



# An Evaluation of G20's Stand on Environment and Climate Change Adaption: A Critical Review

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## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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## ABSTRACT

Environment play significant role in the growth and development of the People and Nations at all levels with better sustainability. The aim of this article is to evaluate the G20 summits held in the world stand of the environment and climate change adaptation and also presents discussions, outcomes of G20 meeting held in New Delhi – India on 9<sup>th</sup> and 10<sup>th</sup> of September 2023. The more focus of this article is environment and climate change adaptation. It is a latest topic and very few studies were conducted on this topic, so that the researcher presented the G20summit stand on environment and climate change adaptation. Methodology: This article is prepared with secondary data, available in the books, reports, research papers and online libraries like Google Scholar, J-

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Gate Plus, Research Gate, Academia, Mendeley and Google. Results: The G20 Summit presided over by India brought new initiatives and funds for climate change mitigation and adaptation for developing healthy and eco-friendly environment. The Biofuel alliance and climate change fund by the United Kingdom are the major achievements at the G20 summit held in India. Announcement of G20 Satellite for environment and climate observation is great initiative born in G20 summit. The leaders attended from various Countries agreed to work on green and low-carbon energy technologies including mechanics like wind turbines, solar panels, biomass systems and carbon capture equipment giving priority for the Non-Conventional type of Energies. These technologies supports the use of natural resources which provide less pollution and promote a green climate which further supports for the achievement of the targets and indicators of Sustainable Development Goals.

*Keywords: Climate change; environment; growth; development; inclusive; accessible; sustainability; G20 summit; stakeholders; collaboration; partnership.*

## 1. INTRODUCTION

G20 is called the 'Group of Twenty' which contains 20 member countries and the 20<sup>th</sup> member is the European Union. The G20 countries are Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Türkiye, the United Kingdom, the United States, the African Union and the European Union [1]. The G20 summit organizes once in a year. G20 was established in 1998 but the first meeting was organized in 2008 by USA in Washington. The platform will be helpful to the Finance Ministers and the Governors of Central Banks to discuss about the economic and financial issues in the world. The primary goal at the time of establishment was to solve the Global Economic Recession and to establish a Framework to address such difficulties in the future. Climate Change was also firmly recognized at the time as a major worldwide concern with enormous economic repercussions, as well as an existentialist dimension for humanity [2]. Last year i.e., 2022 Indonesia organized this G20 summit successfully in Bali. India got the chance to Presidency of this prestigious summit in 2023. The member countries in the G20 are more powerful in the economy, and GDP and have more than 60 per cent of the population in the world. The concept of G20 was initiated in 1997 at the time of the Asian financial crisis [3] but initiated in the second world crisis in 2008. Gradually it was gaining importance in the world. Every year, one country took the Presidency and organize the summit. India has participated in all the summits organized by various countries and got the opportunity to preside it in 2023.

The Government of India organized this G20 summit on the 9<sup>th</sup> and 10<sup>th</sup> of September 2023 in Bharat Mandapam of Pragathi Maidan, New Delhi. It is the 18<sup>th</sup> summit of G20 countries and the first time it is organized in India after its initiation. The heads and representatives of 20 countries attended this summit. India organized the summit fruitfully under the great leadership of the Honorable Prime Minister, Sri. Narendra Modi. The world leaders praised Sri. Narendra Modi for his Decisive Leadership. India promoted the voice of Universe is One and Sri. Narendra Modi proposed One Earth, One Family and One Future [4,5]. There are six priorities of the G20 India summit among them the first one is Green Development, Climate Finance and Life Movement. The Global Leaders have identified the better ways and commitment towards sustainable energy solutions, sustainable development, climate change and climate action [6]. Every Nation has got concern and commitment to work for the growth and development of its People and Country. The following table presents the presidency of G20 summits by various countries from its beginning.

