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IS AN ECONOMIC BOON BECOMING A BANE FOR INDIA?

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Abstract: -

Throughout human history, key discoveries help us to gain major economic and social upliftment, which often comes up with the environmental degradation. This study examines the trajectory of economic growth of India in three phases, first during 1980-2000, where the Indian economy saw a rise in liberalisation, privatisation, and globalisation policies, which created an atmosphere of increased foreign investment. Second phase started in the 2000-2020 where the economy saw an unprecedented growth in real GDP growth rate of nearly double digit. And third phase started 2020 onwards where the Indian economy suffers immensely from Covid-19.

Although each phase proves to be a golden age for the overall development of an economy, one common feature that can be taken out is the environmental degradation. This paper aims to study the level of degradation by taking case studies of river Ganga, Gangotri glacier and forest cover of the western ghats.

The paper aims to focus on key sectors like information technology, energy, telecommunication, etc. as these sectors were the pillars of economic growth for India. The study emphasises on the need for a change in thinking in economic model of India which also includes sustainable practices. In this direction, policy makers must incorporate a critical question when formulating any forthcoming economic policy: does the proposed policy consider environmental concerns or not?

Keywords: - Agricultural Economics, Ecological Economics, Environmental Economics, Natural Resource Economics.

Introduction: -

With the passage of time, human civilization has leveraged key discoveries to catalyse economic and social upliftment. However, this progress often comes at the expense of environmental degradation. India which is the world's largest democracy and the fifth-largest economy, exemplifies this paradox. From the liberalization policies of the 1980s to the unprecedented



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growth of the 2000s and the challenges of the post-COVID era, India's economic trajectory had been marked by transformative changes.

India, which is currently the fastest growing economy of the world, experienced a stagnant growth rate right from its independence. From 1947-1980, the economic growth which was famously known as "Hindu rate of growth" saw a stagnant growth rate of around 3% to 3.5%. the major reason behind this stagnant growth was the full control of the State in every aspect of an economy [IMF, 2004].

The country truly pictured itself as a big economic player by implementing several economic reforms starting from the 1980's and made a big blow in 1991, with the implementation of Liberalisation, Privatisation and Globalisation (LPG). These policies proved to be a boon for the economy throughout the decade of 2000-2010. This helped the economy to consistently registered a dream number of double-digit growth rate. This growth miracle helped India to overcome the financial crisis of 2008 which proved to be the reason for the downfall of many major economies in the world.

From 2011, India experienced a robust economic growth or jobless growth with annual average growth rate of 7%. During this period, the Indian economy suffered hugely from the implementation of demonetisation and GST which severely impacted the informal sector, which is the largest employment-generating sector in India. Unlike 2010's, the decade of 2020's started with the outbreak of Covid-19 and regional wars that put up a break on the world economy. During this period, the growth rate became negative, which ultimately inflated the global food prices. Some key sectors saw an enormous growth like that of artificial intelligence, telecommunication, and IT sector.

Overall, in the last 40 years, the Indian economy witnessed tremendous growth with an annual average growth rate of 6%. Although it faced some challenges along the path, but it emerged as the fifth largest economy of the world and it was expected to become the third largest economy by 2030. However, this growth proved to be a dual-edged problem for India. With the rise in GDP over the years, the level of pollution increased exponentially in the last 40 years that directly impacted the health of the people.

This paper suggests to take case studies of river Ganga, Gangotri glacier and forest cover of the western Ghats as these three ecological systems are vital for the existence of millions of people living not just only in India, but also for the people living in the neighbouring countries.

This paper aims to

1. Analyse the importance of balancing economic growth with environmental sustainability.
2. Analyse the economic growth phases in India from 1980 to the present.



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3. Suggest sustainable practices that can be included by the policymakers in the future economic policies.

Methodology: -

- Tools and techniques:
 - Secondary Data: research papers, environmental reports published by the United Nations Framework Convention on Climate Change, World Bank, International Energy Agency, International Monetary Fund, Indian Institute of Technology, Bombay, Ministry of Statistics & Programme Implementation, Ministry of Science and Technology, Ministry of New and Renewable Energy, Ministry of Coal, Ministry of Housing and Urban Affairs, Ministry of Agriculture & Farmers Welfare, Ministry of Environment, Forest and Climate Change (MoEFCC) and NITI Aayog.
 - Economic models: The paper intends to use environmental economics theories like the Kuznets curve and the tragedy of commons. Kuznets curve demonstrates that various indicators of environmental well-being tend to get degraded as the economy of a nation grows. This trend continues till it reaches the inflection point where the environmental degradation reaches its maximum level.
 - Time-series data for GDP growth, pollution levels, and resource depletion.
- Study Parameters:
 - Economic Indicators: GDP growth, trade volume, FDI inflows.
 - Environmental Indicators: Deforestation rates, pollution levels, climate variability.
 - Sectoral Analysis: Focus on IT, energy, and telecommunications.

