

Sustainable Development: Issues, Concerns and Roadmap Ahead

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Abstract

On the basis of a close and careful examination of the concept of sustainable development in a proper historical and comparative perspective, it is cogently argued that the background environmental processes need not be taken as exogenously given. There is a need for a different mindset, fostering of transformational changes, cross-sectoral decisions, macro-economic policy, the sensitization of the common man to environmental concerns and realization of the potential economic value of the eco-system for the markets and their attendant implications. Given the humungous investment requirements in renewable energy (RE), attempts must be made to identify financing issues, viz., their higher capital-intensive nature with lower organization and management (O&M) cost, exposure limit of banks to sectors, inadequate sector-specific risks awareness among financial institutions, and solar project viability apprehensions. There has to be a renewed thrust on climate change to meet the challenges of today and the expectations of tomorrow. The paper highlights the need for perspicacity and places the inextricably linked issues of renewable energy, environmental pollution, eco-friendly strategy, inter-generational equity, and climate change in perspective.

Keywords: Sustainable development, Renewable energy, Climate change, Economic development

Introduction

There has been a significant improvement in the standard of life for people globally, but it is heartening to see that about 1.1 billion people do not even have fuel to meet their basic household needs (World Economic Forum, 2018). Hence achieving universal access and meeting growing energy necessitate a paradigm shift in the delivery of energy services, progressively greater use of renewable energy, and enhanced energy efficiency measures.

The process of transforming unsustainable patterns of consumption and production and developing sustainable livelihood systems need resolving conflicts between the trade regimes and

environmental agreements, integrating advanced modern technology with traditional practices and mainstreaming education to promote awareness, attitudes, concerns, and skills. This is particularly important post COVID 19 pandemic, which caused synchronized global deep downturn, making it a time like perhaps no other in over a century, with the nearest comparison being that of the Spanish Flu of 1919.

Concept of Sustainable Development

Sustainable development implies “development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs” (Brundtland, 1987). Growth is no longer the unquestioned Holy Grail. Accordingly, the strategy of sustainable

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development encompasses four basic themes in conformity with ubiquitous human needs and requirements, halting of irrevocable environmental destruction, judicious utilization of flora and fauna, and broad-based process and pattern of growth aimed at harmonizing economic growth and distributive equity.

The process of sustainable development is clear, gender-friendly, scalable, and democratic unlike a one-way sale. However, fossil fuels such as coal and oil and natural gas damaged sustainable development. Clearly, then, a paradigm shift to renewable energy generation and storage, carbon capture, electric vehicle (EV) charging points, and clean hydro energy is sorely needed and an accent on sustainable development is clearly the way to go. The sustainability of fossil fuels is worked out by reserves-to-production ratio (R/P), i.e., the extrapolation on the basis of the reserves at their present rate of consumption. Estimated global R/P ratios for the main conventional fuels are: oil – 46 years, natural gas – 58 years, and coal – 118 years. The principles of equity and “common but differentiated responsibility and respective capabilities (CBDR-RC)” require all nations to save the planet, but skewed distribution of income and wealth justifiably necessitate greater financial burden on rich countries than the poor ones.

Equitable sustainable energy policies and programs require a holistic approach all along the line at international, national, regional, sectoral, and project levels for a comprehensive assessment and perspective. In sum, the background environmental processes need not be taken as exogenously given. While some welcome measures have been initiated, such measures need to be strongly reinforced by a different mindset, fostering of transformational changes, cross-sectoral decisions, macro-economic policy, the sensitization of the common man to environmental concerns, and realization of the

potential economic value of the ecosystem for the markets and their attendant implications.

The World Bank’s identification (1996) of challenges in the pursuit of sustainable development continues to be contextually significant even today. These challenges relate to food security, stabilized population level, facilitating eco-friendly population distribution with managed migration, sustainable urbanization, integrated management of energy, water, and so on, and effective use of modern education, information, and communication systems in line with historical tradition, distinctive cultures, and extensive but fragile biodiversity.

Equitable, participatory, and broad-based sustainable development (BBSD) with thrust on a growing and structurally transforming economy, characterized by widely distributed benefits; a political system that provides for human rights and freedoms as well as effective governance; and a political economy not inconsistent with environmental preservation must transcend the narrower goal of economic growth. Given the enormity of the issue, “incremental changes,” as Peter Bakker, President and CEO, World Business Council For Sustainable Development (WBCSD), stresses, “cannot be a strategy for sustainability” necessitating systemic change and global solidarity and collaboration in building a community of all life on earth.

