

Sustainable Development and Climate Change

12 CHAPTER

The year 2012 may arguably be considered 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 landmark 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 global comparative opinion survey shows that people in India and indeed all countries, have a marked and rising concern about sustainable development and climate change. 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. The urgency for action is felt more than ever before. In contrast, though the Doha Gateway on climate change agreed upon in December 2012 ensured that there is continuation of a multilateral and rule-based regime to reduce emissions, the emission pledges on the table by the developed country Parties lacked ambition. Now the Fifth Assessment Report of the Inter-governmental Panel on Climate Change (IPCC) is in the final stages of completion. 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.

INTRODUCTION

12.2 Sustainable Development and Climate Change was introduced as a chapter in the Economic Survey last year for the first time. 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.

12.3 A volatile mix of erratic weather, natural disasters, and enormous pressures 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 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 (Box 12.1). 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 (Box 12.2). With these developments, it is clear that sustainable development and climate change issues are being addressed on a priority basis.

12.4 The world population crossed the 7 billion mark but with continued decline in population growth rates. Urbanization continues to grow with more demand for resources. A United Nations Environment Programme (UNEP) study, 'Keeping Track of Our Changing Environment: From Rio to Rio + 20 (1992-2012)', tells the story of where the world collectively stands today on the sustainability and environment front. According to this study, both global gross domestic product (GDP) and the human development index (HDI increased by 2.5 per cent per year) continue to increase but variation and inequalities between regions still exist. The study also points to the growing pressure on agriculture, water, fisheries, and land resources. Pressure on natural resources reflected in per capita global use of natural resource materials has increased around 27 per cent between 1992 and 2005 though there has been a decline in

Box 12.1 : Twelfth Five Year Plan Approaches for Sustainable Development and Lower Carbon Strategies

The Twelfth Plan strategy 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 recognizes 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; modernize transmission and distribution to bring technical and commercial losses down to world average levels; universalize 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-subsidization 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 institutionalize 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.

Box 12.2 : SAPCC

Since the launch of the NAPCC, 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.

emissions and energy and material use per unit of output, indicating improvement in efficiency levels. At the same time global greenhouse gas (GHG) emissions have continuously been rising (Figure 12.1). GHG emissions measured in million metric tons of CO₂ equivalent (MtCO₂e) from 1990 to 2005 register an increase of 25.9 per cent (World Resources Institute).

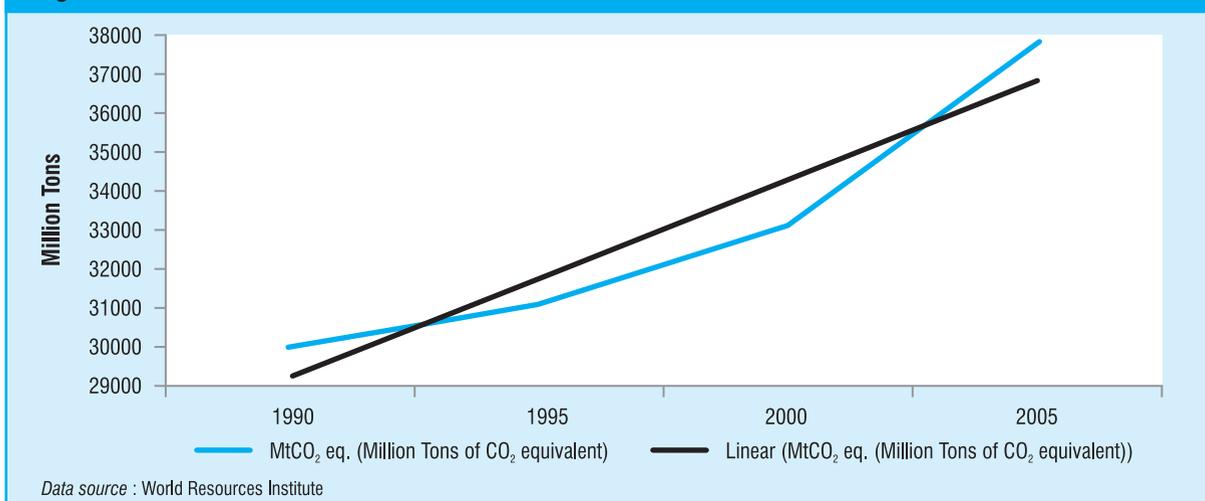
12.5 Positive and rising trends in global efforts are competing against mixed trends in the state of the environment. In 2011, global investment in the renewable energy sector, went up 17 per cent to \$257 billion hitting another record. In terms of new capacity added in 2011, renewable power (excluding large hydro) accounted for 44 per cent of the total new generation capacity added worldwide up from 34 per cent in 2010 (Frankfurt School of Finance and Management 'Global Trends in Renewable Energy investment 2012'). The global community is now working upon a set of Sustainable Development

