CHAPTER

19

SUSTAINABILITY AND CLIMATE CHANGE: INDIA AND THE WORLD

*"... this is the only home we have and, as environmentalists are fond of saying, Mother Nature doesn't do bailouts ... so we better find a better way to grow."**

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*Thomas L. Friedman, **Hot, Flat, & Crowded**, Penguin Books, London, 2009,p. 23

INTRODUCTION

Improving living standards for mankind has been the single minded goal of all nations and world bodies. After defining development in numerous ways for over two decades, there seems to be a consensus on 'Human Development'. While a large popculation on the earth is still to get the 'bare minimum' for development, humanity is at the crossroads where it is faced with the first of its kind challenge—the challenge of 'climate change'. The dilemma is that whatever we can do for our development, there has to be a repercussion on nature. An even bigger dilemma is in achieving a global consensus on how to check or restrict and finally reverse the process of climate change.

We may consider the year 2012, arguably, a high water mark in the field of environment and sustainable development initiatives. The global community met at the *UN Conference on Sustainable Development* that took place in **Rio** in June 2012, also marking the 20th anniversary of the first Earth Summit held in 1992. The conference reviewed the progress made, identified implementation gaps, and assessed new and emerging challenges, which resulted in a political outcome called the *'The Future We Want'*. In India, the Twelfth Five Year Plan was launched with a focus on sustainable growth. This along with sustainable development policies and programmes, which are being followed signalled to citizens at home and the world at large that India is committed to sustainable development with equal emphasis on its three dimensions—social, economic and environmental.

A survey of the global comparative opinion shows that people in India and indeed all countries, have a marked and rising concern about sustainable development and climate change *(cited by the Economic Survey 2014–15)*. However, the challenges are also formidable, especially in the context of finding the matching resources of the required magnitude given the economic conditions. Climate science has rightly taken up an important position in the public debate. Even as the science of climate change grapples with uncertainties, the world is witnessing more extreme events. With rising extreme events, and rising citizen demand, the world has little option but to listen to the voice of evolving science and respond adequately with strategies and policy rooted in the principles of multilateralism with equitable and fair burden sharing.[1]

The *Economic Survey 2011–12,* for the first time, introduced a new chapter entitled 'Sustainable Development and Climate Change'. These topics remained headline news with extreme weather events both at home and abroad. Efforts to arrive at a consensus on what to do at home and abroad gathered momentum, even as they sailed through some rough waters and fickle seas in many respects. In 2012, science and nature voiced a sense of urgency for action. Yet the relevant statistics have a mixed story to tell. It strongly accepts science but weakly reflects on the corresponding multilateral actions, suggesting that a lot remains to be done on the latter. Till the world stops to introspects and accepts that we are a product of the ecological surrounding we are living in, there seems no durable outcome from the international deliberations.

A volatile mix of erratic weather, natural disasters and enormous pressure on the availability of clean air, water, and energy together with the problems of poverty and hunger continues to be of great concern for policymakers particularly in the developing countries. There was building of the forward momentum both globally and domestically with three high-profile events in the

1. Oliver Morton in **'Megachange: The World in 2050',** edited by Daniel Franklin & John Andrews, ***The Economist***, London, 2012, pp. 92–110.

Climate Change at a Glance

Since the industrial revolution, manmade activities have added significant quantities of greenhouse gases (GHG)[2] into the atmosphere. Climate change is a global negative externality primarily caused by the building up of GHG emissions in the atmosphere. The efforts needed to address the climate change include mitigation of GHG emissions on the one hand, and building of adaptive capacities to cope with the adverse impacts of climate change on the other. From a developing country perspective, adaptation is of utmost importance as they are the ones who are most vulnerable to the adverse impacts of climate change.

The incremental impact of a ton of GHG on climate change is independent of where in the world it is emitted. These emissions impose a cost on both the present and future generations, which are not fully recouped from the emitters of these emissions. This formed the starting point for a globally coordinated policy action and the need for an international climate change negotiating regime. UNFCCC, set up in 1992, although global in scope, differentiates the commitments/responsibilities of parties on the basis of historic responsibilities, economic structures, and on the basis of the principle of 'equity' and CBDR which is at the core of the climate change debate.

The largest share of historical and current global emissions of GHGs has originated in developed countries. Scientists attribute the global problem of climate change not to the current of GHG emissions but to the stock of historical GHG emissions. Most of the countries, particularly the industrialised countries, having large current emissions are also the largest historic emitters and the principal contributors to climate change. The convention therefore lays down legally binding commitments for the developed countries, taking into account their historical responsibilities and also squarely puts the responsibilities on developed countries for providing financial resources, including for the transfer of technology, needed by the developing countries. The convention also acknowledges that climate change actions taken by developing countries are contingent on the resources made available to them.

global arena in 2012 and launch of the Twelfth Five Year Plan at home. The Earth Summit in Rio also popularly known as Rio+20 celebrated its 20th anniversary, next the 11th session of the Conference of Parties (**COP 11**) to the Convention on Bio Diversity (CBD), hosted by India in Hyderabad, and finally the year closed with the 18th session of the COP to the United Nations Framework Convention on Climate Change (UNFCCC) in **Doha** in December. These international collaborations came out with balanced packages though short on ambition but proceeding on efforts. At home, we launched the Twelfth Five Year Plan whose explicit theme was a 'faster, more inclusive and sustainable growth' process. It is the first time that a five year plan has sustainability as a prominent focus. The Twelfth Plan outlined lower carbon growth strategies adding momentum to the ongoing policies and programmes of the government on environment and climate change. To add to this, State Action Plans on Climate Change (SAPCC), a recent initiative, will tune national initiatives on the National Action Plan on Climate Change (NAPCC) to regional, socio- economic and ecological conditions. The SAPCC is expected to take off as part of the plan scheme for states. With these developments, it is clear that sustainable development and climate change issues are being addressed on a priority basis.