Environmental Pollution

To be sure, the steady depletion of finite wholesome assets devastates lives and livelihoods over the long haul. But it is not always realized – much less felt – that the adroit use of environmental protection technologies and innovative out-of-box strategies can certainly contain the damage to the environment to manageable proportions. Institutional factors like mode of production, patterns of ownership, and systems of employment have significant

environmental implications – implications not often adequately analyzed or even understood. Further, the present-day world is characterized by (a) economic development and (b) greater energy use and production. Reversing the downward spiral of environmental degradation requires (environmental) life cycle assessment (LCA) of products, eco-design, etc.

An enabling industrial eco-system, inter-alia, requires: (i) discernible, quantifiable and time-bound progress in drastically slashing emission and effluents; focus on holistic recovery and recycling strategies, attack inherited pollution, and create wealth from wastes; (ii) an interspersed strategy of safety, health, environment (SHE) and quality; look beyond ISO 14000, address safety and emergency response issues, and adopt eco-labelling to indicate that the certified product is environmentally more eco-friendly as compared to other non-certified products in the identical category; (iii) translate cutting edge technology into environmental benefits; focus on biotechnology upgradation, environmental and processed management solutions, and accelerate research; (iv) explore new areas for environment trading and clean development mechanism (CDM) projects; implement efficient, reasonable, and clean energy technology projects and introduce carbon accounting; and (v) environmental performance as corporate social responsibility (CSR); attain global eco-competitiveness; focus on green business opportunities.

Strategy for Environment-Friendly Development

The past development planning processes utterly failed to consider the deleterious consequences of thoughtless economic development. This grossly undesirable development provided a strong and compelling case for formulating and streamlining environmental impact assessment (EIA) processes.

The cost-benefit analysis of projects must factor in appropriate discount rates, substitutability, and the assurance of inter and intra-generational equity. The world can no longer be oblivious to emerging concerns and issues – concerns which unmistakably reveal that the lackadaisical attitude of more of the same and business-as-usual need to be immediately replaced by a direct assault on the forces and factors, which cause environmental pollution on a large level. Examples such as the Coca-Cola unit in Kerala, which exploited and polluted the ground water, the Kudankulam Nuclear Power Plant on the sea-shore in Tamil Nadu, and the Tehri dam on the seismic zone, which inundated human dwellings on a large scale, highlight the compelling necessity for a holistic approach because of the divergence between social costs/private costs and private benefits/social benefits caused by “market failure.” Hence, EIA processes need institutional regulation, community participation, and education. EIA processes, therefore, need to form an integral part of development planning to check ravages of unwise development.

The deplorable trail of destruction is reflected in extreme weather, crop losses, flash floods, droughts, heavily fractured mountain rocks, distress migrations and, potentially, conflicts. Other disquieting features include windstorms Ciara and Alex in Europe; Cyclone Amphan in the Bay of Bengal; floods in China, India, Pakistan, Vietnam and Japan; the Siberian heat-wave in Russia; and typhoons Goni and Vamco in the Philippines (Nordhaus, 1990; Costanza, 1991; Walker, 1993). Areas like coral reef, ancient lakes, ecosystem of the Mediterranean climate region, tidal zones, and tropical rain forests – all of which are home to rare and endangered species of flora and fauna (Knoll, 1984) – have been devastated, together with the terrestrial plant species. Viewed in this perspective of living on the edge, the return of the

reality is manifested in the growing sense of the dread starkly reflected in the three-fold rise in the frequency of natural disasters from 1,300 events in 1975–1984 to 3,900 events in 2005–2014 (ADB, 2015). Thus, it incontrovertibly emerges that the traditional approach was “dangerously inadequate” necessitating new ways for new days. For, as Albert Einstein stressed, “You cannot solve a problem from the same level of consciousness that created it.”

Cohesive efforts for dealing with environmentally sustainable economic development require a thrust on four prerequisites of renewal: (a) the rate of regeneration must be greater than or equal to the rate of rate of harvest; (b) waste emissions should not exceed the renewable assimilative capacity of the micro-environment; (c) the rate of exploitation of non-renewable resources must always be less than or equal to the rate of creation of renewable substitutes; and (d) in case an existing renewable resource is to substitute for a depleting non-renewable resource, the rate of harvest of this resource must be strictly less than its rate of regeneration to the extent necessary to prevent this substitution.

Financing Issues

Interactive and mutually reinforcing strategies, viz., greater capacity building, public-private partnerships, and closer inter-relationship between government agencies, multi-lateral institutions, business and industry, non-governmental organizations, and academia provide an impetus to financing for renewable energy (RE). Given the humungous investment requirements in RE, we need to identify financing issues, viz., their higher capital-intensive nature with lower organization and management (O&M) cost, exposure limit of banks to sectors, inadequate sector-specific risks awareness among financial institutions, and

solar project viability apprehensions. An attempt also needs to be made to briefly examine sources of financing, viz., debt finance, equity finance, multilateral funding, clean energy funds, and role of development finance institutions (DFIs).

