



NEW INITIATIVES BY GOVERNMENT OF INDIA TO TACKLE ENVIRONMENTAL PROBLEMS

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Abstract

Once the State become signatory to the International Environmental Convention/treaties, it is obligation to implement through municipal laws. Further in international meetings and conferences state has to share its implementations and information. However government of India did not take up the initiation till 2004 to maintain information and data and share them with international community etc, even though India was party to many international environmental conventions and amended the constitution to implement Stockholm Declaration principles. Now, as Constitutional and statutory obligation of the State to protect and improve environment, in 2004, for the first time in a well coordinated and dedicated effort was made to produce assessing Greenhouse Gases of anthropogenic origin from sectors such as Energy, Agriculture, Industry, Land Use, Land Use Change and Forestry and Waste and efforts were also made to assess the climate change Impacts and vulnerability of key sectors of economy in India's Initial National Communication to the UNFCCC. But the inventory is prepared for the base year 1994.

Key Words: *New Initiatives - India's Initial National Communication - National Action Plan on Climate Change - National Missions - Other Initiatives - Government of India - Environment Protection.*

It is the constitutional and statutory obligation of the State to protect and improve the environment, in general, and its components, in particular. In this regard the government at the Central and State levels and the grass root authorities have bestowed with great responsibilities and challenging jobs.¹ However State first time started to maintain information system to address environmental issues and formulate realistic and more appropriate to implement policies in the year 2004. It is an overview of 2004 initiatives of Government of India.

India's Initial National Communication (NATCOM)

In 2004, for the first time in a well coordinated and dedicated effort was made to produce assessing Greenhouse Gases of anthropogenic origin from sectors such as Energy, Agriculture, Industry, Land Use, Land Use Change and Forestry and Waste and efforts were also made to assess the climate change Impacts and vulnerability of key sectors of economy in India's Initial National Communication to the UNFCCC.² But the inventory is prepared for the base year 1994.

National Action Plan on Climate Change (NAPCC)

As the Fourth Assessment report of the Intergovernmental Panel on Climate Change concluded from direct observations of changes in temperature, sea level, and snow cover in the northern hemisphere during 1850 to the present, that the warming of the earth's climate system is unequivocal. The global atmospheric concentration of carbon dioxide has increased from a pre-industrial value of about 280 ppm to 379 ppm in 2005. Multi-model averages show that the temperature increases during 2090-2099 relative to 1980-1999 may range from 1.1 to 6.4°C and sea level rise from 0.18 to 0.59 meters. These could lead to impacts on freshwater availability, oceanic acidification, food production, flooding of coastal areas and increased burden of vector borne and water borne diseases associated with extreme weather events. As national response to the fourth report of IPCC, the Prime Minister's Council on Climate Change, in its first meeting on 13th July, 2007, had decided that "A National Document compiling action taken by India for addressing the challenge of Climate Change, and the action it proposes to take" be prepared.³ The National Action Plan for Climate Change responds to the decision of the PM's Council, as

¹ Jariwala C.M (2004), *Environment and Justice*, New Delhi: APH Publishing, p.45.

² It was undertaken by the Ministry of Environment and Forests, Government of India, 2004, to fulfill the requirements of the Article 12 of UNFCCC and for the relevant decisions of the Conference of Parties.

³ The Prime Minister, Dr. Manmohan Singh, has set up a High Level advisory group on climate change issues. The Prime Minister's Council on Climate Change will include the following:

(a) Government Representatives:- Minister of External Affairs; Finance Minister; Minister of Environment & Forests; Minister of Agriculture; Minister of Water Resources; Minister of Science & Technology; Deputy Chairman, Planning Commission; Dr. R. Chidambaram, Principal Scientific Advisor to PM; Shri V. Krishnamurthy, Chairman, NMCC; Dr. C. Rangarajan, Chairman, EAC; Shri Ajay Mathur, Chairman, Bureau of Energy Efficiency; Foreign Secretary; Secretary, Environment & Forests and Principal Secretary to PM (Convenor).

