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India's Combat Towards Climate Change and Sustainability (with special emphasis on Paris Pledge and SDG's)

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ABSTRACT

The Sustainable Development Goals (SDGs) is a blueprint conceived by the United Nations, that aims to establish a sustainable global order for the future of humanity, by the year 2030. Aligning its course with the sustainable agenda, India has been relentlessly working towards achieving its goals even before the inception of the SDGs. The objective of the paper is to analyse and assess the country's response towards combatting carbon emissions as India is the world's third largest greenhouse gases emitter after China and the United States (US) while according to the World Bank Study, India will continue to be a low-carbon economy. Furthermore, the paper will dwell upon the operationalisation of various schemes and policies introduced by India, to help achieve its sustainable vision. In the process of scrutinizing these policies, the paper shall attempt to rectify the downsides of the same and seek to identify a viable and implementable solution to the existing module and through a mixed-method approach, attempting to understand the nature and process of implementation of the policies using record keeping. For the purpose of seeking a wholistic understanding of the subject, this study has inducted a narrative research through the use of secondary data by referring to documents and reports to interpret the past and current developments in India related to the SDGs and the Paris Pledge. In conclusion, if India could achieve a successful template for a sustainable national order, it could inspire not only the regional member countries but also help the global community, towards building a sustainable global architecture for the betterment of the future of mankind and controlling the impacts of climate change.

Key words *: Carbon emissions, Sustainability, Low carbon economy, Economic Growth.*

Introduction

As the agenda of the Millennium Development Goals (MDGs) neared its stipulated time, the United Nations (UN) began mulling over the post 2015 agenda and formulated the Sustainable Development Goals (SDGs), a "blueprint to achieve a better and more sustainable future to all." The SDGs are a collection of 17 goals adopted in 2015 that include 169 targets and 232 indicators that need to be achieved by 2030, which are mentioned in the document titled "Transforming our World: the 2030 Agenda for Sustainable Development" focus on the universality, integration, and transformation of the world societies of the developed and developing countries. In order to achieve these goals, the UN Division for Sustainable Development Goals (DSDG) is working towards providing all kinds of

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support and capacity building measures for the above-mentioned 2030 agenda which are divided into various themes like water, energy, oceans, urbanization, climate, science and technology, transport among many others.

India is considered to be the world's third largest GHG emitter. While according to the Global Climate Risk Index 2020 report, released by 'German watch', an international environment think tank, concluded that India's performance towards combating climate change has deteriorated from 2017 to 2018, marking India as the fifth most vulnerable country, globally. In 2019, India's total emissions stood at 132 million tonnes of CO2 whereas, its per capita emissions remain low at 1.98 tCO2/capita that is less than the global average of 4.2 tCO2/capita (Nandi, 2020). Therefore, the centrepiece of the study revolves around certain global Goals 9, 13 and 14 since the climate system is an intricate, complex, inter-related subject consisting of the atmosphere, land surface, snow and ice, oceans and other bodies of water and living things (Le Treut *et al.*, 2007). The Goal 9 of SDG talks about building a resilient infrastructure, promoting sustainable industrialization and fostering innovation. The Goal 13 calls for taking urgent action against climate change and aims at reducing (GHG) emissions by half, by 2030 and strives to transition into a carbon-free global environment by 2050.

Moving on, the Goal 14 focuses on conserving and sustainably using the oceans, seas and marine resources for sustainable development. The protection of coastal and marine biodiversity and maritime resources are of vital importance for India's economy and coastal communities. India is also trying to minimise and address the impact of ocean acidification. The country is also working towards prevention and reduction of marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution. As per the carbon profile of India, we emit large gases through coal power plants and rice paddies. Coal is extensively used in production and manufacturing sector which increases the greenhouse gas emissions, thereby, making India the third largest polluter in the world. Hence, the country has pledged a 33-35% reduction in the emissions intensity of its economy by 2030, compared to 2005 levels. This can be possible only through specific policy efforts and industry capping wherever needed. The study analyses the effect of these policies on the entire economy following a qualitative and quantitative approach.