Goals (SDGs) possibly to be integrated with Millennium Development Goals (MDGs) for the post 2015 global policy architecture. Simultaneously the world over the past decade has entered into many new environmental agreements. Together with the governments the private sector has been forthcoming. However, multilateral and bilateral funding dedicated to environmental purposes fluctuated and was faced with unmet promises to a great extent.

SUSTAINABLE DEVELOPMENT AND CLIMATE CHANGE IN THE INDIAN CONTEXT

12.6 The key environmental challenges in India have been sharper in the past two decades. The State of the Environment Report by the MoEF clubs the issues under five key challenges faced by India, which are climate change (Box 12.3), food security, water security, energy security, and managing urbanization. Climate change is impacting the natural

Figure 12.1 : Global GHG Emissions



Box 12.3 : Understanding Climate Change at a Glance

Ever since the industrial revolution, manmade activities have added significant quantities of GHGs 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 CDR 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 GHG emissions but to the stock of historical GHG emissions. Most of the countries, particularly the industrialized 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.

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°C to 4.3°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.

12.7 Wary of the threats imposed by climate change and pressures on natural resources, sustainability and environment are increasingly taking centre stage 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 (CO₂eq.) which is lower than the global per capita emissions of 4.22 tonnes of CO₂eq. in 2005).

12.8 Along with the national efforts in different sectors, India also recognizes 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 mobilize and

develop capacities of community institutions to utilize natural resources in a sustainable manner and their potential can be further developed.

12.9 Together 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 organizational 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 Twelfth Five Year Plan with a prominent focus on sustainability makes provision and provides for many more opportunities like these.

12.10 Working on the social and economic pillars of sustainable development policies, programmes and targeted schemes have been introduced to eradicate poverty. This is done either through a direct focus on economic indicators like employment generation, youth mobilization, and building up assets of the poor, or indirectly through social indicators of human development with emphasis on health, education, and women's empowerment. Many parameters on this front have shown improvement. The poverty head-count ratio declined by 7.3 percentage points from 2004-5 to 2009-10, maternal mortality rate (MMR) dropped from 301 per 100,000 live births in 2001-3 to 212 in 2007-9; literacy rates have been constantly rising and are estimated to be 82.14 per cent for men and 65.46 per cent for women as per the 2011 Census of India. However, India is still not on target to meet some key MDGs by 2015.

12.11 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.

12.12 Despite all these efforts, the reality that confronts us on the environmental front continues to be harsh and complex. Increasing population, urbanization, 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

12.13 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

12.14 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.

12.15 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 this end, the Conference had two themes, viz. (a) green economy in the context of sustainable development & poverty eradication; and (b) 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 organizational aspects of the proposed high-level political forum to follow up on the implementation of sustainable development.

12.16 '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.

12.17 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 policy-making 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 official developmental assistance (ODA) in this context.

12.18 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.

12.19 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.

