Research Article

Enabling Sustainability and Just Transition for Better Future: Role of G20

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Abstract: Since efforts to mitigate climate change involves externality problem, there is a tendency of free-riding, requiring global close cooperation. It also involves questions of fairness and justice, as least-developed and developing countries, housing the maximum chunk of poor people, have to meet their developmental aspirations. One-fit-for-all principle would not work. The developed countries would do better to further transition to knowledge-based economy, besides increasing the share of renewable energy in energy mix, having robust carbon emission market and immediately phasing-out subsidies on fossil fuels. The developing countries, having prominent industrial and manufacturing sector, should acquire energy efficiency. They have infrastructural and technological lock-in problems; they should replace retiring old thermal plans with renewable ones, besides introducing the carbon price and phasing-out subsidies on fossil fuels. The least-developed countries would do better to increase their agriculture productivity to halt deforestation. The developed countries should help them technically and financially acquire energy efficiency and shift to clean energy. Remaining carbon space should be allocated progressively. Developed countries should vacate some space by targeting net-negative emission. Indian Presidency, with developing countries' Troika, is important for deliberations on these important issues.

Introduction

Sustainability is not a new concept. In economics, it is used as sustainable development or sustainable growth, signifying development with taking due care of ecology. Sustainable development has been defined in simple words in Brundtland Report of UN in 1987 as 'development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs'(UN, 1987). The 1992 Rio Earth Summit consolidated the Brundtland argument that sustainable development must comprise three pillars, including economic, environment and social. There should be economic development with preserving environment and social harmony with inclusive growth.

Nobel laureate Robert Solow defines sustainability as making sure that next

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generation is as well off as the current generation for all times (Kolstad, 2012). He used the concept of weak sustainability and regarded the man-made capital, like machines, and knowledge are close substitutes to natural resources. As per his view, once we deplete the energy or other natural resources, new man-made machines and technologies would replace them, and we would use less of these natural resources as a result of energy or resource efficiency. However, there exits another view which believes in strong sustainability, as there exits weak or no substitutability between man-made capital and natural capital.

The neo-classical framework, under which the world has seen the unprecedented growth for the last few decades, is majorly premised on weak sustainability. The neo-classical framework, based on utilitarianism, individualism and unbounded rationality, has exploited everything which has the capacity of satisfying the insatiable demand of humans. In pursuit of this end, it has created the inequality among nations and within nations (comparable to glided age) and destroyed the ecology. It placed humans at the centre of ecological system rather than as one part of it and exploited it unsustainably, a great deal. Its adverse manifestations are visible in many forms (Nordhaus, 2013), including the frequency of zoonotic deadly diseases (COVID19 being latest), global warming, extreme weather events, desertification, loss of terrestrial and marine bio-diversity, etc.

However, world leaders, having experienced the fury of nature in one form or another, have realized that something is wrong with this path of development and started taking environment seriously. It was also reinforced by the Intergovernmental Panel on Climate Change (IPCC)'s sixth assessment report, which indicates impending grim situations and calls for drastic actions on the part of comity of nations. They have now started believing in science of global warming and climate change, which is on account of anthropogenic activities. They have promised to cut their emissions under the Paris Agreement under the ambit of United Nation Framework Convention on Climate Change (UNFCCC). They have made their commitments for mitigating climate change in Intended Nationally Determined Contributions (INDCs) under the Paris Agreement. They have also announced their respective years for going net-zero emission, which is year 2050 in case of developed countries. India also announced its intention for securing net-zero by 2070.

Transitioning to green economies to combating climate change, which each country needs to undertake, involves the issue of justice and fairness to developing and least-developed countries, which houses the maximum chunk of poor people of the world, the main target group of UN-launched SDGs. All international agreements relating to climate change or biodiversity are also based on the principle of 'common but differentiated responsibility and respective capabilities'. However, the available carbon space is very limited, which will be spent, with the current rate of emission, in less than 10 and 25 years for limiting the temperature increase to 1.5 and 2 degree Celsius respectively. It should be allocated more judiciously, besides applying other environmental laws, initiated by developed countries and having trans-border implications, progressively. Efforts should be expedited by developed countries to help poor and developing economies

financially and technologically in meeting their obligations for mitigating climate change and adaptation.

Its importance increases manifolds in the backdrop of mostly dysfunctional multilateral institutions, which are dominated by developed countries. The climate change and environmental issues are getting increasing traction in G 20 Presidencies of late. Though G20 is not a forum for negotiating the binding commitments, it is consensus-seeking platform on significant issues that the world is confronting. The consensus on issues of importance steer further negotiations for binding or more firmed up commitments in respective specific multilateral forums.

