).

- **Monitoring and implementation of environmental management plan:** The various phases of implementation of the project are monitored.
- **Assessment of Alternatives, Delineation of Mitigation Measures and Environmental Impact Assessment Report:** For every project, possible alternatives should be identified, and environmental attributes compared. Alternatives should cover both project location and process technologies.
- Once alternatives have been reviewed, a mitigation plan should be drawn up for the selected option and is supplemented with an Environmental Management Plan (EMP) to guide the proponent towards environmental improvements.
- **Risk assessment:** Inventory analysis and hazard probability and index also form part of EIA procedures.

Section 3

Progress and Evaluationof EIA in India

The journey of EIA began in India in 1970 to evaluate the river valley projects, later all development projectswere required to obtain permission from the government for operating industrial activities.The systematic and official progress of EIA in India began since the formal inception of EIA by the EIA notification 1994.

EIA Notification 1994

In the initial phase of India's environmental laws, there was no regulatory authority established to create EIA reports. Instead, the preparation of these reports was often swayed by political influences, leading to concerns about their quality. Yet, the emergence of EIA as an impact assessment tool for protecting theenvironment from any proposed project through EIA Notification 1994 under Section 3 of the Environment Protection Act, 1986 brought a revolution. instead of becoming stationary change in India'senvironmental legislation (Jolly and Singh, 2021;Paliwal, 2006). This Notificationapprovedfor the first time a public hearing in the EIA system inIndia after the amendment in 1997. Although publichearings matter on socio-economic and developmentissues rather than environmental concerns (Sainath and Rajan, 2015). It is undeniable that public hearings have been almost overlooked or sidelinedby strategically designing the public participationmechanism since the 2006 EIA Notification to 2020Notification. The EIA Notification of 1994 identified 29 types of projects that are required to go through the EIA process before commencing operations. These include nuclear power plants, oil and gas exploration projects, mining extraction projects, infrastructure and construction projects, as well as hydro and thermal projects.

The Notification clearlyindicates the guidelines of the EIA monitoringprocedure. Even with these guidelines in place, there were significant shortcomings in the implementation of environmental management plans, mitigation measures, and compliance monitoring.The primary challenges to the

EIA Notification of 1994 included the intricate procedural requirements for obtaining a clearance certificate, the unclear enforcement mechanisms for penalizing EIA law violators, and the uncertainty surrounding the authority of the Expert Appraisal Committee (EAC).To address these issues, a new draft of the EIA Notification 2006 was published online in 2005, inviting public feedback. However, since the notification was only available in English, no comments were received. This initial EIA Notification underwent several revisions and was eventually replaced by the EIA Notification 2006.(Turaga, 2016).

EIA Notification 2006

Similar to the EIA Notification of 1994, the 2006 Notification also highlights deficiencies in monitoring the social environment and ecology. In thelast 14 years, there have been a lot of changes in the2006 Notification (Jha-Thakur and Rajvanshi,2020). The EIA Notification of 2006 aims to create a structured regulatory framework to promote sustainable development. It includes environmental safeguards in proposed projects to reduce negative impacts on the environment and involves stakeholders in public hearings for the proposed projects.Despite the provisions of the Nagarpalika Act of 1992, the Panchayat Raj Act of 1992, and the Scheduled Tribes and Other Traditional Forest Dwellers Act of 2006, local bodies are often excluded from decision-making processes related to socio-economic development. The provision ofpublic hearings has been almost diluted in thisNotification, thus creating a loophole for the projectproponents to avoid the public hearings for anextension of project activity. There is acontroversy about the EIA review mechanismsince the review reports are often considered lesseffective and impractically prepared. For example, the health impacts of nuclear projects on humans are often overlooked, and projections from one project are sometimes inaccurately applied to another. Additionally, the limited capacity of regulatory agencies hampers the EIA review process and compliance checks.

As a dominant economic sector, the energy industry restricts the ability of regulatory agencies to enforce stringent measures. (Jha-Thakurand Fischer, 2008).

Draft EIA Notification 2020

With great hope, theEIA law of India was amended in 2020. It was anticipated that the new EIA amendment would bring substantial reforms to address the deficiencies of the previous notifications.The new EIA Notification 2020 introduces several significant improvements, including the creation of a Technical Expert Committee (TEC) to classify proposed projects using scientific criteria, the prompt announcement of Environmental Clearance (EC) or Environmental Permission (EP) decisions, and the provision of rights to appeal these decisions. The draft of the EIA Notification 2020,which was substituted by EIA Notification 2006,was released online during the pandemic in Englishand Hindi languages at the first stage, and after along debate, the Notification was published in threeother vernacular languages. This, in fact, deprivesthe general people of taking part in decision-making.There was a spontaneous protest across the countryagainst the Draft EIA Notification 2020 of India,claiming that this EIA law poses a risk to theenvironment and ecology of the country. One significant critique of the EIA Notification 2020 is that, although it purports to be beneficial for the environment and the public, it predominantly supports industrial interests, often to the detriment of

the general populace.In this draft Notification, the needs of local communities, who primarily rely on the forest for their livelihoods, are neglected, and concerns such as biodiversity loss, climate change, and environmental degradation receive insufficient attention. In addition, the draft Notificationdoes not reflect the objectives of the Environment(Protection) Act, 1986, and goes beyond internationalagreements and conventions. Article 12 of the ParisAgreement, to which India is a signatory, states that"Parties shall cooperate in taking measures, asappropriate, to enhance climate change education,training, public awareness, public participation andpublic access to information, recognizing theimportance of these steps with respect to enhancingactions under this Agreement."The Draft EIA Notification 2020 introduces major changes such as 'post facto clearance' and restrictions on public hearings. Under the new amendment, projects can continue operations without the necessary clearance from the MoEFCC, provided the project proponents pay fines for any violations.

In various courts'decisions, obtaining such clearance was mentionedas illegal. In the Alembic Pharmaceuticals Ltd vRohit Prajapati case of 2020, the Supreme Court ofIndia remarked that such post facto clearance isagainst the EIA Notification 1994 and destructive tothe environment (Sonia, 2021). The right to publichearings in the EIA process has been diminishing inthis Notification by reducing the response time to20 days of a proposed project. Furthermore, while the EIA Notification 2006 required the submission of environmental clearance monitoring reports twice a year, the 2020 amendment allows industries to submit compliance reports annually, introducing a potential weakness in the EIA system.However, due to widespread protests and controversies surrounding the draft Notification 2020, the Karnataka High Court issued a stay order against it. It is important to recognize that, despite certain shortcomings in the recent amendment of the EIA Notification, it has made significant advancements in various areas compared to earlier amendments. There are seen improvementsin completeness and objectivity and speeding upthe EC release. The screening process, the expertiseof the personnel, and transparency in the total EIAsystem have also improved significantly. Manyargue that in the name of the speedy process andtransparency of EIA, the screening and scopingprocess have been diluted (Bindra and Rawat, 2020;Pradhan, 2020), and the recent Notification paves theway for the proponents to relax their strengtheningcapacity to submit compliance reports. An effective EIA system must rigorously follow the monitoring program to ensure that a project's plans and commitments are fulfilled before its design (Rajaram & Das, 2011). However, the recent EIA Notification has relaxed these monitoring requirements.

The rapid population growth and expanding economic activities across various sectors have significantly contributed to the deterioration of India's environmental conditions today.It should be noted that the future outlook of the EIA law largely hinges on political will and economic conditions rather than social responsibility.There are numerous issues within the EIA system in India that cast doubt on the credibility of its regulatory framework. For example, low-qualityor fabricated data are often used to grant an EC, whichmay bring severe environmental disasters. Besides,poor and weak screening and scoping processes,poor monitoring, corruption, inefficient follow-up,and legislative weakness are the most prominentloopholes in not successfully executing the EIA law.It is, therefore, required to shift the EIA system intoan independent regulatory body that works freely andis free from any influences to eradicate suchinadequacies.

Section 4

Conclusion

An effective EIA system is crucial for promoting sustainable development and protecting the environment in a country like India. Maintaininga balance between development activities andconserving the environment at all levels is urgent topromote sustainable development goals. Regardingenvironmental issues, the role of EIA is not satisfactory but rather questionable. India's EIA system has exhibited a biased perspective, favouring the interests of project proponents over those of the affected communities.As a result, project proponents have been afforded numerous chances to manipulate the law and suppress the voices of those impacted. However, it is essential to remember that the interests of local communities should take precedence over commercial considerations.The Draft EIA Notification 2020 stifles the voices of affected communities by restricting their involvement in various projects such as irrigation, road and highway construction, and building development.

In the light of the above it can be concluded that in India the EIA procedure has become more development friendly rather environment friendly over the 30 years of its inception.

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Rural Development and Renewable Energy Resources an Alternative Approach

Dr. Angrej Singh[1]

India is a country in transition. Now the third largest economy in the world in terms of purchasing power, it is poised to make tremendous economic strides over the next ten years with significant development already in the planning stages. The most important single factor, which can act as a constraint on economic growth of a country, is the availability of energy, there is direct correlation between the degree of economic growth and the per capita consumption of energy. Since, energy is an essential input for all productive activities, the process of economic development inevitably demands increasing levels energy consumption. Table-1 shows per capita income and per capita consumption of energy for different countries.

Table 1: Per Capita Income and Per Capita Consumption of Energy for Selected Countries

	2003			2013			2014
Country	Total energy consumption per capita per annum (kgoe/a)	The same value in GJ per capita per annum (1000 kgoe = 42 GJ)	The same value in W per capita (1 GJ/a = 31.7 W) (multiply by 8.766 to get kWh/year)	Total energy consumption per capita per annum (kgoe/a)	The same value in GJ per capita per annum (1000 kgoe = 42 GJ)	The same value in W per capita (1 GJ/a = 31.7 W) (multiply by 8.766 to get kWh/year)	Total energy consumption per capita per annum (kgoe/a)
Egypt	903.1	37.93	1202.4	885.0	37.17	1178.3	
India	565.6	23.76	753.1	606.1	25.45	806.9	
Indonesia	866.5	36.39	1153.7	850.2	35.71	1132	
Japan	3898.4	163.73	5190.3	3570.4	149.96	4753.7	3470.2
United Kingdom	3254.1	136.67	4332.5	2977.7	125.06	3964.5	2751.6
United States	7164.5	300.91	9538.8	6915.8	290.47	9207.8	6917.4

Source: World Development Report and World Development Indicators 2003-04, 2013-14.

In recent years India has heavily invested in development of physical infrastructure. It has given prime importance to energy sector, considering its vital role in the process of economic development, and growth in the quality of life, but only to the major cities and adjacent areas to it.

1. Professor in Economics, Principal Ganpat Sahay P.G. College, Sultanpur (U.P.)

Although, power lines have reached most of rural areas but there is no regularity of power supply and people in the rural areas have to depend upon other sources of energy. Thus, approximately seventy percent of the population is still deprived of a regular power supply.

Many villages still pass their nights in darkness. Proper energy supply to rural areas could change the scenario of rural economy of the country through development of small industries, irrigation, and other farming activities. The conventional grid electricity is not capable of ensuring continuous flow of energy to rural areas because of infrastructural problems. Recently, increasing prices of crude oil in international market, is posing a great challenge in renewable sources of energy. Renewable energy sources are the best alternatives which could ensure cheap and continuous flow of energy to the rural areas. For a developing country like India, it has a great potential.

The purpose of this paper is to analyze the role of renewable of energy in the development of rural economy in India. The whole paper is divided in six sections. In the second section, various energy sources, production and consumption patterns are discussed. In the third section, potential of renewable in Uttar Pradesh is being documented and fifth is about role of state in promoting renewable sources. Finally, conclusions are given.