12.20 The Rio Summit did not lead to any specific commitments on the finance and technology front. The developed countries, having obligations and responsibilities, need to commit to provision of adequate public funds including for transfer of technology and capacity building to developing

countries. There has been no mention of provision of new and additional financial resources by developed countries, something that India would have wanted to see. Any new green economy and sustainable development goals would be meaningless without new money and technology commitments on the table. Nevertheless, we may hope that the follow up process of Rio + 20 on both finance and technology will keep these issues alive leading to some new strategies and mechanisms.

12.21 While developing countries remain disappointed with the outcome document on means of implementation, they managed to secure many of their key positions and demands in the negotiations. It says a lot about the current international situation that a reaffirmation of principles made 20 years ago is a sign of success.

Convention on Biological Diversity

12.22 Global concerns about biodiversity found expression in the CBD adopted in 1992. The objectives of the Convention are: conservation of biodiversity, sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources. The Convention has near universal membership with 193 countries. The USA is the only major country that is not a Party. Following the ratification of the CBD, India also enacted the Biological Diversity Act in 2002 and notified the Rules in 2004 to give effect to the provisions of the CBD.

12.23 Being committed to the cause, India successfully hosted the COP 11 to the CBD, and the sixth Conference of the Parties serving as Meeting of the Parties (CoP/MoP-6) to the CBD's Cartagena Protocol on Biosafety in Hyderabad from 8-19 October 2012. The event provided India an opportunity to consolidate, scale up, and showcase its initiatives and strengths on biodiversity. One of the most important outcomes is the commitment of the Parties to doubling the total biodiversity-related international financial resource flows to developing countries by 2015 and at least maintaining this level until 2020. This will translate into additional financial flows to the developing countries to the tune of about US \$ 30 billion over the next eight years.

12.24 The Prime Minister of India, during COP 11 announced India's ratification of the Nagoya Protocol on Access and Benefit Sharing under the CBD and also launched the 'Hyderabad Pledge' of US \$ 50

million during India's Presidency to strengthen institutional mechanisms and capacity building in developing countries. The Prime Minister unveiled a commemorative pylon in Hyderabad to mark COP-11. It has been decided to establish a biodiversity museum and a garden on this site. At national level, efforts will be made to strengthen the implementation of the Biological Diversity Act and provide support to the State Biodiversity Boards and at local level prepare Peoples Biodiversity Registers.

Doha Climate Change Conference 2012

12.25 The 18th session of the COP to the UNFCCC, that started on 26 November and concluded on 8 December 2012 in Doha, Qatar has resulted in a set of decisions (clubbed together as 'Doha Climate Gateway') aimed at advancing the implementation of the UNFCCC and its Kyoto Protocol (KP).

12.26 The key issues for the Doha conference were: amending the KP to implement the second commitment period under the Protocol; successfully concluding the work of the Bali Action Plan (BAP) within which there was urgent need for a clear path to climate finance; and planning the work under the Durban Platform (DP) for enhanced action. The Conference addressed all three issues and came out with a package which balanced the interests and obligations of various countries (Box 12.4).

12.27 At the Doha Conference, the three issues of equity, technology-related IPRs, and unilateral measures raised by India resounded in the decisions. These outstanding or unresolved issues under the BAP are now part of the planned or continuing work of various bodies of the Convention. At Doha, India also ensured that no hasty decision is taken on aspects related to mitigation in agricultural sector at global level as agriculture is a sensitive sector for developing countries. The Conference has explicitly recognized that the action of Parties will be based on equity and CBDR including the need for equitable access to sustainable development. The Conference also recognized that issues relating to global peaking that could place a cap on emissions of developing countries and restrict their development space were controversial and best avoided at this stage of development.

