




# Missing the Community for the Woods

## Forests, Communities and Climate change In India

### A Climate Education Booklet

		
<p>Indian Network on Ethics and Climate Change (INECC). <a href="http://www.inecc.net">www.inecc.net</a></p>	<p>Centre for Education and Documentation (CED)  <a href="http://www.doccentre.net">www.doccentre.net</a></p>	<p>Orissa Development Action Forum (ODAF)  <a href="http://www.odafforum.org">www.odafforum.org</a></p>

# **Missing the Community for the Woods: Forests, Communities and Climate change In India**

A Climate Education Booklet  
For INECC (Indian Network for Ethics in Climate Change)  
By Centre for Education & Documentation

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## Preface

Tropical forests cover about 15% of the land surface<sup>1</sup>. But they are being rapidly degraded and deforested. Roughly 13 million hectares are converted to other land uses each year. Since forest store a large amount of carbon ( that is about 25% of carbon in the terrestrial biosphere.), this level of deforestation results in nearly 20% of global carbon emissions, making deforestation the second largest contributor to global warming. Thus preserving and growing forests plays a vital role in any initiative to combat climate change.

Further, forests are home to nearly 90% of the world's terrestrial biodiversity. Forest resources also directly support the survival and livelihoods of 90% of the 1.2 billion people. The forest communities depend on forests as a source of fuel, food, medicines and shelter. The loss of forests thus jeopardises poverty alleviation. Further the resultant climate change will exacerbate their situation making them the hardest hit.

Conversely, reducing deforestation, protecting forests, and rejuvenating them, will help forest communities build their resilience to climate impacts. Indigenous (Adivasi) and forest-dependent peoples are natural stewards of their forests and they protect it as their lives depends on it. Thus it is these communities which provide the rest of humanity with vital ecosystem services (ES).

At local to global scales, forests provide essential ecosystem services beyond carbon storage – such as watershed protection, water flow regulation, nutrient recycling, rainfall generation and disease regulation. Old growth forests also soak up carbon dioxide from the atmosphere – offsetting human induced emissions. Protecting tropical forests has a double-cooling effect, by reducing carbon emissions and maintaining high levels of evaporation from the canopy.

### **Causes of Deforestation**

The causes of deforestation are multiple and complex. These vary from country to country. Since forests are the source of livelihood, when natural & traditional regeneration cycles are disturbed, survival needs further disrupt the cycles, leading to de-generation. Further, poverty and population pressure drives more people to seek survival from the forest, either for food, fuel or for additional farmland.

The drivers of the demand for agricultural land vary globally. Whilst millions of people still cut down trees to make a living for their families, a major cause of deforestation is now large-scale agriculture. In Africa, it is primarily small-scale subsistence farming. In South America, it is large-scale farming enterprises, producing beef and soy for export markets. In South East Asia, the driver is somewhere between the two, with palm oil, coffee and timber the main products. In India, it is dams, mining and development projects. In recent decades deforestation has shifted from a largely state-initiated process to an enterprise-driven one.

Meanwhile, tropical forests are now being put at the centre of emerging international efforts to contain and prevent further changes in the climate. A set of proposals titled Reducing Emissions from Deforestation and Forest Degradation (REDD) were put together at the Cancun Conference in December 2010. Activists fear that the proposals will push the forests further into the hands of private enterprise, and alienate local communities from their natural survival options.

Security is being shifted from a nature dependent system to a market/cash based system.

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<sup>i</sup> [www.globalcanopy.org](http://www.globalcanopy.org); a good source of information of forests eco-system services.





# I Basics of Climate Change



## What is Climate Change ?

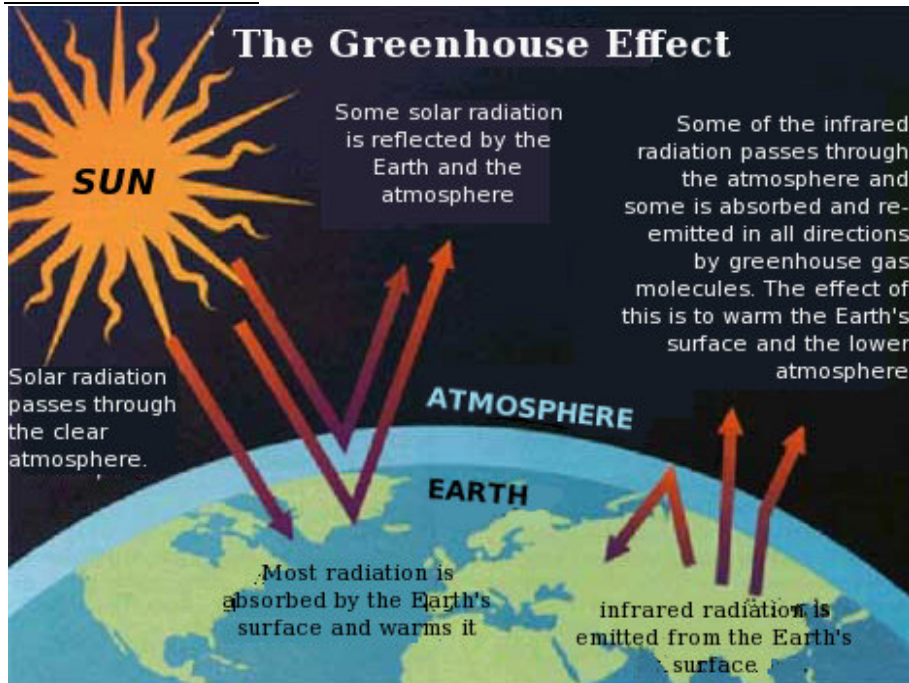
Climate Change refers to long term changes in global and regional climates. It is about changes in the climate system as a whole which affect the average pattern and intensity of climate phenomenon. It does not refer to day to day changes in the weather.

These days however whenever we talk about climate change, we are referring to one type of climate change namely Global Warming.

### Global Warming

Global Warming refers to climate change where there is an increase in temperature, over and above the normal temperature cycles. It specifically refers to increases in earth temperature caused by the increase in Green House Gases(GHGs) in the atmosphere. This increase is largely due to human activities, particularly after the industrial revolution..

### Green House Effect



The Sun and the intensity of its light and heat is the most important driver of climate. The heat of the sun which comes to the earth is in the form of short wave energy while the heat that goes back from the earth is in the form of longer wave energy. The energy retained in the earth's atmosphere is dependent on the composition of gases in the atmosphere.

The Atmosphere: Two elements, Nitrogen ( $N_2$ ) and Oxygen ( $O_2$ ), make up almost 99% of the volume of clean, dry air. The other gases make up the remaining one percent. Some of these gases, namely  $CO_2$ ,  $CH_4$ ,  $N_2O$  etc contribute to the warming of our planet. They are referred to as Greenhouse Gases (GHG).

These GHGs act like a giant net around the earth, which allows short wave energy to pass through it, but stops the returning long wave energy. If the amount of these gases in the atmosphere increases, the net is thicker – It allows less heat to escape the earth compared to that which enters the earth. Therefore the earth becomes hotter.