Literature Review

The idea of Sustainability was first introduced by conservationists and preservationists in the early 20th century, who viewed the concept of 'sustainability'exclusively from the ecological perspective (Report, 2011). However, the concept was revised and its ambit enlarged to form the ideaof 'sustainable development'during the 1972 United Nations Conference on the Human Environment held in Stockholm. The conference deliberations pivoted around the subject of achieving economic growth and industrialisation without exploiting and harming the ecological environment (Report, 2011). In the following decades, the conventional school of sustainable development evolved the concept of sustainability through the World Conservation Strategy (1980) (IUCN, 1980), the Brundtland Report (Commission, 1987) and the United Nations Conference on Environment and Development in Rio (1992), in addition to the national government planning initiatives undertaken by various countries along with the assistance of non-governmental organisations. During these years, the definition of sustainable development underwent prodigious changes until the formulation of the Brundtland Report of 1987, which eventually defined and determined'*sustainable development'* as 'development that meets the need of the present without compromising the ability of future generations to meet their own needs.' In spite of defining sustainability, the definition was ambiguous by nature and yet relevant because it encapsulated and pronounced the fundamental predicaments of environmental degradation which is correlated to economic growth and mitigation of poverty (Lele, 1991). One of the key drivers of sustainability is climate change and its impact on the global environment. As a means to deter and curb the environmental degradation, the United Nations member States framed the Kyoto Protocol, an agreement adopted in Kyoto, Japan in 1997 that later came into force in 2005. The Protocol, a constituent element of the United Nations Framework Convention on Climate Change (UNFCCC) seeks to reduce the emission of GHG namely: Carbon dioxide (CO_2), Methane (CH4), Nitrous oxide (N2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulphur hexafluoride (SF6). The Agreement was set out to reduce the

GHG emissions in conformity with the agreed individual targets set by the Convention for the first commitment period between 2008-2012. During this period, the signatorieswere assignedto periodically submitreports on their national strategies and policies in their effort to tackle and to mitigate GHG emissions. In pursuance of the above Agreement, India ratified the second commitment of the Kyoto Protocol in Qatar under the Doha Amendment in 2012. This amendment calls for revisiting the list of GHGs by the respective signatories for the second commitment period from 2012 to 2020.

Research studies conducted by environmental scientists reveal a strong correlation between the carbon dioxide emissions and energy consumption, and the size of a country's economy (Sovacool and Brown, 2009; Humphrey *et al.,* 1984). In order to analyse different sources of CO_2 emissions, there is a need to scrutinise various sectors. To understand India's effort to combat CO_2 emissions, the following sectors shall be examined and evaluated.

CO_2 emissions from the Power sector: India is dependent on fossil-fuel for the generation of electricity which amounts to 75%. The power sector is responsible for half of India's CO_2 emissions. Electricity power generation from thermal power plants had contributed 96% CO_2 emissions during 1980, whereasin 1994 it dipped to 62% and in 2007, it rose again to 69% of the total CO_2 emissions from the energy sector (Mittal Sharma, and Singh). Coal is also considered to be a major emitter of CO_2. Ever since 2005, India's dependence on the latter fuel has exponentially grown, doubling the emission rate (Myllyvirta, 2019).

CO_2 emissions from the Industrial Consumption: The use of energy in the industrial sector accounts for approximately one-third of global carbon emissions. While observing and evaluating the GHGs from the Indian industrial perspective, the data showsa total amount of CO_2 emissions thatis 24,510 CO_2 equivalent emission in the year 1990; 102,710 CO_2 equivalent emissions in 1994 and 168, 378 CO_2 equivalent emissions in 2000 and 189,987.86 CO_2 equivalent emissions in 2007 (Sharma *et al.,* 2009).