Given the complexity of the underlying issues at stake, there is a manifest need to carefully consider the inter-dependencies and inter-linkages among policy deployment, manufacturing capability, market power, and the underlying costs of capital. The market for energy efficient products and services in India stems both from regulatory moves and commercial incentives for industrial process efficiency. Some of the basic drivers of RE are energy security, energy deficit, abundant renewable supply and potential, climate change, government support, energy access, and increased competitiveness of the sector.

Basic issues hampering the growth of the sector relate inter-alia to the cost, timeliness, adequacy, and tenor of debt; low availability of debt for RE sector because of the lack of an enabling policy and operational frame for banks, constrained foreign borrowings, and inadequate equity for new projects. Accordingly, action-oriented, time-bound outcomes approach requires transfer of energy technologies, enabling policy environments, rising role of the private sector, and effective evaluation systems. All stakeholders such as government, financial community, RE developers, and distribution companies need to work in a coordinated and concerted manner with a sense of immediacy. This requires strengthening of schemes to enhance far greater sanction and disbursement of credit; revised lending policies; enhanced capacity building; greater understanding of viability of financing energy efficient projects, type, and size of projects; and replicating best practices across geographies. There is also a compelling need to assess and mitigate technical risk, commissioning risk, and

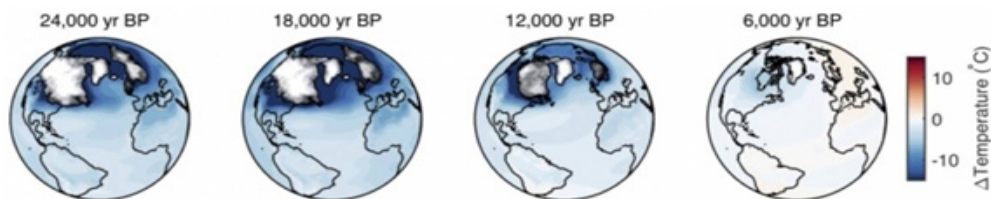
performance risk and energy service company (ESCO) appraisal by credit line to an ESCO and energy efficiency project specific financing.

Climate Change – Act or Perish

The Reserve Bank of India’s recent Annual Report (2021) emphasized increasing vulnerability of the Indian economy to climate change, particularly agriculture. Hence, central bankers need to popularize environment, social and governance (ESG) principles. While focused attention is needed for sustainable development in all forms and

manifestations, climate change adaptation requires altering behavior, systems, and even ways of life to protect families, economies, and the environment. The more we reduce emissions now, the easier it will be to adapt to the inexorable process of change. The concept of climatic change goes back to the seminal work of Broecker (1975). Subsequently, “the apocalyptic vision of ecologists” has acquired not just a terrifying ecological dimension but also a health problem, a social problem, a political problem, and an economic problem (Figures 1–4).

Figure 1: Changing global average surface temperature going back 24,000 years

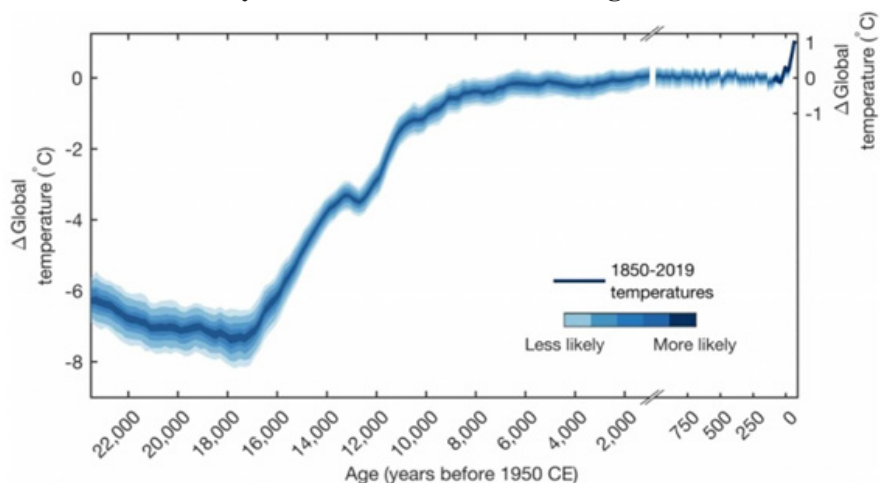


These maps show global average surface temperature at different periods in Earth’s history going back 24,000 years. The darker the shade of blue, the colder the temperature compared to today.

Matthew Osman

Source: Osman et al. (2021).