Literature Review: -

• The Tragedy of the Commons-

Garrett Hardin's "Tragedy of the Commons" propounded in 1968, provided a framework for understanding the overutilization of shared resources such as water, forest, and air. The theory suggested that if the resource were available for the people to consume without any restrictions, then no one would pay anything for the consumption of the resources. This phenomenon was evident in India's case, as the use of natural resources reached its exacerbated level, which ultimately led to long-term ecological consequences.



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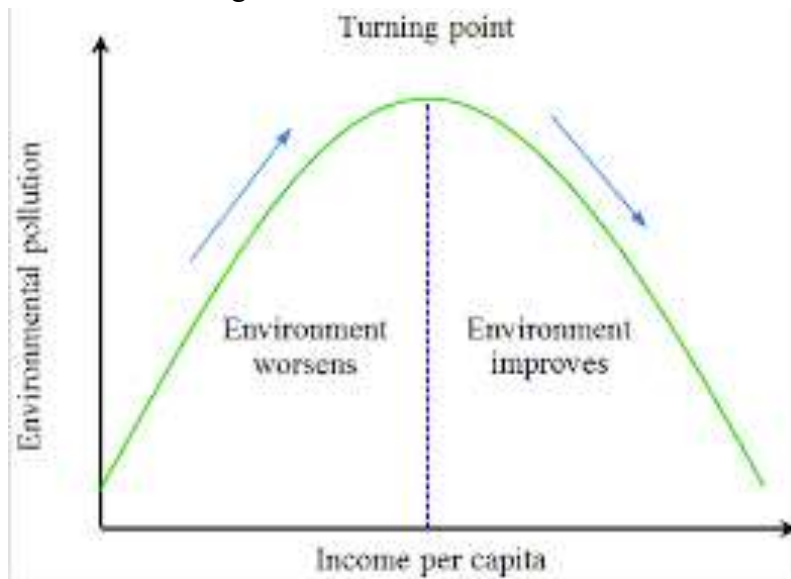
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- **Environmental Kuznets Curve-**

The Environmental Kuznets Curve (EKC) hypothesizes that the relationship between environmental degradation and economic growth of a nation goes through 3 stages. These 3 stages are-

- Stage I- In figure 1, the x-axis is denoted by economic growth and y-axis as environmental degradation. Initially the curve rises, as it shows that an increase in economic growth eventually led to increase in environmental degradation.
- Stage II- In this stage, the curve reaches its maximum showing the maximum limit of environmental damage a nation can suffer.
- Stage III- In this stage, the curve slopes downward and it shows that as a nation became more aware regarding the sustainability, environmental degradation level dives down with the economic growth.

Figure 1. Simon Kuznets Curve



[IMF, 2025]

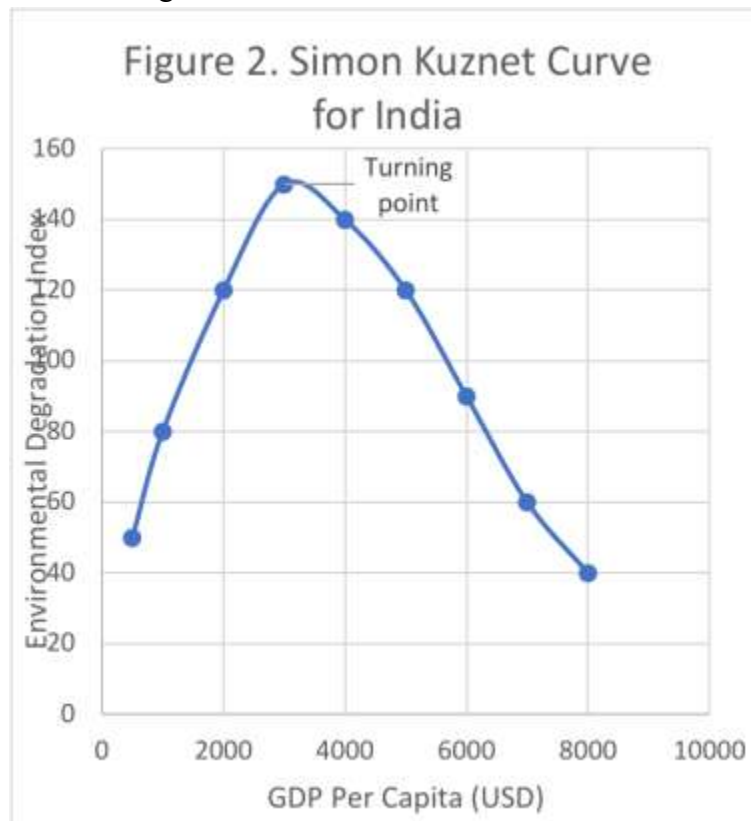
Indian economy is currently at the last phase of stage I, as a nation, it is still in the developing phase and the level of greenhouse emission is still rising.