The data in the Table 1 shows that the various countries presided over the prestigious 18 G20 summits in the world. It is observed that USA organized this summit three times, then every year a country is presiding the G20 summit where India has got this opportunity to preside 18<sup>th</sup> G20 summit. The G20 summits focused on SDGs, climate action and green development initiatives, multilateral financing, digital public infrastructure, artificial intelligence (AI), and international taxation, among others [8].

**Table 1. Presidency of G20 summit from 2008 to 2023**

G-20 Summits	Dates	G20 Host Countries	Venue & Host city	Host Leader
1st	November 14 <sup>th</sup> & 15 <sup>th</sup> , 2008.	United States	National Building Museum, Washington, D.C.	George W. Bush
2nd	April 2nd, 2009	United Kingdom	ExCeL London, London.	Gordon Brown
3rd	September 25 <sup>th</sup> , 2009.	United States	David L. Lawrence Convention Center, Pittsburgh.	Barack Obama
4th	June 26 <sup>th</sup> & 27 <sup>th</sup> , 2010.	Canada	Metro Toronto Convention Centre, Toronto.	Stephen Harper
5th	November 11 <sup>th</sup> & 12 <sup>th</sup> , 2010.	South Korea	COEX Convention & Exhibition Center, Seoul	Lee Myung-bak
6th	November 3 <sup>rd</sup> & 4 <sup>th</sup> , 2011.	France	Palais des Festivals, Cannes.	Nicolas Sarkozy
7th	June 18 <sup>th</sup> & 19 <sup>th</sup> , 2012.	Mexico	Los Cabos Convention Center, San José del Cabo, Los Cabos.	Felipe Calderón
8th	September 5 <sup>th</sup> & 6 <sup>th</sup> , 2013.	Russia	Constantine Palace, Saint Petersburg.	Vladimir Putin
9th	November 15 <sup>th</sup> & 16 <sup>th</sup> , 2014.	Australia	Brisbane Convention & Exhibition Centre, Brisbane.	Tony Abbott
10th	November 15 <sup>th</sup> & 16 <sup>th</sup> , 2015.	Turkey	Regnum Carya Hotel Convention Centre, Serik, Antalya.	Recep Tayyip Erdoğan
11th	September 4 <sup>th</sup> & 5 <sup>th</sup> , 2016.	China	Hangzhou International Exhibition Centre, Hangzhou.	Xi Jinping
12th	July 7 <sup>th</sup> & 8 <sup>th</sup> , 2017.	Germany	Hamburg Messe, Hamburg.	Angela Merkel
13th	November 30 <sup>th</sup> & December 1 <sup>st</sup> , 2018.	Argentina	Costa Salguero Center, Buenos Aires.	Mauricio Macri
14th	June 28 <sup>th</sup> & 29 <sup>th</sup> , 2019.	Japan	Intex Osaka, Osaka.	Shinzō Abe
15th	November 21 <sup>st</sup> & 22 <sup>nd</sup> , 2020.	Saudi Arabia	King Abdullah Financial District, Riyadh.	Salman
16th	October 30 <sup>th</sup> & 31 <sup>st</sup> , 2021.	Italy	Rome.	Giuseppe Conte
17th	November 15 <sup>th</sup> & 16 <sup>th</sup> , 2022.	Indonesia	The Apurva Kempinski, Bali.	Joko Widodo
18th	September 9 <sup>th</sup> & 10 <sup>th</sup> , 2023.	India	Pragati Maidan Convention Centre, New Delhi.	Narendra Modi

Source: Wikipedia ([7])

## 2. "ONE SUN, ONE WORLD, ONE GRID" CONFERENCE HELD IN NEW DELHI

Before this big event, a one-day conference with the title "Transnational Grid Interconnections for One Sun, One World, One Grid (OSOWOG)" was held in New Delhi ahead of the 18th G20 Summit. The Power Grid Corporation of India Limited (POWERGRID) and a "Maharatna" enterprise under the Ministry of Power, has led this conference. With OSOWOG, continuous renewable energy might become more available,

accessible, and affordable and further for eliminating the need for energy reserves (mostly conventional based which affect the health and wealth of the Environment, People and Nation)) and ultimately lowering consumer power bills while guaranteeing energy access for millions of people who do not now have it [9]. All such initiatives will minimize or reduce the impact of Global Warming and Climate Change so that the planned Growth and Development can be achieved for the People and Nation with

improved Quality of Life (QOL) and Sustainability.