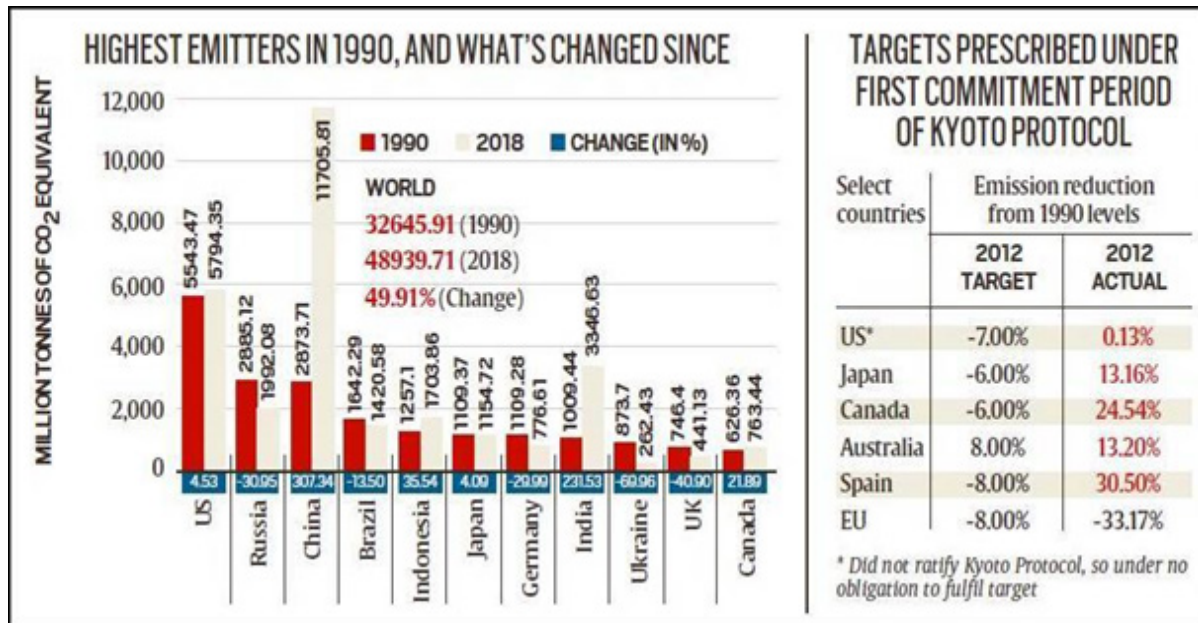
Figure 2: Global average surface temperature for 24000 years. Time is stretched for the past 1,000 years to visualize recent changes



Source: Osman et al. (2021).

Three basic elements of climate change are (a) the estimated damage of climate change, (b) the discount rate and the weight on the future well-being, and (c) the cost of partially mitigating the climate change (Stern, 2007; 2008 a; 2008 b; 2009; 2021).

Figure 3: Changing emissions over the years



Source: Climate Watch, World Resources Institute (WRI)

Figure 4: Uneven progress in emission reduction

EMISSION REDUCTION: TARGETS & PROGRESS		
COUNTRY	EMISSION REDUCTION TARGET	STATUS IN 2018
US	26-28% by 2025 from 2005 levels	10% reduction from 2005
EU (27)	40% by 2030 from 1990 levels	22% reduction from 1990
Australia	26-28% by 2030 from 2005 levels	3.48% above 2005
Japan	25.4% by 2030 from 2005 levels	2.66% reduction from 2005
Canada	30% by 2030 from 2005 levels	24.16% reduction from 2005
Russia	25-30% reduction by 2030 from 1990	30.95% reduction from 1990
China	Peak emissions in 2030	70.57% above 2005
Brazil	37% by 2025 from 2005 levels, 43% by 2030	29.13% below 2005
Indonesia	29% by 2030 from business-as-usual scenario	37.11% above 2005
Iran	4% by 2030 from business-as-usual scenario	45.58% above 2005

Source: Climate Watch, World Resources Institute (WRI)