Following introduction in section 1, the section 2 identifies and analyses enablers of attaining the environmental sustainability along with taking care of developmental needs of developing and least-developed countries. More importantly it deals with just transition to green economies to combat the climate change, spelling out different strategies for broadly developed, developing and least- developed countries. Section 3 critically studies the issues G20 Presidencies have flagged and the initiatives taken on them. Finally, section 4 spells out the way forward and how Indian Presidency (with Troika having all three developing countries) can be watershed in bringing in and securing consensus on the issues related to climate change and environment which are favourable to developing and least-developed countries, with taking care of their developmental aspirations.

Enablers for Sustainability

The economists have deliberated on sustainability and suggested different strategies to deal with local and global pollutants. All types of pollutions involve externality problem, promoting the tendency of free-riding on the part of economic agents. The local pollutants, like sulphur dioxide or nitrogen dioxide, can be dealt with administrative and legislative measures at the local level on the principle of 'polluters must pay full price' including economic and environmental cost (Bhagwati, 2002). However, tackling the global pollution, like Greenhouse Gases (GHGs), is an uphill task. The global warming and climate change are the result of such global pollutants. They involve externality at global level along with temporal externality, involving future generations (Frankel, 2008). So the temptation of free-riding is stronger here. They need global solutions with cooperation from all countries. The Paris Agreement and earlier Kyoto Protocol under UNFCCC are global agreements dealing with global warming and climate change. However, in spite of best intention evinced by world leaders to contain the temperature increase less than 2/1.5 degree Celsius to pre-industrial level, the actions on ground are not commensurate with targets. It is manifested by measures taken by the EU in the wake of Russia-Ukraine conflict to secure energy. It has increased investment on fossil fuels. The US greenhouse gas emission has also increased last year. India, in this regard, is ahead of schedule to meeting its commitments by 2030. It rather upgraded its commitments in COP26 in Glasgow. However, each country needs to do its bit to achieve the desired results. In fact, it involves the transition of the economies from fossil fuels to green economies based on renewable energy or low carbon activities. It should be a just transition, involving the issue of justice and fairness to developing and poor countries, which

have to meet their developmental needs, as they house the maximum poor people of the world. The following steps may be suggested in this regard.

Electrification of All Sectors and Generating Electricity from Renewable Sources

It is generally a two-pronged strategy. Firstly of involves the electrification of all sectors of the economy, including broadly agriculture, industry and services. Electrifying services is relatively easy as most of modern services, including banking, internet-based services, are run on electricity. The work is going on to make the electrical vehicles (EVs) competitive and efficient to internal combustion engines (ICEs). Many countries, especially developed ones, are showing good results in replacing ICE-based vehicles, mainly in the new sales of vehicles. Global EV sales continue strong, with total of 4.3 million sales of new BEVs and PHEVs during the first half of 2022, which is 62 per cent growth compared to last year H1. China is accounting the highest sales (2452), followed by Europe (1161), North America (483) and others (217) (Shahan, 2022). In transportation, aviation, shipping and road freight are regarded hard-to-abate sectors. India has adopted the Fast Adoption and Manufacturing of Electrical Vehicles in India Phase II (FAME India, phase II) . It is a demand-driven scheme, in which, the subsidy is given to consumers in terms of reduced upfront price of EVs, which is eventually reimbursed to original equipment manufacturers. It is Rs. 10,000 crore scheme. As a result of it, India has seen the spike of EV sales. The sale of EVs has increased from 48179 units in 2020-21 to 237811 in 2021-22, which further scaled up to 442901 in 2022-23 (till 9th December), . However, electrification of manufacturing is pretty difficult, especially in hard-to-abate sectors. Hardest-to-decarbonise industries include heavy, energy-intensive industries, such as steel, cement, fertilizers, chemicals, etc. In agriculture, eco-friendly farming practices can ensure sustainability. These practices include organic farming, crop rotation and poly-culture, use of renewable energy sources for powering agriculture processes, agro-forestry, cover crops and mulching, precision farming, etc.

The second part of the strategy is transforming the electric generation to renewable sources. It also involves its challenges in terms of cost competitiveness, grid stability, lack of storage facility, etc. Large scale work is going on in research and development in all segments of value chain of renewable energy sources. Though some of the sources, especially solar power, have seen the drastic reduction in cost of generation, comparable to fossil fuels-based generation, the work needs to go a long way in all segments, especially storage facilities, to do a meaningful and substantial transitioning to renewable sources. Green hydrogen might be the future source of energy; however, it is at very nascent stage.

Setting Appropriate Carbon Price to Build Favourable Ecosystem to Green Activities

There is a need to build the new ecosystem favouring the green activities and discouraging the fossil fuels-based activities. There is a need to charge the right price of fossil fuels including the economic and environmental cost. Setting the appropriate carbon price is the first step. The Kyoto Protocol

envisaged the global level emission trading system. However, it could not be achieved because of varying capabilities and capacities across countries. The EU-Emission Trading System (EU-ETS) has been most successful in this regard. There is a need to increase the capabilities and capacities of developing counties to design the effective carbon price scheme.