Actually, in proper proportions these gases enable the earth to maintain a temperature which supports life, as we know it. If these gases were totally absent in the atmosphere, the earth would have been around  $30^\circ C$  colder ( which means ice like temperatures).



(A Green House at ATREE Butterfly Museum, Bannerghatta, Bangalore)

## Why Global warming?

The most important greenhouse gas is water vapour (making up for about 60% of the greenhouse effect). We assume that global water vapour content did not change a lot during the last few centuries. And therefore even though largest in quantity, water vapour is not considered responsible for the additional warming (radiative forcing) that we experience today.

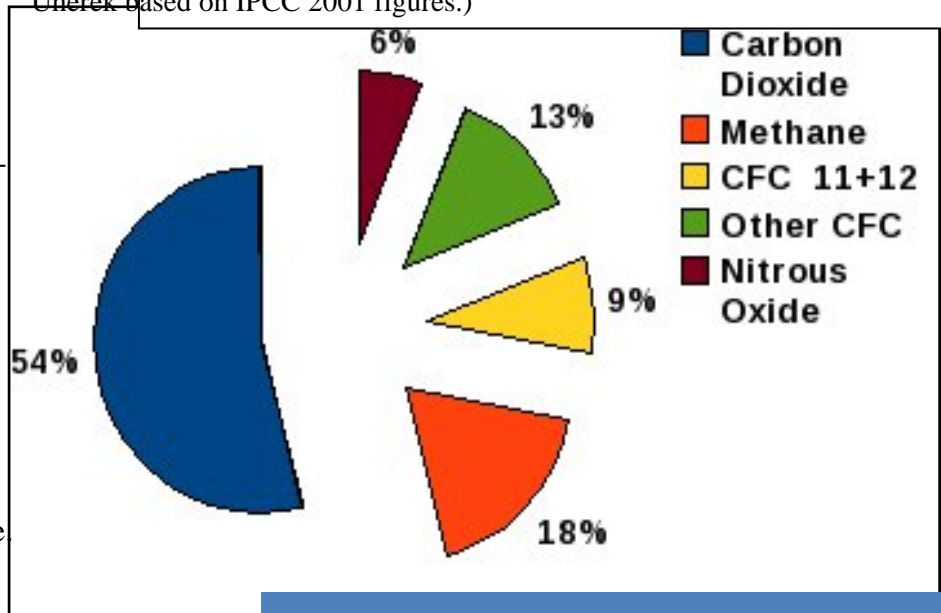
The concentration of carbon dioxide, the second important greenhouse gas, however, has increased about 30 percent, from a pre-industrial level of about 270 parts per million to a current level of 384 parts per million.

Burning of oil & coal produces CO<sub>2</sub> which is released into the atmosphere. This takes place in all our factories, cars, planes etc.

When we use electricity, we don't see the emission of CO<sub>2</sub>, but CO<sub>2</sub> is produced in the power plants creating this electricity.

Since 1901, the Earth has warmed over 0.7°C. An average temperature increase of 0.1°C per decade is already underway. This increase in temperature will start a

Relative contributions (in %) of each of the man made GHGs to radiative forcing between 1750 (preindustrial time) and 2000. Diagram: Elmar Uherek based on IPCC 2001 figures.)



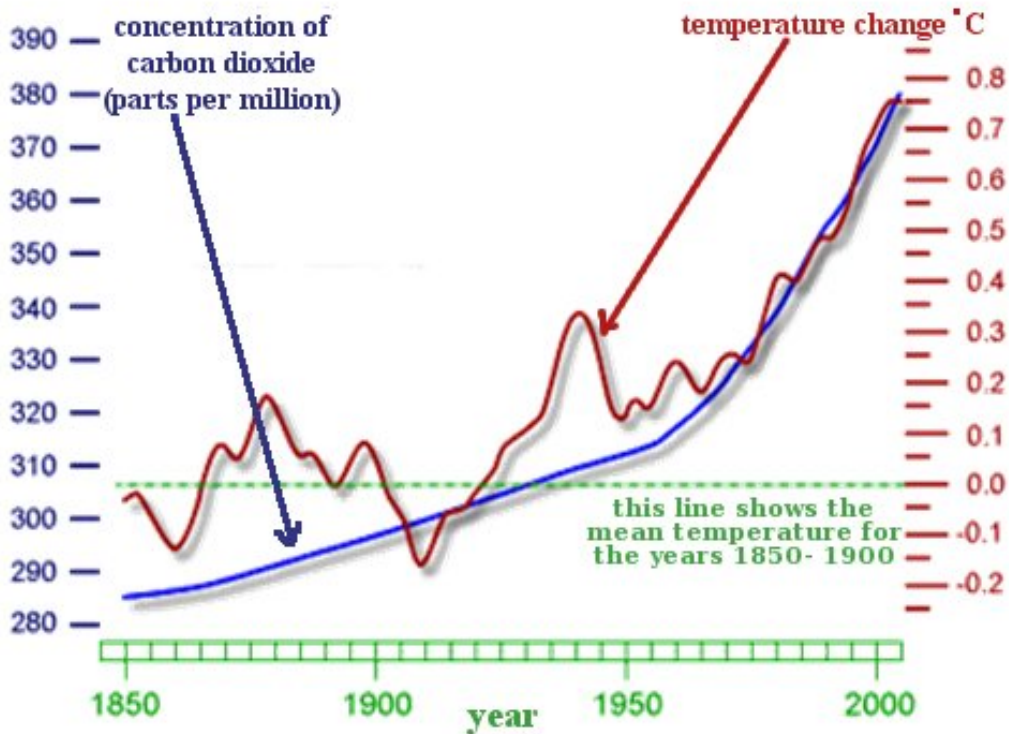
Major GHGs: carbon dioxide, methane, nitrous oxide, sulphur hexafluoride), and two groups of gases - hydrofluorocarbons and perfluorocarbons.

Now all gases do not have the same "netting" or "blocking power", for example methane the gas which smells when our cows pass wind, is 21 times more problematic than CO<sub>2</sub>.

CFCs, a gas used for refrigeration and air conditioning is another important GHG. CFC issue came into prominence when scientist showed how the ozone layer which filtered the UV rays from the Sun, started getting holes. Technology came up with a solution, hyper CFCs, which may be neutral to the ozone layer, but is still a GHG.

vicious circle of less availability of water, increased water salinity, more soil salination, less cultivable land and less crop productivity, resulting in increase in concentration of atmospheric CO<sub>2</sub>, and in turn further increase in atmospheric temperature. If the consumption of fossil fuels such as coal and oil continues into the next century at projected rates, the carbon dioxide concentrations in the atmosphere would reach the 600-700 parts per million by 2100. The average global temperatures are likely to increase further by 1 to 6.40 °C by 2100.

