

Climate Change and Development in Indian Context

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While achieving “Development”, remains as a major challenge of the Developing Countries; most of them are not in a position to ensure basic human need such as food, shelter, clothing and minimum “standard of living” to all of their citizens. Getting rid from Poverty, Employment, Literacy, lack of basic access to primary Health Care and Education, Free from Malnutrition, Stabilizing Population, Reduction in Infant Mortality Rate, ensuring Safe Drinking Water and Sanitation: still remains far-off for the more than the Ninety per cent population of the world today.

On the other hand, due to higher Green House Gas emissions, earth is experiencing a higher rise in temperature (4⁰ Centigrade in 100 years), which drastically influencing the changes in the weather patterns, resulting in melting the Ice-caps, causing flash floods, droughts, cyclones, hurricanes, abnormal increase or decrease in rainfall, arising water scarcity, desertification, change in crop-yield, sea level rise or coastal flooding, causing victor-born diseases, and many unexpected natural disasters including the changes in major river systems and even adversely affecting Bio-diversity.

As a priority, Development certainly comes first. Because Climate Change Policy, can not solve the problems and need of a developmental prospects of a country and at the same time initiatives for Adaptation and Mitigation for Climate Change, can also not be ignored; since this is closely linked to the process of development at each stage. The climate of the future is going to be different form the climate of the past; hence from our experience and traditional knowledge, built over the years, we should able to adopt appropriate Climate Change Policies and subsequently implement the Mitigation Strategies; otherwise the poorest of the poor would suffer the most, since they are the ones, most vulnerable to climate change process. The most of the Developing Countries, unfortunately do not have sufficient either financial resources or technological know-how to support their minimum developmental programmes and in such a situation, Adaptation and implementing Mitigation Policy would certainly be an additional burden for them. In fact, Capacity Building assumes prime importance in such a context for the Developing World.

India has the world’s second largest population and fourth largest economy, with a per capita annual GDP of \$ 2.4. While our economy has been among the fastest growing in the world in the last two decades, the major part of this growth is due to the service sectors, including information technology, bio-technology, and media and entertainment. The nation aims to reduce the poverty rate to 15 per cent, provide full employment, ensure food, energy and economic security and double per capita income – all by 2012. In

order to achieve these goals, India has developed an open, market-based economy.

India's carbon emissions per capita, is the lowest in the world, averaging only one-quarter of the global average and one-twentieth the U.S. rate. While India places a higher priority on development needs, policies driven by economic and environmental challenge have reduced growth in greenhouse gas (GHG) emissions. The greatest challenge has been economic liberalization and restructuring to improve living standards of the people. Pressure from citizen activists to reduce air pollution has also led to sufficient legal interventions in mandating strong clean air measures that affect energy systems. India ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1993 and the Kyoto Protocol in 2002.

First, our per capita Green House Gas emissions are only a fraction of the world average, and an order of magnitude below that of many developed countries. This situation will not change for several decades to come. We do believe that the ethos of democracy can support equal per capita rights to global environmental resources.

In Five-year Planning process, India stated placing " Environment Protection ", due importance right from it's fifth Five-year Plan. The Ninth Plan (1997-2002) recognizes the synergies among environment, health, and development, and identifies as one of its core objectives, as the need for ensuring environmental sustainability of the development process through social mobilization and participation of people at all levels (Planning Commission 1997).

The Approach Paper to the India's Tenth Five-year Plan (2002-2007) links economic development and poverty with environmental degradation. As the poor are dependent on nature for their livelihoods, they are highly vulnerable to natural calamities, environmental degradation, and ecological disasters. Any economic development, which destroys the environment, may aggravate problems of poverty, unemployment, and disease. Moreover, the Approach Paper also emphasizes that India would target a high rate of economic growth (8% GDP), simultaneously striving for enhancement of human will being. This includes adequate levels of consumption of food and other consumer goods, access to basic social services (education, health, drinking water, and basic sanitation), expansion of economic and social opportunities for all individuals and groups, reduction of disparities, and greater participation in decision-making. This is the key challenge for the Indian economy at the start of the new millennium.

Targets set for India's Tenth Plan period (2002-07) and Beyond

- Growth in gross domestic product at 8% for the period 2002-07
- Reduction of poverty ratio by 5% by 2007 and by 15% by 2012

- Providing gainful high-quality employment to the addition to the labour force over the plan period
- Admittance of all children in school by 2003; completion of five years of education by children by 2007
- Reduction for gender gaps in literacy and wage rates by at least 50% by 2007
- Reduction in the decadal rate of population growth between 2001 and 2011 to 16.2%
- Increase in literacy rate to 75% within the Plan period
- Reduction of infant mortality rate to 45 per 1000 live births by 2007 and to 28 per 1000 live births by 2012
- Reduction of maternal mortality ratio to 2 per 1000 live births by 2007 and to 1 per 1000 live births by 2012
- Increase in forest and tree cover to 25% by 2007 and to 33% by 2012
- Sustained access to potable drinking water for all villages within the Plan period
- Cleaning of major polluted rivers by 2007 and other notified stretches by 2012