### 3. ENVIRONMENT AND DEVELOPMENT

Environment is defined as the entirety of the physical world consisting of the world's land masses, oceans, and atmosphere where as Development is defined as the process of growth and change in human social, political, and economic systems [10]. The Frame (Fig. 1) of Sustainable Development covers: Social Progress or Development; Environmental Protection and Enhancement known as Environmental Development; Economic Development (SEE) and later added People's Development (SEEP).

The Domains of Environment and Development works as a cause and consequence of each other. The Healthy, Protective and Eco-Friendly Environment supports for the Growth and Development of People and Nation at all levels. On the other side, need based Development by balancing the Resources both Natural and Mobilized will support Environment with minimum impact by taking matching protective and secured measurers.

Moving ahead for achieving development [11,12] with better sustainability and quality, Sustainable Development Goals or Global Goals are a collection of seventeen interlinked objectives designed to serve as a "shared blueprint for peace and prosperity for people and the planet, now and into the future". SDGs aim to transform our world and are a call to action to end poverty and inequality, protect the planet, and ensure that

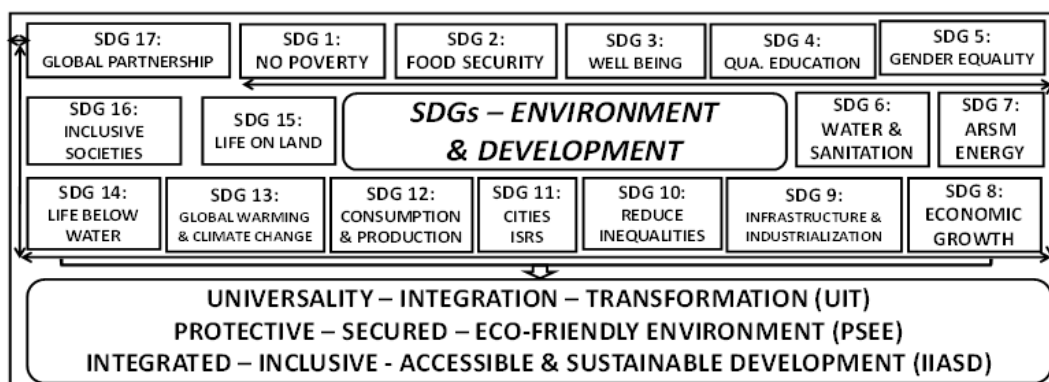
all people enjoy health, justice and prosperity and it is critical that no one is left behind tuning to the vision of "One for All and All for One (OAAO)".

Every Nation has developed their own vision plan [13] to utilize their resources for achieving the targets and indicators of SDGs matching to their own capacities, skills, challenges, vulnerabilities, dynamics, and localized aspects and parameters with better outputs, outcome, milestones, and impact with improved Quality and Sustainability. All the seventeen Goals are interlinked and well connected with the factors of Environment and Development with better Growth and Quality and its frame is shown Fig. 2.

The Frame of SDGs (Fig 2) reflects that they work with the concept of Universality, Integration, and transformation (UIT); to work for Protective, Secured and Eco-Friendly Environment (PSEE); and further resulting to Integrated, Inclusive, Accessible, and Sustainable Development (IIASD) with improved Quality of Life (QOL). The SWOT (Strengths, Weakness, Opportunities and Threats) Analysis in respect of every Nation's vision plan based of SDGs will improve the visibility of the entire process covering: Data Acquisition, Analysis, Planning, Implementation, Monitoring, Evaluation, Documentation, Reporting, Publication, and Sharing (DAPIMEDRPS) with resulted Outputs, Outcome, Millstones, and Impact with better Availability, Accessibility, and Affordability (3As) in an Inclusive, Participatory, Accountable, Responsible, and Visible Environment / Community at all levels with better sustainability and quality [14].