Phasing Out Subsidies on Fossil Fuels and Introducing Them on Green Businesses

The fiscal and monetary support, like subsidies at exploration, production or price level, should be done away with immediately in developed centres, followed by emerging countries and LDCs. It would discourage their production and consumption. Simultaneously, the green businesses, including renewable energy, should be provided subsidies, both at production and consumption fronts. These subsidies can be continued unless the whole ecosystem favouring the green businesses comes into being.

Setting the right price of carbon and doing away with subsidies to fossil fuels-based activities, being the initial steps to transition, would help in promoting the entrepreneurs and financial market favouring the green activities rather than fossil fuels-based activities. Since fossil fuels-based activities would be more costly now, the producers would find it more profitable to invest in green products and services. The financial sector would also give funds, in terms of loans and equity, to them on more favourable terms. Credit rating agencies would also accord them better ratings in comparison to fossil fuels-based businesses. All research and development in financial sector would gear to provide better products to suit the demand of renewable energy and other green businesses. It will also promote research and development in green technologies. This is how the whole new ecosystem would develop to create a new world based on renewable energy and green businesses.

Ensuring Justice and Fairness to Developing and Poor Countries

Since the transition of economies also involves the issue of justice and fairness and all global environmental agreements are based on the principle of 'Common but Differentiated responsibilities and respective capabilities', there is a need to take care of developmental needs of poor countries. It should be especially considered at the time of taking environmental measures at country level, which have trans border consequences and adversely impact the development of poor countries. The Carbon Border Adjustment Measure (CBAM), initiated by EU as part of 'Fit for 55 Strategy' can be cited in this regard. It has adverse developmental implications for poor countries, as it will be applied equally to developing and least-developed countries (Brandi, 2021). It violates the 'Common but Differentiated Responsibilities Principle' of the Paris Agreement. It is also against the WTO's progressive arrangement, which mostly exempts the LDCs and accords special and differentiated treatment to developing countries in their obligations under various agreements. CBAM should be revisited to make certain changes to accommodate developmental concerns of poor countries. The capacities and capabilities of developing countries should be augmented to help them design effective carbon trading schemes at regional and country levels.

Investing in New Green Technologies

The developed countries should invest in the research and development in whole

range of new technologies meant for decarbonisation. They include renewable energy technologies, storage batteries, carbon capture and storage technologies, etc. They should be used as public goods and made available for usage to developing and poor countries.

Breaking Path Dependencies

There is always a problem of path dependency coming in the way of initiating something new. It can arise at all levels- political, research and development, finance, entrepreneurs, infrastructure and consumers. At the political level, the political class is always close to businesses in a democratic set up, since they need donation money to finance their elections. Businesses also seek some favours in return, at least favourable policy regimes. Breaking this nexus is a difficult task, which will always come in the way of announcing new set of policies and regulations favouring the green activity-based businesses. Same way, the investors would keep on focussing in research and development of old technologies-based products to make them more efficient in terms of energy consumption and other functionalities rather than risking their efforts and money in new set of technologies. It is more rewarding for them, besides inertia.

Financial sector would also prefer to give loans to fossil fuels-based activities rather than new green economic activities. The rating agencies would also give better ratings to fossil fuels-based activities, as they are tested businesses, rather than new activities. Entrepreneurs would also fear to go in new activities for their being risky and untested. The green businesses require the new set of infrastructure. For example, even if the electrical vehicles are produced by some entrepreneurs, the lack of electric charging facilities would discourage even willing consumers to buy it. So it would simultaneously discourage both producers and consumers. Thus it is extremely difficult to break all these path dependencies unless there is very strong will-power at the top policy decision-making level to start with favourable policy regime for green businesses. Fortunately, the nature has pushed each country to the edge, as they have experienced anger of nature in one form or another. Now the leaders of countries of world have started according serious heeds to environmental issues. Electorates themselves have been increasingly giving more importance to climate and other environmental issues. These changes are manifested in many instances like Australian Prime Ministerial election manifesto or America rejoining the Paris agreement under Joe Biden administration. The G20 has started giving more importance to environmental issues. These all development bode well for breaking these path dependencies.