### Global Temperature increase since 1890(°C)



### Impacts of Climate Change

The latest high resolution modeling of the scenarios of and projections for climate change in India, shows:

- An annual mean surface temperature rise by the end of century, ranging from 3 to 5°C to 2.5 to 4°C, with warming more pronounced in the northern parts of India.
- A 20% rise in all India summer monsoon rainfall and further rise in rainfall is projected over all states except Punjab, Rajasthan and Tamil Nadu, which show a slight decrease.

Climate Change has a chain of impacts on this planet. Jeffrey Sachs of the Earth Institute warns that four types of geographies will share the largest burden of climate change crisis. They are

- a) the low-lying coastal settlements,
- b) farm regions dependent on river water from glacier and snow melt,
- c) sub-humid and arid regions that suffer from drought, and
- d) regions of Southeast Asia facing changes in monsoon patterns.

Most of India falls into one of these four zones.

- We have a coastline of over 8118 km and touches eight states and two island territories. It is about 5700 kms on mainland and about 1800 kms in the two groups of islands which are most vulnerable
- We have the entire Indo-Gangetic Plains, which rely of the river-waters fed by the Himalayan glaciers,
- We have a large arid regions in the Deccan Plateau, and Rajasthan and finally
- Most of Peninsula India which is affected by both the south-west and the north east monsoon, are vulnerable to changes in the monsoon patterns.

### **Extreme weather**

Most of the potentially damaging consequences relating to climate change are being associated with extremes - heat waves, floods, or severe storms. Extremes in maximum and minimum temperatures are also expected to increase and similarly extreme precipitation also shows substantial increases, particularly over the West Coast of India and west central India.

As a result of global warming; oceans have become warmer, and humidity and water vapor have increased 4% since 1970. This has increased tropical storm activity.

As the planet gets warmer, more evaporation could take place leading to heavy rain and increase in frequency and intensity of floods.

This could have a catastrophic impact at several places especially in countries such as Bangladesh where more than 17 million people live at an elevation of less than 3 ft. above sea level, and millions more inhabit the flat banks of the Ganges and Brahmaputra Rivers.

However evaporation and precipitation occur at different places, and if the planet warms, while wet regions could receive even more rainfall, evaporation may be accelerated in drier regions and they could face acute water shortages. This, in turn, will accelerate desertification and give rise to acute water supply shortages.

### **Shrinking water resources**

Water quality degradation will be a major cause of water scarcity.

Warming accelerates the rate of land surface drying, leaving less water moving in near-surface layers of soil. Less soil moisture leads to reduced downward movement of water and so, less replenishment of groundwater supplies.

Areas in mid latitudes and mountainous regions depend upon glacial runoff to replenish river systems and groundwater supplies.

These areas will become increasingly susceptible to water shortages with time, because increased temperatures will initially result in a rapid rise in glacial melt water during the summer months that will be followed by a decrease in melt as the size of the glacier continues to shrink.

This reduction in glacial runoff water is projected to affect approximately 1/6 of the world's population by the IPCC.

### **Rise in sea-level**

Sea-level rise will not only extend areas of salinity, but will also decrease freshwater availability in coastal areas.

Many islands are gradually facing the loss of their fresh water supply due to salt-water intrusion. At least 300 million people live in low-lying coastal areas and deltas and they are particularly threatened by sea level rise



. It could accelerate coastal erosion and force the relocation of communities and infrastructures.

The average sea level rose by 10 to 20 cm during the 20th century, and an additional increase of 18 to 59 cm is expected by the year 2100. Higher temperatures can cause the ocean volume to expand and glaciers to melt thereby causing the water to overflow onto the heavily populated coastlines of countries like Bangladesh and drown islands like Maldives.

Simulation models show an increase in frequencies of tropical cyclones in the Bay of Bengal; particularly intense events are projected during the post-monsoon period. Sea level rise is projected to displace populations in coastal zones, increase flooding in low-lying coastal areas, loss of crop yields from inundation and salinization.

### **Ecosystem changes**

Ecosystems provide fundamental life-support services. Human civilization depends directly or indirectly on the products and services provided by ecosystems. These include crops, livestock, fish, wood, clean water, oxygen, wildlife, pollination, erosion prevention, nutrient cycles, climate moderation and detoxification of natural substances.

Climate change has the potential to alter ecosystems and impact on the many resources and services they provide to each other and to society. It could benefit certain plant or insect species by increasing their ranges. The resulting impacts on ecosystems and humans, however, could be positive or negative depending on whether these species were invasive (e.g. weeds or mosquitoes) or if they were valuable to humans (e.g. food crops or pollinating insects). Most of the world's endangered species (some 25 per cent of mammals and 12 per cent of birds) may become extinct over the next few decades.

**Forests:** -Climate impact assessments for the year 2085 show 77% and 68% of the forested grids in India are likely to experience shift in forest types under A2 and B2 scenario ( see notes for explanation of scenarios), respectively.



Indications show a shift towards wetter forest types in the northeastern region and drier forest types in the northwestern region in the absence of human influence. Increasing atmospheric CO<sub>2</sub> concentration and climate warming could also result in a doubling of net primary productivity under the A2 scenario and nearly 70% increase under the B2 scenario.



**e) Health**

Climate change can have both direct and indirect human health impacts. WHO has estimated that the increase of temperature by *10 F* in the quarter of the 20th century, was responsible for the annual loss of about 160,000 lives and the loss of 5.5 million years of healthy life by 2000. The toll is expected to double to about 300,000 lives and 11 million years of healthy life by 2020. The exacerbated air pollution levels, and heat waves directly contribute to deaths from cardiovascular and respiratory diseases, especially among the elderly people.

Vector-borne diseases such as Schistosomiasis, Chagas disease, Sleeping sickness, River blindness, and various strains of encephalitis all could change their ranges and patterns of infection in the course of climate change.



Malaria is likely to persist in many states and new regions may become malaria-prone and the duration of the malaria transmission windows is likely to widen in northern and western states and shorten in southern states.

Indirect impacts arise from changes in temperature patterns, which may disturb natural ecosystems and cause large-scale reorganization of plant and

animal communities. Probably the impact of climate change on water availability is likely to be one of the most significant for the health of populations.

Rising temperatures, changing patterns of rainfall, and more frequent droughts and floods are projected to decrease crop yields in many developing countries causing shortages of food supplies. This could result in severe malnutrition, especially among children, in countries where large populations depend on rain-fed farming at subsistence level.

### **Agriculture and food security**

Temperature-induced range changes may push populations into new areas for which they are otherwise poorly adapted. It may render local cultures, economies, and infrastructure (that had been uniquely shaped around specific food resources), obsolete. The range, migration habits, and life cycles of pollinators and plants, pests and their prey, and wild food stocks and their predators, will all be affected.



In general agricultural producers will face less stress from extreme cold events and freezes but higher stress from more frequent and more intense heat waves. Such events can damage crops, kill or stress livestock, and

disrupt or destroy both natural resources and necessary infrastructure. Parasites, diseases, fungi and other pests will thrive and spread faster in warmer and more humid climates. Due to sea level rise, agricultural areas, such as low-lying river deltas and brackish estuaries will be increasingly susceptible to saltwater intrusion.