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Figure 2. Simon Kuznet Curve for India



[IMF, 2025]

The given Simon Kuznets curve (Figure 2) shows the projection of the relationship between India's GDP Per Capita and environmental degradation. India, whose current GDP Per Capita stand as \$2697 in a financial year of 2024-25, will reach the turning point by the year 2040. After that the nation will experience positive results with respect to environment as well as in growth rate. This is because with time, the literacy level, efficient utilisation of resources and awareness would go up [IMF, 2025].

Analysis: -

• Phase I: 1980-2000: LPG policy and its impact on the environment –

In 1980, the Indian Government changed its attitude towards business, globalization and trade, and the degree of state intervention in an economy. Key sectors like the Telecommunication sector grew rapidly during the 1980s with a growth rate of 9% which ultimately led to the annual average growth rate of 5.6% during 1981-1990. The energy sector saw a 5.5% annual average growth rate from 1981 to 1990. The economic reforms of 1991, created an environment of easy business, increased financial flow and employment generation. All this led to an annual average



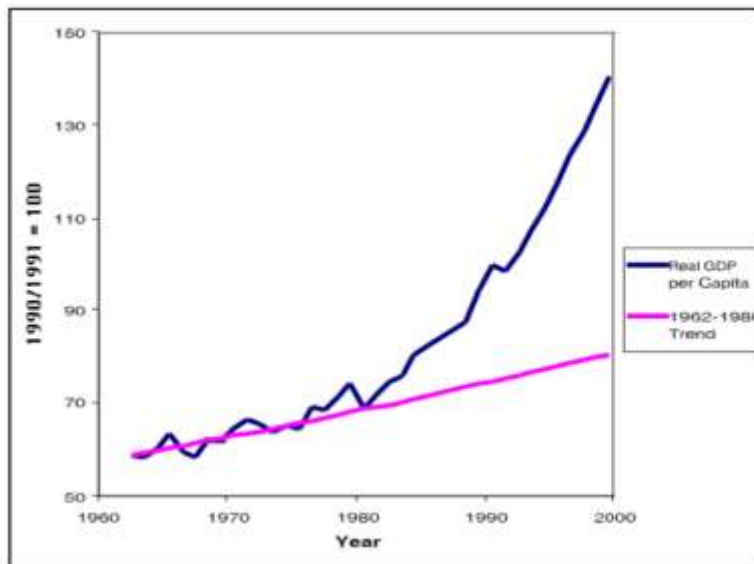
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growth rate of 5.4% during 1991-2000. This growth rate was lower than that of its precedent decade because of some major economic events such as the fall of the Soviet Union, oil crisis of 1990, Stock market fraud of 1992 and Asian financial crisis of 1997 [Bornali Bhandari, (2012)].

In this period, India built its financial stability and steady economic growth, due to which it recorded a miraculous economic growth since the year 2000. After 1991, government interference reduced which ultimately led to rise in foreign direct investment and influx of international brands which provided more range for the Indian customers to choose.

Figure 3. Real GDP growth rate from 1960-2000



[IMF, 2004]

Figure 3 represents the growth in real GDP per capita from 1960-1980 was stagnant due to many factors like restrictive investment opportunities, reduced export numbers, overdependence in government incentives or support, etc. From 1980-2000, growth rate in real GDP increased by exponential numbers. This is due to the introduction of more liberal policies and promotion of private participation in an economy [Kunal Sen, 2009].

With the advancement of economic growth, the nation faced a new problem in the face of increasing pollution levels and environmental degradation. The main cause of the same can be stated as: -

1. Rapid growth in demand for petroleum products which is to be used in vehicles, industries, and the energy sector.



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2. Rapid growth in population, which led to exploitation of resources like water and forest, increase in demand and failure of existed infrastructure to sustain the increasing population.
3. The rise in living standards made it impossible to practise sustainable development practices.
4. Exponential rise in emission of greenhouse gases, which ultimately led to an increase in average global temperatures.

To study the impact of pollution in each period, the study proposes to examine the most important aspect for every living-being to live, i.e., water. River Ganga which is one the most sacred and important river for the survival of 650 million of people in Northern Indian states of Uttarakhand, Uttar Pradesh, Bihar and West Bengal, experienced the threat of high pollution level and poor water quality. During the period of 1980-2000, human settlements near the river risen rapidly, which put an extra burden on the river, hence started the trend of increasing level of pollution and degradation of ecosystem. To support this increasing pollution, large number of projects related to the construction of dams, canals and reservoir took place, which disrupted the natural flow of the river [NMCG, 2025].