CO_2 emissions from the Domestic and Commercial sectors: The households and commercial activities like energy consumption in the forms of cooking, lighting, heating, and using different household appliances are considered as other sources of emissions. At the National level in 2007, the residential sector emitted 137.84 million tons of CO_2 equivalent, and the commercial sector emitted 1.67 million tons of CO_2 equivalent (INCCA, 2010).

CO_2 emissions from the Transportation sector: In 2007, the transport sector emitted a record of 124 million tonnes of CO_2. Emissions from various mediums of transport include, air, rail, road and water.Currently, India has the world's fifth largest car sales and according to the National Transport Development Policy Committee (NTDPC) reports, there will be a fivefold growth in the use of road transport for passenger and freight by 2030-31 which will significantly increase the GHG emissions and CO_2 emissions at large (Program, 2015).

CO_2 emissions from the Agriculture sector: India being an agrarian society contributes to significant emissions of GHGs due to the agricultural activities. The burning of biomass produces CO_2 emissions which comprises of crop waste and stumble burning (Venkataraman *et al.,* 2006).

CO_2 emissions from the Marine Fishing sector: Fishing is considered as a fuel intensive activity that contributes almost 1% of fuel consumption in India. Additionally it consumes 1378.8 million litres of fuel and releases 3.13 million tonnes of CO2 every year (Das and Edwin, 2016).

Methodology and Objectives

This paper shall be primarily qualitative in spirit, attempting to access the SDGs and to understand the nature and process of implementation of government policies and schemes using record keeping for the SDGs. To seek a wholistic understanding of the subject, the tools of research methodology would include a narrative, based on documents and reports while relying on secondary data to interpret the past and current developments in India in related to the SDGs. Based on the analysis of the literature review some gaps were identified and have been studied in detail under the following research.

The objectives underlined in the study are:

- To analyse India's policy towards combatting CO2 emissions.
- To study and comprehend India's efforts to achieve the salient objectives of global goals 9,13 and 14 and the Paris Pledge.

Sustainable Development and Policy Implementation in India

Long before the United Nations conceived the no-

tion of a sustainable order and drafted the global SDGs', the drafting committee of India's Constitution envisaged a paradigm of social and economic inclusiveness and a sustainable model of development for the country, by indoctrinating certain core tenets under the charter of Fundamental Rights in Part III of the Indian Constitution and the Fundamental Duties noted under the article 51-A of the Indian Constitution. The Indian political community founded a sustainable national order through its constitution. With the advent of the SDGs', India's effort and drive towards sustainability has received greater impetus and its commitment is reflected through its policies and schemes initiated by New Delhi, to help achieve the targets and sustainable goals. While India aims to maintain and continue its economic growth and development, its focus on sustainability has not been stunted or compromised. Conversely, it has synergised by adopting the global sustainable agenda in a wholistic manner. According to the Press Information Bureau report, the Ministry of Finance has stated on July 4, 2019, that India's SDG index score ranges between 42 and 69 for States and between 57 and 68 for Union Territories (UTs). While Kerala and Himachal Pradesh are frontrunners in the State list with a score of 70 and 69, Chandigarh and Puducherry lead in the UTs' list with a score of 70 and 66 each.

Prior the pandemic, India was one of the fastest growing global economies of the world, besides its unfeigned efforts to realise its obligation towards building an inclusive and sustainable order. Paving the way for the rest of the economies, India has developed a balanced composite form of a sustainable order by weaving its economic, social and environmental structures into one fabric. Its commitment to the cause as a country has been reflected by the number of programmes undertaken by the Government, to help improve the prevailing socio-economic and environmental conditions. Despite the inadequate financial resources available to the Government due to the low per-capita income coupled with the issue of overpopulation and vast topography, India has devoted its energy to achieve its goals within the stipulated time, to help realise the sustainable order within the country, through a comprehensive rural electrification programme, road and digital connectivity for all, investing in large scale clean and renewable energy programmes, clean India movement, drive towards housing and sanitation projects for all and by providing elementary school education for all. This edifice has been built upon the foundation of 'Sabka Saath, Sabka Vikas' principle of "Collective Effort, Inclusive Development" advocated by Prime Minister Narendra Modi, who has integrated various state and non-actors from central and state governments, corporate stakeholders, civil society, academia, scientific community and technocrats, to help provide a better future for India.