12.28 At the same time, in an effort to cater to the interest of all countries and come up with a balanced package, some elements of the package required

Box 12.4 : Key Doha Outcomes

- It has been agreed that the KP, as the only existing and binding agreement under which developed countries commit to cutting emissions of GHGs, will enter a second commitment period that will run for eight years.
- Governments have agreed to speedily work toward a climate change agreement under DP applicable to all countries from 2020, to be adopted by 2015. Further governments have decided to find ways to scale up efforts before 2020 to meet the gap in global ambition for emissions reduction.
- Governments have launched a robust process to review the long-term temperature goal. This will start in 2013 and conclude by 2015 and is a reality check on the advance of the climate change threat and the possible need to mobilize further action.
- The Work Programme on Long term Finance launched last year has been extended for another year to contribute to the ongoing efforts to scale up mobilization of climate finance. Developed countries have reiterated their commitment to deliver on promises of mobilizing US\$100 billion both for adaptation and mitigation by 2020.
- Decision also encourages developed countries to increase efforts for providing finance between 2013 and 2015, and at least to the average annual level provided during the 2010-2012 fast-start finance period.
- Finance pledges of about \$ 6 billion for period upto 2015 announced by Germany, the UK, France, Denmark, Sweden and the EU Commission.
- The selection of the Republic of Korea by the Board of the Green Climate Fund (GCF) to host the GCF has been endorsed.
- The unresolved issues of Technology-related Intellectual Property Rights (IPRs) and the Unilateral Measures under the BAP are now part of the planned or continuing work of various bodies of the Convention. Based on the decisions, the Technology Executive Committee (TEC) will initiate exploration of issues relating to enabling environments and barriers, including IPRs in its future work-plan. The TEC has already identified IPRs as one of the key messages on which further work is necessary. Similarly, a decision has been taken for facilitating discussion on the issue of unilateral measures under the existing forum on implementation of response measures.

compromise or deferral. In many cases, ambitious and strong demands were collectively made by developing countries, but in the act of balancing, countries were made to accept the mellowed down and subtle versions of their demands. Among the key concerns which the Conference could not address were those relating to financing commitments of developed countries and sectoral actions. No specific targets for mid-term financing (2013-2020) were adopted. While the Conference stopped short of giving a mandate to the International Civil Aviation Organization (ICAO) or International Maritime Organization (IMO) to initiate steps for curtailing emissions in their respective sectors, the absence of a decision on sectoral framework for such actions has left open the possibility of such actions being initiated in such sectors by the respective international organizations. Considering the fact that some of the leading members of ICAO prefer a global market based mechanism to be the vehicle of such actions, the framework and the principles on the basis of which such actions will be taken are likely to be a bone of contention for quite sometime. Also, despite vociferous demand from vulnerable countries, there could be no satisfactory agreement on a compensation mechanism for loss and damage resulting from climate change.

12.29 On the positive side, the Doha Conference succeeded in carrying out amendments to the KP to ensure a second commitment period. The second commitment period will last for a period of eight years as of 1 January 2013. This decision has ensured that there will be no gap between the first commitment period under the KP ending on 31 December 2012 and the second one commencing on 1 January 2013. With the exception of Russia, New Zealand, Japan, and Canada, all other countries that were part of the first commitment period entered into the second round, with some new countries joining as well. It has been agreed that the KP Parties will revisit their targets in 2014 with a view to increasing their ambition. The emission reduction obligations undertaken by the KP Parties are not as ambitious as required by science; however, they provide a relative degree of certainty to the carbon markets. The EU will reduce its emissions by 20 per cent by 2020 compared to 1990 (Table 12.1). Governments also agreed to speedily work under the DP to evolve a new set of arrangements for mitigation commitments and actions applicable to all countries from 2020, and to adopt it by 2015. In a significant and positive advancement, it has been agreed that the work of the DP will be based on the principles of the Convention.

Discussions under G20

12.30 G20—the group of twenty major economies of the world—took up the agenda of inclusive green growth during the Mexican Presidency in 2011-12. The aim of introducing inclusive green growth into the G20 agenda was to support the transition of developing countries, in particular the low income countries, towards becoming lower carbon economies as well as to enable countries to become more resilient to climate change. As of now, the G20 ministers have agreed to voluntarily self-report in 2013 on their respective country's efforts to follow inclusive green growth and sustainable development policies under their structural reform agendas. Leaders at the G20 last year also collaborated to form a Climate Finance Study Group to consider ways of effectively mobilizing resources taking into account the objectives, provisions, and principles of the UNFCCC.