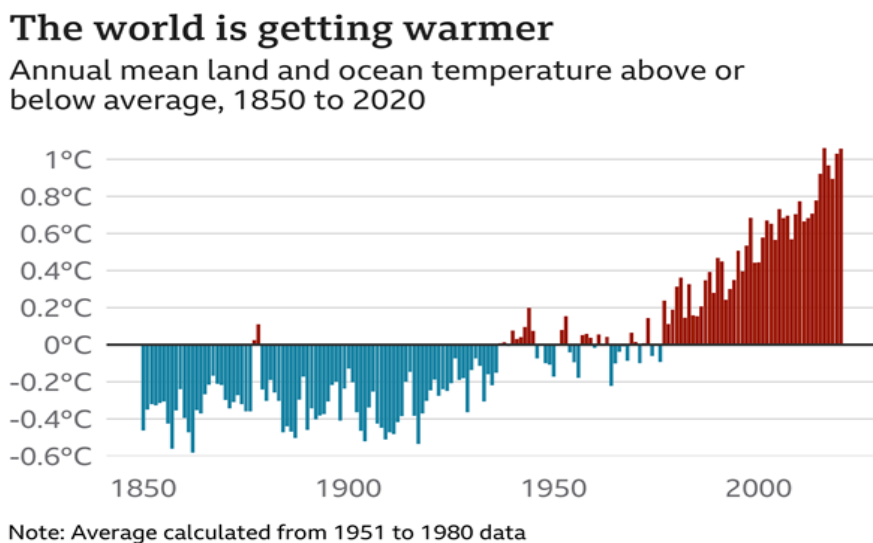
India is greatly susceptible to climate change because of extensive poverty, high population density, high reliance on natural resources, and a stressed environment. There is a battle outside and a war within. India requires USD 2.5 trillion (at 2014–15 prices) for mitigation and adaptation measures till 2030. This requires domestic public budgets, international public finance, and private sector resources. Preparation of India’s National Action Plan on Climate Change (NAPCC) includes eight critical sectors, namely, water, solar, enhanced energy efficiency, sustainable agriculture, sustainable habitat, strategic knowledge for climate change, and Himalayan ecosystem. State Action Plans on Climate Change (SAPCC) helps to profile climate challenge at state level, assess vulnerable areas and sectors for prioritization of climate actions, and develop climate action pathways and strategies.

India’s agreement to a “net zero” climate target depends on developed nations not renegeing on their clear commitments, viz., an annual \$100 billion to developing countries for mitigating climate

change, facilitating technology transfer, and implementing a tangible market-based mechanism to resuscitate the moribund carbon credit markets. A net-zero emissions future in terms of not just decarbonization but also a whole new model for low-carbon development need not be a zero-sum game but could propel India to a higher growth orbit (Kelkar, 2021). The net-zero drive has also been associated with the targets of reaching 500 GW of non-fossil electricity capacity, renewables forming 50 per cent of the energy-mix and to slash projected carbon emissions by 1 billion tonnes by 2030. These targets are, by any standards, stiff targets, particularly, since India’s over 80 per cent energy needs are met by coal, oil, and traditional solid biomass.

The sixth report of the Intergovernmental Panel on Climate Change (IPCC) demonstrates that during 2015–2021, each subsequent year has been hotter than the previous one and the year 2021 is the sixth hottest year ever recorded. Global warming has constantly increased during the previous four decades compared to the last eighty years.

Figure 5: Significantly higher global temperatures than predicted by current climate change models



Source: Sanders (2006).

US National Intelligence Estimate (NIE) on climate maintained, “China and India ... are the first and fourth-largest emitters, respectively, and both are growing their total and per capita emissions, whereas the United States and EU—as the second- and third largest—are declining” (Office of the Director of National Intelligence, 2021). While acknowledging China and India are incorporating more renewable and low-carbon sources into their energy mix, displacement of coal is limited by sunk costs and political factors.

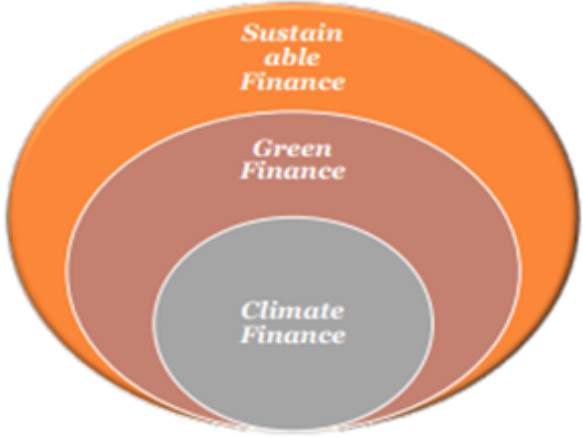

Most developing countries almost continue to submit conditional targets because of inadequate financial assistance, technology transfers, and aid in capacity building by developed countries. Developed countries’ failure to mobilize \$100 billion a year starting 2020 has hampered their ability to take serious action, necessitating new ways to leverage private investment while boosting and better aligning government spending. For leveraging the adaptation/resilience finance, the key challenge remains (a) proper assessment of vulnerability, (b) development of tools for quicker assessment, (c) identification of location-specific sustainable interventions, (d) ensuring stakeholder engagements/peoples participation, (e) technical support and capacity building support of stakeholders, and (f) mainstreaming of involvement of financial institutions through appropriate project

finance approaches.

The report identifies 11 countries, including India, Pakistan, and Afghanistan, as “Select Countries of Concern.” These countries are likely to face warming temperatures, more extreme weather, and disruption to ocean patterns threatening their energy, food, water, and health security. Hence, we can no longer be oblivious to the vision of a common good, a shared future, the role of public goods, the divergence between social and private costs and benefits, and externalities in production and consumption.