Although the countries of the developing world are more vulnerable to climate change, their contribution to the greenhouse problem has been much smaller than that of developed countries. Historically, developed countries have been responsible for more than 60% of GHGs (greenhouse gases) added in the last 100 years (WRI 2001). This is recognized in the UNFCCC, which follows the principles of 'common but differentiated responsibilities' and 'respective capabilities' in addressing its ultimate objective of stabilizing atmospheric GHG concentrations. In 1990, India accounted for approximately three per cent of global GHG emissions. The major part of India's emissions came from fossil-fuel-related CO₂ emission. In per capita terms, India emitted 1.19 tones of CO₂ – equivalent, compared to Japan's 8.8 tones and US's 19.8 tones in the same year (ADB-GEF-UNDP 1998).

Ten year later, India's CO₂ emissions from fossil fuel combustion continue to be much lower than those of key Developed Countries. In per capita terms, India's emissions constitute just a fraction of the world average. Despite its low share in atmospheric GHG concentrations, and its overriding development priorities, India is undertaking numerous initiatives that contribute significantly to international efforts for atmospheric protection, thus putting the country on the path of climate-friendly development.

Recent Energy and Emissions Profile

After climbing steadily for at least two decades, India's energy, power, and carbon intensities all began to decline rapidly after 1995 and this shift suggests the start of a decoupling of energy and economic growth, as has historically occurred in industrialized nations at higher per capita income levels.

Industrial development has contributed significantly to economic growth in India, though not without an environmental price. With coal accounting for over half of total primary energy consumption, this industrial development has been fueled by a relatively high-polluting energy source. Industrial pollution is increasing public health risks, and abatement efforts are consuming a significant portion of India's GDP. Energy consumption by the industrial sector accounted for 41 per cent of the total energy consumption in 1998.

Non-commercial biomass energy meets the cooking needs of most rural India households and nearly half of urban households. Although commercial forms of energy are penetrating rural and traditional sectors, biomass still accounts for roughly one-third of total Indian energy use.

India's carbon emissions have grown by 63 per cent over the last decade, despite the decline in carbon intensity later in the decade. This emissions growth results primarily from energy use associated with economic development and heavy dependence on coal. Methane, originate primarily from rice paddies and ruminant cattle, contributed one-third of India's total GHG emissions, although its share decreased rapidly with the rise in energy-related carbon emissions.

Appropriate Mitigating Measures

Growth of energy-related carbon dioxide emissions in India was reduced over the last decade by an estimated 111 million tons. The key factors in these reductions have been economic restructuring, local environmental protection, and technological change. These drivers have been mediated through economic reform, enforcement of existing clean air laws by the nation's highest court, and renewable energy incentives and development programs funded by the national government and foreign donors. In 2000 alone, energy policy initiative reduced carbon emissions growth by 18 million tons-about 6 per cent of India's gross energy-related carbon emissions.

Market reform driven by domestic policy and international dynamics over the past decade has improved India's fuel quality, technology standards, infrastructure, and operating practices. A key example is power sector restructuring and reform. This Electricity Supply Act of 1995 designated electricity as essentially a human right in India. The advent of market-based pricing for both power and liquid fuels is replacing the administered-price system of the old planned economy. Current prices and bill collections now cover about two-thirds of the cost of power; the remained amount is recovered by only through various forms of subsidy. In some cities such as Delhi and Bangalore power costs more than the U.S. average. Many people still do not pay for power, meaning that the high price reflects a large cross subsidy for the poor and free riders. Liquefied petroleum gas, which is used widely for cooking, is modestly subsidized, but prices are headed toward international levels. Other market reforms have allowed the import of foreign

cars and appliances, which generally are more energy-efficient than those they replace.

Technology development measures in the energy sector have contributed a series of small but notable reductions in emissions growth. Improvements in stoves, reduction of gas flaring in fossil-fuel production, improvements in demand-and supply-side efficiency, and the introduction of modern renewable energy systems now mitigate about 18 million tons of carbon per year. None of these measures has been exploited to its full potential, and many could lead to further reductions in emissions growth in the future.

Lower carbon emissions also have resulted from important technological advancements in coal washing. Indian coal averages approximately one-third ash, wreaking havoc with boilers and their efficiency, driving up transportation costs, and creating serious air pollution. One recent government policy restricts the transportation of unwashed coal to less than 1,000 kilometers. Customers are motivated to reduce ash content to improve efficiency, reduce local pollution, and cut freight costs. New combustion technologies, including supercritical coal-fired power plants, are being introduced, and the capture of coal-bed methane is being promoted. While coal shall continue to be the most important source of energy in India in the foreseeable future, we are promoting many technological innovations in this sector to enhance efficiency and reduce its environmental impacts.