The oceans are absorbing excess amounts of carbon dioxide making the environment acidic which is unsuitable for sea life. Higher concentrations of atmospheric carbon dioxide allow plants to grow faster and larger. Farmers may have to use more herbicides. Due to CO<sub>2</sub>, sometimes plants may speed through the growth phase in which they generate their harvestable grains, fruits or vegetable matter. As a result the harvest may be diminished and less nutritious.

The simulation studies based on experimental work, which predict that increase in CO<sub>2</sub> concentration to 550 ppm would increase the yield of rice, wheat, legumes and oil seeds by 10-20 per cent. While 10°C increase in temperature may reduce the yield of wheat, soybean, mustard, groundnut and potato by 3-10 per cent. Initially, the productivity of most crops will decrease marginally by 2010. However, if the trend of climatic changes continued at the same pace, the losses will be 10-40 per cent by 2100<sup>1</sup>. (Dr Pathak at Indian Science Congress)

### **Shelter**

Human-induced climate change threatens to create an unmanageable environmental refugee crisis during this century. Most in danger are people in the developing world who have the least ability to adapt to climatic variability. Many scholars and activists working on this issue are pushing for international legal recognition of environmental refugees.

The Intergovernmental Panel on Climate Change (IPCC) estimates that there will be 150 million environmental refugees by 2050. The Institute for Environment and Human Security, affiliated with United Nations University, estimated the number of environmental refugees at 20 million in 2005 and predicted the number could be 50 million as early as 2010.

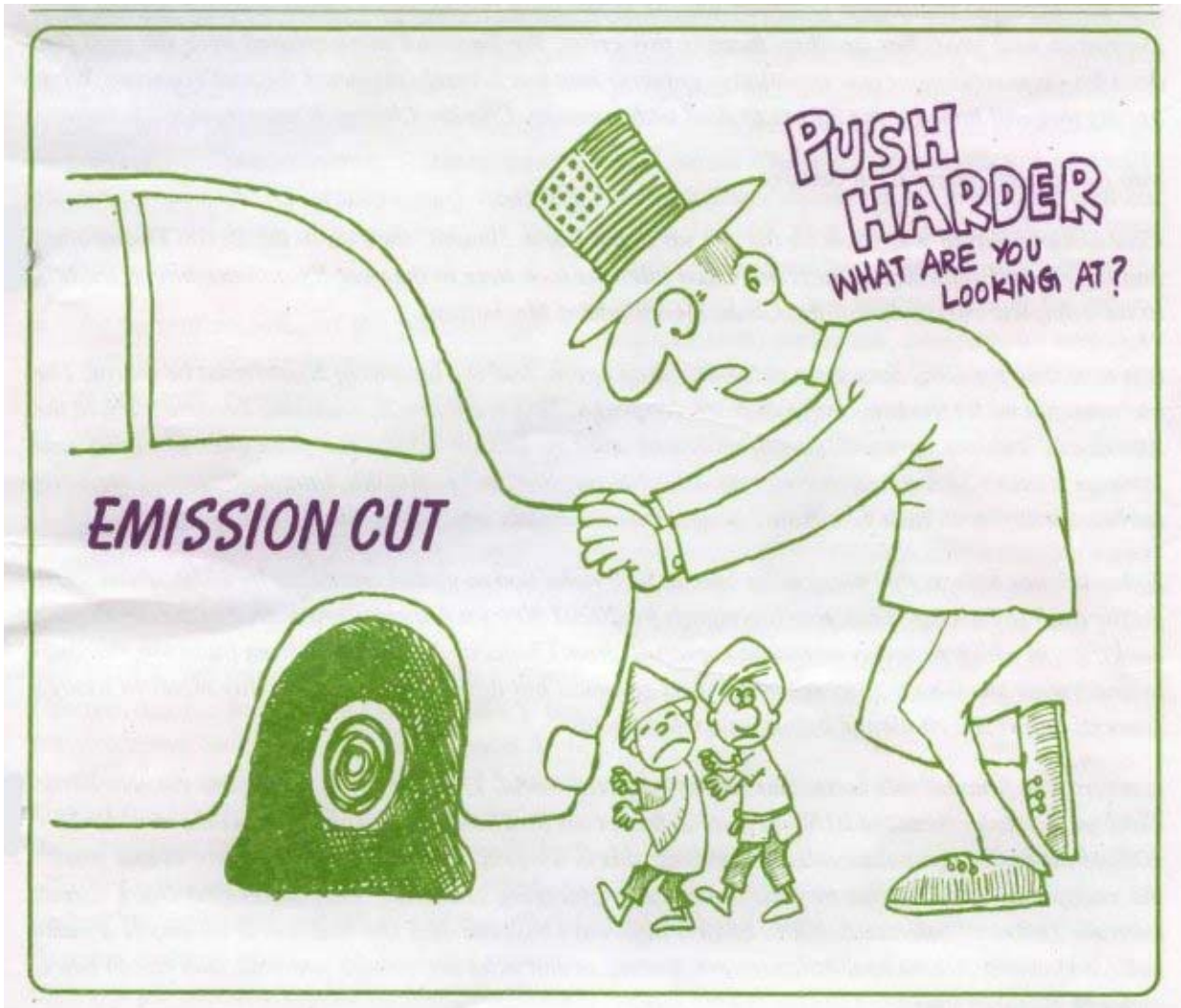
More Reading

<http://climatedigitallibrary.org/>

<http://climateasiapacific.org/>

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<sup>i</sup> Dr H Pathak, Environmental Scientist from the Indian Agricultural Research Institute, New Delhi while delivering the 'Professor S K Mukherjee Commemoration Lecture' at the 98th Indian Science Congress.



II

## Politics of Climate Change

What is the world doing about climate change?

Since the 1960s and 70s, Climatologists and Environmentalist had evidence of increase in concentrations of carbon dioxide in the atmosphere. However it took years before the international community responded to their call for action. In 1988, an Intergovernmental Panel on Climate Change (IPCC) was created by the World Meteorological Organization and the United Nations Environment Programme (UNEP) .

IPCC's first assessment report in 1990, pointed out that there was a real risk for humanity - "The earth's future is in danger" was the message. This spurred the international community to create the United Nations Framework Convention on Climate Change (UNFCCC) at the Rio Earth Summit of UNCED in June 1992. It was agreed to have a framework under which the world would aim at stabilizing greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human induced interference with the climate system. The conference of parties to the framework (COP) was to meet every year to evolve strategies to combat Climate Change.



However, it was not until 1997 at the 3rd COP in Kyoto, that a protocol ( The Kyoto Protocol) was established with legally binding commitments for the reduction of greenhouse gases industrialised countries. To enable the developed countries meet its commitment, it established three "flexible mechanisms", which allow developed countries to adjust its emissions activities. The most important of these is the Clean Development Mechanism (CDM).

CDM was supposed to provide an opportunity for developing countries to access modern technology for reducing emissions and receive financial incentives to overcome the barriers.

The logic was that developing countries who did not have legally binding emission reductions, would have financial incentives to develop



GHG emission reduction projects. This was supposed to be the sustainable development.