Five elements of a robust climate change strategy are macroeconomic context, analytical framework, sectoral transitional mapping, technology and financial mapping, and institutional arrangements (Mangotra et al., 2021). There has to be coherence between them to manage short-term dips and long-term recovery with an accent on climate change. Global Risks Report 2021 stresses managing risks, building resilience, and leveraging new opportunities with an integrated approach. In the ultimate analysis, innovation in institutions, understanding, technology, and leadership are prerequisites to addressing “the economics and politics of climate change” (Helm & Hepburn, 2021). There has to be an assent on green finance in India (Figure 6).

Figure 6: Green Finance – Opportunities in India

<p>Green Finance include :</p> <p>a. Climate Finance : including adaptation and mitigation financing (reducing vulnerability, improving resilience; ecosystem; GHG emission reduction and carbon sink)</p> <p>b. Biodiversity, resource conservation and facilitating infrastructure (Renewable Energy, Electric Vehicles, energy efficiency)</p> <p>Sustainable Finance : Broader objective towards a socio-economically and environmentally sustainable world encompassing climate finance and green finance</p>	
<p>Green Finance Mechanism</p> <ul style="list-style-type: none"> • Debt (Sovereign green bonds, Sub-sovereign green bonds, Green revenue bond, Environmental impact bonds, Green loans etc.) • Equity instruments (Public Private Partnership, Joint Venture, Investment trust, etc.) • Credit enhancement mechanisms (Full or partial credit guarantee, viability gap funding, etc.) • Risk transfer / risk sharing mechanisms (First-loss capital, Loan loss reserves) • Grants by national and international Green financing mechanisms viz; NAFCC, (India), GCF, Adaptation Fund, GEF etc. 	<p>Green Finance Potential assessed for the period 2018 to 2030</p>  <ul style="list-style-type: none"> • Green finance flows in India were INR 111,000 crores (USD 17 billion) for FY 2017 and INR 137,000 crores (USD 21 billion) for FY 2018

Source: Acharya et al. (2020).

Conference of the Parties to the United Nations Framework Convention on Climate Change (COP26)

Almost all the world's negotiators gathered in Glasgow for the 26th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP26) to facilitate a broad agreement on slashing global warming and accelerating the transition to a cleaner economy. The case for holding this geopolitically significant Convention stemmed from the need to revisit climate pledges made by countries in terms of the historic 2015 Paris Agreement. The goal is to slash emissions – across air, water and ground travel and logistics – till they reach net zero by mid-century. While not legally binding, this agreement will set the tone of climate change because what gets measured, improves.

The United States and China would work together in areas including methane emissions and shift to clean energy to slow global warming and bring out meaningful results. This is significant because these two countries are the top greenhouse gas emitting nations, together producing roughly 40 per cent of global emissions in 2019. This is why, though the Glasgow Climate Pact had its faults, it did mark a headway ahead in as much as this was the first time that coal and fossil fuels were included in a final decision of the COP even though the initial aim to “accelerate the phasing-out of coal and subsidies for fossil fuel” was watered down to “phase-down unabated coal,” rather than “phase out.” The pact requires countries to “intensify their efforts” to phase down “unabated coal power,” meaning power plants lacking technology to check carbon dioxide emissions.

It called for an end to “inefficient” fossil fuel subsidies, without specifying a timetable for removing such subsidies. The provisions also “recognize” the need to support workers in these

industries in finding alternative employment. It also allows for “different national circumstances.”

A UN agency will commit to providing “technical assistance” to vulnerable countries to help avoid and cope with the consequences of climate change.

A proposal by developing countries to set up an independent fund to help pay for losses and harm was rejected by wealthy nations including the US, European countries and Australia.

The agreement notes with “deep regret” that rich countries have failed to meet their target of providing \$100bn a year to help developing countries by 2020. The agreement calls for them to raise at least \$100 billion a year until 2025. Rich countries are required to “at least double” their support for adaptation measures by 2025, compared to 2019 levels, which will help developing countries prepare for climate change.

Carbon market is a fundamental part of the “Paris rulebook,” a program to implement the provisions of the Paris Agreement. The rules would create a market for emission reductions countries can trade. While many developing countries argue for a mandatory tax on all “carbon credits” to finance adaptation to climate change, rich countries oppose it. The final agreement included voluntary pledges by countries to contribute to the fund.

By the end of next year, countries need to raise their 2030 national climate targets. Commitments are now on track to raise global temperatures by 2.5C to 2.7C by the end of the century, which falls far short of the Paris Agreement target (Figures 7, 8, and 9).

Parties also approved rules for the establishment of a global carbon market framework. Article 6, which provides a framework to help countries to work together to reach emissions-reduction goals, works primarily by trading credits that count

toward their targets and sharing the burden of the climate fight. This issue is, however, tricky because of disagreement on how to account for emissions credits sold in the global market, avoiding double counting of carbon offsets, the demand of use old, unused credits from the 1997 Kyoto Protocol's defunct CDM, etc.