Energy Resources in India

India is both, a major energy producer and consumer. India currently ranks as world's eleventh greatest energy producer accounting for about 2.4 percent of world's total annual energy production and as world's sixth greatest energy consumer (Earth Trends-2003, Annual Report 2008). Since 1980s, and still currently, India has encountered a negative balance in overall energy consumption. This has resulted in the need to purchase energy from outside and fulfill the needs of the entire country. For this purpose also, emphasis should be given to exploit more and more renewable energy resources. In the following table data on power availability, requirement and surplus/deficit has been presented:-

Table 2: Power Supply – India (in million units)

Period	Energy Availibality	Energy Requirement	Energy Deficit/ Surplus	% Energy Deficit/ Surplus
2002-03	497890	545983	-48093	-8.8
2003-04	519398	559264	-39866	-7.1
2004-05	548115	491373	-43258	-7.3
2005-06	578819	631757	-52938	-8.4
2006-07	624495	690587	-66093	-9.6
2011-12	1224494	1292587	-68093	-5.3%

Source: Central Electricity Authority (CEA)–Power Scenario at a Glance-2007-08, 2011-12.

Energy resource can be divided into two categories renewable sources such as solar, wind, hydroelectric, biogas etc. and non-renewable sources (Commercial sources such as coal, petroleum products, etc.) Due to high energy deficit (Table-2), India has to import a heavy amount every year. The degree of deficit is continuously increasing from 7.1 to 8.4 percent and further 9.6 percent during 2003-04, 2005-06 and 2006-07. India relies heavily on commercial source of energy as

indicated in Table-3. As it is evident from the above table, two third of total energy supply is coming from these sources. Recently sharp increase, in the prices of Crude oil and of other commercial energy resources requires need for searching alternatives. Renewable energy sources are a definite answer. At presently, one third of the total energy supply in India is coming from renewable sources including hydropower.

Table-3: Energy Consumption by Source and Sector, 1999 (in thousand metric tons oil equivalent)

Source	India	Sector	India
(a) Total Fossil Fuels	271806	Industry	97859
(i) Coal and coal products	157169	Transportation	44475
(ii) Crude Oil and Natural Gas	79557	Agriculture	9741
(iii) Natural Gas	20754	Commercial and Public Services	2737
(b) Nuclear	3409	Residential	200781
(c) Hydroelectric	7004	Non-energy uses and other consumption	5309
(d) Renewable excluding hydroelectric	198107		

Table 4: Estimates of Potential Capacities from Renewal Energy Sources (in mw)

Sources	Approx. Potential
Biomass Energy	19500
Solar Energy	20000
Wind Energy	47000
Small Hydropower	15000
Ocean Energy	50000

Source: Annual Report-2008, Ministry of Renewable Energy, India.

The renewable sources of energy that is hydro, solar, wind, biomass etc. are unequally distributed throughout the country depending upon geographical location. Thus, a huge potential exists for renewable energy sources:

(i) Hydroelectric Power

The hydroelectric power refers to the energy produced from water (rainfall flowing into rivers, etc). Consequently rainfall can be a good indicator to measure potential of hydroelectric power supply. The dominant annual is located on the north eastern part of India: Arunachal Pradesh, Assam, Nagaland, Manipur and Mizoram and also on the west coast between Mumbai and Mahe. India has twelve major hydroelectric power plants distributed in the different parts of the country, Bihar (3), Punjab, Uttarakhand, Karnataka, Uttar Pradesh, Sikkim, Jammu & Kashmir, Gujarat and Andhra Pradesh (2). In these plants good water management and storage would allow for continuous electric generation throughout the year.

(ii) Solar Power

Because of its location between the tropic of cancer and equator India has an average annual temperature that ranges from 25-27 degree Celsius. This means that India has huge solar

potential. Solar energy has several applications: photovoltaic cells PV Cells) are placed on the roof of the houses or commercial building and collectors such as mirrors or parabolic dishes that can move and track the sun throughout the day are also used, this mechanism is being used for concentrated lighting of buildings.

PV Cells find application in individual house roof top systems, community street lights, community water pumping, and areas where the terrain makes difficult to access the power grid. High efficiency cells with concentrators are being manufactured which can operate with low sunlight intensities. Therefore, technology resources exits in country and a growing market would lead to job growth in country.

(iii) Wind Energy

India is surpassed only by Germany as one of world's fastest growing markets for wind energy. By mid 1990s the subcontinent was installing more wind generating capacity than North America, Denmark, Britain, and the Netherlands. The ten machines near Okhla in Gujarat were some of the first wind turbines installed in India. Now, in 2006, there is an installed capacity of 4430 mw, however, ten times that potential or 45092 mw exists.

(iv) Biomass

Biomass includes solid biomass (organic, non-fossil material of biological origins), biogas (principally methane and carbon dioxide produced by anaerobic digestion of biomass and combusted to produce heat and/or power), liquid bio fuels (bio based liquid fuels from biomass transformation, mainly used in transportation application) and municipal waste (waste produced by the residential, commercial and public service sectors and incinerated in specific installations to produce heat and/or power).

The most successful forms of biogas are sugarcane bagasse in agriculture, pulp, and paper residues in forestry and manure in live stock residues. It is argued that biogas can directly substitutes fossil fuels as more effective in decreasing atmospheric CO_2 that carbon sequestration in trees. The Kyoto protocol encourages further use of biomass energy. Biomass may be used in number of ways to produce energy: combustion, fermentation, anaerobic digestion.

India is very rich in biomass it has a potential of 19500mw (3500 mw form bagasse based cogeneration and 16000 mw from surplus biogas). Currently, India has 537 mw commissioned and 536 mw under construction. The facts reinforce the idea of a commitment by India to develop these resources of power. Following is a list of some states with, most potential for biomass production:

Renewable Sources of Energy and Rural Development

Nearly 73 percent of India's population lives in more than 5.5 lakh villages. For the growth of the economy, we should mainly emphasis on the development of rural areas. Hence, development of rural economy is an integral part of country's development. Renewable sources can play a vital role in the upliftment of rural economy. These resources are best suited to our rural areas because they are locally produced and consumed. This will not ensure supply of energy to remote and inaccessible areas but will also generate employment.

Conventional electricity is produced at big power plants and is transmitted to the distant areas. This requires heavy investment, huge maintenance charges and less to face other technical hurdles, whereas, renewable sources need one time investment, low maintenance and transmission costs. They are environment friendly and non-depletible also. Renewable sources especially solar power, biomass has great potential in this regard. Small hydro power projects could ensure continuous supply of electricity in hilly areas and in north-eastern states. This approach will prove to be a new dimension to inclusive growth, because uncovered areas could now be covered. This inclusive growth will lead to sustainable growth of the country.

Due to its favourable geographical location; India enjoys tremendous potential of solar energy. Solar energy has several applications for the rural areas. Due to heavy initial investment that is needed to utilize solar power, it can be used for community lighting, street lighting etc. where such cost can borne by the community. At small scale solar cooker, solar lanterns are the probable applications.

India is a country of largest livestock population. Domestic animals as cow, buffalo, goats etc. are important part of our rural economy. Biogas, which is produced through anaerobic digestion of cattle dung and organic waste mixed with water in a biogas plant, is an efficient fuel having a calorific value of about 4800 kcals/m3a, can be used for cooking, heating and lighting, space cooling and refrigeration and in dual fuel or 100 percent gas engines for motive power and when attached with alternators, for generatin of electricity. The digested slurry can be used as manure, for enriching soil for sustaining its productivity. These biogas plants are best suited for our rural areas as they require low investment, low area coverage and maintenance.

As in India less than 25 mw plant is in the small hydro plant designation. There is a potential of 15000 mw and installed capacity 1520 mw to the date. Small hydro project could ensure power supply in remote villages of hilly areas. Himachal Pradesh and Uttarakhand states have great potential of hydro power. These resources will not only ensure a good supply of energy, but they will also generate a good level of employment opportunity in the rural areas.

Role of State

To promote renewable energy technologies in the country the government has put in place some subsidies and fiscal incentives. The Indian Renewable Energy Development Agency has been set up under Ministry for New and Renewable Energy and is a specialized financing agency to promote and finance renewable energy projects. Following is a short list of a new measures;

(1) Income Tax breaks,

(2) Accelerated depreciation,

(3) Custom duty/duty free import concessions,

(4) Capital/interest subsidy, and

(5) Incentives for preparation of detail project reports and feasibility reports.

The ministry has been supporting programmes for the use of renewable energy products and devices such as biogas plants, solar thermal systems, photovoltaic devices, biomass gasifies etc. as

well as the Integrated Rural Energy Programme. Programmes introduced during the 10th plan period such as Remote Village Electrification, Village Energy Security Test Projects, Biogas Power Generation continue to be implemented during the 11th plan. The Ministry has been promoting family type biogas plants since 1981-82 under NMMMP*.

Currently, 40 percent of household in India do not have access to access to electricity. New legislation has set a target of electrifying all households by 2010. This target could be achieved in time only with the help of development of renewable sources.

Conclusions

India is an emerging economy. Increasing GDP is driving the demand for additional electrical energy as well as transportation fuels. India is a nation of extremes. Poverty remains in areas with no energy, service, while wealth growing in the new business hubs. Hence, to make growth more inclusive, that part which is still not having proper energy facilities, should be included in the mainstream. The target of electrifying every village by 2010 by government is achievable only with the development of renewable sources.

India is blessed with vast resources of renewable energy in solar, wind, biomass and small hydro; infact the technical potential of these renewable exceeds the present capacity. However, there are many technical problems related with the exploitation of these sources such as problem in identifying places where a good amount of wind blows, regular sunheat comes, continuous and sufficient flow of water, and lack of cost effective technology etc. As, in the past the challenge in providing electricity, is the inability of the poor to pay in India. Hence, more and more investment should be directed in research and development of cost effective technology. It would be better to develop area specific technology to exploit these resources.

On the other hand, they are most eco-friendly, non-depletible and safe. Further, they would be helpful in reducing pace of global warming also. Renewable energy remains a small fraction of installed capacity yet India is blessed with over 150000 mw (Annual Report-2008) of exploitable renewable. Tapping India's winds, solar, biomass and hydro could bring quality job from a domestic resources. Only, there is need to put sustained effort and strong commitment to realize this potential.

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Effect of Mobile Phone Use on School Students: A Study of Kaljikhal Block, Pauri Garhwal (Uttarakhand)

Dr. Abhay Kumar[1] & Rakesh Lal[2]

Introduction

In the current landscape, mobile phones have become an integral part of all students, especially teenage students. As a teacher of Intermediate College,I observed that many students had felt fatigued and inactive in class.Often,due to excessive engagement with online games and social media, some students spent seven to eight hours daily. This phenomenon raised a critical question about the role of mobile phones in shaping students' academic performance and overall well-being. While mobile phones provide access to information and entertainment, they also pose risk to health and behaviour. The increasing accessibility of android mobile phones has allowed students to connect with a vast array of information and entertainment, but it has also posed potential risks to their health and behaviour. Despite itsincreasing use, there is a lack of research addressing its effects in the rural context of Kaljikhal. This study aims to fillthis gap by examining the impact of mobile phone usage on student behaviour and health. The study explored various dimensions including time spent on mobile phones, types of activities engagedin and implication for students' academic performance and interpersonal relationships. Concerning the effects of mobile phone usage, this study seeks to provide valuable insights that can inform educators, parents and policy makers about the potential risk and benefits associated with use of mobile phone amongteenagers. Ultimately, the goal is to promote healthier mobile phone habits and enhance the educational experience for students of the region.

Statement of the Problem

The rapid proliferation of mobile phones among teenage students, particularly in rural areas of Kaljikhalhasraised significant concern about their impact on behaviour, health and academic performance of teenage students. Students often lack awareness of the risks associated with social media and online gaming. Sometimes, some students felt sleepy in the class, but earlier, they used to

1. Assistant Professor, Department of Economics, Govt. P.G. College Gopeshwar, Chamoli (Uttarakhand) Email-abhaykmr637@gmail.com
2. Assistant Teacher, Govt Inter College Puriyadang, PauriGarhwal (Uttarakhand). Email-rakeshbharti2281@gmail.com

be attentive in the class while the teacher was teaching. After questioning student admitted that they were playing online games on mobile for several hours. This study investigates the extent of mobile phone usage among students and implications for their health and behaviour, as well as the role of educational institutions in mitigating associated risks. This study provides insights for promoting healthier mobile phones habits among students in the region. Therefore "**Effect of Mobile Phone Use on Intermediate College Students in Kaljikhal Block, PauriGarhwal"** topic was chosen for study.