With so much exploitation and negligence, still the river manages to sustain itself as the chemical component of the river supported by the rich minerals which gets drained down from the Himalayas empower the river to heal itself. Due to this very reason, the news regarding the pollution in the river was not catching many eye-balls.

- **Phase II: 2000-2020: India's economic miracle and its severe implication on the environment –**

Since the starting of a new century, India emerged as an economic powerhouse and stable economy. The true advantage of 1991 economic reforms were realised from 2000, as the Indian economy saw a rapid rise in IT sector, Telecommunication sector and energy sector. During the early 2000's, Indian middle-class average annual income bulged, which create an environment of more private consumption, resulting in double-digit growth in GDP.

By the end of 2000's, Indian economy suffers immensely due to the 2008 Financial crisis, but the economy somehow performs better than the world's major economies. In the decade of 2010-2020, Indian economy saw a mixed trend in GDP growth rate. Demonetisation, GST implementation and oil-price fluctuations in international market made it impossible for Indian economy to maintain its miraculous double digit GDP growth achieved during the past decade [MoSPI, 2023].



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Table 1. level of real GDP growth from 2000-2020

Year	Real GDP Growth (%)
2000	5.5
2005	7.5
2010	8.0
2015	6.8
2020	4.2

[MoSPI, 2023]

As stated in the given table 1, the real GDP growth reached its maximum level in the year 2010. In the latter half of the two-decade period, the numbers went down due to internal and external factors.

During the period of 2000-2020, service sector, which include artificial intelligence, telecommunication, and IT sector, became a dominant sector with 55% of GVA (Gross Value Added) in the financial year of 2019-2020. Energy sector saw a rapid rise during this period, as in 2000 the MTOE (Mega Tonnes of Oil Equivalent) was 425 and till the end of 2020 it increased to 850 [Economic Survey, 2022].

With the introduction and rise of internet, smartphones and artificial intelligence, average demand of electricity by a household in India increased. It results in more consumption of coal, natural gas, and oil to produce electricity. By 2020, 44% of electricity was produced by using coal and 25% by using oil. The increase of reliance in the non-renewable source of energy made India the 3rd largest carbon emitter in the world [IEA, 2021].

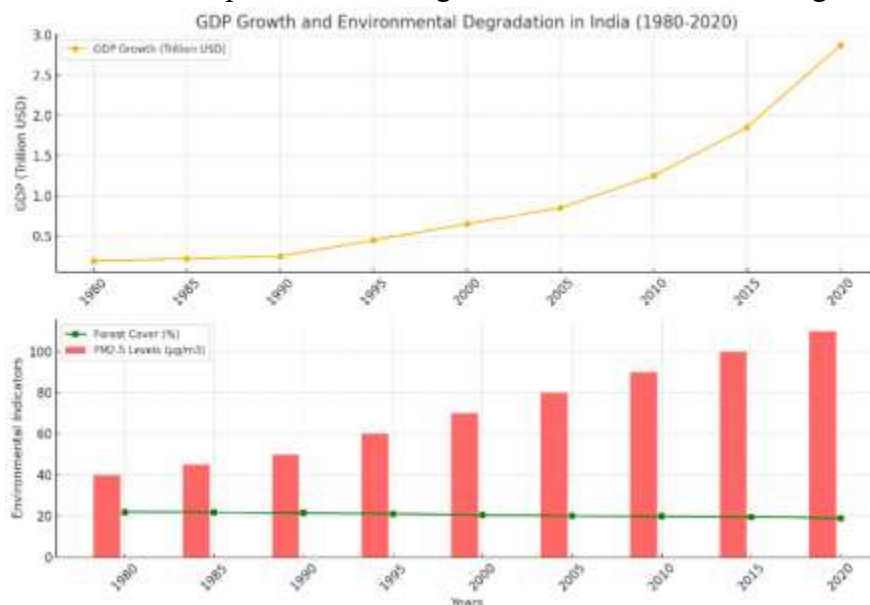
In the given figure 3, as the economy reaches the 3 trillion-dollar mark, the pollution level which was majorly indicated by PM 2.5 levels saw an unprecedented rise in worsening air quality. Also, the area of forest cover in India is reducing slowly due to rapid urbanization, which ultimately adds to the degradation of the environment. The data underscores the correlation between economic growth and environmental degradation in India. While GDP has risen impressively, it has been accompanied by significant environmental challenges.