Fig. 1. Frame of sustainable development



**Fig. 2. Frame of SDGs with environment and development**

As suggested in SDG 17, working on the mode of Partnership at all levels [12] will be more effective and efficient covering Inputs, Systems, Process, Outputs, Outcome, and Impact. These partnerships are expected from the level of Community or Panchayat, Mandal, Block, District, State, National and Global giving priority to the local dynamics, needs, challenges, vulnerabilities and resources. In this direction, the well-known model of partnership is Public Private Partnership (PPP) which majorly concentrates on bigger projects like: Irrigation Dams, Roads & Building, Power Generation, Metros, Airports, and other areas which are mutually accepted and agreed with specific terms and conditions. The SWOT of model of PPP reflects advantages on one side and several limitations on the second side covering: works on major projects only; dominance of Private; mostly works on business model with the motto of profit; investor motive; dominantly works with top down approaches (TDAs); limited work frame and service delivery systems; works with rigid frame; the benefits are not available, accessible and affordable for all; low priority for the health and wealth of people, community and environment; mismatched supports in the form of resettlement and rehabilitation for the project affected people (PAPs) directly and indirectly for others covering both short-term and long-term; poor visibility; less scope for Social Audit; poor or limited use of local resources; and other challenges and vulnerabilities resulted as a cause and consequences of each other.

These limitations have been taken care while framing the SDGs and focusing on Goal (SDG17) on Partnerships only. As indicated, Civil Societies or Non-Governmental Organizations (NGOs) gains priority to work on partnership and to overcome the limitations of the model of PPP.

The added or need based partnership is Government, Private, NGO Partnership (GPNP). This aspect is stressed while preparing the Annual Progress Report on SGDs by the team of experts of NITI Aayog, Government of India, New Delhi. The role of NGOs has been appreciated by the team of experts and authorities at all levels. The SWOT of GPNP reflects several advantages like: very near to or with the people and community; works on not for profit motto; works with bottom up approaches (BUAs); works with life cycle approaches (LCAs); flexible; participatory; accountable; responsible; visible; scope for Social Audit; utilizes the local resources to the maximum extent possible; ownership; sustainable; and all other resulted positive outputs, outcome, and impact.

At the same time, GPNP do have some limitations like: limited resources; less scope to work on partnership; less opportunities; less scope to be sustainable; and other attitudinal aspects of Stakeholders on NGOs. As recognized by the Government, Private, Corporate and other Institutions, these limitations or threats of NGOs can be minimized or transformed into their Opportunities and Strengths and further to be more effective and efficient at all levels of partnerships (GPNP) starting from Panchayat to Mandal, Block, District, State, National and Global level with flexibility fitting to the given groups, community and working environment. The provisions made under the Corporate Social Responsibility (CSR) have become a strength to the NGOs to mobilize required resources in general and particularly to work in the areas of Environment and Development covering Global Warming, Climate Change, Energy Resources and Power Generation, Urbanization; Awareness cum Advocacy; and others keeping the Growth and

Wellbeing of People at all levels tuning to the mission of One for All and All for One (OAAL).

#### 4. CLIMATE CHANGE

Climate Change is one of the burning problems in the world as well as in India. It affects everyone, regardless of age, gender, occupation, geographical area, socio-economic status etc. According to the United Nations [15], climate change refers to a long-term shift in temperature and weather patterns. Such shifts may be caused by massive volcanic eruptions or variations in the energy of the Sun. Human beings are doing a few activities for their amenities like making electricity, and burning fossil fuels like coal, oil and gas are the main causes of climate change [15]. The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as: 'A change which is attributed directly or indirectly to human activities that alter the composition of the global atmosphere and which are in addition to natural climate variability observed over comparable time periods [16]. Climate change has many causes. Every Nation knowingly and inconspicuously with their activities contributing for the climate change. The emissions that cause climate change come from every part of the world and affect everyone, but some countries produce much more than others. The seven biggest emitters alone (China, the United States of America, India, the European Union, Indonesia, the Russian Federation, and Brazil) accounted for about half of all global greenhouse gas emissions in 2020 [15].