Review of Literature:

- Mobile phone usage has dramatically increased over the past decade, raising concerns about its impact on various aspects of life, particularly among students. This literature review aims to explore the relationship between mobile phone use and academic performance, mental health, and social interactions.
- Kuss and Griffiths, 2012 "Mobile Phone Usage Patterns and Their Effects: Urban vs. Rural Students"noticed there are significant differences in mobile phone usage patterns and their effects on students in urban versus rural environments, indicating the impact of context on technology use.
- Buckingham, 2013 "Digital Literacy in the Classroom: Teaching Students to Navigate Mobile Technology" found integrating digital literacy into school curricula is essential for helping students navigate mobile phone and internet use responsibly and effectively.
- Lepp, Barkley,et.al. 2014 have mentioned in "The Relationship Between Cell Phone Use and Academic Performance", Higher mobile phone usage among college students is associated with lower academic performance, indicating that distractions from mobile devices negatively impact grades.
- Hale and Guan, 2015 found in "The Health Effects of Mobile Phone Use: A Review of Eye Strain and Neck Pain" thatprolonged mobile phone use is linked to physical health issues like eye strain and neck pain, which are especially relevant for students using devices for long period.
- Twenge et al., 2018 "I-Gen: The Impact of Social Media on Mental Health in Adolescents" found that increased social media use correlates with rising rates of depression and anxiety among teenagers, highlighting the mental health implications of mobile phone usage.
- Przybylski and Weinstein, 2019 investigated in "Digital Screen Time and Mental Health: An Analysis of Excessive Mobile Phone Use" that excessive mobile phone use can lead to increased irritability and family conflicts, particularly among adolescents balancing screen time with face-to-face interactions.
- Kaur and Kaur, 2020 "Mobile Phones in Rural Education: Access, Opportunities, and Social Interaction" explore that access to mobile phones influences educational opportunities and social interactions among students in rural areas, affecting their learning experiences.

Objectives:

1. To investigate the influence of Android mobile phone usage on interpersonal relationships and behavioural patterns among teenagers.
2. To assess the relationship between durations of mobile phone use and changes in emotions.
3. To explorethe role of students' educational institution to aware the students about the effective use ofandroid mobile phone.
4. To examine the types of content consumed by students on mobile.
5. To find out time spent by students on mobile devices.
6. To explore the frequency and duration of online gaming sessions and their engagement with mobile technology.

Hypotheses:

- H01- There is no significant relationship between multiple hours of using mobile phones and the behaviour of the teenage students with their parents, siblings, and friends.
- H11- There is a significant relationship between multiple hours of using mobile phones and the behaviour of the teenage students with their parents, siblings, and friends.
- H02: There is no significant relationship between multiple hours of using mobile phones and change in emotions of the teenage students.
- H12: There is a significant relationship between multiple hours of using mobile phones and change in emotions of the teenage students.
- H03: There is no significant relationship between multiple hours of using mobile phones and concern about teenage students' role of school /institution.
- H13: There is a significant relationship between multiple hours of using mobile phones and concern about teenage students' role of school / institution.
- H04: There is no significant relationship between multiple hours of using mobile phones and the watching habits of the teenage students.
- H14: There is a significant relationship between multiple hours of using mobile phones and the watching habits of the teenage students.
- H05: There is no significant relationship between multiple hours of using mobile phones and playing online games by the teenage students.
- H15: There is a significant relationship between multiple hours of using mobile phones and playing online games by the teenage students.

8- Operational definition of terms-

This study conducted for use of mobile phones by teenage students from class 9 to 12.

9- Delimitations of the Study-

This study was conducted in Intermediate Colleges of Kaljikhal, a completely rural block, is situated in sub-district Pauri, district PauriGarhwal, Uttarakhand. This study is limited to the RajkiyaUchchatarMadhyamikVidyalayas and Rajkiya Intermediate Colleges of theblockKaljikhal district PauriGarhwal.

10- Methodology:

This study is based on 80 samples of teenage students studying in class 9 to 12 in the session 2024-25. Primary data was collected through a structured questionnaire.The Chi- Square was applied to test all hypotheses with the help of AI.

11- Study Area:

Effect of Mobile Phone Use on Intermediate College Students in Kaljikhal Block, PauriGarhwal, Uttarakhand, entirely a rural block.

12- Research Design:

This study employs a quantitative research design to assess the impact of mobile phone usage on the behaviour, emotions, and academic performance of teenager intermediate college students. A structured questionnaire has been used to gather data.

13- Data Collection Technique:

Data has been collected using a structured questionnaire administered to students in the selected intermediate colleges. It hasfacilitated the collection of both quantitative and categorical data.

14- Types of Data:

a) **Primary Data**: Collected directly from students through the structured questionnaire.

b) **Secondary Data**: Literature and existing studies on mobile phone usage and its effects, which provided context and support for the research.

15- Data Collection Tools:

Structured Questionnaire: Designed to collect information on:

- Duration of mobile phone usage.
- Types of content consumed (educational, entertainment,social media, gaming).
- Emotional and behavioural changes.
- Students' perceptions of their educational institutions regarding mobile phone usage.

16- Sample Size:

The study hasfocused on a sample of **80 students**(40% girls and 60%boys) from intermediate colleges in Kaljikhal block, covering classes 9 to 12 for the academic session 2024-25. This sample size has chosen to ensure statistical validity while being manageable for data collection and analysis.

17- Data Analysis and Interpretation:

H01- There is no significant relationship between multiple hours of using mobile phones and the behaviour of the teenage students with their parents, siblings, and friends.

H11- There is a significant relationship between multiple hours of using mobile phones and the behaviour of the teenage students with their parents, siblings, and friends.

Table-1:The Chi- Square: Using mobile phones and the behaviour of the teenage students

Change in behaviour with parents, siblings, and friends	Hours of using Mobile phone				
	Less than 1 hour o/e	1-2 hours o/e	2-4 hours o/e	More than 4 hours o/e	Row total
Irritate	0 (8.25)	8(4.95)	10(6.05)	4(2.75)	22
Shout	0(5.25)	4(3.15)	6(3.85)	4(1.75)	14
Angry	0(5.25)	6(3.15)	6(3.85)	2(1.75)	14
No impact	30(11.25)	0(6.75)	0(8.28)	0(3.75)	30
Column total	30	18	22	10	80

Calculation of the Chi-Square with the formula-

Expected Frequency = (Row Total * Column Total) /Grand Total

Chi Square (χ^2)= $\sum$ [(fo-fe)^2/fe]

χ^2=8.25+2.56+2.63+0.64+5.25+0.24+1.15+4.31+5.25+2.31

+1.39+0.03+31.25+6.75+8.25+3.75=84.013

Degree of freedom = (r-1)(c-1)

= (4-1)(4-1) = 9

Table value of Chi Square is at 0.05 =16.919

Calculated value is 84.013 while Table value is at 0.05% is 16.919. The null hypothesis is rejected. Hence, there is a significant relationship between multiple hours of using mobile phones and the behaviour of the teenage students with their parents, siblings, and friends.

- **H02:** There is no significant relationship between multiple hours of using mobile phones and change in emotions of the teenage students.
- **H12:** There is a significant relationship between multiple hours of using mobile phones and change in emotions of the teenage students.

Table-2: The Chi- Square- Using mobile phones and change in emotions of the teenage students

Change in emotions	Hours of using Mobile phone				
	Less than 1 hour o/e	1-2 hours o/e	2-4 hours o/e	More than 4 hours o/e	Row total
Happiness	30(24)	18(21.6)	0(1.2)	0(1.2)	48
Excitement	4(6)	8(4.5)	0(0.3)	0(0.3)	12
Jealousy	2(4)	6(3.6)	0(0.2)	0(0.2)	8
Anxiety	0(2.5)	2(2.25)	1(0.125)	2(0.125)	5
Loneliness	4(3.5)	2(3.15)	1(0.125)	0(0.175)	7
Column total	40	36	2	2	80

Calculation of the Chi-Square with the formula-

Expected Frequency = (Row Total * Column Total) /Grand Total

$\chi^2 = \sum [(fo-fe)^2/fe]$

$\chi^2 = 4.501+4.989+3.0+36.7778+6.792 \approx 56.0598$

Degree of freedom = (r-1)(c-1)

= (4-1)(5-1) = 12

P value of Chi Square is at 0.05 =21.026

Calculated value is 56.0598 while table value is at 0.05% is 21.026.Thus, the null hypothesis is rejected. There is a significant relationship between multiple hours of using mobile phones and change in emotions of the teenage students.

- **H03:** There is no significant relationship between multiple hours of using mobile phones and concern about the teenage students' role of school /institution.
- **H13:** There is a significant relationship between multiple hours of using mobile phones and concern about the teenage students' role of school / institution.

Table-3: The Chi- Square- Using mobile phones and concern about teenage students' role of school / institution.

Concern about the role of Institution	Hours of using Mobile phone				
	Less than 1 hour o/e	1-2 hours o/e	2-4 hours o/e	More than 4 hours o/e	Row Total
Should educate	36 (34.2)	32 (34.2)	2 (1.8)	2 (1.8)	72
No need to educate	2 (3.8)	6 (3.8)	0 (0.2)	0 (0.2)	8
Column Total	38	38	2	2	80

Calculation of the Chi-Square with the formula-

Expected Frequency = (Row Total *Column Total) /Grand Total

$\chi^2 = \sum [(fo-fe)^2/fe]$

$\chi^2 = 0.095+0.141+0.022+0.022+0.853+1.271+0.2+0.2$

= 2.804

Degree of freedom = (r-1)(c-1)

= (4-1)(2-1) = 3

Table value of the Chi Square is at 0.05 =7.815

The calculated value is 2.804 while Table value is at 0.05% is 7.815. The null hypothesis is accepted. Hence,there is no significant relationship between multiple hours of using mobile phones and concern for the role of school of the teenage students.

- **H04:** There is no significant relationship between multiple hours of using mobile phones and the watching habits of the teenage students.

- **H14:** There is a significant relationship between multiple hours of using mobile phones and the watching habits of the teenage students.

Table-4: The Chi- Square- Using mobile phones and the watching habits of the teenage students.

Watching habits	Hours of using Mobile phone				
	Less than 1 hour o/e	1-2 hours o/e	2-4 hours o/e	More than 4 hours o/e	Row total
Funny Videos	10 (14)	16 (10.8)	0 (0)	2 (1.4)	28
News Updates	10 (7)	2 (6.3)	0 (0)	2 (0.7)	14
Subjective/ educational content	20 (19)	18 (17.1)	0 (0)	0 (1.9)	38
Column total	40	36	0	4	80

Calculation of the Chi-Square with the formula-

Expected Frequency = (Row Total* Column Total) /Grand Total

$\chi^2 = \sum [(fo-fe)^2/fe]$

$\chi^2 = 1.143+3.47+0.257+1.286+2.93+2.414+0.053+0.047+1.9 = 13.5$

Degree of freedom = (r-1)(c-1)

= (3-1)(4-1) = 6

Table value of the Chi Square is at 0.05 =12.592

The calculated value is 12.45 while Table value is at 0.05% is 12.592. The null hypothesis isrejected. Hence, there is a significant relationship between multiple hours of using mobile phones and watching habits of the teenage students.

- **H05:** There is no significant relationship between multiple hours of using mobile phones and playing online games by the teenage students.
- **H15:** There is a significant relationship between multiple hours of using mobile phones and playing online games by the teenage students.

Table-5: The Chi- Square- Using mobile phones and playing online games by the teenage students.

Hours of using Mobile phone	Playing online games		Row total
	Yes o(e)	Noo(e)	
Less than 1 hour	6 (7.67)	40 (38.33)	46
1-2 hours	8 (7.33)	36 (36.67)	44
2-4 hours	0 (0)	0 (0)	0
More than 4 hours	2 (1)	4 (5)	6
Column Total	16	80	96

Calculation of Chi-Square with the formula-

Expected Frequency = (Row Total ß Column Total) /Grand Total

$\chi^2 = \Sigma [(fo-fe)^2/fe]$

$\chi^2 = 0.363+0.0727+0.0613+1+0.2 = 1.697$

Degree of freedom = (r-1)(c-1)

= (2-1)(4-1) = 3

P value of the Chi Square is at 0.05 =7.815

The calculated value is 1.697 while Table value is at 0.05% is 7.815. Hence, there is no significant relationship between multiple hours of using mobile phones and playing online games by the teenage students.