The agreement pledged to significantly increase money to help poor countries cope with the effects of climate change and make the switch to clean energy. There is also the prospect of a trillion dollar per year fund from 2025, after the previous pledge for richer countries to provide \$100 billion (£72

billion) a year by 2020 was missed.

The issue of loss and damage was not addressed, i.e., developing countries pledging to pay for the damage already happening that cannot be avoided through adaptation. Developing countries wanted a facility to be set up but this did not fructify.

Phasing out coal was proposed as the main action to keep us below 1.5°C. above pre-industrial level. But countries agreed to a weaker commitment to “phase down” rather than “phase out” coal after a late intervention by China and India. However, no firm date has been set for the same.

Figure 7: Still a gap to 1.5°C above pre-industrial

Projections for global temperature increase by 2100 based on targets and announcements from COP26



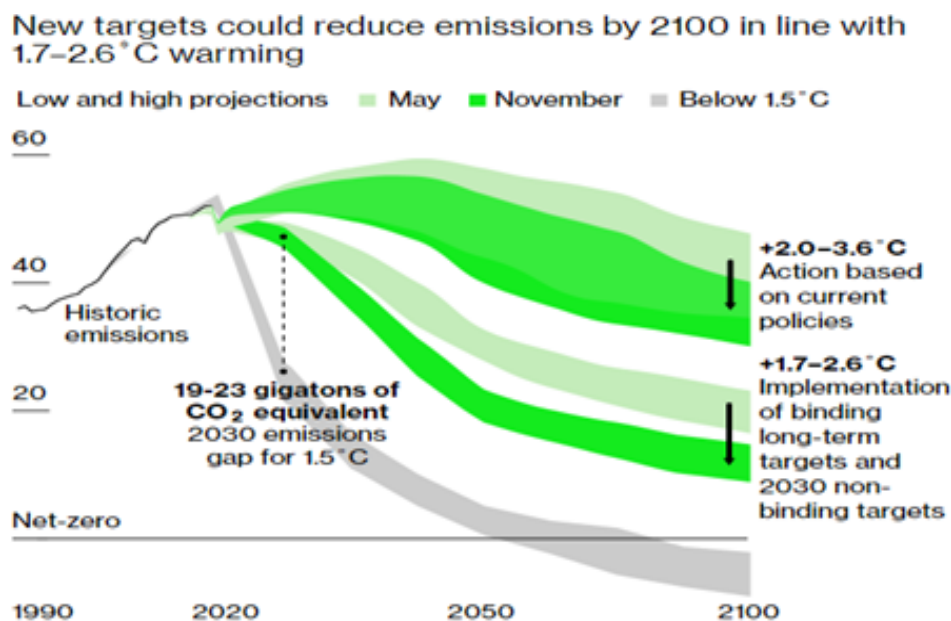
Source: Climate Action Tracker

Several coalitions were made on saving forests, and cutting methane, although it seems most of the focus is on methane from fossils.

Countries were asked to come back next year with stronger commitments for mitigation because these

measures were clearly inadequate to prevent a “climate catastrophe”. Current pledges, if met, will only limit global warming to about 2.4°C.

Figure 8: Impact of COP26 on Emissions Pathways



Source: *Climate Action Tracker*

Leaders from more than 100 countries – with about 85 per cent of the world’s forests – promised to stop deforestation by 2030. This is crucial because trees absorb vast amounts of CO₂. Given the unhappy experience of earlier initiatives, there have been some doubts about its success and the manner of its implementation and monitoring.

A scheme to cut 30 per cent of methane emissions by 2030 was agreed by more than 100 countries. Methane is currently responsible for a third of human-generated warming. But China, Russia, and India were conspicuous by their absence.

Financial organizations with around \$130 trillion in assets pledged to assign their business with the net-zero goal with thrust on “clean” technology, such as, renewable energy, and direct finance away from fossil fuel-burning industries. The initiative is an attempt to involve private companies in meeting net zero targets by effective action, enhancing low-carbon technologies, and plugging existing and potential new sources of emissions. However,

without a greater commitment to ending support for fossil-fuels, this measure could be too little, too late.