The course for international development and environmental policy agenda for the global

2. **'Megachange: The World in 2050'**, op. cit., pp. 94-96.

community for the next fifteen years is being decided in the year **2015**. The negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) are expected to result in a global agreement by December 2015, applicable to all countries, to take action on climate change from 2020. Simultaneously, governments are due to agree on a new post 2015 development agenda including a set of Sustainable Development Goals (SDGs), replacing the *Millennium Development Goals*, which are coming to an end in 2015.

A major development attracting attention worldwide has been the *Joint Announcement* on Climate Change by the **United States & China** – the world's two largest emitters – in November 2014. As per this announcement, the US intends to achieve an economy-wide target of reducing its emissions by 26–28 per cent below its 2005 level in 2025 and to make best efforts to reduce its emissions by 28 per cent. China intends to achieve the peaking of carbon dioxide emissions around 2030 and to make best efforts to peak early and intends to increase the share of non-fossil fuels in primary energy consumption to around 20 per cent by 2030. This has great political significance in the run-up to the post 2015 climate change agreement. The announcement is expected to provide a boost to the renewable energy sector globally.

India has also taken several measures to address climate change. Most importantly, India's national solar mission is being scaled up fivefold from 20,000 MW to 100,000 MW by 2022. The clean energy cess on coal has also been doubled to Rs. 100/tonne in 2014. India has set a target of producing green energy of 1,75,000 MW by the year 2022.

SUSTAINABLE DEVELOPMENT AND CLIMATE CHANGE IN THE INDIAN CONTEXT

In the past two decades, the key environmental challenges in India have been sharper. *The State of the Environment Report* by the MoEF clubs the issues under five key challenges faced by India—

(i) Climate Change,
(ii) Food Security,
(iii) Water Security,
(iv) Energy Security, and
(v) Managing Urbanisation.

SAPCC (State Action Plans on Climate Change)

After the NAPCC was launched,[3] there have been serious efforts to dovetail national programmes of action to regional and local levels consistent with varying socio-economic and ecological conditions. At the Conference of State Environment Ministers held on 18 August 2009, the Prime Minister of India requested all state governments to prepare SAPCCs. The State Action Plans took their lead from National Mission documents while formulating mitigation/adaptation strategies. So far, 21 states have prepared documents on the SAPCC focused on approaches that are sectoral but with regional ramifications. The State Action Plans include strategies and a list of possible sectoral actions that would help the states achieve their adaptation and mitigation objectives. The common threads that bind these State Plans together are the principles of territorial approach to climate change, sub-national planning, building capacities for vulnerability assessment, and identifying investment opportunities based on state priorities. This framework provides a broad, systematic, and step-wise process for the preparation of SAPCCs and advocates a participatory approach so that states have enough ownership of the process and final plan. The major sectors for which adaptation strategies envisaged are agriculture, water, forests, coastal zone, and health.

3. **NAPCC**, Ministry of Forest & Environment, GoI, Final Draft March 31, 2011, N. Delhi.

Climate change is disturbing the natural ecosystems and is expected to have substantial adverse effects in India, mainly on agriculture (on which 58 per cent of the population still depends for livelihood), water storage in the Himalayan glaciers which are the source of major rivers and groundwater recharge, sea-level rise, and threats to a long coastline and habitations. Climate change will also cause increased frequency of extreme events such as floods, and droughts. These in turn will impact India's food security problems and water security. As per the *Second National Communication* submitted by India to the UNFCCC, it is projected that the annual mean surface air temperature rise by the end of the century ranges from **3.5^0 C to 4.3^0 C,** whereas the sea level along the Indian coast has been rising at the rate of about **1.3 mm/year** on an average. These climate change projections are likely to impact human health, agriculture, water resources, natural ecosystems and biodiversity.

Concerned of the threats imposed by climate change and pressures on natural resources, sustainability and environment are increasingly taking centrestage in the Indian policy domain. India has been part of 94 multilateral environmental agreements. India has also voluntarily agreed to reduce its emission intensity of its GDP by 20–25 per cent over 2005 levels by 2020, and emissions from the agriculture sector would not form part of the assessment of its emissions intensity. Indian economy is already moving along a lower carbon and sustainable path in terms of declining carbon intensity of its GDP which is expected to fall further through lower carbon strategies. It is estimated that India's per capita emission in 2031 will still be lower than the global per capita emission in 2005 (in 2031, India's per capita GHG emissions will be under 4 tonnes of carbon dioxide equivalent (CO 2 eq.) which is lower than the global per capita emissions of 4.22 tonnes of CO_2 eq. in 2005).

Together with the national efforts in different sectors, India also recognises that rural areas are equally prone to stress and pressures from natural resource exploitation. In this context, schemes for rural development and livelihood programmes are very relevant. A vast majority of the works under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) are linked to land, soil, and water. There are also programmes for non- timber forest produce-based livelihood, promotion of organic and low-chemical agriculture, and increased soil health and fertility to sustain agriculture-based livelihoods. These schemes help mobilise and develop capacities of community institutions to utilise natural resources in a sustainable manner and their potential can be further developed.

Along with efforts to incorporate sustainability in the rural development process, India is increasingly making efforts to integrate the three pillars of sustainable development into its national policy space. In fact, environment protection is enshrined in our Constitution (Articles 48 A and 51 A [g]). Various policy measures are being implemented across the domains of forestry, pollution control, water management, clean energy, and marine and coastal environment. Some of these are policies like Joint Forest Management, Green Rating for Integrated Habitat Assessment, Coastal Zone Regulation Zone, Eco Labelling and Energy Efficiency Labelling, Fuel Efficiency Standards etc. Over a period of time, a stable organisational structure has been developed for environment protection. The country has been making fast progress in increasing its renewable energy capacity and has displayed the fastest expansion rate of investment of any large renewables market in the world in 2011, with a 62 per cent increase to $12 billion (Frankfurt School of Finance and Management *Global Trends in Renewable Energy investment 2012*). The 12th Plan with a prominent focus on

sustainability makes provision and provides for many more opportunities like these.