(b) Non-Government Members:- Dr. R.K. Pachauri, Chairperson, TERI; Dr. Prodipto Ghosh; Dr. Nitin Desai; Dr. Sunita Narain; Shri Chandrashekhar Dasgupta (Retd. Diplomat); Shri Ratan Tata, Chairman, Investment Commission; Shri Raj Chengappa, Executive Editor, India Today; Dr. R.Ramachandran, Science Editor, The Hindu. The Council will coordinate national action plans for assessment,



well as updates India's national programmes relevant to addressing climate change. It identifies measures that promote our development objectives, while also yielding co-benefits for addressing climate change effectively. It lists specific opportunities to simultaneously advance India's development and climate related objectives of both adaptation as well as greenhouse gas (GHG) mitigation.

On June 30, 2008, Prime Minister Manmohan Singh released India's first National Action Plan on Climate Change (NAPCC) outlining existing and future policies and programs addressing climate mitigation and adaptation. The plan identifies eight core "national missions" running through 2017. The NAPCC is coordinated by the Ministry of Environment and Forests and implemented through the nodal Ministries and is aimed at advancing relevant actions in specific sectors/areas. Emphasizing the overriding priority of maintaining high economic growth rates to raise living standards, the plan "identifies measures that promote our development objectives while also yielding co-benefits for addressing climate change effectively." It says these national measures would be more successful with assistance from developed countries, and pledges that India's per capita greenhouse gas emissions "will at no point exceed that of developed countries even as we pursue our development objectives."

National Missions

a. National Solar Mission: The NAPCC aims to promote the development and use of solar energy for power generation and other uses with the ultimate objective of making solar competitive with fossil-based energy options. The plan includes:

1. Specific goals for increasing use of solar thermal technologies in urban areas, industry, and commercial establishments;
2. A goal of increasing production of photovoltaic's to 1000 MW/year; and
3. A goal of deploying at least 1000 MW of solar thermal power generation.

Other objectives include the establishment of a solar research center, increased international collaboration on technology development, strengthening of domestic manufacturing capacity, and increased government funding and international support.

Regarding the above said mission the government has launched the Jawaharlal Nehru National Solar Mission (JNNSM) in January 2010 with a target of 20,000 MW grid solar power (based on solar thermal power- generating systems and solar photovoltaic [SPV] technologies), 2000 MW of off-grid capacity by 2022. The Mission will be implemented in three phases. The first phase will last three years (up to March 2013), the second till March 2017, and the third till March 2022. The Government has also approved the implementation of the first phase of the Mission (up to March 2013) and the target to set up 1100 MW grid connected solar plants including 100 MW of rooftop and small solar plants and 200 MW capacity equivalent off-grid solar applications and a 7 million sq. m solar thermal collector area in the first phase of the Mission, till 2012-13.⁴

b. National Mission for Enhanced Energy Efficiency (NMEEF): Current initiatives are expected to yield savings of 10,000 MW by 2012. Building on the Energy Conservation Act 2001, the plan recommends:

1. Mandating specific energy consumption decreases in large energy consuming industries, with a system for companies to trade energy savings certificates;
2. Energy incentives, including reduced taxes on energy efficient appliances; and
3. Financing for public-private partnerships to reduce energy consumption through demand-side management programs in the municipal, buildings and agricultural sectors.

The Ministry of Power and Bureau of Energy Efficiency has been entrusted with the task of preparing the implementation plan for the NMEEF and up scaling the efforts to create and sustain market for energy efficiency to unlock investment of around Rs 74,000 crore. The Mission is likely to achieve about 23 million tons oil equivalent of fuel savings in coal, gas, and petroleum products by 2014-15, along with an expected avoided capacity addition of over 19,000 MW. The carbon dioxide emission reduction is estimated to be 98.55 million tons annually.

adaptation and mitigation of climate change. It will advise government on pro-active measures that can be taken by India to deal with the challenge of climate change. It will also facilitate inter-ministerial coordination and guide policy in relevant areas. See Press Information Bureau , Government of India, Prime Minister office, June 5th 2007, available at <http://www.pib.nic.in/new site /erelease.aspx?relid=28457>