In reality it dis-incentivised highly polluting industry or luxury consumption, from finding climate friendly solutions (alternative paths to fossil fuel based growth), by providing a cheaper route to continue “business as usual”.

All in all the treaty established the principle of “common but differentiated” responsibility. By January 2009, 183 countries have ratified the Kyoto Protocol. The notable non-signers were US and Australia. In the protocol, there were several details that were not fully agreed to.

In its Fourth Assessment Report (AR4), the IPCC suggested a time frame and GHG reduction targets that would give the world a reasonable chance to keep warming to 2 degrees C over pre-industrial levels. The general consensus was that Annex 1 countries would have to reduce GHG emissions ranging from 25% to 40% below 1990 levels by 2020, This was coupled with an overall assessment that world emissions should peak by 2015, and GHG emissions should reduce to 50% below 1990 levels by 2050. For this, the developed countries need to reduce emissions by 80% or more below their 1990 levels.

Since no meaningful commitments to this end was forthcoming, negotiators at Bali (COP13) in 2007 evolved a two-track process :

- ***The Convention (UNFCCC) Track ( now known more as the Long term Cooperation Track(LCA) )*** , which would focus on four building blocks: adaptation, mitigation, technology transfer & deployment, and financing, and
- ***The Kyoto Protocol Track***, which would deal with the agreed emission reduction targets that was to be set in 2009, and the means including market mechanisms, to achieve these targets.

This was a compromise, which negotiators hoped would enable progress on some fronts like reducing emissions from deforestation and forest degradation (REDD); mitigation action from developing countries; and mitigation commitments from developed countries. On the Kyoto protocol track there was not much headway, and in December 2009 at Copenhagen (COP 15) the Kyoto track reach a dead end as the biggest emitter, the US was unwilling, along with other major developed countries to take the deep emission cuts needed. There was an impasse.

At this juncture, President Obama put this back door proposal before the BRIC (Brazil, Russia, India, China – emerging countries) countries. He proposed that 1) Industrialised countries to put on the table what emission reduction target they are willing or ‘able’ to do and 2) Developing countries must list their specific mitigation action and subject these to verification. Thus emerged the **Copenhagen Accord**, which was not accepted by many countries and therefore only “taken note of” by the COP. However, by March 2010, more than 110 nations including India, China and the US submitted their commitments indicating their acceptance of the Copenhagen Accord. Recent Wikileaks of cables indicated that many countries were coaxed with incentives to join in.

**The Cancun conference in December 2010** then more or less laid the basis for the burial of the Kyoto Protocol. The per-capita based as well as historic emission based equity principle seems to have been blunted. What emerged is a set of commitments, which are subject to verification, but fall much short of required commitments. Funding was the carrot used particularly to get the small island states in line. Even so, no clear commitment or modality for any financial incentives were disclosed. The powers that be seem to expect further negotiations and incentives to get developing countries to raise their commitments, to make up the gap between current commitments and to desired levels.

**REDD** - Reducing emissions from deforestation and degradation . It is concerned primarily with deforestation and financial compensation for it.

**REDD Plus** - includes measures to reduce emission through, conservation, sustainable management of forests and enhancement of forest carbon stocks. India is one of the countries that pushed for REDD Plus

One of the measures that emerged was a set of proposals called the Reducing Emissions from Deforestation and Forest Degradation (REDD). This development has important implications for forests in general and forest communities in particular.

Basically the Cancun decision and outcomes ( about 20 odd ) has given more prominence to the "Long Term Cooperative Action track". The attempt seems to be that the elements of Climate Mitigation and Adaptation in the Kyoto track is made redundant by getting both Annexe 1 and non Annexe 1 countries (through NAMAS - Nationally Appropriate Mitigation Actions) to commit to emission cuts, and have them externally verified. The only difference would be that non-Annexe1 countries would get international financial and technological support for their efforts. Corporates in India especially seem to welcome this as they see in it an opportunity to broaden the scope of CDM like mechanisms.



It is likely that individual polluters in developing countries would press for them to purchase CERs from within their countries, as well as from other lesser developed countries. Corporate in the developed countries would however try to retain their comparative advantage using finance capital and technology. Thus while there is the carrot of 100 billion dollars, there is no indication of the sources of such money and the conditions that would be attached to such finance.

## The Indian Response to Climate Change

At the international level, India has stood firm on the per-capita-based equity principle. At the time of Kyoto (1997), India had a low per capita emission rate barely 0.8 tce (tonnes of coal equivalent). Being an emerging country, by 2005, the total emissions took it to 5th highest in the world, though per capita emissions remained low – 1.2 tce. Thus it was labeled by the international media as “dangerous emitters”, likely to become even more dangerous in the future. The Northern countries started putting pressure on countries like India to consider mitigation actions to ‘build trust’ with Annexe 1 countries.

Perhaps, as a counter to all these pressures, in June 2008, India pulled out the proverbial rabbit out of the bag in the form of the **National Action Plan on Climate Change**, the stated principles of which were:

- Protecting the poor and vulnerable sections of society through an inclusive and sustainable development strategy, sensitive to climate change.
- National growth objectives through a qualitative change in direction
- Efficient and cost-effective strategies for end use Demand Side Mgmt.
- Deploying appropriate technologies for adaptation & mitigation
- Engineering new forms of market, regulatory and voluntary mechanisms to promote sustainable development.
- Creating unique linkages, including with civil society and local government institutions and through public-private-partnership.
- Welcoming international cooperation for research, development, sharing and transfer of technologies

This is to be achieved through 8 national missions: on 1. Solar energy; 2. Enhanced Efficiency; 3. Sustainable Habitat; 4. Water Mission; 5. Sustaining the Himalayan Ecosystem; 6. Green India; 7. Sustainable Agriculture and 8. Strategic Knowledge for Climate Change

In the last 3 years, India has fleshed out some of its missions:

**The Jawaharlal Nehru National Solar Mission** envisages implementation in three stages leading up to an installed capacity of 20,000 MW by the end of the 13th Five Year Plan in 2022, with 1,100 MW of solar power through the electricity grid and 200 MW off the grid, in its first phase; and a ‘focussed R&D programme.’ At the launch of the mission, the PM called for creation of ‘solar valleys’ on the lines of the Silicon Valley!