Working on the social and economic pillars (sustainable development policies, programmes and targeted schemes) have been introduced to eradicate poverty either through a direct focus on economic indicators like employment generation, youth mobilisation, and building up assets of the poor; or indirectly through social indicators of human development with emphasis on health, education, and women's empowerment. As per the **Census 2011**, many parameters on this front have shown improvement, however, India is still not on target to meet some key MDGs by 2015—

(i) The *poverty* head-count ratio declined by 7.3 percentage points from 2004–05 to 2009–10;

(ii) The *MMR* (maternal mortality rate) dropped from 301 per 100,000 live births in 2001–13 to 212 in 2007–09; and

Sustainable Development and Lower Carbon Strategies of the 12th Plan

The Twelfth Plan strategy[4] suggests that there are significant ***'co-benefits'*** for climate action with inclusive and sustainable growth. India as a large responsible player with very low income has also to ensure that these efforts are matched by equitable and fair burden sharing among countries, taking into account the historical responsibilities for emissions. These issues are being discussed in the UNFCCC.

India's approach to a lower-carbon growth strategy explicitly recognises that policies have to be inclusive and differentiated across sectors according to national priorities, so as to lower the transaction costs of implementing the policy, and conform with a nationally fair burden-sharing mechanism. An Expert Group on Low Carbon Strategies appointed by the ***Planning Commission*** has outlined the lower carbon strategies for major potential carbon mitigation sectors.

(i) **Power:** On the supply side, adopt super-critical technologies in coal-based thermal power plants; use gas in combined heat and power systems; invest in renewable technologies; and develop hydropower in a sustainable manner. On the demand side, accelerate adoption of super-efficient electrical appliances through market and regulatory mechanisms; enhance efficiency of agricultural pump sets and industrial equipment with better technology; modernise transmission and distribution to bring technical and commercial losses down to world average levels; universalise access to electricity; and accelerate power-sector reforms.

(ii) **Transport:** Increase the share of rail in overall freight transport; improve the efficiency of rail freight transport; make it price competitive by bringing down the levels of cross-subsidisation between freight and passenger transport; complete dedicated rail corridor; improve share and efficiency of public transport system; and improve fuel efficiency of vehicles through both market-based and regulatory mechanisms.

(iii) **Industry:** Greenfield plants in the iron and steel and cement sectors adopt best available technology; existing plants, **particularly small** and medium ones, modernize and adopt green technology at an accelerated pace, with transparent financing mechanisms.

(iv) **Buildings:** Evolve and institutionalise green building codes at all levels of government.

(v) **Forestry:** 'Green India Mission' to regenerate at least 4 million ha of degraded forest; increase density of forest cover on 2 million ha of moderately dense forest; and overall increase the density of forest and tree cover on 10 million ha of forest, waste, and community lands.

4. ***Twelfth Five Year Plan 2012–17***, Planning Commission, GoI, N Delhi, 2012.

(iii) *literacy* rates have been constantly rising and are estimated to be 82.14 per cent for men and 65.46 per cent for women.

Over the years, arguments in favour of looking beyond the conventional measure of GDP and taking into account the environmental damage caused by production of goods and services received attention. An expert group under the chairmanship of Prof Sir Partha Dasgupta has been set up to develop a framework for 'Green National Accounts' for India. In fact, the Central Statistics Office (CSO) under the Ministry of Statistics & Programme Implementation (**MOSPI**) has been publishing comprehensive environment statistics since 1997. The process of putting in place a system for natural resources accounting was initiated by MOSPI way back in 2002.

Despite all these efforts, the reality that confronts us on the environmental front continues to be harsh and complex. Increasing population, urbanisation, and growing demand for water and land resources have severely impacted the quality and availability of water and soil resources. Rising energy needs is another area of concern. Besides, rapid growth will require corresponding growth in energy supply.

Presently, a large share of our energy demand is met through coal and oil and this trend will continue, given the unprecedented surge in energy demand and resource constraints. Energy issues become more complex with existing energy poverty and rise in energy prices. There is considerable scope for increasing efficiency in the use of energy and water in India together with other development indicators like infant mortality rate, MMR, sanitation facilities, and public health services. Economic instruments, regulatory measures, and market mechanisms can play an important role in helping to achieve development and growth in a sustainable manner.

INTERNATIONAL COLLABORATION AND EFFORTS

Admitting the well-founded concerns on the need to redress environmental problems, there were global calls for cooperation, action, and innovation. World leaders in 2012 continued to engage and deliberate in international forums dedicated to climate and environment and also in forums like the G20 where sustainable development and climate change were an integral part of the discussions. Ambition or goal setting to reach targets, provision of finance and technology for developing countries, and institutions and mechanisms for capacity building were the common threads of negotiations running through all these forums. Some of the high-profile events which the world was watching are discussed in the following paragraphs.

Rio+20

The United Nations Conference on Sustainable Development (UNCSD), was held in June 2012, at Rio de Janeiro, Brazil, (also known as **Rio+20**) and was attended at the heads of states level. The objective of the Rio+20 Conference was to secure renewed political commitment for sustainable development, review progress made and identify implementation gaps, and assess new and emerging challenges since the UNCSD held 20 years ago in Rio de Janeiro in 1992. Towards the end, the Conference had two **themes**—

(i) Green economy in the context of sustainable development & poverty eradication; and

(ii) Institutional framework for sustainable development.

The most significant outcomes of the Rio Summit have been the restoration of

the principles of equity and of common but differentiated responsibilities (CBDR) in the global environmental discourse and placing poverty eradication at the centre of the global development agenda. The ***outcome*** also ensures the required domestic policy space to countries on a green economy and launched four processes/ mechanisms, i.e., developing SDGs, financing strategy, technology transfer, and defining the format and organisational aspects of the proposed high- level political forum to follow up on the implementation of sustainable development.