⁴ <http://palakmathur.wordpress.com/2011/06/03/national-action-plan-on-climate-change-napcc/>



- c. National Mission on Sustainable Habitat(NMSH):** To promote energy efficiency as a core component of urban planning, the plan calls for:
1. Extending the existing Energy Conservation Building Code;
 2. A greater emphasis on urban waste management and recycling, including power production from waste;
 3. Strengthening the enforcement of automotive fuel economy standards and using pricing measures to encourage the purchase of efficient vehicles; and incentives for the use of public transportation.
- d. National Water Mission (NWM):** With water scarcity projected to worsen as a result of climate change, the plan sets a goal of a 20% improvement in water use efficiency through pricing and other measures.
- e. National Mission for Sustaining the Himalayan Ecosystem (NMSHE):** The plan aims to conserve biodiversity, forest cover, and other ecological values in the Himalayan region, where glaciers that are a major source of India's water supply are projected to recede as a result of global warming.
- f. National Mission for Sustainable Agriculture (NMSA):** It seeks to address issues regarding 'sustainable agriculture' in the context of risks associated with climate change by devising appropriate adaptation and mitigation strategies for ensuring food security, enhancing livelihood opportunities, and contributing to economic stability at national level. Under this Mission, the adaptation and mitigation measures would be mainstreamed in research and development activities, absorption of improved technology and best practices, creation of physical and financial infrastructure and institutional framework, facilitating access to information and promoting capacity building.
- g. National Mission for a "Green India":** Goals include the afforestation of 6 million hectares of degraded forest lands and expanding forest cover from 23% to 33% of India's territory. National Mission for Sustainable Agriculture: The plan aims to support climate adaptation in agriculture through the development of climate-resilient crops, expansion of weather insurance mechanisms, and agricultural practices.
- h. National Mission on Strategic Knowledge for Climate Change(NMSKCC):** To gain a better understanding of climate science, impacts and challenges, the plan envisions a new Climate Science Research Fund, improved climate modeling, and increased international collaboration. It also encourages private sector initiatives to develop adaptation and mitigation technologies through venture capital funds.

Other Programs: The NAPCC also describes other ongoing initiatives, including:

Power Generation: The government is mandating the retirement of inefficient coal-fired power plants and supporting the research and development of IGCC and supercritical technologies.

- a. **Renewable Energy:** Under the Electricity Act 2003 and the National Tariff Policy 2006, the central and the state electricity regulatory commissions must purchase a certain percentage of grid-based power from renewable sources.
- b. **Energy Efficiency:** Under the Energy Conservation Act 2001, large energy consuming industries are required to undertake energy audits and an energy labeling program for appliances has been introduced. Pew Center on Global Climate Change Implementation.

Ministries with lead responsibility for each of the missions are directed to develop objectives, implementation strategies, timelines, and monitoring and evaluation criteria, to be submitted to the Prime Minister's Council on Climate Change. The Council will also be responsible for periodically reviewing and reporting on each mission's progress. To be able to quantify progress, appropriate indicators and methodologies will be developed to assess both avoided emissions and adaptation benefits.⁵ The mission programmes are at advanced stages of preparation and would contribute to advancing the state of knowledge in the various aspects of Climate Change.⁶

The scientific information is required to implement the above mentioned mission programmes. Realizing this truth, the Ministry of Environment and Forest, Government of India has launched an assessment programme in the year 2009.

Indian Network of Climate Change Assessment (INCCA)

It launched on 14th October 2009 and it is a network comprising 127 research institutions. It undertakes research on the science of climate change and its impacts on different sectors of the economy across the various regions of India. Mr. Jairam Ramesh⁷ stated at the launch that we must make the "3 M's" – Measurement, Modelling and Monitoring – the essence of our policy making and we must build indigenous capacity for this. This report is a step in this direction. It is recognition of the need for assessing the implications of Climate Change in India as it coincides with the emergence of the issue of global

⁵ <http://www.c2es.org/docUploads/India%20National%20Action%20Plan%20on%20Climate%20Change-Summary.pdf>

⁶ Indian Network of Climate Change 2007, MOEF, Government of India, May 2010.