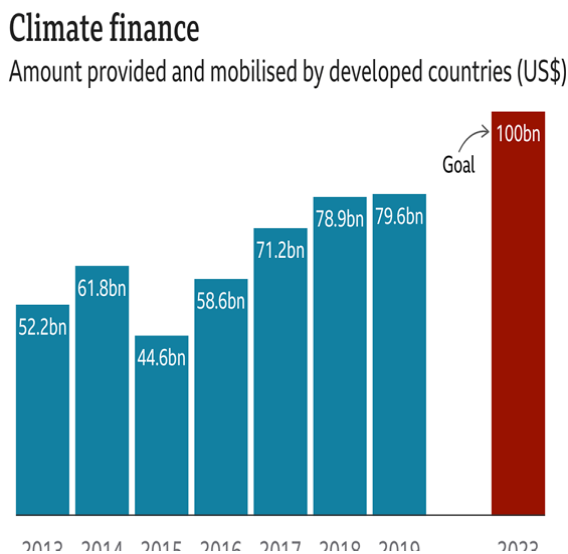
There is a lack of mechanism to ensure that the countries meet their pledges. Most commitments made at COP will have to be self-policed. Only a few countries are making their pledges legally binding.

To be sure, it is not easy for rich countries to eliminate fossil fuels and carbon and insulate their economies. This issue of effectively tackling climate change gets exacerbated in the case of developing nations. They are confronted with a serious resource crunch hampering their attempt to pay for new infrastructure and technology. This in turn necessitates immediate grants, loans, and private investment to bolster efforts to adapt to climate change and mitigate its effects, and move to renewable energy sources such as solar, wind, and hydro power. What makes it worse is that climate finance has largely focused on loans rather than

grants, which are bedeviled with repayment issues. Hence, both the quality and the quantity of funding are important.

Despite agreement among countries to submit long-term strategies in conformity with 1.5° C, there is a clear skew in terms of timelines, an accent in political and technical thrust, and the financial resources necessary to achieve the avowed goals of development. The implementation of individual and joint commitments is fraught with difficulties because the final version of the convention retains controversial proposals, including provisions to reduce coal and fossil fuel subsidies and the proposed new climate targets by next year. Financial modeling needs to be supplemented by an understanding of complex ecosystem dynamics and principles of ecosystem valuation to discernibly alter the ground realities because of inadequate funds provided by developed countries (Figure 10).

Figure 9: Climate Finance - Amount Provided and Mobilized by Developed Countries (US\$)



Source: Amount provided and mobilized by developed countries, Aggregate data, OECD, 17 September 2021.

Roadmap Ahead

The cognizable dilemmas of development necessitate a comprehensive view, not swayed by short-term considerations. Surging carbon emissions require an effective check, rising sea levels require minimization, dying corals necessitate an immediate resuscitation. Together we can. Judicious choice is a tall order and necessitates inter-alia:

- Individual choices – reduce food waste by 50 per cent; eat less meat; reduce transport emissions.
- Government choices – increase renewable energy; restore and protect forests and wetlands; build our cities more sustainably.
- Industry choices – reduce industry emissions; sustainable fast fashion; more artificial meat.

In the final analysis, there is no inherent conflict between the objectives of economic development and the goals of sustainable development (International Monetary Fund, 2021). There is a manifest need for a greater sensitization on this increasingly important issue, as starkly brought out by disastrous weather events across India and Himalayan vulnerabilities – anatomy of mountainous hotspots, northward march of the snowline, re-evaluation of development projects, and improved trans-boundary cooperation on watersheds – making it a case of restless mountains and shattered lives. This is why, we can conceivably no longer “muddle through.”

Asymmetric information renders both “quantity instruments” approach, for example, cap and trade and “price instruments” approach, for example, carbon taxes imply setting of a price by the government that emitters must pay for each ton of greenhouse gas emission. The resulting mechanism is at best the second best solution and at worst grossly inadequate, necessitating far greater

coverage of cap and trade. It is a difficult task but with the cooperation of all stakeholders, it is eminently doable.

We cannot solve today's challenges with yesterday's mindset. A paradigm shift is needed to reorient with the VUCA times and stay ahead of the curve. VUCA traditionally stood for volatility, uncertainty, complexity, and ambiguity. Contrary to popular perception, Harvard Professor Bill George's newer concept of VUCA necessitates VUCA 2.0, comprising vision, understanding, courage, and adaptability. Accordingly, a judicious mix of programs for each area by considering cost, environment, and convenience needs to be worked out urgently with innovative and out-of-box thinking. The commonality of interest requires equitable allocation of resources, attention to quality of economic growth, and new technologies such as geographic information systems (GIS), decision science, and research method for efficient resource use to reshape our current systems and advance solutions for the future – instead of further locking in our fossil-fuel-intensive past.

The proof of pudding lies in eating. Hence, meticulous planning needs to be accompanied by scrupulous implementation, not just through quantity and price instruments but also through a heightened consciousness of sensitization, behavioral change, communication, education, mass movement, and participation of all persons and groups on a war footing. Otherwise, the outcome would be “the worst of all possible worlds” for the citizens of the world. This catastrophic tragedy is calamitous stemming from “the integral and interdependent nature of the Earth, our home.”

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