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Figure 3. Relationship between GDP growth and environmental degradation



[IEA, 2021]

As the Indian economy experienced rapid growth right from the start of the century, the population of the cities that lie on the banks of the river grew exponentially. This not only degrades the air quality but also the ecosystem of aquatic life living in the river Ganga. Pollution level in the river Ganga reached its threshold level and the stretch of approximately 600 km of the river is a dead zone. The people living in the states of Uttar Pradesh, Bihar and West Bengal were more prone to diseases like cancer, diarrhoea, typhoid, etc than anywhere else in the nation. Many native species of the river are facing the threat of being extinct soon [NMCG, 2020].

Causes for this level of pollution is a rise in infrastructural development along the river, sewage discharge, over-fishing, construction of dams and untreated waste discharged directly into the river from the banks of Kanpur, Prayagraj, Varanasi, and Kolkata [NMCG, 2020].

The problem attracted the attention of the mainstream media and the public which created pressure on the government to implement necessary steps to resolve the issue efficiently. So finally, in June 2014, the Government of India under the leadership of Hon'ble Prime Minister Shri Narendra Modi launched a programme named “Namami Gange Programme” with a budget outlay of Rs 20,000 crore with a dual motive to effectively abate pollution and rejuvenate the river. However, the programme failed miserably, as the number of sewage treatment plants inaugurated was not able to handle the volume of the waste being disposed of in the river. Right from its starting point, the river gets exposed to toxic materials and untreated sewage. And until it drained out into the Bay of Bengal, the river's situation became so much worse that it can be



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categorised as sewage rather than a river. In the basin of the river, approximately 12,000 million litres per day (mld) of sewage was generated, for which presently there only exists a treatment capacity of around 4,000 mld. Volume-wise, the contribution of industrial pollution is about 20 per cent which became the central problem for the river due to its toxic and non-biodegradable nature. The metropolitan city of Kanpur proved to be the biggest contributor in terms of industrial pollution along with the industrial pockets in the catchments of Ramganga and Kali rivers [NMCG, 2020].

The degradation of the river is not only limited to the river itself, but also to the origin of the river Ganga, i.e., Gangotri glacier, which is in the Uttarkashi district of Uttarakhand. The glacier having a length of 30km and 2-4 km wide, faced an unprecedented challenge of extinction due to the rapid economic growth. The sustainability of any glacier depends on the rate at which it is melting and the amount of snow or ice it is receiving during winter season. If the rate of melting is higher than that of another one, then it is known as retreating of glacier. During the last decade, the Gangotri glacier retreated by about 300m, and because of this very reason many scientists termed Ganga River as a “Dying River” [Neeraj Santoshi, 2021].

The main cause of the retreating of the Gangotri glacier was the increased Black carbon concentration in the region, which increased the risk of light-absorbing capacity of the glacier, making it more prone to melt. In summer, it increased by 400 times, which was higher than in the normal situation. Agricultural burning and forest fire proved to be a main culprit behind this seasonal increase. In year 2016, black carbon (BC) concentration in this region changed from $0.01\mu\text{gm}^{-3}$ in winter to $4.62\mu\text{gm}^{-3}$ during summer depending the prevailing meteorological condition [Ministry of Science and Technology, 2020].

To mitigate such threat, forests proved to be a most powerful instrument as the ecosystem build up by these forests assist to squeeze carbon from the atmosphere, prevent soil erosion and provide shelter for different living-beings [IIT Bombay, 2024]. In India, such forest cover can be seen in the form of Western ghats. Western Ghats Region (WGR) is in the western part of the Indian subcontinent stretching from the south of Gujarat in the north to Kerala and Tamil Nadu in the south. It is recognised as a UNESCO World Heritage Site and represents one of the 36 biological hotspots of the world. But as similar as river Ganga and Gangotri glacier, the forest is currently facing the challenge of mass deforestation and the loss of flora and fauna because of the pressure created by the implementation of unsustainable and unplanned activities [Chandra Shekhar Jha, C. B. S. Dutt and Kamaljit S Bawa, 2000].

Some parts of the WGR have seen soil erosion rates risen by 94% between 1990 to 2020. The average soil loss for the region was 32.3, 46.2, 50.2, and 62.7 tons per ha per year for the years 1990, 2000, 2010, and 2020 respectively. In the last 90 years, western ghats had lost 35.3% of



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the forest cover, out of which 25.6% had been lost between 1990 to 2020 [Pennan Chinnasamy & Vaishnavi U Honap. 2023].

Some reasons that could be stated to understand the problem are given as-

- The rapid rise of urbanisation after the 1991 economic reforms forced the cities or towns to expand their area.
- States like Gujarat, Maharashtra, Goa, Kerela, Tamil Nadu and Karnataka saw a tremendous growth in their agriculture sector, which came up at a cost of clearing forest area.
- The irregularity of the monsoon season due to El-Nino made it difficult for the forest to sustain itself. Due to lack of rainfall, forests became extremely dry, which worked as an additional fuel in case of any wildfire.
- The extinction of many species in the WGR, disrupted the perfect yet delicate system of flora and fauna.