A Look at CO₂ Emissions of the G 20 Countries

12.31 As CO₂ is the predominant GHG, an analysis of its emissions across countries in per capita terms in 2009, compared to 2005 presents an interesting picture. Although the G20 is referred to as a group, there are stark disparities on the ground between member countries in terms of incomes, stages of development as well as respective per capita CO₂ emissions. In 2005, the USA had the highest CO₂ emissions in metric tons per capita at 19.7, followed by Australia (18.0). The lowest per capita emitters in 2005 were Brazil (1.9), Indonesia (1.5), and India (1.2) who continued to be the bottom three in 2009 as well. In 2009, Australia ranked first within the G20, followed by the USA (Figure 12.2).

FINANCING CLIMATE CHANGE

12.32 The idea of a global budget for carbon and its corresponding financing stems from the objective of stabilizing 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.

12.33 Yet the question remains: How to finance actions to achieve this target. 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 investment 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.

12.34 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

Figure 12.2 : CO₂ per capita emissions for G20 countries

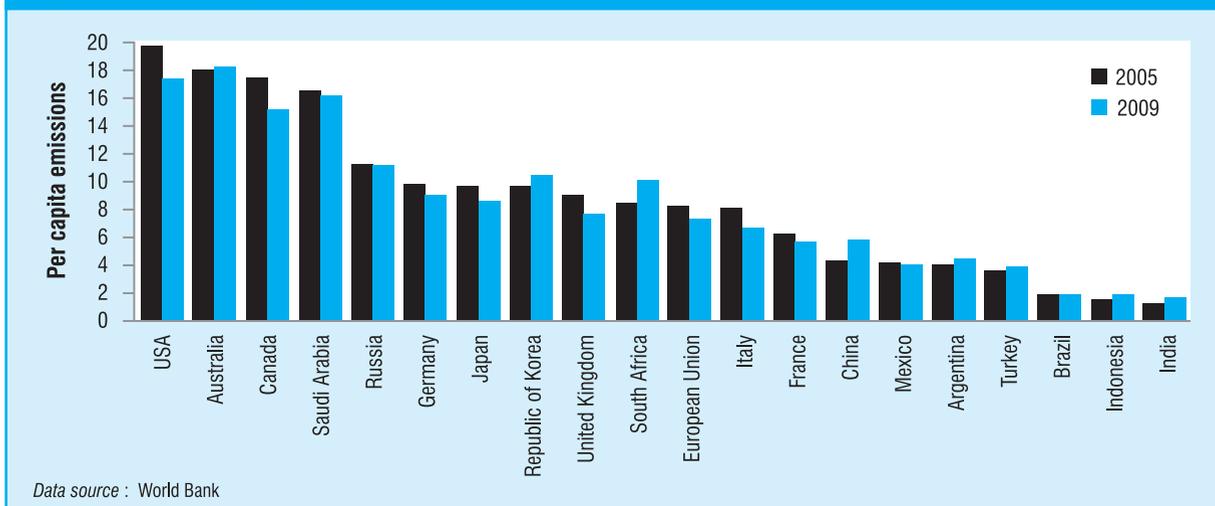


Table 12.1 : Emission Reduction Commitments by Kyoto Parties in the Second Commitment Period