In order to meet these goals, a country requires synergy and cooperation at the administrative level which India is blessed with, since the central and state administrations are dedicated towards accomplishing the common goals of providing the citizens with basic services and facilities of employment, better road connectivity between the rural and urban region, housing for the poor and education for all. Even in the face of poverty, the country is committed towards the preservation of environment by combating the rate of carbon emissions by 33%-35% by the year 2030, in contrast to 2005. Additionally, it has drawn a plan to establish a carbon sink of 2.5-3 billion tonnes through the plantation of tree cover whereas, India's tree cover has increased by only 5.188 km^2, yielding a 42.6 million tonne carbon sink increase (Ministry of Environment, 2019).

Emissions in the last 5 years

India's contribution in the CO2 emissions per capita has been discussed below, being the third largest polluter due to the increase in production processes and burning of coal and gas as industry fuels. The following table states the changes in the CO2 emissions:

As per Table 1 it is clear from the % change that CO_2 emissions per capita have reduced from 1.36% to 0.51%. However, this is not a significant decrease. Some policy measure must be implemented in more stringent manner in order to commit positive towards the Paris Pledge. These emissions are stemming because of burning of fossil fuels and cement manufacturing. The Covid crisis situation had a short-term impact on the emissions but the long run impacts are still of a greater influence. Post crisis stimulus can direct the combat of climate change towards more efficient use of the renewable resources and better management of energy systems. Reinforcing the better-quality air and reducing the emission rate are the major factors for policy makers in India.

Table 1. CO2 emissions per capita (India)

YEAR	VALUE (tons per capita)	%CHANGE
2019	1.90	0.51 %
2018	1.89	4.25 %
2017	1.81	3.29 %
2016	1.73	0.10 %
2015	1.75	1.36 %

Source: atlas/India/CO2-emissions-per-capita

India's commitment to achieving the global sustainable goals within the stipulated time is mirrored in the government's wholistic approach, wherein the political leadership is personally observing the development through state machinery organisations. The policy campaigns must spread awareness, promote and sensitise all the stakeholders, build capacities and infrastructure for the observation and execution of the SDGs and its targets, through the national developmental programme which is aligned with the SDGs along with the cooperation of the state governments, while its other function is to float multiple innovative projects for various SDGs' themes and targets.

Of all the SDGs India has maintained its focus on achieving the goals of 9, 13 and 14, as they are the kernel features of sustainability and the fundamental requirements of a society. And in 2008, India adopted the National Action Plan on Climate Change (NAPCC) and the State Action Plan for Climate Change (SAPCC) in a bid to outline strategies to control climate change related issues at the national and state level, respectively.

In order to achieve the above-mentioned objectives, NAPCC focuses on different national missions which enables in promoting understanding of climate change, strategic knowledge for adaptation and mitigation, maintaining sustainable habitat and agriculture.

Goal 9:Build Resilient Infrastructure, Promote Inclusive and Sustainable Industrialisation Foster Innovation

India has been rapidly building infrastructure and promoting industrialisation to help bolster its economy. Its transportation sector that includes road connectivity, railways, civil aviation and waterways are witnessing tremendous expansion across the country with the aim of providing better connectivity, easy transport facilities to the people. In the past 5 years, there has been notable growth in the generation of electricity and electrification of the rural states, parallelly Bharat Broadband Network Ltd., has aimed to deliver high speed internet connectivity across rural and urban sectors. India has reformed its business agenda by introducing economic and financial incentives to foreign and domestic investors in order to stimulate its economy and become the hub of business in Asia. Business programmes such as 'Make in India', 'Startup India', 'Standup India' and 'Skill India' are instruments that promote and pool in indigenous resources, innovation and creativity thinking and encourage domestic entrepreneurship to help accelerate and bolster the national economy and create a self-sustaining business model. To foster innovation in the country, the scientific institutions of the government have collaborated with other international scientific institutions over 44 countries through dynamic R&D cooperation. The Union Budget for 2019-20 allocated a sum of INR 700 billion to public banks to augment credit growth for the country's economy. The overall growth rate in the industrial sector has fallen from 7.7% in 2016-17 to 6.9% in 2018-19. It is imperative to sustain a steady growth rate to ensure continuous employability in the country.