⁷ Then the Hon'ble Minister of State (Independent Charge) Environment & Forests, Government of India,



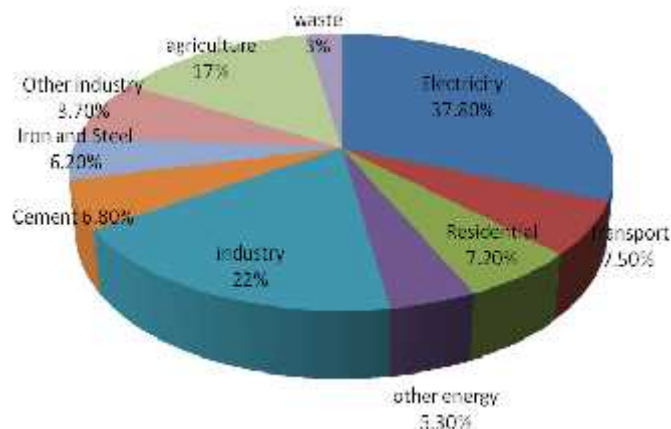
warming in late eighties and early nineties. Globally, the decade of 1990's which saw the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) and the publication of the update on Climate Change 1992 by the Inter Governmental Panel on Climate Change (IPCC) could be taken as the beginning of preparation of the dedicated assessments of climate change. In the Indian context, scientists/ researchers initiated work in their own limited fields. By all means the information was scattered, diffused and fragmented on various aspects of Climate Change. The only source of information on climate was available through India's Meteorology Department (IMD) and the Indian Institute of Tropical Meteorology (IITM) and certain premier institutes such as Indian Institute of Science (IISc) and the Indian Space Research Organization (ISRO) and its associated institutions. For the first time information on Climate Change was consolidated for the preparation of India report of the Asian Development Bank's study on Climate Change in the year 1994. The study was limited to the compilation of literature and certain studies on impacts of Climate Change on Agriculture, Water and Forests besides sea level rise. During this period a nation wide campaign was instituted by MoEF to access the emission of CH₄ from rice paddy cultivation in India. The study had an international impact on the global as well as national emissions of CH₄⁸. The Asian Development Bank conducted a in the year 1998 study known as 'Asia Least Cost Greenhouse Gas Abatement Strategy' (ALGAS) was another important assessment on Greenhouse Gases at the 1990 level. These studies provided the impetus to the work relating to impacts of Climate Change in the country.

INCCA's provides information on India's emissions of Greenhouse gases i.e. Carbon Dioxide (CO₂), Methane (CH₄) and Nitrous Oxide (N₂O) emitted from anthropogenic activities at national level from: Energy; Industry; Agriculture; Waste; and Land Use Land Use Change and Forestry (LULUCF). The net Greenhouse Gases (GHGs) emissions from India that is emissions with LULUCF, in 2007 were 1727.71million tonnes of CO₂ equivalent of which

1. CO₂ emissions were 1221.76 million tonnes;
2. CH₄ emissions were 20.56 million tonnes; and
3. N₂ O emissions were 0.24 million tonnes

energy sector emitted 1100.06 million tonnes of CO₂ eq, of which 719.31 million tonnes of CO₂ eq were emitted from electricity generation and 142.04 million tonnes of CO₂ eq from the transport sector. Industry sector emitted 412.55 million tons of CO₂ eq. LULUCF sector was a net sink. It sequestered 177.03million tonnes of CO₂. India's per capita CO₂ eq emissions including LULUCF were 1.5 tonnes/capita in 2007.⁹

GHG Emissions by Sector in 2007 (India) is Shown in the Pie-Chart



Source: Indian Network of Climate Change Assessment, "India; Greenhouse Gas Emission 2007", MOEF, Government of India, May 2010.