Overall, in this period, India built its financial stability and was able to achieve steady economic growth, due to which it recorded a miraculous number of economic growths after the year 2000. But this growth, came up with a devastating effect on the environment, which made it near to impossible for India to meet its goals made up in the Paris Agreement of 2015 to limit the global average temperature below 1.5 Degree Celsius.

- **Phase III: 2020 - present: Covid-19 and it's severe implication on the India's economy and nature's self-healing process –**

2020 and 2021, proved to be the most difficult and devastating years for the world economy, as it got struck by the Covid-19 pandemic. The nature of the disease forced the governments all around the world to put restrictive actions related to the movement of people, goods, and services. Indian economy, which was then struggling to overcome the negative impacts of demonetisation and GST, faced a knockout blow due to covid-19. In the financial year of 2020-21, the Indian economy contracted by 5.8% and in 2021-22, it recorded a growth rate of 9.1% given the fact that the base from which it was calculated is extremely low. The reasons behind this negative growth rate can be stated as-

1. The restriction on the travel of people, destroyed the aviation and tourism industry.
2. All the resources shifted towards the healthcare sector in India.
3. Informal sector, which is the largest employment giving sector took a big shock as the overall consumption in an economy gone down.
4. Global supply chain disrupted immensely, which led to the rise in inflation level.
5. Due to lack of demand, oil and gas industry also registered a negative growth rate.



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6. Most importantly, it degrades the mental health of the people. Because of the lockdown, people were forced to be confined within their homes for almost 2 years which severely impacted their habits, routine, and fitness.

Right after the covid-19, regional wars started with the invasion of Ukraine by Russia followed by Isreal-Hamas war, proved to be a huge step back for the already weakened global supply chain. As politics and economy goes hand in hand, the instability in the world order, created an environment of distrust between the economies of the world. Indian government decision to buy Russian oil, helped to control inflation the country, but it degrades the relations with the western countries, leading to fall in remittances and foreign direct investment from these countries.

During this period, some sectors shown exponential growth because of the change in the trend of how the world economy used to work. Online platforms like Meta, Google, educational applications grown immensely because of the culture of Work from Home. Due to the mass migration of labourers from urban centres to rural areas, the agriculture sector registered positive growth rate. Pharmaceutical sector proved to be at the forefront to tackle covid-19 and was expected to record a rise of 37% in CAGR from 2020-2025. India created its own vaccine (Covishield and Covaxin), which made India a global supplier of vaccine especially for the poor countries [IBEF, 2024].

In the year of 2020 and 2021, the pollution level gone down as the world economy was on stalemate. Although the energy consumption remained almost the same as the household consumption increased given the fact that people were not allowed to leave their homes.

Table 2. Pollution Levels Before and After COVID-19 Lockdowns.

Year	Pollution Indicator	Pre-Lockdown Level (2020)	Post-Lockdown Level (2020)	Percentage Change
2020	PM2.5 ($\mu\text{g}/\text{m}^3$)	80	50	-37.5%
2020	NO2 ($\mu\text{g}/\text{m}^3$)	40	20	-50.0%
2020	CO (ppm)	1.2	0.8	-33.3%
2020	SO2 ($\mu\text{g}/\text{m}^3$)	20	15	-25.0%
2020	O3 ($\mu\text{g}/\text{m}^3$)	50	70	+40.0%

[IMF, 2025]

The above table 2 indicates that the restrictions put up at the time of the lockdown, temporarily reduced the level of pollution indication, such as PM 2.5, nitrogen oxide (NO₂), carbon dioxide (CO₂) and sulphur dioxide (SO₂). Only the ozone (O₃) increased, which has both the negative as well as positive impact for the environment, as it prevents the radioactive UV rays to reach the



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surface of the Earth, but it also acts as a greenhouse gas, which ultimately led to the rise in the temperature. This reduction in pollutants enhanced the healing power of nature, as the same can be witnessed from the case that the mountains of Himalayas can be seen from 200km away with naked eye.

The reduction in the pollution did not last too long, as the industries such as, Information Technology, artificial intelligence and smartphone saw an increase in demand. This ultimately increased the consumption of energy and it also created a problem of E-waste. As the lockdown restrictions removed, the level of pollution increased exponentially, which ultimately upset the healing done by the nature in the initial phase.

The sudden rise of greenhouse gases created a chain of devastation in the form of frequent hurricanes, drought, excessive rainfall, more heatwaves during the summer season and shorten span of winter season. This change became more intense with the effect of El-Nino, which disrupted the cycle of monsoon in India.