India also launched National Mission on Sustainable Habitat under NAPCC with the aim to improve the ability of the habitats to adapt varying climate changes by building resilient infrastructure through covering various aspects like extension of energy conservation building code to address the design of new and large commercial buildings to optimize their energy demand; better urban planning and model shift to public transport to make long term transport plans to facilitate the growth of medium and small cities which will ensure efficient and convenient public transport and recycling of material and urban waste management- a special areas of focus will be development of technology for producing power form waste (Shivaranjani, 2005).

Goal 13: To Take Urgent Action to Combat Climate Change and Its Impacts

The UN report on India's climate change has stated that there has been approximately 50% rise in the global carbon emissions since the 1990s onwards. The rate of emissions has been continuously increasing globally, ever since. As a result, this goal strives to mitigate climate change by integrating a climate action plan along with a set of well-articulated national policies. India's commitment to the cause is reflected at both the national and interna-

tional level. At the international platform, India has signed the UNFCCC and has pledged to adhere to the goals of the Kyoto Protocol by introducing and implementing measures to achieve the intended goals. Similarly, India is signatory to the Paris Agreement which offers not only a blueprint to mitigate emissions but renders a roadmap for developing climate resilience. Under this agreement, India has proclaimed the Nationally Determined Contributions (NDCs) which call for achieving three targets by 2030:

- To reduce emissions intensity of GDP by 33-35 per cent from 2005 level.
- To install 40 percent cumulative electric power from non-fossil, fuel-based energy resources.
- To create an additional space of carbon sink of 2.5 to 3 billion tonnes of CO2, through additional forest and tree cover.

In a serious drive to improve and protect its environment, India is taking various initiatives under the NDCs to meet its desired targets. For instance, as part of its national endeavour to combat the rate of CO2 emanation, the Indian Government has introduced the 'Unnat Jyoti Affordable LEDs for All' (UJALA) a national scheme in 2015, substituting its former the 'Bachat Lamp Yojana'. The UJALA scheme is considered as the world's largest programme designed to promote energy efficiency through the distribution of low-cost LED bulbs. As a result of this initiative, India saved on an average 37 Metric tons of CO2 by the third quarter of 2019. As part of this scheme, Odisha saved (5.4 MtCO2) the highest number of emissions followed by Gujarat (4.3 MtCO2) and Uttar Pradesh (2.73 MtCO2), while among the Union Territories, Delhi topped the charts with 1.38 MtCO2.

The Impact of COVID-19 on CO2 Emissions

During the 2019 Climate Action Summit held in New York, the UN Secretary-General Antonio Guterres raised his deep concerns over the soaring rate of global emissions that have set new records. Addressing the global community at large, he urged the Governments to formulate a climate action plan by 2020, with the objective of abating GHG emissions by 45 percent in the coming decade and while seeking to achieve an emission-free environment by 2050.

In an unprecedented turn of events, COVID-19 paralysed the global economy arresting all forms of commercial activities. During this interim period the environment recuperated from the wounds of man-made disasters that have scathed its pristine atmosphere and habitat. Interestingly, according to one of the reports from the Centre for Research on Energy and Clean Air (CREA) confirmed that India's CO2 emissions dipped for the first time in the last four decades amid the pandemic lockdown. In order, to straddle the revivification of the environment and the restoration of the global economy post COVID, the UN Secretary-General outlined actions for the Governments to adhere to and directed to create a systematic shift, in generating a sustainable economic order that is clean, green, healthy and resilient, safeguarding the organic and innate form of the planet as well as the economic aspirations and needs of the people.