Note

1. CO₂ Equivalent: It is the sum total of all Greenhouse Gases in terms of their global warming potential. In this document the CO₂ equivalent includes the sum of Carbon dioxide, Methane multiplied by its GWP (21) and Nitrous oxide multiplied by its GWP (310).

2. Other Energy: includes GHG emissions from petroleum refining, manufacturing of solid fuel, commercial & institutional sector, agriculture & fisheries and fugitive emissions from mining, transport and storage of coal, oil and natural gas.

⁸ Parashar et al., (1994), "Methane Budget From Paddy Fields In India", *Current Science*, 66: 938-941

⁹ Indian Network of Climate Change Assessment, "India; Greenhouse Gas Emission 2007", MOEF, Government of India, May 2010, p.i.



3. Other Industry: includes GHG emissions from production of glass and ceramics, soda ash, ammonia, nitric acid, carbides, titanium dioxide, methanol, ethyleneoxide, acrylonitrile, carbon black, caprolactam, ferro alloys, aluminium, lead, zinc, copper, pulp and paper, food processing, textile, leather, mining and quarrying, non specific industries and use of lubricants and paraffin wax.

4. Agriculture: includes GHG emissions from livestock, rice cultivation, agricultural soils and burning of crop residue.

5. Waste: includes GHG emissions from municipal solid waste (MSW), industrial and domestic waste water.

6. LULUCF: includes GHG emissions and removals from changes in forest land, crop land, grass land, wet land, settlements and combustion of fuel wood in forests.

Greenhouse Gas Emissions by Sources and Removal by Sinks from India in 2007 (thousand tons)

	CO ₂ Emissions	CO ₂	CH ₄	N ₂ O	CO ₂ Equivalent
Grand total	1497029.2	275358	20564.2	239.31	1727706.1
ENERGY	992836.3		4266.05	56.88	1100056.89
Electricity generation	715829.8		8.14	10.66	719305.34
other energy industries	33787.5		1.72	0.07	33845.32
TRANSPORT	138858		23.47	8.67	142038.57
Road transport	121211		23	6.00	123554
Railways	6109		0.34	2.35	6844.64
Aviation	10122		0.10	0.28	10210.9
Navigation	1416		0.13	0.04	1431.13
RESIDENTIAL	69427		2721.94	36.29	137838.49
COMMERCIAL/	1657		0.18	0.04	1673.18
AGRICULTURE/ FISHERIES	33277		0.2	1.15	33658.7
FUGITIVE EMISSIONS			1509.4		
INDUSTRY	405862.9		14.77	20.56	412546.53
Minerals	130783.95		0.32	0.46	130933.27
Cement Production	129920				129920
Glass and Ceramic production	277.82		0.32	0.46	427.14
Other uses of Soda Ash	586.12				586.12
CHEMICALS	27888.86		11.14	17.33	33496.42
Ammonic Production	10056.43				10056.43
Nitric acid Production				16.05	4975.5
Carbide Production	119.58				119.58
Titanium dioxide Production	88.04				88.04
Methanol Production	266.18		0.91		285.37
Ethylene Production	7072.52		9.43		7270.64
EDC & VCM Production	198.91				198.91
Ethylene Oxide Production	93.64		0.19		97.71
Acrylonitrile Production	37.84		0.01		37.98
Carbon Black Production	1155.52		0.03		1156.07
Caprolactam				1.08	336.22
Other Chemicals	8800.21		0.56	0.2	8873.97
METALS	122371.43		0.95	1.11	122736.91
Iron & Steel Production	116958.37		0.85	1.09	117315.63
Ferroalloys Production	2460.70		0.08		2462.29
Aluminum Production	2728.87		0.01		2729.91
Lead Production	84.13			0.01	86.38
Zinc Production	76.11			0.01	77.99
Copper Production	63.25				64.7
OTHER INDUSTRIES	123969.17		2.37	1.65	124530.44
Pulp and paper	5222.5		0.05	0.08	5248.35
Food processing	27625.53		1.12	0.22	27717.25
Textile and Leather	1861.11		0.03	0.02	1867.94
Mining and quarrying	1460.26		0.06	0.01	1464.62
Non-specific industries	87799.77		1.11	1.32	88232.88
NONENERGY PRODUCT USE	849.49				849.49
Lubricant	776.75				776.75
Paraffin wax	72.75				72.75
AGRICULTURE			13767.8	146.07	334405.5