Country	Emission reduction commitment in the second period 2013-2020 (% of base year 1990)	Emission reduction commitment in the first period 2008-2012 (% of base year 1990)	Actual change in GHG emissions from 1990 to 2010 (%)	Deviation from Kyoto target of 1 st commitment period as in 2010 (%)
Australia	(-0.5)	8	30.0	22
Austria	(-20)	(-8)	8.2	16.2
Belgium	(-20)	(-8)	-7.6	0.4
Bulgaria*	(-20)	(-8)	-52.0	(-44)
Croatia*	(-20)	(-5)	-9.1	(-4.1)
Czech Republic*	(-20)	(-8)	-28.9	(-20.9)
Denmark	(-20)	(-8)	-10.5	(-2.5)
Estonia*	(-20)	(-8)	-49.6	(-41.6)
European Union	(-20)	(-8)	-15.4	(-7.4)
Finland	(-20)	(-8)	6	14
France	(-20)	(-8)	-6.0	2
Germany	(-20)	(-8)	-24.8	(-16.8)
Greece	(-20)	(-8)	12.6	20.6
Hungary*	(-20)	(-6)	-40.9	(-34.9)
Iceland	(-20)	10	29.7	19.7
Ireland	(-20)	(-8)	11.2	19.2
Italy	(-20)	(-8)	-3.5	4.5
Latvia*	(-20)	(-8)	-54.5	(-46.5)
Liechtenstein	(-16)	(-8)	1.1	9.1
Lithuania*	(-20)	(-8)	-56.9	(-48.9)
Luxembourg	(-20)	(-8)	-5.9	2.1
Monaco	(-22)	(-8)	-18.7	(-10.7)
Netherlands	(-20)	(-8)	-0.9	7.1
Norway	(-16)	1	8.2	7.2
Poland*	(-20)	(-6)	-28.9	(-22.9)
Portugal	(-20)	(-8)	17.5	25.5
Romania*	(-20)	(-8)	-57.6	(-49.6)
Slovakia*	(-20)	(-8)	-35.9	(-27.9)
Slovenia*	(-20)	(-8)	-3.5	4.5
Spain	(-20)	(-8)	25.8	33.8
Sweden	(-20)	(-8)	-9.0	(-1)
Switzerland	(-15.8)	(-8)	2.2	10.2
Ukraine*	(-24)	0	-58.8	-58.8
United Kingdom	(-20)	(-8)	-22.6	(-14.6)
Belarus*	(-12)			
Malta	(-20)			
Kazakhstan	(-5)			
Cyprus	(-20)			

Source: UNFCCC (The latest available data of actual emissions available upto 2010 only)

Notes: 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 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 2010-2012, Australia's emission should have been reduced by 22 per cent for it to be within the target

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

12.35 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 ₹ 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.

12.36 The most obvious source of financing for climate change action is government budgetary support. Most of it would come as sectoral finance 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 ₹ 50 per tonne of coal to invest in entrepreneurial ventures and research in the field of clean energy technologies. The government expects to collect ₹ 10,000 crore

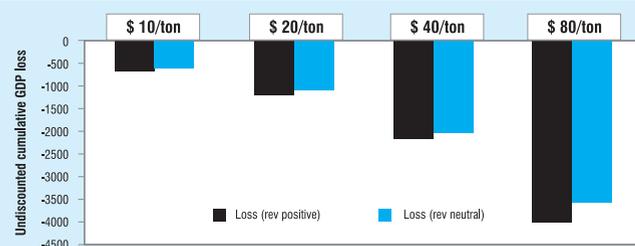
under the NCEF by 2015. Governments have a range of policy instruments and variables at their disposal to use for generating the enormous resource requirements in this field. This includes a set of price signals, direct and indirect taxes, subsidies, and export and import levies. Theoretically, environment-related 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 (Box 12.5).

12.37 Relying solely on carbon taxes and subsidy may not be 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, Perform Achieve and Trade (PAT) and Renewable Purchase Obligation (RPO) are examples of cap and trade market mechanisms promoting energy efficiency and the use of renewable energy respectively in India (Box 12.6).

Box 12.5 : Carbon Taxes and Environmental Subsidies

Results of Preliminary Modeling Studies by MoEF on Carbon Taxes and GDP Loss

Loss of GDP in four different carbon tax scenarios (2010-11 to 2030-31)



Note : Figure represents undiscounted cumulative GDP loss at 2005 prices

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.