Giving Financial and Technical Help to Developing and Least-Developed Countries

The promised financial help (annual $100 by 2020) by developed countries for mitigation of climate change and adaptation is largely unfulfilled. The developed countries, including G7 countries, have continuously over-reported their climate finance. They diverted funds meant for meeting other SDG goals, including health, education, gender equality and poverty alleviation, to climate finance. They should meet their promise in true spirit. They should also make provisions for loss and damage to compensate the poor countries suffered most as a result of climate change. This loss and damage issue again surfaced in recently concluded COP27 summit. Though members have decided to set

up a loss and damage fund, it should be satisfactorily implemented, with clear-cut objectives, principles and operational modalities, and finance should be linked to the transition of economies of recipient countries.

Judicious Allocation of Available Carbon Space

Carbon space is going to be the rarest of the rare inputs in future, as very limited carbon space is left. It is barely sufficient, with the current rate of emission, for less than 10 years and 25 years for limiting the temperature increase to 1.5 and 2 degrees Celsius to pre-industrial level, respectively. It should be used fairly to accommodate the developmental concerns of developing and poor countries, as maximum poor people of world reside there. If fact, it is advisable that developed countries should advance their net zero emission years to 2035, and target net negative emission by 2050. It would create extra carbon space, which can be used by developing and least-developed countries in a progressive manner. It would be helpful to achieve the SDGs.

Promoting Circular Economy

The circular economy, based on 3 Rs (Reduce, reuse and Recycle), should be promoted to increase the efficiency in usage of materials. For it to succeed there is a need to change the whole industrial ecosystem and supply chain (ranging from the product design to establishing new supply chain, including waste management to recycle facilities).

Promoting Sustainable Urbanization Based on Smart City

The urbanization is going to increase as economies of the world develop, especially in developing and least developed countries. The idea of a smart city, which is productive, equipped with advanced technologies, environment-friendly and socially inclusive, should be promoted. The urban population is going to increase by 2.5 billion in next three decades, which is going to burden the resources of cities. Thus our cities should be ready to cope with these changes for ensuring economic, environmental and social sustainability. The concept of smart cities can do it successfully by integrating the migrant workers productively, connecting the urban centres with peripheries, giving services to all (rich or poor) and managing utilities, like power plants, water supply networks, garbage disposal, school, hospitals, etc. For these, there is a need to empower the Urban Local Bodies (ULBs) to raise adequate funds to undertake all these changes. There is also a need to increase the capacity of urban local bodies and make them accountable.

Preserving and Protecting Forests and Oceans

Our forests and oceans are natural carbon sinks, as they are capable of absorbing 50 per cent of the carbon emitted into the atmosphere. They are also natural habitats for bio-diversity. They should be preserved and protected well. The local communities should be involved in their governance and management. For this purpose, the CBD parties should implement the post-2020 Global Biodiversity Framework (GBF), concluded in COP15, in an effective way. Actions should be strengthened to halt and reverse biodiversity loss by 2030. The COP 15, which concluded on December 19, 2022, has set the goal of ensuring that by 2030 at least 30 per cent of the terrestrial, inland waters and oceans globally will be managed as protected areas. However, it is not yet clear how the targets would be split among member countries and

how high seas lying outside the national jurisdiction be covered. Another targets include reduction of emission from chemical fertilizers by half and use of toxic pesticides by two-third by 2030, which might have repercussion for food security at global level, especially for the poor and developing countries. Another target of totally eliminating plastic waste by 2030 also seems very ambitious, especially in the absence of clear-cut indication of financial support by developed countries to developing countries. There is a reference of increasing financial sources from all sources to at least $ 200 billion per year, including new financial resources (Sharan, 2022). It also has reference of at least $20 billion per year international financial flow from developed countries to developing countries, especially least-developed countries, small island developing countries and countries with economies in transition by 2025, and annual $30 billion by 2030. $20 or 30 billion would be a meagre amount, given the task at hand. Another source of finance of $500 billion, raised through phasing out many harmful subsidies to biodiversity, has also been mentioned. It applies to all countries. It seems that finance has to be majorly raised by all countries, which is against the common but differentiated responsibility and respective capabilities principle.

One of the important objectives of Convention on Biological Diversity (CBD) is access and benefit-sharing of using genetic resources with local communities. To implement this objective, CBD in 2010 introduced the Nagoya Protocol mandating the potential users of genetic resources to secure the prior informed consent from local communities protecting these resources and mutually agreed terms for their utilization. However, on ground, the application of these measures leaves much to be desired. In COP 15, there has been an agreement to strengthen the mechanism of access and benefit-sharing of commercial use of genetic resources. A multilateral fund has been agreed to be set up for this purpose by 2024 COP 16 in Turkey. The developed countries have been constantly insisting for the stronger patent regime; however, they barely share the benefits with local communities harbouring the genetic resources, foundation of their drugs and other products.