Electric Fermentation			10099.8		212095.8
Livestock Manure Management			115	0.07	2436.7
Rice Cultivation			3327		69867
soils				140	43400
Burning of Crop residue			226	6	6606
LULUCF	98330	275358			-177028
Forest land		67800			-67800
Cropland		207520			-207520
Grassland	10490				10490
Settlement		38			-38
Fuel Wood use in forests	87840				87840
WASTE			2515.58	15.8	57725.18
Municipal Solid Waste			604.51		12694.71
Domestic Waste Water			861.07	15.8	22980.47
Industrial Waste Water			1050		22050

Source: Indian Network of Climate Change Assessment, Greenhouse Gas Emissions 2007, MOEF, Government of India, 2010.

The 1994 assessment is available in India's Initial National Communication to the UNFCCC. Both the 1994 and 2007 assessments have been prepared using the IPCC guidelines for preparation of national greenhouse gas emissions by sources and removal by sinks. The total GHG emissions without LULUCF have grown from 1251.95 million tons in 1994 to 1904.73 million tons in 2007 at a compounded annual growth rate (CAGR) of 3.3% and with LULUCF the CAGR is 2.9%. Between 1994 and 2007, some of the sectors indicate significant growth in GHG emissions such as cement production (6.0%), electricity generation (5.6%) and transport (4.5%). A comparative analysis of GHG emissions by sector is shown in the following Table.

A Comparison of GHG Emissions by Sector between 1994 and 2007 in Million Tons of CO₂ eq.

	1994	2007	CAGR
Electricity	355.05 (28.4%)	719.30 (37.8%)	5.6
Transport	80.28 (6.4%)	142.04 (7.5%)	4.5
Residential	78.89 (6.3%)	137.84 (7.2%)	4.4
Other Energy	78.93 (6.3%)	100.87 (5.3%)	1.9
Cement	60.87 (4.9%)	129.92 (6.8%)	6.0
Iron & Steel	90.53 (7.2%)	117.32 (6.2%)	2.0
Other Industry	125.41(10.00%)	165.31 (8.7%)	2.2
Agriculture	344.48 (27.6%)	334.41 (17.6%)	-0.2
Waste	23.23 (1.9%)	57.73 (3.0%)	7.3
Total without LULUCF	1251.95	1904.73	3.3
LULUCF	14.29	-177.03	-
Total with LULUCF	1228.54	1727.71	2.9

Source: Indian Network of Climate Change Assessment, Greenhouse Gas Emissions 2007, MOEF, Government of India, 2010.

The need for environment protection cannot be over emphasized¹⁰ and once a state has formally accepted an international environmental obligation, it usually needs to develop, adopt or modify relevant national legislation, or give effect to national policies, programmes or strategies by administrative or other measures.¹¹ It is imperative as laws and machinery is there to enforce the legal norms and law alone cannot be helpful, it needs to be backed by efforts at the administrative as well as public.¹²

The Government of India started to prepare and share information 2004 onwards and strive to stabilize the information management system with existing tools, equipments and technology, even they are in sufficient. It is a good initiation and India need to have more eco friendly activities regional as an effort to mitigate environmental degradation. However, recent CSR notification is recent and more adorable and admirable act on the part of Government. It is required time to assess its impacts on environmental aspects.

¹⁰ Ahmad, Furqan(2009), *Legal Regulation of Hazardous substances*, Delhi: Daya Publishing House, p.255.

¹¹ Sands Philippe(2012), *Principles of International Environmental Law*, UK: Cambridge University Press, p.138.

¹² Ahmad , note10, p.255.