Findings:

1. **Behavioural Changes**: The study found a significant relationship between the number of hours spent on mobile phones and behavioural issues among students. Increased mobile phone usage was correlated with increased irritability, shouting, and anger towards family and friends. This advices that excessive phone use can negatively impact interpersonal relationships.
2. **Emotional Impact**: There was also a significant association between mobile phone usage and changes in emotions. Students reported feelings of happiness, excitement, jealousy, anxiety, and loneliness, particularly as their use of device increased. This indicates that excessive engagement with mobile devices can influence emotional well-being or health.
3. **Perception of Educational Institutions**: The results revealed no significant relationship between mobile phone usage and students' concerns regarding the role of educational institutions. This suggests that students might not perceive the need for educational interventions related to mobile phone use.
4. **Watching Habits**: The study found a significant relationship between mobile phone usage and students' watching habits. This indicates that the amount of time spent on mobile phone influence the type of content consumed, such as educational versus entertainment content.
5. **Online Gaming**: There was no significant relation between the mobile phone usage duration and playing online games. This indicates that the amount of time spent on mobile phones does not directly affect whether students engage in online gaming.

Conclusions:

- **Interpersonal Relationships**: High mobile phone usage negatively affects student behaviour with their relatives.
- **Emotions:** Excessive use of mobile phone affects emotional states of teenage students.
- **Education and Awareness**: Although students exhibit behavioural and emotional changes, they do not recognise the role of educational institutions in managing mobile phone use.
- **Content Consumption**: Mobile phone usage significantly influence content preferences, indicating that the type of engagement with media may change as the result the time spent.

- **Online Gaming**: The study indicates that online gaming has not playing crucial role among teenage students.

Recommendations:

- **Promote Healthy Usage**: Teachers and parents should promote healthier mobile phone habits among students.
- **Interventions**: Schools should consider integrating digital literacy programmmes to help students manage their mobile phone usage and its impacts effectively.

Suggestions:

- Effect of Mobile Phone Use on Intermediate College Students in Kaljikhal block, PauriGarhwal, types study could be conducted in the district and broader level.
- PARAKH andlike Android mobile based programmmes should be promoted among the students.
- Parents and institutions need to keep close eyes on the watching habits of the teenage students.
- Guidance and Counselling should conducted in a regular interval for the students.

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Celebrity Endorsement and their Impact on Consumer Trust

Priti Maurya[1], Anil Kumar Yadav[2] & Prof. Dhirendra Bahadur Singh[3]

ABSTRACT

The aim of this study is to analyse the current time role of representing products through different channels and Medias.

This paper indicates that how celebrity endorsement impact consumer trust and how consumer purchasing intention directly influence of celebrity endorsement in market.

Celebrity endorsement is very effectiveness for consumer buying behaviour. This study includes many components: - Brand attitude, Intentions of luxurious brand, Promotions activities, Brand image, Specific celebrity, Awareness and Willingness of product, customer satisfaction, consumer retention, Generating profitable fund.

For effectiveness of knowledge, trust, loyalty and dedication of customers reviews the celebrity endorsement media is involve in marketing communication media. It is done both online & offline.

Consumer brand trust is moderate to enhancing & influencing of celebrity popularly advertising strategies. Celebrity endorsement helps to boosting of consumers preparation by their attractiveness of product in different categories.

Consumer trust on celebrity endorsement affect lot of followers. Companies hiring celebrities for promoting the product & boosting of product brands & achieving the numbers of increasing sales& profit.

Celebrity endorsement is crucially impact on consumers fashions purchase indorsement by changing time. According to the willingness & consumers psychographic connection of people product attitude & images.

Celebrity endorsement presents their product requirement, ad story, rational implication, emotional appearance, implication of product & their present reviews. It impacts expertise the brands concurrency, likeability of product, positive images & physical attractiveness through the market channels their needs, satisfaction & quality, quantity of buying product.

Celebrity endorsement signifies the positive effect on purchasing decision on social media through trust & stronger level of customer confidence.

Celebrity endorsement influenced voluntarily, consumers that have ability to buy the product with happiness & desired result.

***Keywords**: Mass media & effect, theoretical frame work, crucial purposes, Trustworthiness.*

1. MBA, KIPM - College of Management, Gorakhpur, (U.P.)
2. Assistant Professor, KIPM - College of Management, Gorakhpur, (U.P.)
3. Professor, KIPM - College of Management, Gorakhpur, (U.P.)

Introduction

At this time, there are many varieties of products in the market who represents their products in the market who represent their product in the market in different ways.

In these days competition became very crucial challenges in promoting products & consumers will be attracted & interest with the product promotions.

Ads became very interesting instrument to introduce any product to the public market.

Current advertisement often to found anywhere either it is radios, social media, television, advertising agencies as so on. This instrument occupies wider area which providing information & attract the attending of the consumers.

Celebrity endorsement is a channel of communication which act as a brand's products & represent and promote the position of brand in the market celebrity endorsement attracts costumers in high proliferation market either it is local, regional, national, or internation

Celebrity endorsement gives a great impact on brand image in market.

According to CHIOSA ANA RALUCIA (2012). Refers to a market that celebrity endorsement the brand communication. It helps to achieve level of attention through the promotion of products by the endorsement gives experts opinion and research has use to celebrities in advertising through the modelling and can have positive influence the purchase intension.

Celebrity endorsement impact on consumers purchase intension and buying behaviour. In this research suggest that it all ow the view of significant and stimulating the consumers rates & their buying behaviour, the celebrity trustworthiness is the most important contribution is to increasing to consumers' confidence during purchasing of product of brand & firm. (Frieden) 1986; Dougles '1994' Sporle & Bekk 2010.

This fact of components effects from celebrity trustworthiness.

The aim of this researches is to extend the current knowledge by searching of examine the effect of celebrity endorsement trust as advertisement on brand credibility & conceptual model of representing & awareness of consumer trust.

Researches Objective

Celebrity endorsement is on very effective brand communication advertisement tool which is use to launch a new product with expertise creativity and spreading valuable information to the customer. It attracts and impress by the first by the presenting way to the customers.

The objectives of this researches are an analyse that how celebrity endorsement effect on consumer trust.

Choosing the appropriate celebrity endorsement on their ads for representing the brand products with celebrities affirmative in social media status & it is easy to promoting brands in shortest ways. It affects the other competitor products in market.

It impacts on consumers perceptions would be working on purchase the product or adopted deeply into indorsing a brand which is new for consumers.

Endorsement impact on consumer behaviour during the purchase situation and impulsion purchase decision by their facilitated presentation.

In this consumer perspective, a brand highly effect to increase its reputation by celebrity endorsement. It affirmative represents social status & different from others celebrity involvement would be loyal audience be affected. In this content, the celerity endorsement in one of the key success elements for companies to marketers for making marketing strategy decision.

Literature Review

Celebrity endorsement defined as a famous individual brand communication in market who reaches that makes the brand products popular as well as known to the peoples. During the more curious about celebrity personalities either it is online or offline.

Company that uses the right celebrity for endorsement which is more likes & holds a very important role.

This research showed that the consumer's loyalty, trustworthiness, satisfaction and awareness of product need. Which significant the positive influenced consumer trust.

CHDOSA AN ARALUCA (3/2012)

Celebrity indoors is highly reported &person and being to know to most celebrity in endorsement is a suitable strategy or promotion which is improve the image of product brand.

Celebrity endorsement has end of the strategy which communicate experts' youth in marketing build for their attitude celebrity present types techniques and models of analysing product with their efficiency of a brand which is attractive familiarity and trustworthy and more like ability for consumer and help in aspire value of lifestyle changes.

D.RAJASEKER (2018)

Celebrity endorsement strategy changing the perception attitude of customers. different celebrity present different varieties of brand which influencing the consumer help to increase and extent the ideas sales in the market and increase the purchase decision.

The relationship of credibility of celebrity indoors have to find me moderating effect of consumer willingness to why consumer participate with perception intention with attitude toward the endorsement against the physical attractiveness buying intention trustworthiness awareness of information about product brand measured these reliable is being tested by consumer.

C.S JAYANTHI PRASAD (2012)

The use of celebrity for advertising in companies has been corporate me friend image in product marketing their existing interpretation between celebrity and customer present digit result result for consumer satisfaction consumer loyalty and consumer awareness and achieving the result of consumer action.

CHABO DIMED SAOUMA JOULYANA (2005)

Celebrity endorsement strategy is used in nowadays it frequently used in marketer to increase the sales and extent their market shares the use of celebrity is mainly positive aspect but another hand its environmentally negative aspect also endorses affect consumer purchasing decision when a celebrities get negative publicity of product.

It causes interest which is most important for crucial consumer perception of purchasing product.

Celebrities who enjoy the public recognition by large group of people with attractiveness and trust worthiness but are affect the consumer buying behaviour and their trust.

ANGGA FEBRIAN METHOD FADLY (2021).

Celebrity endorsement is a marketing communication strategy which online or offline in effectively influence the customer percentage decision needs it affects me consumer attitude and Buying behaviour in their lifestyle effectively influence the addition of brand trust & moderate variable which influence of endorsement on the brand trust attitude therefore the marketers are refer to see how a big brand product trust and endorse by big celebrity for the promoting their product for consumers satisfaction and more likeable celebrity.

RESEARCH METHODOLOGY

In this research study secondary and primary data has been collected in all information which is qualitative in nature.

RESEARCH DESIGN

Descriptive Research

This study is a purely in descriptive research which is seen in research to know about topic the topic role of celebrity endorsement is built the main strategy in market which impact on consumer trust attitude and behaviour on their lifestyle this descriptive research knowing information for ordering the data of research question for me current status of my study.

SOURCES OF DATA

SECONDARY DATA COLLECTION

On the other hand, be also you have few second-hand data from journal article website which referred for the purpose of research process.

SAMPLING METHOD

In this research we use personal observation of collecting information interaction to collect the data for this research study.

FINDING AND DISCUSSION

In recent traders the most efficiently strategy in brand communication is celebrity endorsement celebrities who endorsed product or brand institutional with the target audience celebrity endorsement are more effective for customer purchase behaviour and intention c. endorsement technique is use to create the awareness of favourable response in the market it often to relasied the positive and negative image about celebrity in endorsement about their product and services promotion it influence consumer purchase intention experiment and information collection about product are a brand for their satisfaction and trustworthy .

The image of celebrity in public should be charged after endorsement likewise but same time it affects negative light basically celebrity endorsement creates awareness about brand and different inline between quality reliability which is almost completely available to increase the popularity of purchase brand product which affect the consumer trust in positively moderate in their lifestyle favourable attitude.

The reality is that there are a several brand are product which is made to each other and might able to negative information which is impact an consumer trust worthiness' the shadow effect the multiple brand product with negative effect however it affect society and their cultural congruence and the appearance of celebrity especially effective for the organisation in the market with the worldwide repetition the effectiveness message implies the favourable image about the product and acceptance in attractive Ness depends on the similar and audience as the voice message effect ordinary model for target for audience are consumer.

THEORETICAL FRAMEWORK

Theory behind the celebrity endorsement has attracted the interest for research agenda found that product through the consumer.

CREDIBILITY MODEL

In this model depend on the effectiveness of label expertise and trust worthiness information for a credible source it influences beliefs attitude behaviour which occurs source influence in their attitude and it refers to honesty and believability for the target customer.

ATTRACTIVENESS MODEL

This theory accepts the identification and condition information for receiver with the attractiveness and except his opinion trust beliefs and condition which pass the brand source of product.

CONCLUSION

For launching the product are brand celebrity endorsement is always the easiest way this research concludes more attractive advertisement.

The significant relation between all attractive of celebrities and customer and the respond are clearly to convey the purchase and buying behaviour perception.

The physical attitude of attitude impact on customer perception boosting up the purchase and sales intention in market basically consumer attractive towards the endorse which explored the goods resulting either it is a negative or a positive influence for the consumer attitude and trustworthiness the product. In this study we suggest that the celebrity endorsement stimulate the purchase intentions of consumers affects the brand loyalty and perceived quality affects in various products categories for target audiences.