Adopting Different Approaches for Transition to Green Economies

Each country has to contribute its bit in the fight against climate change triggered by GHGs build-up over the years on account of anthropogenic activities. There has to be concerted, well-coordinated approach at the world level. The developed countries, developing countries and least-developed countries, being at different stages of economic development, will need to adopt different approaches. The developed countries, whose services sector dominates their GDP (70 percent on an average), would do better to transition to knowledge-based economy. The World Bank has made the knowledge economy index (KEI). The KEI is made of various indicators of four pillars including economic and institutional regime, education and skill, information and communication infrastructure and innovation system (World Bank, 2008). The KEI and GDP per capita are found to be highly correlated. The UNDP also prepared cross- country Global knowledge Index with the help of seven indictors including pre-university education, technical and vocational education & training, higher education, research development and innovation, information and communication technology, economy, and general

enabling environment. All developed countries have done already excellent in all the pillars. They need to further accelerate the process with securing the increasing greater share of renewable energy. They should have robust carbon emission market and phase out subsidies on fossil fuels at all levels.

The developing countries (lower middle income countries plus upper middle income countries), whose industry and manufacturing sector is prominent, need to shift to clean energy and acquire energy efficiency. They cannot immediately shift to clean energy owing to lack of resources, and infrastructural and technological lock-in problems, which would come in their way to transitioning to clean energy completely. However, they should retire the old thermal plants and replace them with renewable sources. They should introduce the carbon price and phase out the inefficient subsidies on fossil fuels. They should promote green activities through doling out the fiscal incentive at all levels, including innovation, consumption and production levels.

The low income countries' economic structures are prominently dominated by very low level of economic activities dominated by primary sectors (agriculture and mining). They use mainly the fossil fuels, majorly wooden inputs. The productivity of their agriculture sector is very low, and they have the population explosion on account of their demographic evolution, with the low death and high birth rates. These all forced them for extensive farming with claiming new lands from forests, which is creating the problem of large-scale deforestation in these economies. These countries are generally rich with fossils fuels, which are generally untapped assets for them. They are engaged in low value of services. The level of electrification is very low. Their per capita energy consumption and concomitant per capita emission are also very low. They have the advantage that they do not have the infrastructural lock-in problem, as they have yet to create one. However, they do not have financial and technological resources. The best strategy for them would be to increase the productivity in agriculture to feed their increasing population. Here developed and developing countries should supply them better tools and methods suitable to their conditions (socio-economic and environmental). It would halt deforestation in these economies. The developed countries should provide them help in financial and technical terms to acquire energy efficiency in industrial and agriculture production. These countries should also, on their part, establish a vibrant financial sector, modern property laws and other components of conducive business environment to encourage people to take up entrepreneurial activities. They

Table 1: Sector-Wise Break-up of GDP of Country Groupings in 2020(%)

Country Groups	Agriculture	Industry	Manufacturing	Services
Low Income Countries	27.6	25.6	10.9	38.4
Lower Income Countries	16.4	27.7	14.8	49.2
Upper Middle Income Countries	6.9	33.9	22.0	56.0
High Income Countries	1.2	22.6	13.4	70.0

Source: World Bank (2021).

should be exempted from environmental measures, initiated by other developed and developing countries and having transborder implications, like carbon tax or CBAM discussed earlier. They should be provided the certified emission credits for maintaining their forests and other natural sinks to encourage them for doing so in an efficient and effective way.

Table 2 : Global Knowledge Index- Top Ten countries and BRICs(Brazil, Russia,China& India)

Country	GKI Rank	Score
Switzerland	1	73.6
USA	2	71.1
Finland	3	70.8
Sweden	4	70.6
Netherland	5	69.7
Luxembourg	6	69.5
Singapore	7	69.2
Denmark	8	68.3
United Kingdom	9	68.1
Hong Long	10	66.8
BRICs		
Russia	45	50.6
Brazil	68	45.4
China	31	57.4
India	75	44.4

Source: Global Knowledge Index , UNDP, 2020.

Making LiFE (Life for Environment) a Mass Movement at Global Level

There is a need to bring the change at the individual level by nudging them for changing to responsible lifestyle, which is friendly to environment. In this regard, Indian Prime Minister introduced the concept of LiFE-Lifestyle for Environment- at COP26 in Glasgow, calling on the global community of individuals and institutions to drive LiFE as an international mass movement towards 'mindful and deliberate utilization, instead of mindless and destructive consumption' to protect the environment. The individuals are encouraged to adopt pro-environment lifestyle and they are recognized as Pro-Planet People. The Indian G20 presidency also promotes LiFE by adopting theme "Vasudhaiva Kutumbakam" or One Earth, One family, One Future. It values all life and their connectedness on planet Earth and in wider universe.