**The National Water Mission** has five goals:

- Comprehensive water database in public domain by 2011 and assessment of impact of climate change on water resources by 2012.
- Promote citizen and state action for water conservation, augmentation and preservation – includes expeditious implementation of irrigation projects, minor irrigation schemes, groundwater development, mapping flood-affected areas, capacity-building and awareness
- Focused attention on over-exploited areas – intensive rainwater harvesting and groundwater recharge programmes, pursuing enactment of groundwater regulation and management bill
- Increasing water use efficiency by 20 percent – both on the demand side and the supply side, particularly in the agriculture and commercial sectors. Guidelines for incentivizing recycled water, water neutral and water-positive technologies, improving efficiency of urban water supply systems, benchmark studies for urban water use, water efficiency indices for urban areas, manuals for mandatory water audits in drinking water, irrigation and urban systems, promoting water-efficient techniques including sprinkler and drip irrigation systems
- Promote basin-level integrated water resources management – basin-level management strategies, review of National Water Policy in order to ensure integrated water resources management, appropriate entitlement and appropriate pricing. (Review of State Water Policy and review and adoption of a National Water Policy by March 2013. T. N. Narasimhan, <http://www.thehindu.com/2010/06/08/stories/2010060856501100.htm>)

**The National Mission for Enhanced Energy Efficiency** is expected to save 23 million tonne oil equivalent of fuel and avoid the need to build additional capacity of over 19,000MW, leading to greenhouse gas emissions reduction of 98.55 million tonnes per year, and will add towards the country's target of reducing its emission intensity by 20-25% below 2005 levels.

Finally, we have the **Green India Mission**: enhancing carbon sinks in sustainably managed forests and other ecosystems, adaptation of vulnerable

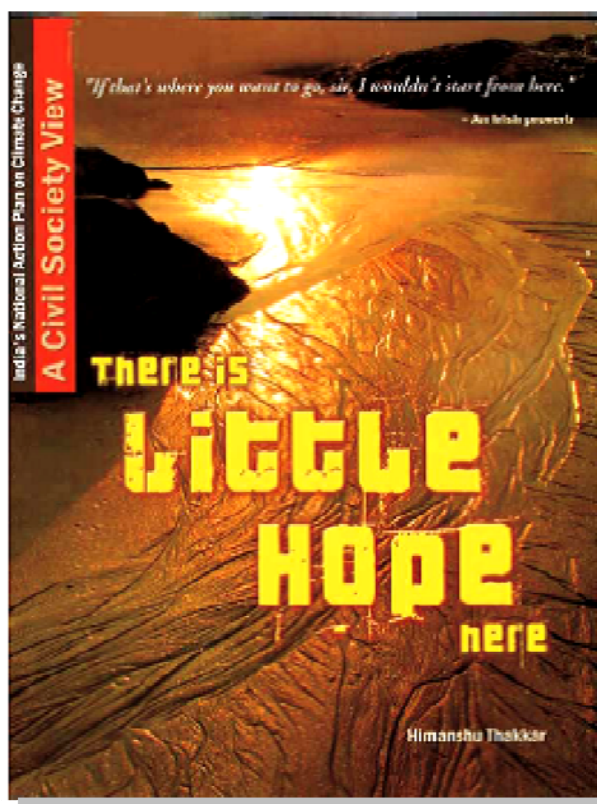
species & ecosystems to the changing climate, and adaptation of forest-dependant local communities in the face of climatic variability. Its goals include the afforestation of 6 million hectares of degraded forest lands and expanding our forest cover from 23% to 33% of the country's geographic area.

The Corporate Sector has generally welcomed the Plan. One of the key initiatives was the Corporate Action Plan on Climate Change, a white paper by TERI-BCSD India in February 2009, which has come out with its own ideas on the Challenges Ahead, and the Way Forward for each of the Missions. BCSD - Business Council for Sustainable Development has followed this through with key initiatives on different missions with various corporate and consultancy bodies.

All these take forward the market based ideas of the NAPCC.

### **Civil Society critique of the NAPCC**

- Civil Society has criticised the secretive, exclusive process that excluded the majority of the country from having a voice in its conception, process and planning. NGOs feel that whilst the NAPCC preamble has lofty principles, its proposals are mostly business as usual.
- Further the NAPCC ignores the key issues of equity within India, and resorts to the market mechanisms such as the CDM, which only increases inequity. Much of what the government claims as adaptation is merely a repackaging of existing programmes.
- There is a dangerous advocacy of large dams as part of the National Water Mission. Whilst the Water Mission makes the necessary obeisance to localized water harvesting, it still focuses on large storage and major hydro projects, and capital intensive technologies for centralised water



distribution. Groundwater, the mainstay of the harvesting system for domestic and irrigation use, receives very little attention. There is very little radical thinking on urban and industrial use.

- The National Solar Mission is an ambitious mission. There are some issues relating to the regime of incentives and subsidies. The plan however seems to ignore the potential of Solar and other renewable as a means of decentralised generation and use of energy, particularly in villages that have no electricity. India's persistent moves to go in for nuclear power, as a 'clean power' as compared to fossil fueled power, comes in for universal criticism among civil society critics across the country.
- There is lip-service paid to small farmers and their dryland farming technology, the focus on solutions seems to be on bio-technology; with little or no learning from the green revolution that has led India up the unsustainable fossil-fueled based path to agricultural 'development'.

Civil Society maintains that the decades of involvement at the grassroots on issues relating to food production and distribution, watershed management and forest development and protection is finally being validated by the need for a low carbon path to equitable and sustainable development. The models and results are there for all to see; there is very little evidence of such awareness, understanding and acceptance in any of the missions.

The NAPCC focuses largely on mitigation, and leaves very little space for adaptation to changes that are already taking place, and affecting small farmers, traditional fisher folk, and forest-based communities. Its economic focus belies the basis in equity and 'inclusive and sustainable development strategy, sensitive to climate change' that is amongst the first statements of principles of the Plan: By putting the economy ahead of the environment, the NAPCC inevitably is full of prescriptions lack scientific rigour, and the proposed actions are incoherent and at times paradoxical, considering the government's ideas of economic development. The various positive suggestions in the report are not accompanied by identifying any current economic policies and actions that may need to be done away with, which may be harmful to climate. (Missing the mountain for the snow, Sudhirendar Sharma , INDIA TOGETHER, 24 Jul 2008)

We need to democratize the debate and action on climate change – in intent, process and implementation. A National Action Plan needs a debate on the larger vision of a low-carbon path to development, development that is inclusive, and provides for inter-generational ecological equilibrium and balance.

The Govt of India's Green India Mission suggests:

- Training on silvicultural practices for fast-growing and climate-hardy tree species
- Reducing fragmentation of forests by provision of corridors for species migration, both fauna and flora
- Enhancing public and private investments for raising plantations for enhancing the cover and the density of forests
- Revitalizing and upscaling community-based initiatives such as Joint Forest Management and Van Panchayat committees for forest management
- Formulation of forest fire management strategies
- In-situ and ex-situ conservation of genetic resources, especially of threatened flora and fauna
- Creation of biodiversity registers (at national, district, and local levels) for documenting genetic diversity and the associated traditional knowledge
- Effective implementation of the Protected Area System under the Wildlife Conservation Act and National Biodiversity Conservation Act 2001<sup>i</sup>

However, the Government is yet to come up with a final design for this mission.<sup>ii</sup>

Ashish Kothari, commenting on the GIM says that one of the biggest weaknesses is the complete absence of a strategy to prevent the loss of standing forests. While the MoEF formulates greening programmes, the Government of India is busy de-greening India. Between 1999 and 2007, about 50,000 ha of forest land, some of it with good standing forests, was diverted annually to non-forest use. If the ultimate objective of any green India mission is to help counteract climate change and its impact, surely it is important to conserve what still exists while also regenerating what has been degraded

The GIM's second major weakness could be governance, given the fact that mostly JFM is dominated by bureaucracy and particularly the lack of coherence between different Departments of Forests, Tribal/Social Welfare, and Rural Development.<sup>iii</sup>

### **From Copenhagen to Cancun**

In the Copenhagen Accord that India and other countries agreed upon in Copenhagen, repeated references are made to a scheme called "REDD plus". Paragraph 6 of the Accord recognised..."