The positive association of purchase intentions are examined the effect of actual behaviour of consumers and future studies of purchase intention and actual buying behaviour directly and indirectly affect the product brand image.

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Trade-off between Employment and Poverty in India

Dr. Narendra Kumar[1], Prof. Bharti Pandey[2] & Dr. Abhishek Pandey[3]

ABSTRACT

The problem of poverty is a hurdle in the path of development at the global level. Development of a country or the entire world is possible only with poverty eradication. The relationship between poverty and employment holds an important place in economic and social policy making globally, in which it is particularly relevant in developing countries like India. Increasing employment opportunities increases the possibility of poverty eradication, but this effect depends on many social and economic factors, such as education level, per capita income, and government welfare policies. In this research, Linear regression technique has been used to analyze the relationship between poverty and employment, to understand how employment growth can help in reducing poverty. The findings of this study may prove useful in strengthening poverty alleviation efforts at Indian and global level and in adopting an effective strategy for policy makers and researchers.

Key Words: *Sustainable Development Goal, Zero Poverty, Employment Dynamics, Economic Development, India.*

1. Introduction

People face problems of deprivation or inconvenience due to the scarcity of resources and opportunities in the economy, leading to social and economic differences among individuals (UNDP, 2023). The problem of unemployment and poverty is a major challenge for development in India as well as in the world. Globally, the relationship between poverty and employment is one of the most prevalent socio-economic challenges. Increasing employment has been considered an effective means of reducing poverty, but its results vary from country to country.

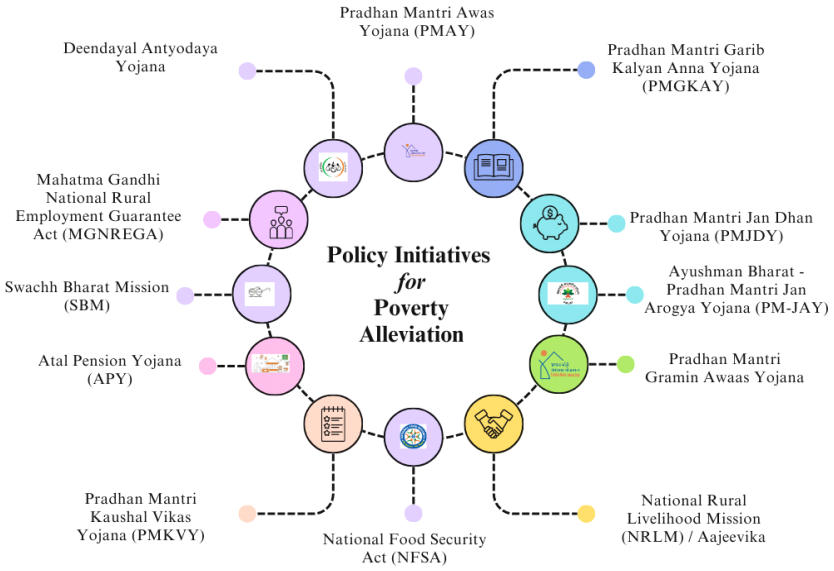
"A country is poor because it is poor". **— Ragnar Nurkse**

1. Guest Faculty, Department of Economics, Dr. Shakuntala Mishra National Rehabilitation University, Lucknow, (U.P.) E-Mail: narendra21191@gmail.com
2. Professor & Head, Department of Economics, *Shri Jai Narain* Misra *P.G. College*, Lucknow, (U.P.) E-Mail: dr.bhartipandey06@gmail.com
3. Assistant Professor, Department of Economics, Dr. Shakuntala Mishra National Rehabilitation University, Lucknow, (U.P.) E-Mail: pandeyabhishek451@gmail.com

According to Ragnar Nurkse, the problem of poverty affects the demand and supply of the economy in a cyclical manner. In this situation, the development of the nation is negatively affected due to which the country affected by poverty becomes even poorer. The relationship between poverty and employment in a developing country like India has been an important topic of economic policy-making for centuries. While on the one hand, increasing employment opportunities improves the standard of living, on the other hand, it also creates many obstacles in poverty eradication efforts. This research study analyzes this relationship from the economic perspective of India to understand how increasing employment can help reduce poverty. Further, considering various social and economic factors, the study also highlights the areas where there are greater opportunities for poverty reduction.

Policy Initiatives for Poverty alleviation

Figure 1: Policy Initiatives by Government of India for Poverty alleviation



Source: Created by Authors

2. Review of Literature

Recently India has hosted G20 Summit which is an important agenda for climate and development under which it has been decided that the countries should prepare environment friendly plans for poverty alleviation and there should be no compromise with the environment for poverty alleviation (Kant, A. 2023).

The Agenda 2030 for Sustainable Development and all the 17 Sustainable development Goals (SDGs) cover the Economic Development, Environmental issues and Social aspects of the society. It follows the concept of "leaving no one behind" (NITI Aayog, 2023). India's presidency of the

G20 Summit reflects a visionary plan for sustainable consumption and production based on the principle of high quality of lifestyle for sustainable development (Bagai, A. 2023). Pandey A. (2023) show that during 2004-05 and 2018-19, the income effect and education effect leads to the overall deterioration in labour force participation in Bihar after that the income effect is subdued by the substitution effect contributing the increase in the female labour force participation in Bihar which will lead to poverty eradication. Informal sector plays key role in employment generation, Livelihood and social change (Shekar, Joseph & Beena, 2023). Mehta and Awasthi (2024) explored that the youth population related to the higher income groups have lower probability of being not in education, employment or training as compare to the lower income goups.

3. Research Gap

Despite numerous studies on the relationship between employment and poverty, there is limited research on the impact of employment growth in different sectors on poverty and the combined effect of factors such as education, skill development, etc. In a country like India, a comprehensive analysis of this complex relationship is necessary, which makes this research particularly relevant.

4. Objectives of the Study

To analyze the relationship between employment rate and poverty levels.

5. Hypotheses

H_0: There is no significant relationship exist between employment and poverty in India.

H_1: There is an inverse relationship between employment and poverty in India.

6. Research Methodology

6.1 Data

The present study is based on quantitative analysis using secondary data. Data has been gathered from various reports of RBI, Ministry of Labour & Employment, PLFS reports of NSSO, other Government departments, National and International organizations. On the other hand various websites have been used as the digital sourse of data.

6.2 Data analysis

Data on verious variables has been analysed using SPSS. Linear regression analysis has been used to analyze the relationship between employment and poverty. Poverty Rate (PR) has been used as dependent variable and Employment Rate (ER) has been used as independent variable to solve the objective of the study and hypothesis testing.

7. Results and Discussion

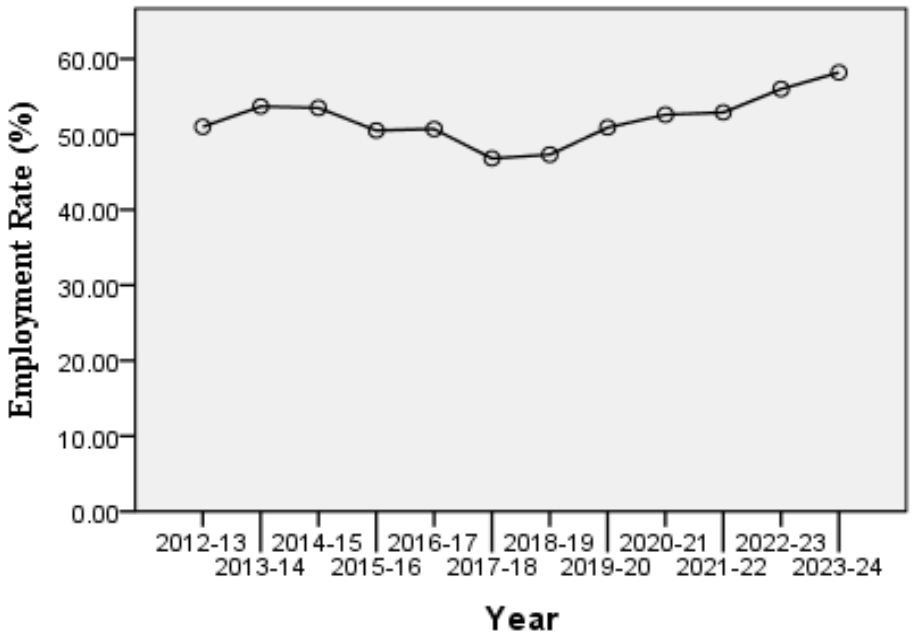
The data on the employment rate and poverty have been analysed to answer the research question or the objective of the study.

Table 1: Employment rate in India in usual status (ps+ss) for persons of age 15 years and above (in %)

Year	Employment Rate	Year	Employment Rate	Year	Employment Rate
2012-13	51.00	2016-17	50.70	2020-21	52.60
2013-14	53.70	2017-18	46.80	2021-22	52.90
2014-15	53.50	2018-19	47.30	2022-23	56.0
2015-16	50.50	2019-20	50.90	2023-24	58.2

Source: 1. Annual Reports of GoI, Ministry of Labour & Employment (2012-13 to 2016-17)
2. Annual report of PLFS, NSSO (2017-18, 2018-19, 2019-20, 2020-21, 2021-22)

Figure 2: Employment rate in India in usual status (ps+ss) for persons of age 15 years and above (in %)



Source: Table 1

According to the data, it has found that the employment rate in India was 51 percent in 2012-13 which increased to 53.70 percent in 2013-14. It declined to 53.50 percent and 50.50 percent in 2014-15 and 2015-16 respectively. It increased to 50.70 percent in 2016-17 after that it again declined to 46.80 percent in 2017-18. After 2017-18, the increasing trend of employment rate has been found. It increased to 47.30 percent, 50.90 percent, 52.60 percent, 52.90 percent, 56 percent and 58.2 percent in 2018-19, 2019-20, 2020-21, 2021-22, 2022-23 and 2023-24 respectively (Table 1 & Figure 2).

SDG and Poverty in India

The Sustainable Development Goal 1 is focused on ensuring to end the poverty from everywhere. The increase in Government spending to reduce the poverty shows a positive effect on the aforesaid problem. In 2015, the government spending on health, education and social protection was 47 percent which increased to 53 percent in 2021 (United Nation). The Sustainable Development Goals (SDGs) aims to reduce the poverty at least half of the poor population by 2030 UNDP.

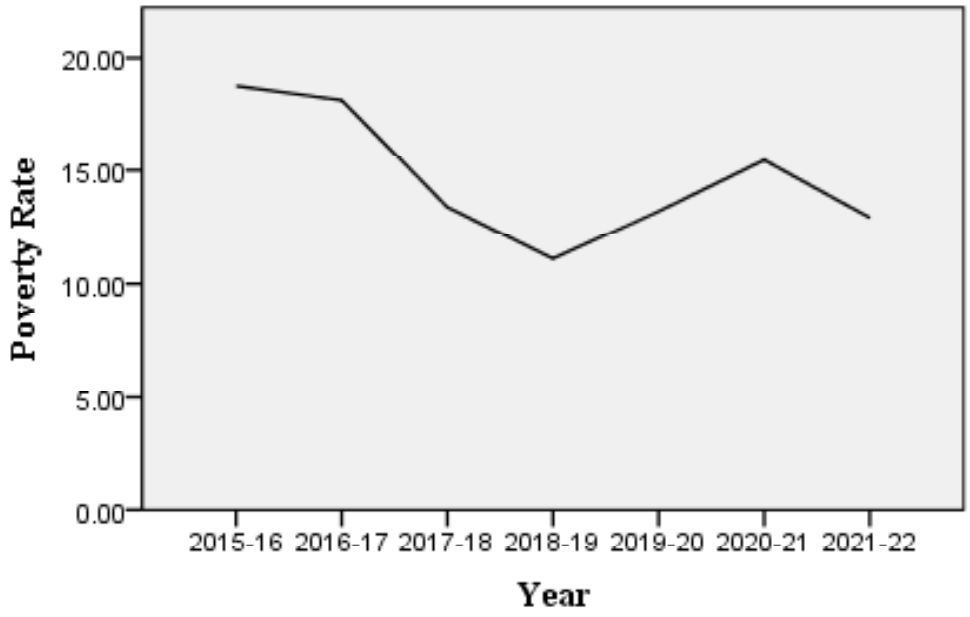
Poverty in India

Table 2: Poverty Rate in India (in %)

Year	Poverty Rate	Year	Poverty Rate
2015	18.75	2019	13.2
2016	18.12	2020	15.45
2017	13.38	2021	12.92
2018	11.1	-	-

Source: World Bank

Figure 3: Poverty Rate in India (in %)



Source: Table 2

The data on poverty rate in India shows a continuously declining trend. It was 18.75 percent in 2015 which declined to 18.12 percent, 13.38 percent and 11.1 percent in 2016, 2017 and 2018.