Goal 14: To Conserve and Sustainably Use the Oceans, Seas and Marine Resources

A coherent plan has been drawn for the promotion of the 'Blue Revolution' by the government, to conserve the marine ecosystem, since India is the second largest producer of fish globally. India has signed the International Convention on Prevention of Marine Pollution agreement. The Coastal Ocean Monitoring and Prediction System is stationed at various junctions all along the Indian coast to survey the level of marine pollution. To add to the monitoring system the Merchant Shipping Rules 2009, framed under the Merchant Shipping Act of 1958, acts as a deterrence. A Marine Litter and Microplastics research programme is underway to gauge the situation and it acts as the prelude for the building of the National Marine Litter Policy. India is also instituting a Marine Observation System along the coast, to study coastal processes and assess the water quality.

For the conservation of maritime biodiversity and marine natural resources, the Centre has undertaken a National Plan for Conservation of Aquatic Eco-systems and created Marine Protected Areas. To preserve the coastal marine sites the management has designated Important Coastal and Marine Areas. The sanctuary for coral reefs has been protected under the Wildlife Protection Act 1972, Environmental Protection Act 1986, and by the Coastal Regulation Zone. Regarding sustainable fishing, the centre has taken several measures including the enactment of a Potential Fishing Zone Advisory programme, modernisation of fishing centres and banning of mechanised fishing in designated areas. The government has initiated all these programmes

and measures to ensure the conservation of marine biodiversity while permitting the use of maritime resources to its people without exploiting them.

Conclusion

Overall, India has grown socially and economically over the past few years, bringing economic prosperity to all. Nonetheless, shortcomings still prevail in certain sections of society especially in rural pockets and within the economically backward population in terms of health, food and nutrition, essential infrastructure, quality of education and employment among other issues. India's drive and commitment towards achieving the SDGs reflect the measures and initiatives undertaken by the national and the state governments to help develop the socio-economic-environmental markers. Since the three markers are interrelated due to the nature of the various objectives under the SDGs agenda, it is evident that no one single scheme or programme can help achieve the goals but a collective integrated multi-prong strategy at the state and central level is required to accomplish the global agenda.

To ensure the success of the SDGs nation-wide, state governments need to adopt the SDGs agenda as the axis of their policy goals and work in tandem in letter and spirit with the Union Government. Since several articles of the SDGs fall under either the State list or the Concurrent list of the Schedule VII of the Indian Constitution, it is imperative that there be a coordination between the state governments and the central government. Besides, factors such as the quasi-federal government structure, the country's population and the geographical size of India only add more complexity to the task. Despite such difficulties, the state governments and the union government are trying to help achieve the desired outcomes through the alignment of policies.

The Paris Pledge is asignificant landmark that has received tremendous recognition worldwide. Among them, India's position on thePledge has been both equally resolute and unwavering. Its commitmentis reflected by the various initiatives undertaken by the government and its multi-prong strategy with its states' administrations, including its joint efforts with various non-state actors. The fusion and integration of the public and private stakeholders has underscored its national resolve to achieve the convention's mandated goals. Its multi-prong strategy has driven India to be one of the front runners, in the pursuit of combating climate change and is well on course to achieve the targets under the Paris Pledge by 2030.

The implementation and monitoring activities at the local level are essential for the accomplishment of the SDGs agenda. A regular coordinated planned and consulting mechanism between the centre and the state can help evolve better mechanisms for executing the SDGs and targets. A few state governments have appointed special officers to every department to ensure the coordination of activities related to the SDGs, while creating similar structures at the district level. The major reason for the progress in the global agenda is the implementation of appropriate policies, programmes and schemes with the help of public action. Maintaining period or time-based targets would ensure the objective and monitoring institutions at the state/local level would help expedite the process of attaining the global agenda throughout the country.

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