'Fairness' as an issue received attention. It is a matter of satisfaction and achievement for India that the Rio outcome document reaffirms equity and the principle of CBDR among other Rio principles. India together with other developing countries played an instrumental role in this. CBDR is especially important for developing countries, as it implies that while all countries should take sustainable development actions, the developed countries have to take the leading role in environmental protection, as they have contributed the most to environmental problems. Also they should support developing countries with finance and technology in their sustainable development efforts. India has always held that the eradication of poverty should be the overarching goal of sustainable development. This was given due recognition in the deliberations at the Rio Summit and in the outcome document.

On the issue of ***Green Economy***, the outcome document affirms that there are different approaches, visions, models, and tools available to each country, in accordance with its national circumstances and priorities, for achieving sustainable development. It identifies green economy in the context of sustainable development and poverty eradication as one of the important tools for achieving sustainable development but specifies that while it could provide options for policymaking it should not be a rigid set of rules. The outcome document clearly states what green economy policies should result in and what they should not. It is a matter of satisfaction that the document firmly rejects prescriptive policies, unilateral measures, and trade barriers as well as unwarranted conditionality on **ODA** (Official Developmental Assistance) in this context.

The Rio+20 Conference will also be remembered for kick-starting the process on developing SDGs. The SDGs would address and incorporate in a balanced way, all the three dimensions of sustainable development and their inter-linkages. The SDGs would be universal, global, and voluntary. Since the SDGs are expected to become a part of the post-2015 UN development agenda, they would hopefully guide the international community towards inclusive sustainable development.

From India's point of view, SDGs need to bring together development and environment into a single set of targets. The fault line, as ever in global conferences, is the inappropriate balance between environment and development. Developing countries do not want any bindings on their efforts towards poverty eradication or any agreement that comes with such a price tag. Therefore, we could also view the SDGs and the post 2015 agenda as an opportunity for revisiting and fine-tuning the MDG framework and sustainably regaining focus on developmental issues. India and many developing countries are slow or off track in achieving targets under some of the MDGs, which have concrete areas of overlap between environment and development. This is another reason why these MDGs should continue to be a part of the post 2015 global policy architecture.[5]

5. ***Economic Survey 2012-13,*** MoF, GoI, N. Delhi, p. 259.

There has been a growing political drive towards the post 2015 development agenda due for agreement in September 2015. In this direction, the thirty-member Open Working Group mandated by the Outcome Document—The Future We Want"—of the UN Conference on Sustainable Development **(Rio+20)** held in June 2012 at Rio came out with a set of 17 SDGs in July 2014. The Sustainable Development Goals (SDGs) cover a broad range of sustainable development issues and the means of thier implementation. These are expected to be integrated into the UN's post-2015 Development Agenda. At present, the post-2015 agenda and SDG processes are moving rapidly towards their conclusion in 2015. The **17 SDGs** are as given below:

1. End poverty in all its forms everywhere
2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
3. Ensure healthy lives and promote well-being for all at all ages
4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all
5. Achieve gender equality and empower all women and girls
6. Ensure availability and sustainable management of water and sanitation for all
7. Ensure access to affordable, reliable, sustainable, and modern energy for all
8. Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all
9. Build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation
10. Reduce inequality within and among countries
11. Make cities and human settlements inclusive, safe, resilient, and sustainable
12. Ensure sustainable consumption and production patterns
13. Take urgent action to combat climate change and its impacts
14. Conserve and sustainably use the oceans, seas, and marine resources for sustainable development
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions at all levels
17. Strengthen the means of implementation and revitalise the global partnership for sustainable development.

COP20 AT LIMA

The 20th Session of the Conference of Parties to the *UNFCCC (COP20)* in December 2014 in **Lima**, Peru, was an important milestone as it came out with a 'Lima Call for Climate Action' after long deliberations and intense negotiations. With less than a year left to conclude the deal in Paris later this year, nations are working hard towards finalizing the agreement by December 2015 at the *COP 21* session in **Paris**.

The UNFCCC negotiations focused on the finalization of elements of the draft negotiating text for the 2015 Paris agreement, identification of information to be submitted by Parties under the Intended Nationally Determined Contributions (INDCs), and enhancement of pre 2020 actions. Some of the important outcomes of the Lima Conference are the following:

1. The Lima Conference has decided that the new agreement will be under the UNFCCC and will reflect the principle of CBDR in the light of different national circumstances. It also addresses all elements, i.e., mitigation, adaptation, finance, technology development and transfer, capacity building, and transparency of action and support in a balanced manner.
2. The draft text has to be finalized by May 2015 in order to be placed for consideration and adoption of Parties at COP 21.
3. Another key decision was that countries should not backslide from current pledges under the INDCs (Intended Nationally Determined Contributions) and their contribution has to be more than their current commitments. The final decision successfully ensured that countries can include adaptation, finance, technology development and transfer, capacity building, and transparency of action and support also in their INDCs, in addition to mitigation. There is also no 'ex-ante assessment' to be undergone.
4. Now countries have to submit quantifiable information on the reference point (base year), time frames, scope and planning process, assessments, etc. related to the INDCs. This will be published on the UNFCCC website and a Synthesis Report of the aggregate effect of the INDCs prepared.
5. It was decided to accelerate action on enhancing the pre-2020 actions like early ratification of the *Kyoto Protocol* second commitment period, revisiting of targets and conditionalities associated with it, and provision of finance, technology, and capacity building support by developed countries to developing countries.
6. On the issue of finance, developed countries have been invited to provide clarity on reaching the US$ 100 billion goal by 2020, by way of enhanced information and greater transparency and predictability for scaling up climate finance. On the *Green Climate Fund* (GCF), pledges amounting to US$ 10.2 billion for initial capitalization of the Fund have been acknowledged. It was further decided to urge contributors to confirm these pledges in the form of fully executed contribution agreements so that at least 50 per cent of pledges made till November 2014 are reflected as fully executed contribution agreements by April 2015.