#### 5. IMPACT OF CLIMATE CHANGE

Climate Change is a Global phenomenon that poses a significant threat to the environment and human well-being. It can affect the health, ability, agriculture, economy, and work of human beings [17]. Due to climate change human beings face weather changes, sudden rains, high heat waves, seasonal diseases, acid rains etc [18]. They face many health problems generally and among children and the aged particularly. Fertility among youth is also affected due to climate change effect [19]. There is an impact of climate change on marine food supply, fisheries and water sources [20]. It can also affect the animals, birds and insects living on the earth [21]. Conditions such as rising sea levels and saltwater intrusion have progressed to the point where entire communities have had to be relocated, and prolonged droughts put people at risk of starvation [22]. Due to climate change, the

earth faces hotter temperatures, more severe storms, drought will be increased, and rising ocean and sea levels. It leads for the severe health problems and displacement due to lack of food and livelihoods. Government organizations, non-governmental organizations (NGOs) and individuals worldwide are implementing many activities, creating awareness cum advocacy through many programs and showing their responsibility to mitigate the impact of climate change. Hazards and Disasters are the resultant of the Climate Change and vice versa affecting the people and communities covering Social, Economic and Environmental Domains.

Covid 19 is the recent environmental emergency which affected the people and environment covering: Social, Medical, and Economic (SME) with challenges, and vulnerabilities including isolation. As reported along with Government, Non-Governmental Organizations (NGOs) have played a key role at all levels in supporting the affected people and families with better awareness, advocacy, motivation, guidance, identification, facilitation, health care, nutrition, provisions, transportation, livelihoods, and other aspects covering prevention, training and rehabilitation. Following the guidelines, NGOs also well equipped to prepare the People and Communities as Disaster Risk Reduction (DRR). The technological shift from Traditional to Digital [14] has become a powerful tool in the hands of Government, NGOs, People and Communities to overcome the challenges and vulnerabilities resulted due to various hazards and Disasters. On positive side, it is the opportunity given by Covid 19 and such attitudinal changes have brought several advantages with better inputs, outputs, outcome and impact with quality and wellbeing of People at all levels.

#### 6. CLIMATE CHANGE ADAPTATION

IPCC 2014 defined Climate Change Adaptation as "the process of adjustment to actual or expected climate and its effects". In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities [23]. The goal of adaptation is to reduce the risks created by climate change and seek the advantages of that situation. It is one of the two primary policy responses to climate change, the other is mitigation, which involves lowering greenhouse gas emissions in order to address the underlying causes. Even if emissions are significantly reduced over the next ten years, additional warming is still certain, and adaptation will be

required to deal with the climatic shifts currently in motion [24]. Adaption should be need based with better participation of Government, Private and NGOs with scope for partnerships to mobilize and share resources and further to reach the targeted groups with matching opportunities as a solution with quality and quantity for achieving planned targets and indicators with better sustainability.

## **7. G20 SUMMITS AND CLIMATE CHANGE**

There are 18 G20 summits organized by various countries in the world. One of the major agenda points in G20 summits is Climate Change. The beginning of Washington Summit 2008 to India Summit 2023 requested for the mitigation, adaptation, technology, and financing to be included, partnerships, and committed to "assist developing countries in deploying clean energy technologies, reducing forest-related emissions and adapting to the effects of global warming". They called on the World Bank to take the lead in responding to demanding global challenges, such as climate change and urged international financial institutions to assist countries in this process. Over the medium term, G20 Nations decided to phase out inefficient fossil fuel subsidies while providing targeted assistance to the poorest. A special emphasis was placed on financing the green economic transition through investments in sustainable clean energy, energy efficiency, renewables, and climate resilience. The summit called the heads of the countries to prepare the appropriate policies and action plans for climate change adaptation with the effective participation of Government, Private, and Non-Governmental Organizations at all levels.