Suggestions: -

The study emphasizes on providing the valuable suggestions to meet out the pledges made by India in the International Forum, such as-

1. In Paris Agreement of 2015, 196 parties including India pledged to hold the rising trend in the average global temperature to well below 2°C and execute necessary plans and actions to limit the temperature increase to 1.5°C above pre-industrial levels [World Bank, 2017].
2. In Conference of the Parties (COP 26) meeting of 2022, India pledged to Reach 500GW non-fossil energy capacity by 2030, will produce 50 per cent of its energy requirements from renewable energy sources by 2030, Reduce the total projected carbon emissions by one billion tonnes from 2022 to 2030 and will become net zero emitter by 2070 [Ministry of Environment, Forest, and Climate Change. 2022].

Some of the suggestions that the study provides are already being implemented by the government, but the scale at which these suggestions should be implemented is still a matter of concern.

1. Renewable energy sources-

Renewable energy source are those sources which can be harnessed all day long without creating any greenhouse gases. Wind energy, solar energy, geothermal energy, hydropower energy, etc. are the examples of renewable energy sources. Since the Independence of India, the Indian government relied heavily on Thermal power plant that uses coal as a source of energy creation which produces toxic gases such sulphur dioxide, nitrogen oxide, etc. In the year 2020, 75% of



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the Country's total energy production was done through thermal power plants that are located all around the country [Ministry of Coal. 2020].

The share of renewable energy sources increased in the last decade by initiating the programmes like Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM, Solar Rooftop Phase II, National Green Hydrogen Mission, Solar PV Module PLI Scheme, PM - Surya Ghar: Muft Bijli Yojana, and National Bioenergy Programme. But still it is not enough for India to meet out its pledges made in the Paris agreement, COP meetings, etc [Ministry of New and Renewable Energy, 2023].

The study emphasizes on increasing the number of renewable energy sources by tapping the potential zones, such as by installing more solar plants in the Thar desert, geothermal plants in the Himalayas, nuclear power plants, tidal energy along the coast of India and by setting wind farms where the speed of the wind is ideal. The most important and easy task that can be implemented is to incentivise the household to setup solar panels in their rooftops.

2. Promote circular economy practices-

Circular economy is that economy in which the resources are used efficiently and all the stakeholders of an economy (producer and consumer) follows the practice of reuse, recycle and reduce.

Indian cities are the main culprit of improper utilisation of resources that can be seen in the form of waste mountains, untreated sewage canals, burning of waste and extreme pollution level. To mitigate such a situation, Indian government launched Swachh Bharat Mission in 2014 to reduce the level of garbage and promote the practice of reduce, reuse, and recycle. But the programme did not provide the results as expected. Some of the cities performed exceptionally well like Indore, Surat, etc. But most of the cities especially Tier-I cities like Delhi, Mumbai, Chennai, Kolkata, Hyderabad, etc. became worse [Ministry of Housing and Urban Affairs, 2023].

The study suggests other cities to take necessary steps for the implementation of circular economy practices by taking inspiration and suggestions from cities like Indore and Surat.

3. Sustainable Agriculture-

Agriculture is the primary and most important sector in terms of employment generation. About 60% of the country's population is directly or indirectly dependent on agriculture. Agriculture sector consumes about 70% of the world's fresh water, so it holds the potential to solve the water crisis that the world is facing today [World Bank, 2017].

The major problems associated with the agriculture is the extensive use of fertilisers, shortage of irrigation facilities and inefficient utilisation of given freshwater sources. Punjab which is known as the wheat basket of the nation, is currently facing the problem of reduction in the overall



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production of wheat due to the degradation of soil quality, overutilisation of groundwater sources and overutilisation of fertilisers.

To solve the issue, Government has initiated many programmes such as National Mission for Sustainable Agriculture (NMSA), Paramparagat Krishi Vikas Yojana (PKVY), Mission Organic Value Chain Development in the North Eastern Region (MOVCDNER), Soil Health Card (SHC), National Pest Surveillance System (NPSS), AgriSURE, Krishi-DSS Portal, Pradhan Mantri Kisan Samman Nidhi (PM-KISAN), Pradhan Mantri Kisan MaanDhan Yojana (PM-KMY) and Pradhan Mantri Fasal Bima Yojana (PMFBY) [Ministry of Agriculture & Farmers Welfare, 2024].

But all these schemes only benefitted the large farmers leaving behind the poor small farmers. The study suggests that the government must educate and provide subsidies to the farmers to adopt sustainable practices like usage of organic fertilisers, drip irrigation and solar pumps.