G20 Initiatives for Enabling Sustainability

The Climate issues are getting increasing attention year after year in G20 forum. Emphasis, in general, has been laid on all three ways to fight climate change problem, including mitigation, adaptation and sequestration. Seeing the pressing problem of climate change, during the German Presidency, the B20, C20 and T20 each decided to set up dedicated climate and energy taskforce to better target their recommendations towards the G20. The following issues have been flagged during various G20 presidencies.

Protection and Preservation of Marine Ecology

The issue of marine protection emerged initially from accidents related to oil and gas exploration and development in seas. Later on, full-fledged marine protection and preservation came from the environmental perspective as a natural sink. Osaka Blue Ocean Vision (Japan), Coral Reef R&D Accelerator Platform(Saudi Arabia) , Circular Carbon

Economy Platform to reduce the plastic use and banning SUP, increasing Marine Protected Areas (MPAs) (Rome), banning illegal, unreported and unregulated (IUU) fishing are some initiatives in this regard in various Presidencies.

Phasing out Subsidies on Fossil Fuels

Phasing out fossil fuel subsidies has emerged an important issue in all the presidencies' declarations, as it leads to excessive uses of fossil fuels. However, the fossil fuel subsidies are still bigger than environmentally harmful agriculture or water subsidies owing to reasons relating to political economy. The fossil fuel subsidies include any government support at production, exploration or consumption level. These are explicit subsidies. If one includes the unpaid negative externalities, it would be much larger. In 2021, the global fossil fuel consumption subsidies alone were estimated at $ 440 billion dollars. Encouraging low carbon development strategies was emphasised. Leaders also pledged to promoting effective policies to develop clean energy and energy efficiency technologies in various G20 Presidencies.

Helping Poor Countries in Mitigation and Adaptation Measures

Helping poor and low income countries in their adaptation and mitigation programmes, including Green Climate Fund, has been emphasised. Support for inclusive green growth in developing and poor countries through institutions and mechanisms that can facilitate knowledge sharing, resource mobilization, and building technical and institutional capacity to design inclusive green growth strategies and policies were given due attention. The financial pledge of annual $ 100 billion by developed countries to developing and poor countries by 2020 was also mentioned in all Presidencies. However, it is still unfulfilled and reported financial help is distorted and misrepresented, as they have been diverted from other headings meant for meeting other SDGs, like, health, education, etc.

Collaboration to Build Well-Functioning, Robust Energy Market

In line with the G20 Principles on Energy Collaboration, leaders reaffirmed commitment to building well-functioning, open, competitive, efficient, stable and transparent energy markets, fostering more effective and inclusive global energy architecture to better reflect the changing realities of the world's energy landscape. Natural gas has been acknowledged as intermittent fuel in the fight against climate change. The pledge to eradicate energy poverty was also reaffirmed through promoting universal energy access, cooperating to provide displaced people and disaster-impacted and remote areas with access to energy, and enhanced implementation of G20 regional plans.

Protecting Terrestrial and Marine Biodiversity

G20 Presidencies reaffirmed commitment to Convention on Biological Diversity (CBD). The Rome presidency committed to strengthen actions to halt and reverse biodiversity loss by 2030 and called on CBD Parties to adopt a robust and transformative post-2020 Global Biodiversity Framework at COP15. It also welcomed the launch of the UN Decade on Ecosystem Restoration 2021-2030, reaffirmed the shared ambition to achieve a 50 per cent reduction of degraded land by 2040 on a voluntary

basis, and pledged to strive to achieve Land Degradation Neutrality by 2030. It promised to build on the G20 Global Initiative on Reducing Land Degradation and Enhancing Conservation of Terrestrial Habitats launched under the Saudi Presidency and look forward to its upcoming Implementation Strategy. Leaders appealed to scale up and encourage the implementation of Nature-based Solutions or Ecosystem-based Approaches as valuable tools to provide economic, social, climate and environmental benefits, including in and around cities, in an inclusive manner and through the participation of local communities and Indigenous Peoples. They also promised the implementation of 'One Health Approach' in relevant policies and decision-making processes to take care of health of the whole ecology. They highlighted the importance of parties to United Nations Convention on The Law of the Sea (UNCLOS) to make progress as soon as possible in the ongoing negotiations for an ambitious and balanced international legally binding instrument under UNCLOS on the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction. They supported and encouraged further progress to implement the long-standing commitment of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), recognizing Marine Protected Areas (MPAs) can serve as a powerful tool for protecting sensitive ecosystems representative of the Convention Area, in particular in East Antarctica, the Weddell Sea and in the Antarctic Peninsula.

Encouraging Sustainable Urbanization

G20 presidency supported intermediary cities in adopting integrated and inclusive urban planning; accelerating their transition towards clean and sustainable energy and sustainable mobility for all; improving waste management; fostering empowerment and decent work for women, youth, migrants and refugees; assisting disabled and elderly persons; enhancing food systems sustainability; and enabling more equitable access to digital innovations. Partnerships like the Coalition for Disaster Resilience Infrastructure could act as a vehicle to accelerate this agenda.