## **8. G20 SUMMIT IN INDIA AND IMPORTANT DECISIONS TAKEN RELATED TO CLIMATE CHANGE ADAPTATION (CCA)**

G20 countries are the most powerful and dominant countries in the world. The Hon'ble Prime Minister of India Sri. Narendra Modi said that the theme of this G20 summit held in 2023 is 'Vasudaika Kutumbham' which means One Earth, One Family and One Future. During the two-day summit held in New Delhi, many decisions have been taken by the leaders towards the Sustainable Development Goals (SDGs) and Green Earth as Community Initiatives with Multisectoral and Multidimensional (MSMD) Approaches. Among them, climate

change adaptation is one of the agenda points to take up on priority basis with the effective and efficient partnerships among Government, Private, and NGOs at all levels. As reported [25] by the NITI Aayog, the progress achieved by India in the targets and indicators of 17 SDGs is very much positive and moving on to achieve the same to the maximum level of 100% by 2030 with better sustainability and quality. India is committed to move forward to achieve desired CCA with opportunities as solutions. The outcome of the G20 summit is to build a strong, sustainable, balanced and inclusive growth and accelerating the progress on sustainable development goals. The decisions taken in the G20 meeting is discussed below.

### **8.1 Biofuel Alliance**

The United States, Brazil and India formed a Global Biofuels Alliance during the G20 summit (2023) in New Delhi. These three countries are producers as well as consumers of biofuels. These three countries involve the other interested countries and promote the use of biofuels in the transportation sector and other allied sectors. These three countries emphasize strengthening markets, facilitating global biofuels trade, developing concrete policy lesson-sharing and providing technical support for National Biofuels Programs worldwide. These countries adopt the best practices done other countries in the field of biofuels and replicate the same in other developing countries and low-income countries. The alliance is responsible for bringing more biofuel products and trades for Green Earth. Biofuel products should be available in low-income countries and developing countries at an affordable cost to the country's population. The alliance coordinates the other relevant existing Regional, National and International Agencies as well as initiatives in the bioenergy, bioeconomy, and energy transition fields more broadly, including the Clean Energy, Ministerial Bio-future Platform, the Mission Innovation Bioenergy initiatives, and the Global Bioenergy Partnership (GBEP) [4,5]. These initiatives added with technologies including digital environment are the best to overcome the challenges of Global Warming and resulted in Climate Change and to work towards its prevention such that together they can work for the achievement of an eco-friendly environment and further support the People and Nation with opportunities as a solution for better Growth cum Development with improved Quality of Life (QOL) and Sustainability.

## 8.2. United Kingdom Contribution 2 billion Dollars for Climate Change Action

During the G20 summit, the Prime Minister of the United Kingdom Rishi Sunak announced that the United Kingdom will spend Two Billion Dollars to the Green Climate Fund to work on Climate Change and its consequences. They initiate the Green Climate Fund and support low-income countries and developing countries through the fund for climate change mitigation and adaptation. They are interested in the promotion of Green Climate in the World. He called the fellow countries to take action in reducing carbon emissions and assisting economically vulnerable Nations in this regard. The leaders of the committee agreed to work on green and low-carbon energy technologies including mechanics like Wind Turbines, Solar Panels, Hydro-power, Biomass Systems and Carbon Capture Equipment with other localized initiatives with the use of non-conventional resources available locally. These technologies provide less pollution and promote a Green Climate [26] with effective and efficient monitoring cum evaluation systems with priority on digital environment.

The leaders of the committee make critical moves to address environmental change covering causes and consequences supporting SWOT Analysis. They called for a "Quantum Jump" in climate financing, and environment supporting, and they consented to pursue accomplishing net zero emissions by 2050 [27]. The pioneers also focused on the significance of Food Security and Nutrition with other domains like Water. They called for expanded interest investment in agriculture farming and food creation and they vowed to address the difficulties presented by environmental, climate change and struggle.