*“the crucial role of reducing emission from deforestation and forest degradation and the need to enhance removals of greenhouse gas emission by forests”*

*and agreed*

*“on the need to provide positive incentives to such actions through the immediate establishment of a mechanism including REDD plus, to enable the mobilization of financial resources from developed countries.”*

As per its earlier submissions, the government of India wants to make it possible to earn “carbon credits” (i.e. tradeable permits certifying that emissions of greenhouse gases have been reduced somewhere else) on the basis of carbon supposedly stored in forests.

### **India's approach to REDD**

India advocates a comprehensive approach to REDD which has been termed as REDD Plus approach. This approach argues for compensating countries not only for 'reducing deforestation' but also for 'conservation, sustainable management of forest and increase in forest cover' (ICFRE 2007). The basic principle of this approach is that a unit of carbon saved is equal to a unit of carbon added. In its submission to UNFCCC in August 2009, India has elaborated REDD as 'Reducing Emissions from Deforestation in Developing countries, SFM and Afforestation and Reforestation which further substantiates its approach (MoEF 2009).

India advocates a mechanism outside the purview of CDM, with a national level accounting for REDD. Indian approach on financing REDD activities has changed from strict fund based approach to a mix of market and fund based approaches, a central funding should compensate for maintenance of forest carbon stocks whereas money for compensating change in carbon stocks (due to decrease in deforestation and degradation or increase in forest cover) could be generated by selling carbon credits in the international markets (MoEF 2009).

Civil Society organisations in India feel that the REDD Plus approach would promote more business than mitigate because the communities have neither participated in these formulations nor will they be involved in its implementation.

We shall return to this issue in the concluding section.

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<sup>i</sup> India's National Action Plan on Climate Change, climate-leaders.org, <http://www.climate-leaders.org/climate-change-resources/india-and-climate-change/indias-national-action-plan-on-climate-change>

<sup>ii</sup> Jairam Ramesh calls for convergence on reducing biodiversity loss, Thaindian.com, Saturday, May 22, 2010, [http://www.thaindian.com/newsportal/feature/jairam-ramesh-calls-for-onvergence-on-reducing-biodiversity-loss\\_100368148.html](http://www.thaindian.com/newsportal/feature/jairam-ramesh-calls-for-onvergence-on-reducing-biodiversity-loss_100368148.html)

<sup>iii</sup> <http://www.hinduonnet.com/fline/stories/20100730271509000.htm>





**NON TIMBER FOREST PRODUCE**



Forests

Forests play a significant role in the social, economic and cultural aspects in our country. Many rivers originate from forests especially in peninsular India which form the lifeline of populations cutting across eco-systems. Forests provide timber, fuel wood and non-timber products to the local communities and the national economy.

Approximately 270 million ton (Mt) of fuelwood, 280 Mt of fodder and over 12 million m<sup>3</sup> of timber and several non-timber forest products are removed from forests annually. The value of goods and services provided by the forest sector is estimated to be Rs. 25,984 crores.

Therefore forest resources and forest lands need to be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. Any change in forest vegetation and bio-diversity will have adverse implications for the livelihoods of communities.

**Non-Timber Forest Produce (NTFP)** - an important source of food and income of forest communities ranging from 5.4 to 55 percent.

All India average value of NTFP to be Rs 1671.54 per hectare. Commercial NTFPs are estimated to generate Rs. 3 billion (US\$ 100million) annually in India. India also exports NTFP to the tune of Rs. 10 billion (US \$ 384 million) annually. In 2006-07, India earned Rs 39.7 billion from export of NTFP and their valued added extracts. (Ganguli, 2007)

Of an approximate 5.8 lakh villages in India, 1.7 lakh villages with a total population of 14.7 crore are located in the vicinity of forests.<sup>i</sup> These communities as also an estimated additional 6 crore people depend on the forests for their livelihood. It provides substantially to the food (fruits, flowers, tubers, leafy vegetables, bamboo shoots, honey mushroom etc) supply of tribal populations, particularly in times of

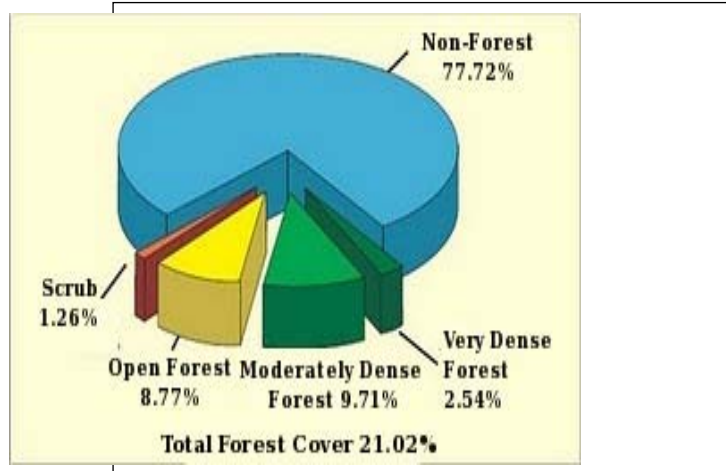
scarcity and drought, when there is an increase pressure on these forests. The forest also provide medicinal plants to the tribal and traditional communities. Nearly 6,500 native plants are still used prominently in the indigenous health care systems.

India is home to 45,500 plant species (including fungi and lower plants) and 91,000 animal species, representing about seven percent of the world's flora and 6.5 per cent of the world's fauna, 59,353 insect species, 2,546 fish species, 240 amphibian species, 460 reptile species, 1,232 bird species and 397 mammal species, of which 18.4 per cent are endemic and 10.8 per cent are threatened. The country is home to at least 18,664

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species of vascular plants, of which 26.8 per cent are endemic.