Commitment to full implementation of Paris Agreement

G20 has reaffirmed its commitments to fully implementing Paris Agreement' commitments with complying the principle of Common But Differentiated Responsibility (CBDR). They recognized that G20 members can significantly contribute to the reduction of global greenhouse gas emissions and so, in line with the latest scientific developments and with national circumstances, they promised to take further action to enhance their 2030 NDCs. They committed to formulate long-term strategies for clear and predictable pathways consistent with the achievement of a balance between anthropogenic emissions and removal by sinks by or around mid-century. While making such strategies, they will take into account different approaches, including the Circular Carbon Economy, socio-economic, economic, technological, and market developments, and promotion of the most efficient solutions. They appealed to governments for national recovery and resilience plans that allocate, according to national circumstances, an ambitious share of the financial resources to mitigating and adapting to climate change and avoid harm to the climate

and environment. They promised to speed up efforts to phase out methane and took note of specific initiatives on methane, including the establishment of the International Methane Emissions Observatory (IMEO).

Promoting the Green Finance

The G20 leaders committed to mobilize international public and private finance to support green, inclusive and sustainable energy development and putting an end to the provision of international public finance for new unabated coal power generation by the end of 2021. They welcomed the agreement by Finance Ministers and Central Bank Governors to coordinate their efforts to tackle global challenges such as climate change and environmental protection, and to promote transition towards green, more prosperous and inclusive economies. However, they did not talk about the adoption of appropriate carbon price eloquently and explicitly. The lack of standardized taxonomy for green projects at global level and accurate risk-related data about green projects are not conducive to establishing a vibrant green financial market.

Way Forward

The world has seen the impressive and unprecedented economic growth during recent decades under majorly neo-classical framework, which is premised on utilitarianism, individualism and unbounded rationality. Aspiring to pursue the hyper-globalization, where goods and international finance (both long-and short-terms) were envisaged to cross borders, was also one of significant components of neo-classical framework. Though there have been many achievements to its credit, like bringing out millions of people out of abject poverty, unprecedented creation of wealth, unleashing innovations across sectors, etc., it has left the world extremely unequal comparable to glided age and destroyed the ecology to a great extent. The inequality has increased not only among countries but also within economies. As far as the dismal state of ecology is concerned, as per the Living Panel Report 2022 of the worldwide fund for Nature, nearly 34,000 plant and 5,200 animal species, comprising almost one-eight bird species, face the threat of extinction. Overall, the wildlife population has seen a drastic reduction by 69 per cent since 1970. The anthropogenic activities have been mainly responsible for them. They included mindless pursuit of economic growth at the cost of ecology, leading to over-exploitation of natural resources, deforestation and destruction of natural habitats, loss of biodiversity, air and water pollution, and climate change.

The fossil fuels-based development has resulted into the build-up of GHGs in atmosphere, which is causing the global warming and climate change. were often regards man-made capital and knowledge as close substitutes to natural capital to remain at same level of utility or welfare in the face of decreasing natural capital, Solow. However, it turns out to be untrue. There is a weak or no substitutability between the two. The humans are part of the ecology, rather than at center of it. If ecology is destroyed, it would have adverse consequences for the humans as well, which are already evidenced immensely in many forms, including increased heat-waves and extreme weather events, frequent occurrence of zoonotic diseases, desertification and sea rising. The temperature has already increased by over 1 degree Celsius to pre-industrial level. The Paris agreement kept the limit of temperature increase

at 2 degree Celsius by 2100, which was upgraded to 1.5 degree Celsius at COP26 in Glasgow. The countries have made commitments to undertake measures to cut GHGs (especially CO2) emission in their intended nationally determined contributions (INDCs) under the Paris agreement. They have announced their respective years for becoming net-zero emission.

Enablers of sustainability include broadly bringing all sectors of the economies on electricity and generating electricity from renewable sources; creating the new ecosystem favouring the green activities and discouraging the fossil fuels-based activities with charging the right price of carbon; phasing out the subsidies on fossil fuels at all levels and, in their place, introducing subsidies for green businesses and renewable energy; creating a vibrant green financial market; and according due emphasis to fairness and justice (based on common but differentiated responsibilities principle) to accommodate the developmental aspirations of poor countries while making environmental laws at country level having trans-border developmental implications for the developing and poor countries. Others enablers are investing, especially by developed countries, in R&D in whole range of new technologies meant for decarbonisation and making them public goods for free accessibility by poor countries; meeting already promised financial help ($100 billion annually) by developed countries to developing countries for mitigation and adaptation measures to climate change and increasing it further to meet their actual requirements for the purpose; promoting the concept of smart city well-equipped with pursuing sustainable development; involving local community in governance and management of preserving and protecting forests and oceans; and encouraging global community to adopt LiFE (Lifestyle for Environment) as mass movement to avoid mindless and destructive consumption and adopt responsible consumption.