## 8.3 G20 Satellite

The honorable Prime Minister of India Sri Narendra Modi announced that the India launches a G20 Satellite Mission for environment and climate observation. It helps to promote environment and climate change adaptation among South Asian Countries of the World. The Satellite helps these countries to promote their Green Environment [28].

## 8.4 Driving Gender Inclusive Climate Action

Acknowledging the disproportionate impact of climate change, biodiversity loss, desertification and pollution on all women and girls, accelerating climate action must have gender equality at its core. To this end, all G20 countries will support and increase women's participation, partnership, decision-making and leadership in climate change mitigation and adaptation, and disaster risk reduction (DRR) strategies and policy frameworks on environmental issues [29].

One of the Goal (SDG 5) of Sustainable Development Goals (SDGs) works on Gender Equality emphasizing "Achieve gender equality and empower all women and girls" with specific targets covering: End all forms of discrimination against all women and girls everywhere; Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation; Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation; Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate; Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life; Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences; Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws; Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women; and Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels. These targets are expected to achieve the indicators which include: Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex;



Proportion of ever-partnered women and girls aged 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months, by form of violence and by age; Proportion of women and girls aged 15 years and older subjected to sexual violence by persons other than an intimate partner in the previous 12 months, by age and place of occurrence; Proportion of women aged 20-24 years who were married or in a union before age 15 and before age 18; Proportion of girls and women aged 15-49 years who have undergone female genital mutilation/cutting, by age; Proportion of time spent on unpaid domestic and care work, by sex, age and location; Proportion of seats held by women in National Parliaments and Local Governments; Proportion of women in managerial positions; Proportion of women aged 15-49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care; Number of countries with laws and regulations that guarantee full and equal access to women and men aged 15 years and older to sexual and reproductive health care, information and education; Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and share of women among owners or rights-bearers of agricultural land, by type of tenure; Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control; Proportion of individuals who own a mobile telephone, by sex; and Proportion of countries with systems to track and make public allocations for gender equality and women's empowerment. Awareness cum Advocacy as part of Women Empowerment will be effective and efficient to achieve Gender Equality at all levels and further to contribute significantly for the mitigation of Global Warming and Climate Change.

### **8.5 Legal Stand of India Against Climate Change Adaptation**

Protection of the environment is one of the fundamental duties of the Indians which was mentioned in article 51-A (g), which says that protection of environment and climate is duty of every citizen of India. Article 48 - A says that the state has the power to initiate any type of activities to protect the environment and safeguard to the forests and the wild life of the country [30]. The following acts are also related to Climate Change in India.

- The Water Prevention and Control of Pollution Act of 1977,
- The Forest Conservation Act of 1980,
- The Air Prevention and Control of Pollution Act of 1981,
- The Environmental Protection Act of 1986,
- The Energy Conservation Act of 2001,
- The Wildlife Protection Act of 2002,
- The Biological Diversity Act of 2002, and
- The National Green Tribunal Act of 2010

India's current climate action plans are motivated by an awareness of the risks and economic costs that may follow from inaction. Investments in green technology and durable infrastructure, according to India's 2021–22 Economic Survey, can shield the economy from concerns about the future of the environment. Until now, India's climate adaptation and mitigation efforts have been mostly supported by domestic green funding. In an effort to direct the growing pool of worldwide climate finance sources, it is now making aggressive efforts to arrange its investment platform. Both established technologies, like solar photovoltaic panels, and new ones for clean energy and transportation, such as carbon capture and storage (CCS), green hydrogen, and battery storage options, have been made more affordable in India thanks in large part to the private sector. India wants to establish green hydrogen value chains and industrial uses in high-emitting industries such as steel and cement through initiatives like as the Leadership Group for Industry Transition, which it co-founded. One such endeavor is the National Infrastructure Pipeline, which serves as a repository for infrastructure projects to be connected with investors. In this direction, the Private and Corporate can play a key role to work with the Government on the mode of Public Private Partnership (PPP) and support to their respective Corporate Social Responsibility (CSR).