INDIA'S STAND AT LIMA

India has been following action-oriented policies to bring rapid development to its people while purposefully addressing climate change. India has been one of the foremost advocates of long-term global cooperation in combating climate change in accordance with the principles and provisions of the UNFCCC.

Climate change impacts being witnessed today are a result of the total accumulated greenhouse emissions for which the major responsibility lies with the *developed nations*. Moreover, despite the fast growth registered by some of the developing countries, a large proportion of people in these countries still live in extreme poverty. The Indian stance in the climate change negotiations has been guided by the principle of CBDR. India thus believes that the climate change agreement of 2015 should take into consideration a whole gamut of issues including adaptation, finance, technology development and transfer, capacity building, transparency of action and support in a balanced manner, and loss and damage in addition

to mitigation. As per the *Economic Survey 2014–15*, the broad parameters of India's stand on the climate change issue are as given below:

Mitigation: Historical responsibilities of developed countries and equity in access to global atmospheric resources should continue to be the basis of defining mitigation commitments. The 2015 agreement must ensure that the developing countries be given their fair share of carbon and development space. The contribution of developing countries to mitigation efforts is far greater than that of developed countries and could be further enhanced if developed countries effectively implement and significantly increase their commitments of providing finance, technology, and capacity building support to developing countries.

Adaptation: Equal weightage has to be given to adaptation as it is essential for reducing vulnerabilities of communities to climate change. This assumes more importance in view of the fact that the developing countries are the most vulnerable to climate change. However, both global action and finance flows have been biased in favour of mitigation. The developing countries are pushing hard to include adaptation in a comprehensive and balanced manner in the 2015 agreement.

Finance: The responsibility of providing financial assistance to the developing countries lies with the developed countries and this has been clearly articulated in the UNFCCC. India together with other developing countries continue to urge the developed countries to honour their obligation to provide new, additional, and predictable financial support to developing countries in a measurable, reportable, and verifiable manner. In this context ambitious capitalization of the GCF assumes significance. Developed countries have been urged to provide clear timelines and pathways to reach the US$ 100 billion annual commitment made by them in 2010.

Technology transfer: Technology forms a major component of any move towards combating climate change. The important issue in this regard is that while the developed countries are the frontrunners in clean technology, the developing countries do not possess either sufficient technical capability or the financial resources to develop clean technologies. Appropriate mechanisms for smooth transfer of technology from the developed to developing countries have to be agreed upon. The intellectual property rights price-tag should not come in the way of such technology transfer.

IPCC ASSESSMENT REPORT

The Intergovernmental Panel on Climate Change (IPCC) reviews and assesses the most recent scientific, technical, and socio-economic information produced worldwide relevant to climate change. The IPCC in its recent report the *Fifth Assessment Report (AR5),* published in **2014**, has observed that there has been an increasing trend in the anthropogenic emissions of greenhouse gases (GHG) since the advent of the industrial revolution, with about half of the anthropogenic CO2 emissions during this period occurring in the last forty years.The period 1983–2012 is likely to have been the warmest thirty year period of the last 1400 years. CO2 emissions from fossil fuel combustion and industrial processes have contributed a major portion of total GHG emissions during the period 1970–2010. Two major findings of the report are—

(i) Contribution (%) by different countries to cumulative **Global CO_2:** USA (21.2); EU (18.4); China (10.7); Russia (7.4); Brazil (4.4); Jappan (3.3); India (2.8); Canada (2.2); and Rest of the World (28.7).

(ii) Sectoral emissions (percentage) to **Global Green House Gases:** Electricity & Heat production (25); AFOLU, i.e., agriculture, forestry and other land use

(24); Industry (21); Other energy (9.6); and Buildings (6.4).

FINANCING CLIMATE CHANGE

The idea of a global budget for carbon and its corresponding financing stems from the objective of stabilising the GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. There has already been a 0.8° C increase in global mean temperature. It is widely believed that we are fast approaching the 2° C temperature rise within which the global community is striving to limit itself. This indicates that only a small and fast closing window of opportunity exists for the international community to take actions and ensure that we avoid reaching this point.

Yet the question remains that how to finance actions to achieve this target.[6] A UNFCCC paper (2007) estimated a requirement of US$ 200–210 billion in additional annual investment in 2030 to return GHG emissions to current levels. Further, additional investme nt needed worldwide for adaptation was estimated to be annually US$ 60–182 billion in 2030. However, with the passage of time and inadequate action, these estimates are being revised upwards. Most recent estimates presented at the UNFCCC's workshop on Long-term Finance (July 2012), point to an even more enormous scale of funds, in the range of $600–$1500 billion a year, that would be needed by developing countries for mitigation and adaptation. This amount is at least 5–10 times the prospective financing flows of US$100 billion per year by 2020 agreed upon as the goal under the UNFCCC. Representatives from the International Energy Agency reported at this workshop that annual global investments for power generation alone, in a 2° C temperature rise scenario, would involve $370 billion from 2010 to 2020; $630 billion between 2020 and 2030; and $760 billion between 2030 and 2050.

DOMESTIC RESOURCES AND MECHANISMS

The UNFCCC (The latest available data of actual emissions available is upto 2010 only) notes that Kazakhstan, Cyprus, Malta, and Belarus did not have reduction commitments for 2008-2012 under the KP. Canada, Japan, New Zealand and Russia are not Parties to the second commitment period to the **KP** (Kyoto Protocol): Countries that are undergoing the process of transition to a market economy. For any representative country say for Australia, the table shows that in the first commitment period, Australia could collectively increase emissions by 8 per cent between 2008-2012 (taking the base year as 1990), whereas for the second KP round, Australia would need to reduce its emissions by 0.5 per cent collectively between 2013–2020. The last two columns of the table measure progress towards the first KP target which shows that Australia's actual emissions increased by 30 per cent between 2008–10. This indicates that for the period between 2010–12, Australia's emission should have been reduced by 22 per cent for it to be within the target.