Government policy has included public investment to develop the Natural Gas infrastructure for long-distance, and local distribution as well. One example is the HBJ 1,500- kilometer high-pressure gas pipeline from near Mumbai to the north of Delhi, which carries 4 to 5 billion cubic meters of gas from off-shore production. The share of gas in power generating capacity has risen to 8 percent against the 2 per cent ten years ago. Liquefied petroleum gas has significantly replaced commercial coal and kerosene in urban households. Public vehicles have been converted to Compressed Natural Gas.

India has instituted a sizable renewable energy program over the past 20 years, which is implemented by the Ministry of Non-Conventional Energy Sources, since 1992. About 3.3 million household Biomass Gasification Systems have been built, which produce 3-4 cubic meters of Biogas per unit per day, enough to supply cooking fuel for a large percentage of rural homes. A larger scale program has improved the efficiency of wood stoves in 34 million homes, reducing deforestation in areas, where wood-fuels were unsustainably harvested.

Forest covers nearly one-fifth of India's geographical landmass. The per capita deforestation rate has been among the lowest of the major tropical countries. In recent years, closed forests have actually increased in total area. Forest conservation measures include prohibiting the use of forestland for

non-forestry purposes, encouraging agro-forestry and private plantations to meet industrial wood needs, and expanding areas under protection. During the last decade, over 14 million hectares were protected under Indian forestry programs. These efforts have led to a steady increase in the rate of forestation, significantly contributing to the removal of atmospheric carbon.

Future Mitigation Options

Projections assuming sustained economic growth and continued dependence on domestic coal resources, suggest sharply rising energy use and GHG emissions in India. One study - The Asia Least-Cost Greenhouse Gas Abatement Strategy (ALGAS), projected energy-sector carbon emissions of at least 688 million tons in 2030, which is nearly three times then the current level. Forestry-related emissions would reach 21 million tons of carbon by 2020 and about 29 million tons by 2030. More recent studies have given lower energy-related estimates, one projecting 572 million tons in 2020.

The ALGAS scenario is driven by a continuation of economic, demographic, and energy trends and current policies. The economy would grow at an annual rate of 5 per cent, increasing GDP in 2030 to nearly five times the present level. India's population would increase from 1 billion to 1.35 billion. However, energy use would only triple, mainly because the current energy intensity reduction rate of 1.5 per cent per year is assumed to continue. Carbon emissions would increase at about half the rate of GDP – 2.7 times – because carbon intensity would decrease as gas and renewable substitute for coal. Methane emissions would grow slowly due to low growth in the agriculture and livestock sectors, the main contributors of methane emissions. Local air pollutants would rise at much lower rates– and particulate emissions would actually decline- due to policies that are already being implemented as a result of increasing public pressure.

Most studies of future emissions in India suggest a hierarchy of mitigation options. It is estimated that India could reduce projected emissions over the next 30 years by nearly one-quarter for less than \$25 per ton of carbon equivalent, with a substantial portion available at a very low cost. Over the next decade, 120 million tons of carbon mitigation could be achieved at a cost of \$0-15 per ton avoided. Major opportunities include demand-supply-side efficiency measures, fuel switching from coal to gas, afforestation, and power transmission improvements. Demand and Supply side efficiency measures alone could avoid 45 million tons of emissions.

The cost of these measures depends on the extent to which they would be applied, which in turn depends in part on the stringency of GHG production policies. India could in the midterm help finance these mitigation measures by selling emission reduction credits, either through the Clean Development Mechanism established under the Kyoto Protocol or in a futures market based on expectations that future global policies would certainly

impose more stringent GHG restrictions, provided that credits could be banked and sold.

Now let us pledge for:

- Recognition that, given current scientific knowledge, deep cuts in emissions will be necessary to avoid dangerous climate change. These must be achieved with the principles of equity and common but differentiated responsibilities.
- Increased capacity and financing for adaptation must be ensured. In practice, adaptation should be integrated with sustainable development. However, without far deeper emissions reductions, no amount of adaptation can stave off catastrophic impacts.
- Fair and adequate public participation in Decision-making and implementation, which requires increased public awareness, education and training.
- Reaffirmation that the right to sustainable development is fundamental to achieving the goals of the convention and the protocol. This includes making poverty eradication a global priority, just as it includes shifts to equitable and sustainable patterns of consumption.

Climate Change has emerged as one of the most serious environmental concerns of our times, which is a global phenomenon with diverse local impacts. There is a need to pay adequate attention to the concerns of developing countries on vulnerability and adaptation issues; hence Adaptation is the key theme for the eighth Conference of Parties of UNFCCC at New Delhi, let us expect this should not be a substitute for Mitigation for cutting back emissions. The New Delhi Declaration should provide us with a sound basis for global cooperation, reflecting the consensus that addressing the challenge of climate change as an integral part of achieving sustainable development to create a better world for all our people.