### **8.6 'India-middle East-Europe' Economic Corridor, A Modern-day Spice Route**

During the yearly Group of 20 Summit of the world's leading economies, Honorable Prime Minister of India, Shri. Narendra Modi, unveiled plans to establish an economic corridor spanning from India to the Middle East and Europe, which will include maritime and rail connections. A plan to cooperate on connectivity and infrastructure encompassing India, the United Arab Emirates, Saudi Arabia, the European Union, France, Italy, Germany, and the US would create the first-ever

economic corridor. On the fringes of the Group of 20 Summit in New Delhi, the United States, Saudi Arabia, the European Union, the United Arab Emirates, and others initiated the project to connect Ports, Railroads, Power and Data Networks, and Hydrogen Pipelines. Despite having a strong commercial focus, the plan may have broader effects, such as fostering relations between Saudi Arabia and Israel, longtime enemies. One idea for a project would connect [9] with various groups as part of collaboration cum partnerships.

## 9. CONCLUSION

The study made on Global Warming and Climate Change has resulted for several conclusions and some of them include:

1. Global Warming and resulted Climate Change is one of the burning issues in the world as it lowers the Growth, and Development of the People, Communities and Nations with challenges and vulnerabilities.
2. India as a developing country and the most populated country in the world is facing many consequences in agriculture, health of human beings and environmental problems due to Climate Change.
3. Environment and Development works as a cause and consequences of each other at all levels.
4. The targets and indicators of Sustainable Development Goals are well connected with the Environment and Development.
5. Community Initiatives with ownership will be effective and efficient to protect the Environment and further to achieve the desired Development.
6. The partnership model of Public Private Partnership, in spite of several advantages, do have several limitations to protect Environment.
7. Other model of partnership known as Government, Private, and NGO Partnership (GPNP) working with bottom up approaches will be more effective and efficient with better participation, accountability, responsibility and transparency.
8. India initiated many Laws and Acts to protect the Environment and Climate.
9. The Government of India initiated many Schemes to promote Climate Change adaptation among the country's population.

10. New green technologies, biofuel motor vehicles, biofuel technologies, and green climate funds will be helpful to future generations to promote climate change adaptation.
11. The G20 Summit organized by India (2023) brought new initiatives and funds for climate change mitigation and adaptation.
12. There is a need to increase the role of Corporate Social Responsibility in promotion of quality of life of citizens of the world [31].
13. The Biofuel alliance and climate change fund by the United Kingdom are the major achievements at the G20 summit held in India [32,33].
14. The leaders attended from various countries agreed to work on green and low-carbon energy technologies including mechanics like wind turbines, solar panels, biomass systems, other non-conventional source of energies and carbon capture equipment.
15. These technologies provide less pollution and promote a green climate giving priority to the dynamics of the given environment / community [34,35].
16. Every effort should be made to make environment more eco-friendly which further supports for the Growth and Development of the People, Communities and Nations.

## 10. RECOMMENDATION

To strengthen the Resources and Action Plans for the Mitigation of Global Warming and resulted Climate Change, the recommendations made include:

- a. To support for the Community Initiatives with Ownership as part of Gender Equality and Empowerment for better Inputs, Outputs, Outcome and Impact.
- b. To support the developing and under developed Countries in respect of sharing Resources and Technologies on Collaboration with opportunities to be more effective and efficient.
- c. To accept and create opportunities for NGOs to work with Government on the model of Government – Private - NGO Partnership (GPNP).
- d. To develop Digital Environment for Data Acquisition, Processing, Analysis, and

Reporting with better Access and Affordability.

- e. To support the Industries working on Eco-friendly Environment like: Products Making, Transport Systems, Agriculture, Water & Sanitation, Waste to Product, Waste Disposal, Packing, Power Generation, and other such large scale Projects / Establishments.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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