The assessment and quantification of the costs of adaptation and mitigation is a difficult task. However, it is clear that these costs are significant and will likely be higher in the future as initiatives are taken in line with the goals outlined in the NAPCC. The preliminary estimates indicate a sum of Rs. 230,000 crore to fulfill the mission objectives under the NAPCC alone, let alone other lower carbon strategies and environment policies and programmes of the government.

The most obvious source of financing for climate change action is government budgetary support. Most of it would come as sectoral finance

6. ***Economic Survey 2012-13,*** MoF, GoI, N. Delhi, p. 262.

Carbon Taxes and Environmental Subsidies

A recent study 'Preliminary Modeling Studies on Carbon Taxes and GDP Loss' was conducted by the Ministry of Environment and Forest, GoI. The results of the study are given as below—

Undiscounted cumulative GDP loss: Carbon tax is *revenue positive* when it involves no adjustment to other tax rates in the economy. It is *revenue neutral* when other tax rates are adjusted so that the revenue inflow from carbon tax is exactly balanced by an equal reduction in yields from reduced taxes.

GoI Expenditure on Environment Promoting Subsidies

Environment-promoting Subsidies	Exp. in 2008–09 (Rs. crore)
Sewerage & sanitation	1,236.06
Soil & water conservation	26.04
Fisheries	221.52
Forestry & wildlife	696.36
Agricultural research & education	365.11
Special areas development prog.	1,560.29
Flood control & drainage	175.28
Non-conventional energy	477.21
Ecology & environment	473.80
Total	**5,231.67**

Source : A Technical Paper on *'Environmental Subsidies in India: Role and Reforms'* by the Madras School of Economics (January 2012), as quoted by the *Economic Survey 2012–13*, p. 264.

since some of the resources for adaptation and mitigation are built into the ongoing schemes and programmes. Although mitigation is sometimes an important co-benefit, the deployment of resources for such purposes is largely guided by the overall availability of resources. The Finance Bill 2010-11 created a corpus called the National Clean Energy Fund (NCEF) out of a cess at the rate of Rs.50 per tonne of coal to invest in entrepreneurial ventures and research in the field of clean energy technologies. The government expects to collect Rs. 10,000 crore under the NCEF by 2015. Governments have a range of policy instruments and variables at their disposal to use for generating the enormous resource requirements in this field. This includes a set of price signals, direct and indirect taxes, subsidies, and export and import levies. Theoretically, environment- related taxes have an important role to play in funding green initiatives. At the same time, any government must use these policy tools after serious consideration and analysis as they may have serious repercussions on other sectors of the economy. Preliminary modelling studies by the Ministry of Environment and Forests indicate that even a modest revenue-neutral economy-wide Carbon tax of US$10 per ton of GHG emissions in India would result in a GDP loss of around US$ 632 billion at 2005 prices. At the same time, the government continues to use subsidies to promote the environment.

Carbon taxes and *subsidy* may not be relied solely as the most viable policy option. Therefore, India is experimenting with a careful mix of market mechanisms together with fiscal instruments and regulatory interventions. On one hand, where the

cess on coal is a type of carbon tax being levied in India, **PAT** (Perform Achieve and Trade) and **RPO** (Renewable Purchase Obligation) are examples of cap and trade market mechanisms promoting energy efficiency and the use of renewable energy respectively in India.

The Twelfth Plan, in the particular context, lower carbon strategies will require capital finance for improvements in technology and enhanced deployment of renewable and clean energy technologies. Some of these objectives may be met through regulatory interventions and use of market mechanisms, in which case the required budgetary support may be small. In other cases, adequate financial outlays will be needed to implement policies and measures that can achieve specific mitigation outcomes in the individual sectors. So far, three grants of Rs. 5,000 crore each, for forest cover, renewable energy, and the water sector, have been recommended by the 13th Finance Commission for the state governments.

Considering the large resource requirement, arguments in favour of setting up a **National Green Fund** to finance public and private sector projects/ activities aimed at protecting environment in accordance with the Twelfth Plan objectives have found support. The Fund could also be a vehicle for receiving international support through agreed bilateral and multilateral sources and can finance

PAT and RPO

The ***PAT*** (perform - achieve - trade) is a scheme for trading energy-efficiency certificates in large energy-intensive industries under the National Mission for Enhanced Energy Efficiency—

(i) Identified industries are required to improve their specific energy consumption (SEC) within the specified period of three years or face penalty provisions.

(ii) At the same time this mechanism facilitates efficient industries to trade their additional certified energy savings (that go beyond the assigned target) with other designated consumers who could use these certificates to comply with their SEC-reduction targets.

(iii) In the Twelfth Five Year Plan, the PAT scheme is likely to achieve about 15 million tonnes oil equivalent of annual savings in coal, oil, gas, and electricity (including 6.686 million ton of oil-equivalent energy savings of first phase).

Similarly, the ***RPO*** (Renewable Purchase Obligation) is creating domestic markets for renewable energy through regulatory interventions at state level.

(iv) The RPO is the minimum level of renewable energy (out of total consumption) the obligated entities (DISCOMs, Captive Power Plants, and Open Access Consumers) are entitled to purchase in the area of a distribution licensee.

(v) The obligation is mandated by the State Electricity Regulatory Commission (SERC). Since the renewable energy sources are not evenly spread across India, SERCs cannot specify a linear level of RPOs for all states.

(vi) Renewable Energy Certificates (RECs) under the RPO mechanism is an instrument that enables the obligated entities to meet their Renewable Purchase Obligation by trading surplus or deficit RECs among themselves with the owner of the REC being able to claim to have purchased renewable energy.

Source: ***Economic Survey 2012-13,*** MoF, GoI, N. Delhi, p. 265.

actions not only at national level but also at state level for agreed priorities and thrust areas.