It increased to 13.2 percent 15.45 percent and 12.92 percent in 2019, 2020 and 2021. This increase in the poverty rate can be caused by the nationwide lockdown imposed by the Government to prevent the spread of Covid-19 pandemic (Table 2 & Figure 3).

Hypothesis Testing

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.340[a]	.115	-.062	2.93793

a. Predictors: (Constant), Employment Rate

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.625	1	5.625	.652	.456[b]
	Residual	43.157	5	8.631		
	Total	48.782	6			

a. Dependent Variable: Poverty Rate

b. Predictors: (Constant), Employment Rate

Coefficients[a]

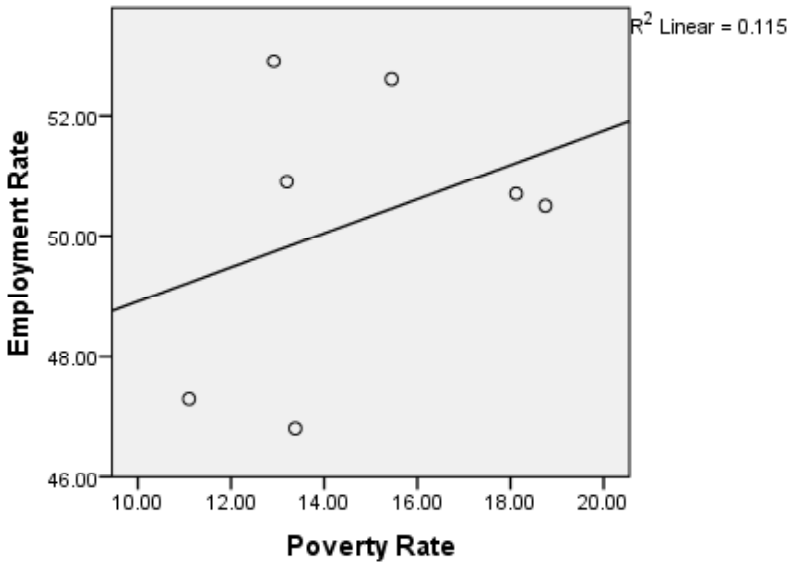
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.782	25.400		-.228	.829
	Employment Rate	.408	.505	.340	.807	.456

a. Dependent Variable: Poverty Rate

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	13.2991	15.7862	14.7029	.96824	7
Residual	-2.86623	3.94230	.00000	2.68195	7
Std. Predicted Value	-1.450	1.119	.000	1.000	7
Std. Residual	-.976	1.342	.000	.913	7

a. Dependent Variable: Poverty Rate



According to the results of the analysis the p-value is .829 > 0.5. On the basis of the results we failed to reject the null hypothesis (There is no significant relationship exist between employment and poverty in India). The results show that there is a trade-off between employment and poverty in India but due to the Covid-19 pandemic the relationship between employment and poverty weak. Because of during the pandemic all the economic activities were closed which declined the employment rate and increased the poverty in the Nation as well as in the World.

8. Conclusion

There are some weak relations found due to the economic recession caused by the Covid-19 pandemic. In the post pandemic era the government is doing well to reduce the poverty rate in India.

The present study makes it clear that there is a relationship between employment growth and poverty in India, which is useful in preventing various social and economic inequalities. Increasing employment opportunities will prove to be helpful in improving the standard of living as well as poverty alleviation, especially in those areas where economic inequality is high. If this relationship is effectively incorporated in the policy, it may be possible for India and other developing countries to achieve the goal of zero-poverty, which will promote overall economic growth and social prosperity.

9. Suggestions

Several policies and initiatives have been implemented by the central government as well as by the state governments to get back the increasing trend of the employment and decreasing trend of poverty rate. The findings of this study will play an important role for policy makers. Policy makers should focus on employment generation for poverty alleviation, especially in areas where inequality and unemployment rates are high. For this, it is necessary to strengthen the schemes like; MNREGA,

which provides sustainable employment opportunities in rural areas. Similarly, skill development program can be emphasized through various programmes like Pradhan Mantri Kaushal Vikas Yojana (PMKVY) and Deen Dayal Upadhyaya Grameen Kaushal Yojana (DDU-GKY) so that more people can get employment opportunities and their productivity can be improved.

Pradhan Mantri Jan Dhan Yojana (PMJDY) is also playing a significant role in poverty alleviation. It is necessary to promote the financial inclusion through PMJDY so that even poor families can achieve financial security. Other programmes like; Pradhan Mantri Awas Yojana (PMAY) and Swachh Bharat Mission can improve the standard of living, which are very helpful in overall poverty alleviation efforts. Financial assistance is being provided to micro and small enterprises under schemes like; Pradhan Mantri Mudra Yojana (PMMY), which increases employment opportunities.

Effective implementation of these schemes and community participation are essential to achieve the goal of zero poverty in India, thereby ensuring the long-term prosperity and social inclusion.

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Economic Renaissance in Uttar Pradesh: Pathways to Growth and Success

Alpana Srivastava[1] & Nimish Gupta[2]

ABSTRACT

This study explores the economic transformation of Uttar Pradesh, India's most populous state, and its journey toward sustainable economic growth. Utilizing state-level data, sectoral performance, and key growth indicators, this paper analyzes the structural changes that have contributed to the state's economic renaissance. We identify the primary drivers of growth, including infrastructure development, policy reforms, and demographic advantages, while addressing the challenges of unemployment, poverty, and regional disparities. Policy recommendations are provided to sustain long-term growth, with a focus on inclusive development and industrial diversification.

***Keywords**: Economic growth, unemployment, poverty, regional disparities, Sectoral Analysis*

1. Introduction

Uttar Pradesh (UP), India's largest state by population, has long been considered an economic laggard despite its rich cultural heritage and significant natural resources. However, recent years have witnessed an economic resurgence in the state, driven by structural reforms, enhanced governance, and strategic investments in infrastructure. The state's GDP had gone up from ₹ 16.45 crore in 2020-2021 to ₹ 25.48 crore in 2023-2024, growing 16.7% in the past three years, which was above the national average. The GDP growth rate was 12.8% at current prices and 8% at constant prices in 2023-2024 compared to 20.1% at current prices and 9.8% at constant prices in 2021-2022. The state is contributing 8% to India's GDP. 56% of UP's 240 million population are in the working age group which is another boon to economy.

This article examines the key factors propelling Uttar Pradesh's economic growth and the challenges that remain as the state strives for long-term sustainable development.

1. Guest Faculty, Department of Economics, Dr. Shakuntala Mishra National Rehabilitation University, Lucknow, (U.P.) E-Mail: narendra21191@gmail.com
2. Professor & Head, Department of Economics, *Shri Jai Narain* Misra *P.G. College*, Lucknow, (U.P.) E-Mail: dr.bhartipandey06@gmail.com
3. Assistant Professor, Department of Economics, Dr. Shakuntala Mishra National Rehabilitation University, Lucknow, (U.P.) E-Mail: pandeyabhishek451@gmail.com

1.1 Research Problem

Despite these advancements, Uttar Pradesh continues to face significant hurdles such as regional economic disparities, underemployment, and low per capita income compared to national averages. This study aims to investigate the factors that have contributed to its recent growth, analysing sectoral performances, and explore pathways for overcoming persistent challenges.

1.2 Objectives

1. To identify the main drivers of economic growth in Uttar Pradesh over the last decade.
2. To analyze the impact of reforms and policies on key sectors such as agriculture, industry, and services.
3. To explore the regional disparities within Uttar Pradesh in terms of economic development.
4. To provide policy recommendations for sustaining and accelerating economic growth in the state.

1.3 Research Questions

1. What are the primary drivers of economic growth in Uttar Pradesh?
2. How have different sectors (agriculture, manufacturing, services) contributed to this growth?
3. What are the major challenges in achieving equitable economic development across different regions of the state?
4. What policy initiatives can further enhance Uttar Pradesh's economic success?

2. Literature Review

Previous studies have highlighted disparities in economic performance across Indian states, with Uttar Pradesh often categorized as a "BIMARU" state (representing poor socio-economic performance). However, recent reforms and policy initiatives have positioned Uttar Pradesh as a potential growth leader, yet comprehensive district-wise analyses remain limited. To design policies and strategies for accelerating economic and social development in Bihar and UP, it is vital to identify the underlying factors that have stalled development there.

While huge efforts have been made to document the diverse patterns of economic growth in India (e.g., Ghosh, Citation2008; Parker & Kozel, Citation2007), little systematic work has been done to understand the factors that contributed to different growth patterns within the country. This study analyzes the socio-economic performance of Indian states, categorizing Uttar Pradesh as a BIMARU state due to its historical challenges in achieving significant economic growth and development.

The focus has often been on micro-issues overlooking the broader structural and policy matters that shape the patterns of development (e.g., Parker & Kozel, Citation2007; Thakur, Bose, Hossain,

& Janaiah, Citation 2000). This research focuses on the micro-level issues affecting economic growth in India, particularly in Uttar Pradesh and Bihar, highlighting the need for targeted interventions to address local constraints on development. The authors explore various socio-economic factors, such as land ownership patterns and access to resources, that impact agricultural productivity in Uttar Pradesh, contributing to the state's overall economic performance.

Although reducing poverty and accelerating economic growth has been the key focus in development economics, understanding about the causes of economic growth has remained poor (Kenny & Williams, Citation2001). This paper critiques existing economic growth models, arguing that understanding the complexities of social and economic interactions is crucial for addressing growth challenges in underdeveloped regions like Uttar Pradesh and Bihar. In this analysis, the authors highlight the need for a deeper understanding of the factors driving economic growth, particularly in contexts like Uttar Pradesh and Bihar, where traditional models may fall short.

While the empirical literature has contributed to an enhanced understanding of cross-country growth performance and recent development in econometric methods allowed endogeneity and model uncertainty to be explained (e.g. Dollar, Citation1992). This article presents comparative analysis on the growth performance of outward-oriented economies, providing insights relevant to understanding India's diverse economic landscape and the implications for states like Uttar Pradesh.

(Mirestean & Tsangarides, Citation2009), This paper reviews recent developments in econometric methods for analyzing economic growth, addressing the complexities of causal relationships in economic and social processes.Econometric models fail to grasp fully the complex causal nature of the social world, underlying economic and social processes that reinforce each other and shape development patterns and space (Bunce, Citation2004; Pierson, Citation2007).

(Mayntz, R. (2004)) explores the role of mechanisms in social processes, emphasizing the need for an integrative approach to understanding economic development. (Pierson, P., 2007)). discusses how social changes impact economic policy and development, stressing the importance of addressing structural issues in underdeveloped regions.Strategies and policies based on such analysis fail to address the fundamental causes of underdevelopment, as economic development is a multifaceted complex and dynamic process (Adelman, Citation2001; Kenny & Williams, Citation2001).

3. Key Drivers of Growth

The literature highlights infrastructure development, investment in the agricultural sector, and labour-intensive industries as key drivers for economic progress in developing regions. Further, literature on Uttar Pradesh points to initiatives like "One District One Product" (ODOP) and MSME growth as catalysts for employment generation and exports.Key Growth Drivers Additionally, the state's young and growing workforce presents both an opportunity and a challenge for future development.The state is making 9.2% contribution to the national income and is turning out to be the growth engine for the nation's development by becoming the second-largest economy.