A Look at the Expenditure on Some Environment Promoting Subsidies by Government

Environment-promoting subsidies	Exp. in 2008-9 (₹ crore)
Sewerage & sanitation	1236.06
Soil & water conservation	26.04
Fisheries	221.52
Forestry & wildlife	696.36
Agricultural research & education	365.11
Special areas development prog.	1560.29
Flood control & drainage	175.28
Non-conventional energy	477.21
Ecology & environment	473.80
Total	5231.67

Source: A Technical Paper on 'Environmental Subsidies in India: Role and Reforms' by the Madras School of Economics (January 2012).

Box 12.6 : PAT and RPO

PAT is a scheme for trading energy-efficiency certificates in large energy-intensive industries under the National Mission for Enhanced Energy Efficiency. Identified industries are required to improve their specific energy consumption (SEC) within the specified period of three years or face penalty provisions. 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. 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 is creating domestic markets for renewable energy through regulatory interventions at state level. 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. 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. 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.

12.38 In the particular context of the Twelfth Plan, 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 ₹ 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.

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

12.40 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

12.41 Primarily out of its own concerns, India 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 Prime Minister 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.'

12.42 In the recent past, in the context of making finances available to developing countries, much of the talks under the UNFCCC revolved around two numbers, namely US\$ 30 billion between 2010 and 2012 as Fast Start Finance (FSF) 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

Box 12.7 : Assessing the US\$ 30 Billion FSF Commitment (2010-2012)

As FSF came to an end in 2012, many studies echoed serious concerns on the way FSF was implemented. There are lessons to be learnt so that these issues are addressed when we implement long-term finance by 2020. As a part of the FSF assessment, an Oxfam study 'The Climate Fiscal Cliff' reveals five numbers that speak for themselves on the delivery of funds under FSF.

1. Only 33 per cent of FSF appears to be new money
2. Only 24 per cent of public finance was additional to existing aid promises
3. Only 21 per cent went for supporting adaptation in spite of promises to balance it with mitigation
4. Only 43 per cent was provided as grants and the rest as loans
5. Only 23 per cent was channeled through multilateral funds

Almost all assessments on FSF point to the core problems as being a) that it was recycled money either diverted from ODA or made up of funds delivered or planned before the Copenhagen promise in 2009; b) that the most vulnerable were not prioritized, with minimal funds spent on adaptation and c) net transfer of resources to developing countries was not even half the amount promised as more than 50 per cent was in the form of loans that have to be repaid. Therefore, an important takeaway in the context of the long-term finance flows are lessons on transparency, coherence, and consistency in reporting and verifying climate finance flows.

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 (Box 12.7). These differences more recently led to demand from developing countries on the need for a mechanism to measure, report, and verify (MRV) climate finance flows.

12.43 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 2010-2012 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.

12.44 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 operationalizing 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 mobilized 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.

12.45 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 Climate Investment Fund (CIF)-- 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.

Private Sector and Carbon Markets

12.46 Disappointed 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 emphasized. While not sufficient in themselves, the private sector and carbon markets have shown significant potential in mobilizing finance for climate change especially for mitigation action. According to 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 mobilize 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.

12.47 At the same time, both these sources 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 off-grid distributed renewables for poor regions. They will instead prove useful for market-led goods and services for the better off, 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 ambition of nations. 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.

CHALLENGES AND OUTLOOK

12.48 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: follow up and action on the Rio + 20 outcome document, and the four processes/mechanisms part of it, especially on developing SDGs and the processes on the financing strategy and technology transfer. Also taking forward the climate change discussions at Doha, the key question to be addressed is to articulate equity 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.

12.49 We should take 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 organizations like ICAO or IMO on their own. More importantly, 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 mobilize finance and provide initial capital to the GCF for its operations.

12.50 Based on historic emissions and responsibilities, developed countries should take the lead. However, according to a June 2011 study by the Stockholm Environment Institute, 'Comparison of Annex 1 and non-Annex 1 pledges under the Cancun Agreements', 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 infrastructure, transportation sector, housing, or agriculture and to make these 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.

12.51 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 the future we want will be a future in which there is ecological and economic space for sustainable development for all.