Carbon offsetting and its requisite financing require global effort and process. Markets that are operating take signals from international negotiations. Domestic markets and mechanisms alone are neither sufficient for generating resources of the required scale nor efficient enough for reaching the set level of targets and therefore rely heavily on international policy architecture. The second commitment period of the KP has brought some respite and certainty to the carbon markets; however, due to lack of ambition the future of carbon markets could still be in an indeterminate state. India's actions for climate change will, therefore, need to be financed from a pool of resources consisting of domestic resources, international carbon finance, and multilateral funds.

INTERNATIONAL SOURCES AND ISSUES

India, primarily out of its own concerns, has chalked out ambitious plans and policies to tackle climate change and environment issues that reflect India's strong will to address this global public good. However, given the *scarcity of resources* and competing demands, finding the matching resources is a challenge. The 'Expert Group on Low Carbon Strategies' has also stated in its Interim Report that aggressive mitigation cannot be achieved without substantial international financial support, both in terms of financial resources and technology transfer. The Indian PM also echoed similar sentiment in his **Rio+20 Summit** speech*: 'Many countries could do more if additional finance and technology were available. Unfortunately, there is not enough evidence of support from the industrialised countries in these areas.'*

In the context of making finances available to developing countries, in the recent past, much of the talks under the UNFCCC revolved around two numbers, namely US$ 30 billion between 2010 and 2012 as **FSF** (Fast Start Finance) and US$ 100 billion annually by 2020 as long-term finance. These were the two finance figures that the developed world collectively pledged as climate change finance in 2009. These pledges need to be new and additional. The term *'new and additional'* in the context of provision of finances by developed countries can be traced right from the text of the Convention to various COP decisions. In this sense 'new and additional' refers to provision of financial resources that represent new commitment, rather than those that are diverted from flows that have already been earmarked for some other form of development assistance.

However, in the absence of an agreed definition of additionality in climate finance, the developed and developing countries have diverging views. In the backdrop of these differences, together with great uncertainty in finance flows, complex web of channels, and lack of transparency and reporting practices, the actual additionality on FSF turned out to be a matter of great contention *(given below in the box)*. These differences more recently led to demand from developing countries on the need for a mechanism to **MRV** (*measure, report, and verify*) climate finance flows.

As a part of the ***finance package*** in the Doha Conference, the MRV of finance was an important element of the deal. It is satisfying that elements of MRV will be taken up by the Standing Committee on Finance under the COP. The Committee will consider ways of strengthening methodologies for reporting, measuring, and tracking climate finance. Talking about other finance elements, the Conference did not take ambitious or meaningful decisions especially on the demand for finance for the period between 2013 and 2020. The final decision encourages developed country Parties to increase efforts for at least maintaining the average annual 2010–12 level of finance between 2013 and 2015. On the other hand, it is reassuring that the work programme on long-term finance started

in COP17 in Durban has been extended with a view to continuing discussion on likely sources of finance in the long term. To sum up, finance negotiations and outcomes at Doha were in the nature of small slow steps rather than big strides.

Simultaneously, there have been efforts to build the requisite infrastructure for enabling and facilitating the flows of climate finance under the Convention. This is because only scaling up of finance will not suffice. The money should be put to efficient use and generate results. To this effect, work on operationalising the GCF progressed. The Republic of Korea has been selected as the host country to house its secretariat. The GCF is expected to be instrumental in channelling a significant share of the US$ 100 billion expected annually to be mobilised to developing countries by 2020 for addressing climate change. The vision, structure, and strategy of the Fund to carry out its function are a crucial priority on the agenda of the GCF Board. The Board should not rush with the 'standard' solutions sometimes proposed by outside interests but focus on ultimate goals and results on the ground with accountability and transparency.

Meanwhile, there are other Funds under the UNFCCC which continue to function. Collectively, the climate focal area of Global Environment Facility (GEF), the Special Climate Change Fund, the Least Developed Countries Fund, and the Adaptation Fund disburse around less than US$ 1 billion per year (Report on the workshop of the work programme on long-term finance 2012). The GEF, which is also an operating entity of the financial mechanism of the UNFCCC like the GCF, provides project grants for addressing global environmental issues while supporting national development initiatives. Till date, India has accessed about US$ 438 million of GEF grant of which US$ 269.5 million is for projects under the climate change focal area. At the same time, the **CIF** (Climate Investment Fund)—a collaborative effort among the multilateral development banks is offering its funds to be used for climate action on the basis of agreed terms and conditions. India has agreed 'in principle' to accessing the CIF, provided it is not treated as part of the climate change finance flows under the Convention and no GHG emission reduction related conditionalities are associated with the funds. The Trust Fund Committee in May 2012 has approved the allocation of the first tranche amounting to US$ 263 million for four projects contained in India's Investment Plan.

CARBON MARKETS AND PRIVATE SECTOR

Visible disappointments with the Doha outcomes on finance, many observers warned that we are heading towards a climate fiscal cliff. In this context, the private sector and global carbon markets are being increasingly emphasised. While not sufficient in themselves, the private sector and carbon markets have shown significant potential in mobilising finance for climate change especially for mitigation action.

As per the UNFCCC report on long-term finance, of the estimated current international climate financial flows, US$ 55 billion per year was generated from the private sector. Likewise, carbon markets help developing countries to find financial resources to proceed on their sustainability efforts. The CDM (the KP's market mechanism) as the world's largest carbon market has helped mobilise more than US$ 215 billion collectively so far in investments in developing countries (CDM Policy Dialogue Report). India has been an active player in the CDM, with over 2000 projects having been accorded host country approval, which has the potential of facilitating an overall inflow of approximately US$ 7.07 billion if all the projects get registered.

Both these sources, at the same time, have serious limitations in terms of predictability and adequacy of flows. It is absolutely clear that they

will not deliver on the hardest things: equity, public goods, and adaptation such as climate resiliency in agriculture or offgrid distributed renewables for poor regions. They will instead prove useful for market- led goods and services for the better, such as grid-based solar and wind power, where public subsidies in one form or another will be demanded. Also private sector investment is guided by risk return. This explains the strong inclination of the private sector towards mitigation projects. Adaptation financing continues to be a concern for all developing countries with insignificant private participation as adaptation usually does not yield returns on investment.