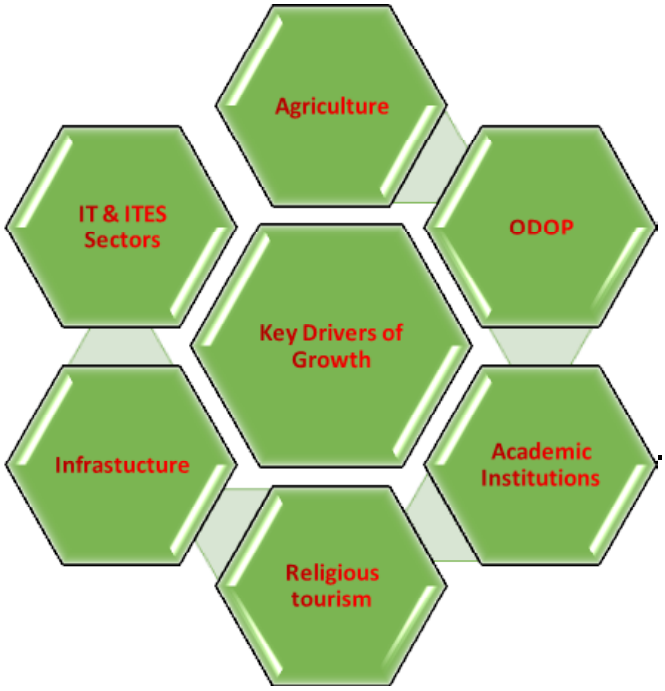


Figure-1

Uttar Pradesh, India's most populous state, is experiencing robust economic growth, driven by a combination of industrial, agricultural, and infrastructural development. Key growth drivers include large-scale investments in manufacturing and industrial sectors, thanks to initiatives like the "One District, One Product" (ODOP) scheme, which promotes the state's unique industries by district. Uttar Pradesh has also been developing its connectivity infrastructure with new highways, expressways, and upcoming airports, positioning it as a logistics and trade hub. The agriculture sector, benefiting from government-backed irrigation projects and modern farming techniques, remains another significant contributor, making the state a vital agricultural hub. Additionally, growth in the tourism sector, boosted by cultural heritage and religious tourism in cities like Varanasi and Ayodhya, has generated employment and spurred development in associated services. With a young workforce and pro-investment policies, Uttar Pradesh is attracting both domestic and foreign investments, promising sustainable growth and improved living standards for its residents

4. Critical Analytical of Key Indicators of Growth

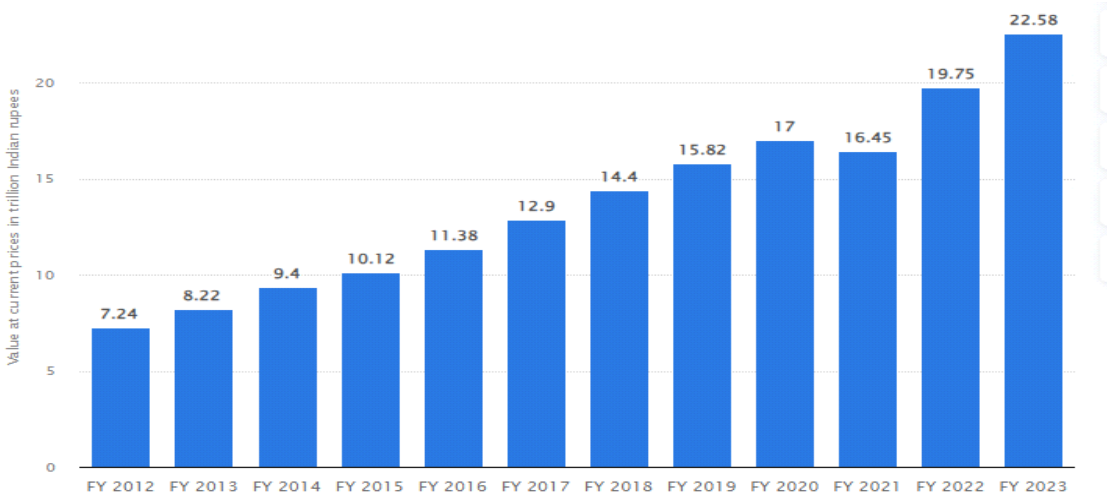
This research utilizes secondary data from various sources, including, RBI, government reports and survey. Sectoral growth figures from government reports and economic surveys

Infrastructure development data from NITI Aayog and Planning Commission reports

Population and employment data from the National Sample Survey Office (NSSO).

The state's GDP had gone up from ₹ 16.45 crore in 2020-2021 to ₹ 25.48 crore in 2023-2024, growing 16.7% in the past three years, which was above the national average.The GDP growth rate was 12.8% at current prices and 8% at constant prices in 2023-2024 compared to 20.1% at current prices and 9.8% at constant prices in 2021-2022, he said reviewing the efforts made by the state government to make UP a trillion-dollar economy at a high-level meeting here.

4.1 GDP Trend



Graph-1: Gross state domestic product at factor cost of Uttar Pradesh, India from financial year 2012 to 2023 (in trillion Indian rupees)

The state government had set the target of making UP a trillion-dollar economy by 2027-2028.

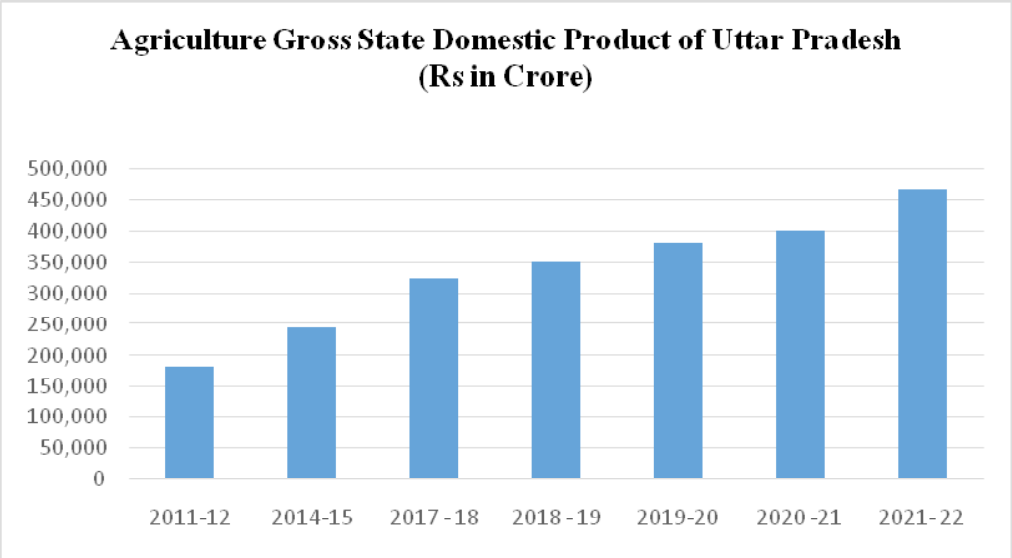
Adityanath said the departmental minister and the state planning department should review the progress made to achieve the objective of making the state a trillion-dollar economy every month.

Uttar Pradesh's GDP status has shown a promising upward trend, reflecting its role as one of India's fastest-growing states. With a diverse economic base, Uttar Pradesh's Gross State Domestic Product (GSDP) is largely fueled by its strong agriculture sector, which makes the state a major producer of crops like wheat, sugarcane, and rice. Additionally, industrial growth has accelerated, with sectors like manufacturing, textiles, electronics, and food processing receiving significant investments under the state's industrial policies and initiatives, including the "One District, One Product" (ODOP) scheme. Infrastructure advancements, such as the construction of major expressways, new airports, and improved rail connectivity, are boosting logistics and trade, attracting more businesses and creating jobs. Uttar Pradesh's service sector, including tourism, IT, and real estate, has also expanded, supported by improved connectivity and pro-investment policies. With ambitious goals and consistent support for economic activities, Uttar Pradesh aims to achieve a trillion-dollar economy status by the next decade, showcasing its transformation into a thriving economic hub in India.

4.2 Sectoral Analysis

The study breaks down GDP contributions from agriculture, manufacturing, and services sectors to understand the drivers of Uttar Pradesh's economic growth.

4.2.1 Agriculture: Agriculture remains a vital sector, though its relative contribution to overall GDP has decreased. Innovations in agri-tech, increased irrigation coverage, and crop diversification have improved productivity, though regional disparities persist. Agriculture is a critical contributor to Uttar Pradesh's economy, accounting for approximately 24% of the state's Gross State Domestic Product (GSDP). As one of India's most agriculturally productive states, Uttar Pradesh is a major producer of crops like wheat, rice, sugarcane, pulses, and potatoes.

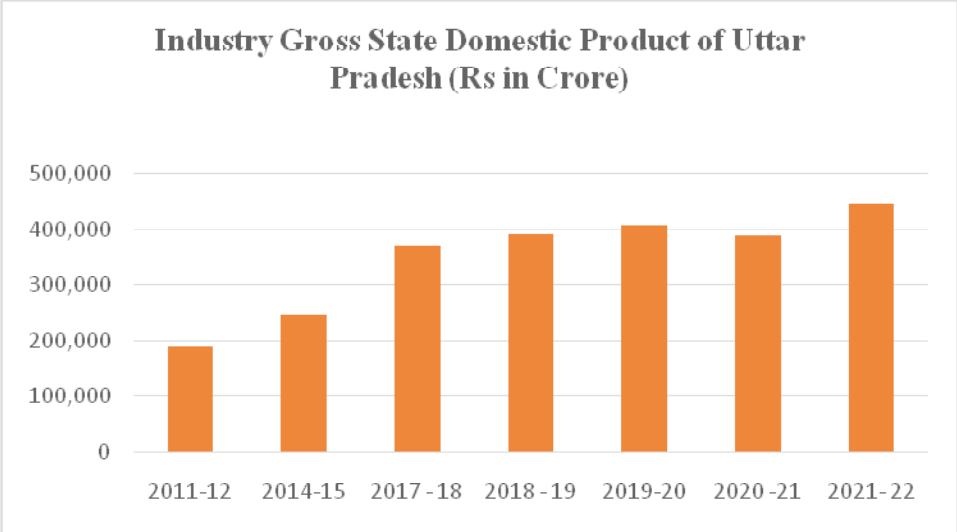


Graph-2:AgricultureGross State Domestic Product of Uttar Pradesh (Rs in Crore)

The state's sugarcane production alone drives its significant sugar and ethanol industries, both of which are central to rural employment and revenue generation. Government policies have played a vital role in sustaining agricultural growth, providing support through crop insurance, fertilizer subsidies, and improved irrigation systems, which have helped farmers increase yields. Furthermore, programs like the "Per Drop More Crop" under the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) have boosted water-use efficiency in farming. The state's agricultural contributions not only meet regional needs but also strengthen India's overall food security, while promoting rural economic stability and supporting ancillary industries such as food processing.

4.2.2 Industry: Manufacturing, particularly MSMEs and the ODOP scheme, has emerged as a key growth engine, creating employment and promoting exports, especially in districts known for artisanal goods. The industrial sector in Uttar Pradesh is a substantial driver of the state's economic growth, contributing around 26% to its Gross State Domestic Product (GSDP). The state's industrial base includes key sectors such as manufacturing, textiles, leather, food processing, electronics, and

chemicals. Initiatives like the "One District, One Product" (ODOP) scheme, which promotes traditional and unique industries in each district, have invigorated local manufacturing and expanded market reach, both domestically and internationally. Uttar Pradesh's industrial growth is further fueled by infrastructure projects like expressways, industrial corridors, and upcoming airports, improving logistics and attracting investments.