4. Protect and Increase Forest cover-

In 2013, total of 8,27,357 sq km, which is 25.17 percent of the total geographical area of the country was covered in forest and tree. Out of which, 21.76 percent was covered by forest. Forest plays a pivotal role to combat pollution, as it squeezes large proportion of the carbon dioxide from the atmosphere, home to a variety of species of flora and fauna and balance regional temperature impacting the weather pattern [Ministry of Environment, Forest, and Climate Change, 2024].

Due to rapid urbanisation, deforestation and wildfires, the area covered by the forest is shrinking day by day. Western Ghats, which is the most important biological rainforest of India is shrinking, which ultimately led to disruption in monsoon season and frequent and intensive heatwaves [Pennan Chinnasamy & Vaishnavi U Honap, 2023]. To mitigate this issue, government initiated many programmes like National Afforestation Programme (NAP), Green India Mission (GIM), Forest Fire Protection & Management Scheme (FFPM), Nagar Van Yojana (NVY), School Nursery Yojana, Compensatory Afforestation Fund Management and Planning Authority (CAMPA) and Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI) [Ministry of Environment, Forest, and Climate Change, 2023].

The study suggests that the government must implement the already existed programmes strictly and monitor the progress report frequently. It also suggests to educate people regarding the importance of forests and biodiversity.

5. Decarbonize Transportation Industry-

India which is an emerging market for the automobile sector is one of the largest car and two-wheeler manufacturers in the world. India has the fourth-largest railway network and one of the fastest-growing aviation market in the world. By 2030, the vehicles plying on the road expected



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to get double to over 200 million. This sector is the third most greenhouse gas (GHG) emitting sector in the country followed by energy and agriculture sector and it accounted for 14 per cent of our energy-related CO₂ emissions. Since 1990, the emissions have more than tripled, and it is expected to rise even further with the growing India's urban population that is expected to double by 2050.

Currently, in Indian cities with population of over 1 million people, 25% of them uses non-motorised transport such as bicycle which is higher than the similarly sized cities of the world. Still, the Internal Combustion Engine (ICE) is the major contributor of the pollution in major cities like Delhi.

The government has initiated many programmes like FAME II scheme which provide the subsidy in the production and purchase of Electric Vehicles (EVs) further bringing down the cost differential between EVs and ICE vehicles. The Ministry of Railways has pledged to become a net-zero emitter by 2030. The presence of Metro rails in the big cities, provide an alternative mode of transport which is clean and fast [NITI Aayog, 2021].

The study suggests that more EVs charging stations must be installed all over the country, so that more people will get motivated to purchase EVs. The railway needs more rail connection and modern trains, which will improve the efficiency. Also, the government must provide more incentives to public to use public transport. These incentives can be in the form of discounts and offers. For example, Delhi metro provide 10% discount to all the riders holding smart card issued by the Delhi Metro Rail Corporation (DMRC). Delhi Transportation Corporation (DTC) buses came up with an offer of free ticket only for the female passenger to boost female participation in an economy.

6. Conservation of Water-

Out of the total water available in the Earth, only 3% of it is drinkable. India which has the world's 18% population, holds only 4% of the drinkable water. This shows that water in India is scarce. But the Indian government right from the independence had failed to efficiently utilise the resource because of certain reasons like leakage, overutilisation of groundwater by agriculture sector, discharge of toxic waste directly into the river by the industries and lack of infrastructure to capitalise rainwater [NMCG, 2025].

The government did try to resolve the issue by initiating programmes like Pradhan Mantri Krishi Sinchayee Yojana, Jal Jeevan Mission, Namame Gange, Ground Water Management and Regulation and River Basin Management. The government spend crores of rupees to tackle the pollution in the River Ganga, but the situation of the river deteriorates even further in the last 10 years [NMCG, 2020].



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To tackle the situation, the study suggests the government to educate and provide financial assistance for the construction of rainwater harvesting system. There is a paradigm need to construct enough Waste Water treatment plants, so that the quality of the river remains healthy.

Conclusion: -

India's journey towards sustainable development need to address the dual-edged nature of development and thus, it demands a change in basic assumptions in its existing economic model. Currently, Indian government focus is on to eradicate poverty and income inequality. Due to this, India must suffer environmental problems for some time, as it is still on the developing phase. According to the theory of EKC, India will achieve its turning point by 2040, till then it must bear some severe consequences of the global warming.

Since the independence of India, Indian government initiated many programmes to tackle the problem of pollution. Some of them provided a desired result, but majority of them failed to deliver. The main reason behind this failure was the inefficient utilisation of resources, which was supposed to be spend on a particular scheme or programme.

To overcome this situation, the government must prepare such economic models that should integrate policies related to renewable energy sources, circular economy practices, sustainable agriculture, protection of forest and decarbonisation of transport for a prosperous and sustainable India.

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