Carbon markets on the other hand are volatile, where success is contingent on the level of collective mitigation of ambition of nations. The end of the first phase of the KP saw the CDM market collapsing with carbon prices declining around 70 per cent in the past year alone. Moreover, unilateral restrictions imposed by the authorities in some of the major carbon markets such as EU on carbon credits from major developing countries such as India have not helped matters. The prices of carbon credits are likely to remain in a trap until the global ambition improves and new market mechanisms emerges to take into account the pledge based emissions. Both the carbon markets and private money need clear and targeted signals from public policies to address the institutional and market barriers confronting them.

PROBLEMS & PROSPECTS

Though multilateral efforts on sustainable development and climate change have led to several positive outcomes, there are still areas of concern where further work is needed to safeguard the interests of developing countries in future deliberations. Some of the challenges and deliverables from India's point of view are—

(i) Follow up and action on the Rio+ 20 outcome document, and the four processes/mechanisms that were as part of it, especially on developing SDGs and the processes on the financing strategy and technology transfer.

(ii) Taking forward the climate change discussions at Doha, the key question to be addressed is to articulate equality in the evolving arrangements that will be applicable to all in the post 2020 period. We have to ensure that domestic goals continue to be nationally determined even as we contribute to the global efforts according to the principle of CBDR and respective capabilities.

(iii) Taking concrete decisions on the sectoral framework for such actions closing the possibility of both unilateral measures and actions being initiated in sectors by the respective international organisations like ICAO or IMO on their own.

(iv) Equity, fair burden sharing, and equitable access to global atmospheric resources have to be protected and addressed more adequately under the DP, India will have to fight for its fair share of carbon and development space.

The sources and channels of providing long-term finance by developed countries have not yet been clearly identified. With no certainty on funding in the coming years, it is absolutely necessary to expeditiously mobilise finance and provide initial capital to the GCF for its operations.

Based on historic emissions and responsibilities, developed countries should take the lead. However, according to a June 2011 Study[7], developing countries are pledging greater cuts in their GHG emissions than developed countries.

India is also proactive in this regard with its intentions and ambition firmly in place in its policies and programmes. One may rightly argue that with the Twelfth Plan's focus on 'environmental sustainability', India is on the right track with the right enabling environment and has a number of achievements to its credit. However, the challenge while India is growing is to identify the key drivers and enablers of growth be it—

(i) Infrastructure
(ii) Transportation sector
(iii) Housing, or
(iv) Agriculture

And finally, to make the above-given sectors grow sustainably. This leads us to the next and most **vital issue** of finding and raising new and additional resources for meeting economic well-being needs with greater environmental sustainability. More often, it is the resource crunch which is the stumbling block for developing countries like India. While it makes efforts to efficiently and expeditiously bring price signals and other policy instruments into play, India could do much more if new and additional finance and technology are made available through multilateral processes.

"Be it national or global, environmental decline and global warming occurred gradually over decades and centuries, picking up pace with time. We must remember that the clock is now ticking on the needed global action to combat and contain this decay. This action should be fair, just and equitable for all countries so that our future has ecological and economic space for sustainable development for all".[8]

Moreover, mankind is faced with a situation when, by all means, it develops and selects the kind of 'technologies' which have the minimum or least 'fallouts' on our eoclogy and environment in the process of promoting the cause of mankind's development. Absence of global concensus cannot be cited by the individual nations as a refuge to sit idle and continue in the mode of 'business as usual'. Before it is too late, the conscience of humanity must awaken from its inertia.

EPILOGUE

Hardly anything makes economic sense unless its continuance for a long time can be projected without running into absurdities. Growth and development can happen to a 'limited objective', but it cannot be stretched upto an 'unlimited extent'. How can the 'finite' earth support mankind's 'infinite' physical needs? – long before this was postulated by the 'Club of Rome' in 1972, exactly the same thing Gandhiji had said in late thirties itself, 'Earth provides enough to satisfy every man's need, but not for every man's greed'. Mankind needs to introspect not only about its present needs but the way those needs are being met.

Besides, we also need to 'differentiate' between our 'needs' and 'aspirations'. Our physical needs

7. Stockholm Environment Institute, 'Comparison of Annex 1 and non-Annex 1 pledges under the Cancun Agreements', as cited by the ***Economic Survey 2012-13,*** MoF, GoI, N. Delhi, p. 268.
8. ***Economic Survey 2012-13,*** MoF, GoI, N. Delhi, p. 268.

have a direct 'link' with the resources we have at our disposal to meet them. If mankind is to survive and prosper, we need to be aware of the repercussions of our activities on Mother nature.[9]

9. These virtuous opinions can be seen in a number of contemporary thinkers and writers since 1970s:

   E. F. Schumacher, ***'The Economics of Permanence',*** *Resurgence,* Volume 3, No. 1, May/June 1970, (reprinted in Robin Clarke, Editor, ***'Notes for the Future: An Alternative History of the Past Decade',*** Thames & Hudson, London, 1975). Schumacher invoked Gandhi while advocating for the 'economics of permanence'.

   Jeffery Sachs, ***'Common Wealth: Economics for a Crowded Earth',*** Penguin Books, Great Britain (GB), London, 2009, pp. 29-35, 55-155.

   Jeffery Sachs, ***'The End of Poverty',*** Penguin Books, GB, London, 2005, pp. 280-284.

   Tim Harford, ***'The Undercover Economist',*** Abacus, GB, London, 2006, pp. 90-104.

   Thomas L. Friedman, ***'The World is Flat',*** Penguin Books, GB, London, 2006, pp. 383-385, 495-504

   Ramachandra Guha, ***' The Ecology of Affluence'*** in ***'The Ramachandra Guha Omnibus',*** Oxford University Press,N. Delhi, 2005, pp. 69-97.