There are always path dependencies at all levels, including political, research and development, finance, entrepreneur, infrastructure and consumer levels. It requires a lot of will power at the top decision-making level to break these path dependencies and introduce a new set of policy measures conducive to promoting green businesses. Having experienced the anger of nature in one form or another for some time, the world leaders have now started taking the environmental issues seriously. It augurs well for breaking these path dependencies and unveiling the new rules conducive to green activities.

The carbon space is going to be the rarest input in the coming time, as it has been estimated by scientific community that the remaining carbon space is barely enough, with the current emission rate, for less than 10 years and 25 years to limit the temperature increase to 1.5 and 2 degree Celsius respectively. So it is imperative that the developed countries advance their date for going net-zero emission to 2035(at least) and aim for negative net-zero by 2050. It would create more carbon space, which should be used by developing and poor countries for development to bring out their major chunk of citizens out poverty and securing decent life for them. It would also help meet the UN-sponsored SDGs.

The developed, developing and least developed countries would have to pursue different approaches to transitioning to green economies. The developed countries would do better to aggressively embrace knowledge-based economies, as they are already the top rankers in knowledge Economy Index

(KEI), prepared by the World Bank and UNDP. They should increase the share of renewable energy substantially in their energy mix. They should have robust emission markets at regional and domestic levels, and phase out subsidies on fossil fuels at all levels.

The developing countries, whose industry and manufacturing sector is prominent, are advised to shift to clean energy and acquire energy efficiency. They cannot shift to clean energy immediately owing to lack of resources and infrastructure lock-in problem. They should be allowed to transition gradually, with replacing retiring old thermal plants with renewable ones. They should also introduce the appropriate carbon price and phase out the subsidies on fossil fuels. They should instead provide subsidies on green businesses.

The LDCs are having mainly low level economic activities, dominated by primary sector. Their services sector is of low value and industries are largely energy-intensive. They are experiencing population explosion, forcing them to adopt extensive farming leading to large scale of deforestation. The developed countries should help these economies increase productivity in agriculture by providing them with better technologies and tools suitable to their conditions. It would help preserve forest there, which are part of larger ecology. They should also be provided technical and financial help to acquire energy efficiency in agriculture and industrial sectors. These countries should also, on their part, establish vibrant financial sector, effective modern property law and other constituents of conducive business environment to encourage the local people to take up business activities. They should be exempted from environmental laws (like CBAM) having transborder implications and provided certified emission credits for maintaining forests and other natural sinks in an effective way.

During Germany Presidency, B20, C20 and T20 each decided to have separate taskforce on environment and climate Change to give dedicated recommendations to G20. G20 has lot of weight to steer the change issues to be negotiated in Conference of Parties (COP) under UNFCCC. They include protection of marine ecology, phasing out subsidies on fossil fuels, promotion of low carbon development strategies, helping poor countries (financially and technically) in their mitigation and adaptation initiatives to climate change, promoting collaboration to build well-functioning and robust energy market to end energy poverty, promotion of research and development in green technologies, protecting terrestrial and marine biodiversity, encouraging sustainable urbanization, promoting circular economy for material efficiency, commitment to full implementation of Paris agreement and promoting green finance.

Since the transition to green economies involves issues relating to justice and fairness to developing and poor countries, these issues should be taken more seriously and aggressively during the Indian Presidency. India Presidency has the advantage of having Troika of developing countries, including Indonesia, India and Brazil. It might turn out to be watershed Presidency emphasising issues favourable to developing and least developed countries. Two important issues from the developing and poor counties' perspectives, which have not yet received space in Leaders' declarations, are available carbon space and its judicious allocation, and application

of environmental laws having trans-border implications to least-developed and developing countries. As available carbon space is very limited, it is going to be the rarest and costliest input in the coming time. Its judicious allocation is very important. The developed countries should vacate carbon space by targeting net negative emission instead of net-zero emission by 2050. The available carbon space should be allocated in a progressive manner, giving maximum space to least developed countries, followed by developing countries. It would help achieve SDGs.

Secondly, environmental laws, initiated by developed countries, might have developmental implications for the poor and developing countries. The least-developed counties should be exempted from such laws and developing countries be accorded special and differentiated treatment. Besides, an attempt should be made to secure the pledge from developed countries for the enhanced financial and technical support, which have been majorly unfulfilled even in case of promised $100 billion annual help by 2020, for the transition of developing and poor countries to green economies and adaptation.

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