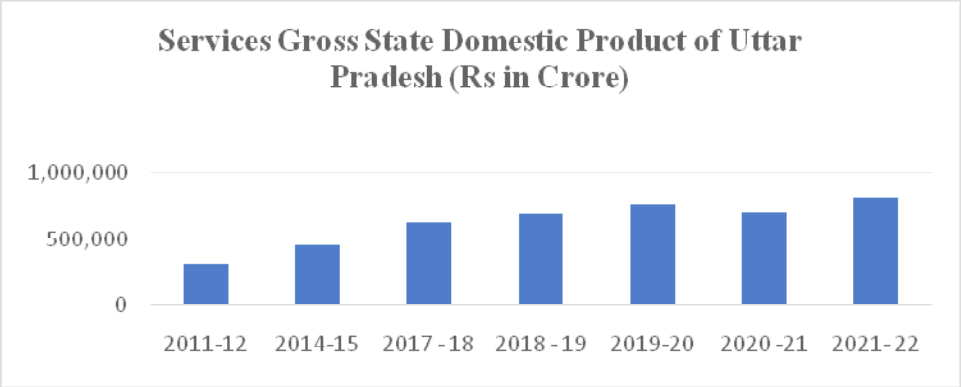


Graph-3: Industry Gross State Domestic Product of Uttar Pradesh (Rs in Crore)

Additionally, the state government's proactive policies, including subsidies, single-window clearances, and tax incentives, have made Uttar Pradesh an attractive destination for both domestic and foreign investors. The focus on establishing dedicated industrial zones and technology parks has bolstered growth in sectors like electronics manufacturing, especially in regions like Noida, solidifying the state's role as an emerging industrial hub. Through these developments, Uttar Pradesh is enhancing employment opportunities and contributing significantly to India's overall industrial output.

4.2.3 Services: The service sector, particularly IT services and retail, has seen significant expansion in urban centers such as Lucknow, Noida, and Ghaziabad, contributing to income growth and urban employment.

The service sector is a vital component of Uttar Pradesh's economy, contributing approximately 50% to its Gross State Domestic Product (GSDP). This sector encompasses a diverse range of industries, including banking, finance, real estate, retail, healthcare, education, IT, and tourism. Tourism, in particular, is a significant driver, with Uttar Pradesh being home to iconic destinations like the Taj Mahal in Agra, religious sites in Varanasi and Ayodhya, and wildlife parks, which attract millions of domestic and international visitors annually. The growth of IT and business services, especially in cities like Noida and Lucknow, has also strengthened the service sector, transforming these areas into technology and outsourcing hubs.



Graph-4: Services Gross State Domestic Product of Uttar Pradesh (Rs in Crore)

Uttar Pradesh's government has encouraged service-sector expansion through policies promoting infrastructure, digitalization, and ease of doing business, resulting in improved connectivity and financial inclusiveness. The real estate and retail sectors have benefited from rapid urbanization and rising consumer demand, further contributing to the state's economic landscape. With continued investment and support, the service sector is expected to remain a primary driver of Uttar Pradesh's economic growth and employment.

5. Challenges of Development in Uttar Pradesh

Despite these advancements, regional imbalances and disparities between eastern and western UP, along with low urbanization and industrialization, are recurring themes in the literature. Additionally, scholars have pointed to the underutilization of human capital and the slow pace of industrial development as barriers to inclusive growth.Despite recent progress, several challenges persist as shown in figure-2:

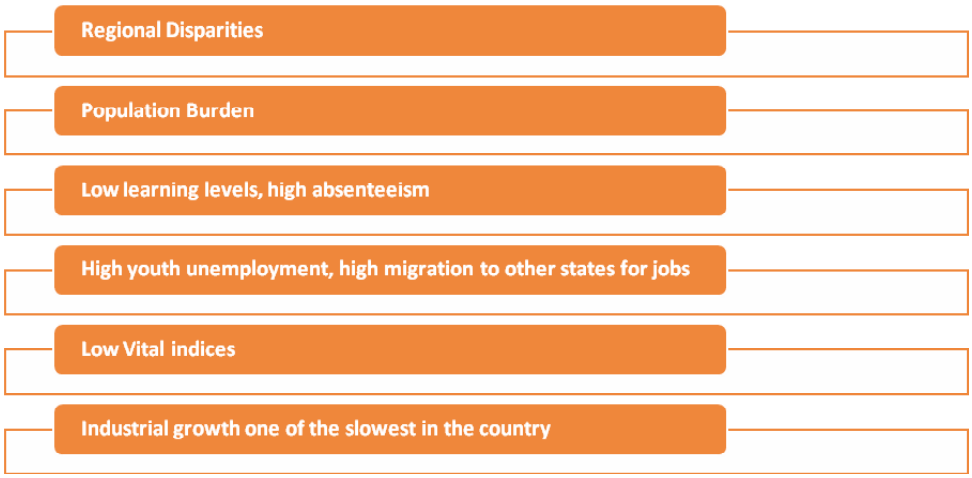


Figure-2: challenges in developmental path

Regional Disparities: The analysis reveals significant economic disparities between western Uttar Pradesh (which enjoys better infrastructure and industrial development) and eastern UP, which continues to lag due to inadequate investment, poor connectivity, and lower literacy rates.

Unemployment and Underemployment: While job creation has improved, especially in urban areas, rural underemployment remains a concern.Though the rate of unemployment came down from 6.2% in 2017-2018 to 2.4% now while there had been an improvement in the women labour force, which went up from 13.5% in 2017-2018 to 31.2 % in 2022-2023 still as the state with huge work force have to undergo a long way in this direction.Education and skill development also present significant challenges, with relatively low literacy rates and limited access to quality education, particularly in rural regions. This has led to a shortage of skilled labor, affecting the employability of the youth and the growth of emerging sectors.

Poverty and Regional Imbalances: Regional inequalities, particularly between eastern and western UP, have hindered inclusive growth. Increased investment in healthcare, education, and rural infrastructure is necessary to close these gaps. High levels of poverty and unemployment, especially in rural areas, continue to impact quality of life and strain state resources.

Health indicators: According to the NITI Aayog's Health Index, UP ranks low overall among large states; however, it leads in incremental improvements across several health parameters. From 2018-19 to 2019-20, UP made substantial progress in 33 out of 43 tracked health indicators, including maternal and infant mortality rates, immunization coverage, and healthcare accessibility improvements.UP's investments in health infrastructure and policy reforms have been significant. The state has increased health funding, expanded hospital and medical facilities, and implemented initiatives under the Ayushman Bharat scheme, aimed at enhancing healthcare access, especially in rural areas. Efforts are also underway to improve outcomes in nutrition, maternal and child health, and communicable disease control.While UP still lags in many areas—scoring low on maternal mortality, neonatal mortality, and access to sanitation—the state's incremental improvements suggest a positive trajectory for health indicators if current reforms continue to strengthen healthcare delivery systems and focus on underserved regions

Investment in Infrastructure: Infrastructure development, particularly roadways and expressways like the Yamuna Expressway and Purvanchal Expressway, has played a pivotal role in improving economic integration within the state and with other major economic hubs.Despite its growth, Uttar Pradesh faces several developmental challenges that hinder its full economic potential. One major issue is inadequate infrastructure in rural areas, including limited access to reliable electricity, roads, and healthcare facilities, which restricts economic activities and access to basic services for a large portion of the population.

Additionally, agricultural dependency and climate vulnerability make rural livelihoods fragile, as erratic weather patterns and insufficient water resources can severely impact crop yields. Pollution and environmental degradation, particularly in urban centers like Kanpur and Lucknow, also present ongoing health and sustainability issues. Governance and administrative challenges, including bureaucratic inefficiencies and corruption, can hinder effective policy implementation, deterring potential investors.

6. Policy Implications and Recommendations

To tackle its developmental challenges and achieve sustainable growth, Uttar Pradesh needs a comprehensive approach through well-targeted policies. Here are some policy implications and recommendations:

- **Infrastructure Development:** Strengthening infrastructure in both urban and rural areas should be a top priority. Investments in roads, power supply, water resources, and digital connectivity are essential. Expanding renewable energy sources, like solar and biomass, can address electricity shortages while reducing environmental impacts.
- **Education and Skill Development:** Enhancing the quality of education and access to vocational training programs is critical for creating a skilled workforce. Policies should focus on improving teacher training, updating curriculums to match industry needs, and building partnerships with private sectors for on-the-job training. Special emphasis on digital literacy and STEM education would also prepare youth for modern job markets.
- **Healthcare Access and Public Health:** Uttar Pradesh should prioritize strengthening its healthcare infrastructure, especially in rural areas. Policies should focus on expanding healthcare facilities, training healthcare workers, and improving the supply of medicines and resources. Mobile health units, telemedicine, and public health awareness campaigns can also improve access to healthcare for underserved populations.
- **Agricultural Resilience and Modernization:** Policies aimed at promoting sustainable farming practices, crop diversification, and efficient water usage (e.g., drip irrigation) can help combat climate risks. Government support for crop insurance and digital platforms to provide market information to farmers will improve resilience. Further, promoting agri-tech innovations and creating value chains through food processing units can enhance rural incomes.
- **Environmental Protection and Pollution Control:** Addressing pollution through stricter regulatory measures and promoting green technology in industries can help mitigate environmental damage. Expanding green spaces, supporting sustainable waste management, and enforcing emission standards for vehicles and factories are essential steps to control urban pollution.
- **Economic Diversification and Industrial Growth:** Industrial policies should focus on diversifying the economy beyond agriculture by supporting manufacturing, IT, and service sectors. Incentives for small and medium enterprises (SMEs), along with simplification of tax structures and single-window clearances, can attract domestic and foreign investments. Special Economic Zones (SEZs) and industrial corridors should be developed to promote exports and job creation.
- **Improved Governance and Transparency:** Strengthening governance through administrative reforms, digitization of services, and anti-corruption measures is key to efficient policy implementation. Transparent systems for permits, subsidies, and grants will build investor confidence and ensure that public resources are effectively allocated.

- **Boosting Tourism Potential:** Uttar Pradesh can leverage its rich cultural heritage to boost tourism by improving infrastructure around tourist sites, promoting eco-tourism, and ensuring tourist safety. Strategic marketing campaigns, both nationally and internationally, can help increase visitor numbers and contribute to economic growth.
- **Social Inclusion and Gender Equity:** Policies should prioritize social inclusion, focusing on marginalized communities and gender equity. Promoting women's participation in the workforce, offering incentives for women-led businesses, and implementing social welfare programs will contribute to inclusive development.

By implementing these policies, Uttar Pradesh can work towards balanced and inclusive growth, address socio-economic disparities, and strengthen its position as an economic hub in India.

7. Conclusion

This study demonstrates that Uttar Pradesh is experiencing an economic renaissance driven by a combination of strategic policy interventions, infrastructure development, and sectoral growth in industries and services. However, addressing regional disparities and ensuring inclusive growth remain key challenges. With appropriate policies and sustained investment, Uttar Pradesh can consolidate its position as an emerging economic powerhouse in India. Uttar Pradesh stands at a critical juncture in its economic development journey. Despite historical challenges and socio-economic disparities, recent policy reforms, infrastructure investments, and sector-specific initiatives have positioned the state as a potential growth leader in India. Key sectors such as agriculture, industry, and services each play a pivotal role in driving the state's GDP, supported by improved connectivity and pro-investment policies. However, realizing Uttar Pradesh's full potential will require a sustained focus on addressing foundational issues such as rural poverty, education, healthcare, environmental sustainability, and administrative efficiency. By adopting an inclusive, multifaceted approach that empowers local communities, promotes sustainable practices, and leverages technological advancements, Uttar Pradesh can achieve long-term, balanced growth. This trajectory will not only uplift the living standards of its people but also contribute significantly to India's broader economic landscape, transforming Uttar Pradesh into a thriving economic and social hub.

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- This article critiques the limitations of traditional econometric models in understanding the interplay between political structures and economic growth, advocating for more nuanced approaches to policy analysis.

Glories of the Past

With Best Compliments :

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Society For Promotion of Economics T.R.N. 202000996024999 - Registration No. LUC/ 00551/2022-2023

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The Uttar Pradesh-Uttarakhand Economic Association (UPUEA), established in 2005, is a premier society of economists for the promotion of economics in both the states. Professionals of Economics from both academic and non- academic institutions are its active members. The UPUEA organises annual conferences for members that discuss contemporary economic issues of the Indian economy, especially that of Uttar Pradesh and Uttarakhand. Besides, to promote original research in the area of regional sponsorship to research projects undertaken by members on disciplinary or trans-disciplinary economic issues add to the knowledge and facilitate the development of the region. It also supports and encourages the members to organise seminars, symposia, workshops, and training courses for the professionals of Economics.

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