India contributes 8 per cent to the global biological diversity. It has been estimated that at least 10 per cent of the country's recorded wild flora, and possibly the same percentage of its wild fauna, are on the threatened list, many of them on the verge of extinction.<sup>ii</sup>



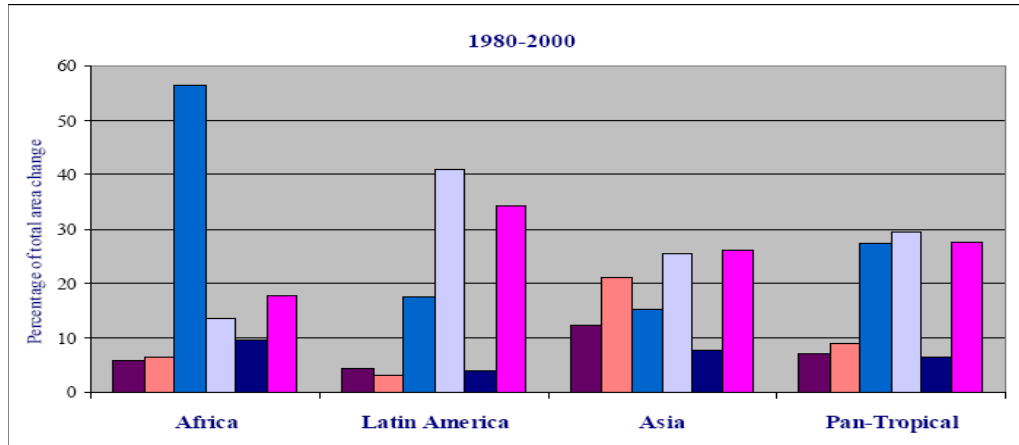
India's forests & tree cover of the country, as per the 2007 assessment is 78.37 million ha. However more than 40% of it is degraded open forest. In fact between 2005 and 2007 the area under open forest went up by 1626 sq km, at the expense of 936 sq.km of moderately dense forest. There was however a gain of 38 sq km of very dense forest.

Over the past several centuries, we have witnessed a gradual change in the land use pattern in order to accommodate the needs of a growing world population. This has led to several thousand hectares of forest land giving way to agriculture in order to meet the increasing demands for food, fuel and human settlements. According to a UN report of 2008, 13 million hectares of forest is cleared every year which translates into a loss of about 200 sq km of forest every day bringing about vast climate change.

This chart shows the results of an FAO study, on the causes of in different regions. Africa is the only place where clearing of forests for small scale permanent agriculture is dominant. Otherwise the share of the blame spreads across deforestation for large scale permanent agriculture and Others (presumably non-agriculture based)

- [ ] Expansion of shifting cultivation into undisturbed forests
- [ ] Intensification of agriculture in shifting cultivation areas
- [ ] Direct conversion of forest area to small-scale permanent agriculture
- [ ] Direct conversion of forest area to large-scale permanent agriculture
- [ ] Gains in forest area and canopy cover

[ ] Other



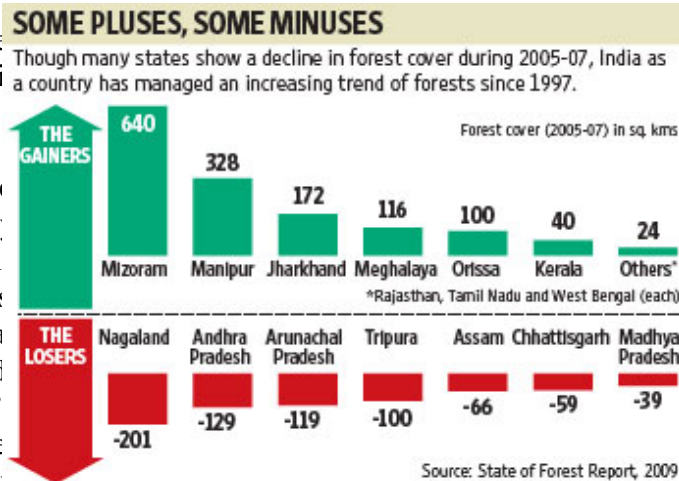
Source: <http://mdtf.undp.org/document/download/1740>

### The Political Economy of Forests

The British declared the forests in India as “reserved” in order to exploit them for timber and revenue.

Post independence, the 1952 Forest Policy discouraged shifting cultivation and reforestation. The State asserted “eminent domain” over the forests and the denouement of community rights on the commons and started exploiting the forest commercially.

#### States decline in forest cover



Graphics: Ahmed Raza Khan / Mint  
<http://www.livemint.com/2009/11/30230537/India8217s-forest-cover-ros.html>

In 1980, the Government drew up a Forest Conservation Bill 1980, in which 81 of the 84 sections of the colonial 1878 Forest Act were reproduced. The Bill sought to give the government complete control

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over the forests Forest and police officials were to be empowered to take action against anyone found guilty of destroying forests. However, due to stiff resistance by social and environmental activists and tribal groups, the bill was not introduced.

This paved the way for the National Forest Policy of 1988, where the rights of local communities were given precedence over commercial exploitation of forests. The control however was still vested with the forest department. The Policy was amended forbidding state governments from diverting forests for non-forest activities without the approval of the central government. These developments led to the drafting of the 1990 resolution on joint forest management (JFM) by the Government of India.

Under the JFM, the Forest Department and the village community enter into an agreement to jointly protect and manage forest land adjoining villages and to share responsibilities and benefits.

As of 2005, 27 states of the Indian Union had various JFM schemes with over 63,000 FPCs (forest protection committees) involved in the joint management of over 140,000 km<sup>2</sup> of forested land. However this has not been able to improve the situation of the poor people depending on Non-Timber Forest Produce (NTFP), as has also been confirmed by several studies.

The struggle of adivasis and other forest dwellers finally led to the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Bill, 2006 (FRA). For the first time, the law recognized the “primary role” of forest communities in forest management. Among other things it asserted the rights of communities to protect, conserve, regenerate or manage any forest or community forest resource that has been traditionally protected.

The FRA (Forest Rights Act) however does not provide a clear road-map for institutionalizing a democratic forest management system. The legal status of committees and the powers of its member on right to stop felling etc needs to be made explicit. (says, Sharachandra Lele, ATREE :[http://www.currentconservation.org/issues/cc\\_2-4-3.pdf](http://www.currentconservation.org/issues/cc_2-4-3.pdf))

## **Development & Displacement**

Since independence, development projects under India's Five-Year plans have displaced about 500,000 persons each year. They have also led to the destruction of forests. Hydroelectric and irrigation projects are the largest source of displacement and destruction of habitat. Other major sources are mines, thermal and nuclear power plants, industrial complexes, military installations, weapons testing grounds, railways, roads, and the expansion of reserved forest areas, sanctuaries and parks.

Most of the land acquired were actually Common Property Resources (CPRs), of tribals and forest dwellers. Walter Fernandes has estimate that thirty two percent of the land acquired for development projects in Andhra Pradesh was CPRs . In Orissa it was 58 percent.

It is easy for the government to acquire these lands in the absence of legal recognition of community title to CPR lands. Also culpable is the view that displacement is the sad but an inevitable price of development. The absence of a robust rehabilitation policy and reliable data on the number of people displaced, inevitably means that such development has lead to impoverishment. With climate change, another effect of development, such communities will be further vulnerable and more and more tribal communities will be part of Internally Displaced people (IDP). The UNHCR estimates that in 2007 at least 26 million people got forcefully displaced due to climate change and got added to the growing number of climate refugees.

## **Impact of Climate Change on Forests**

The Intergovernmental Panel on Climate Change (IPCC) estimates that at least one-third of the world's remaining forests may be adversely affected by changing climate, especially in the boreal zone where the warming will be greatest.

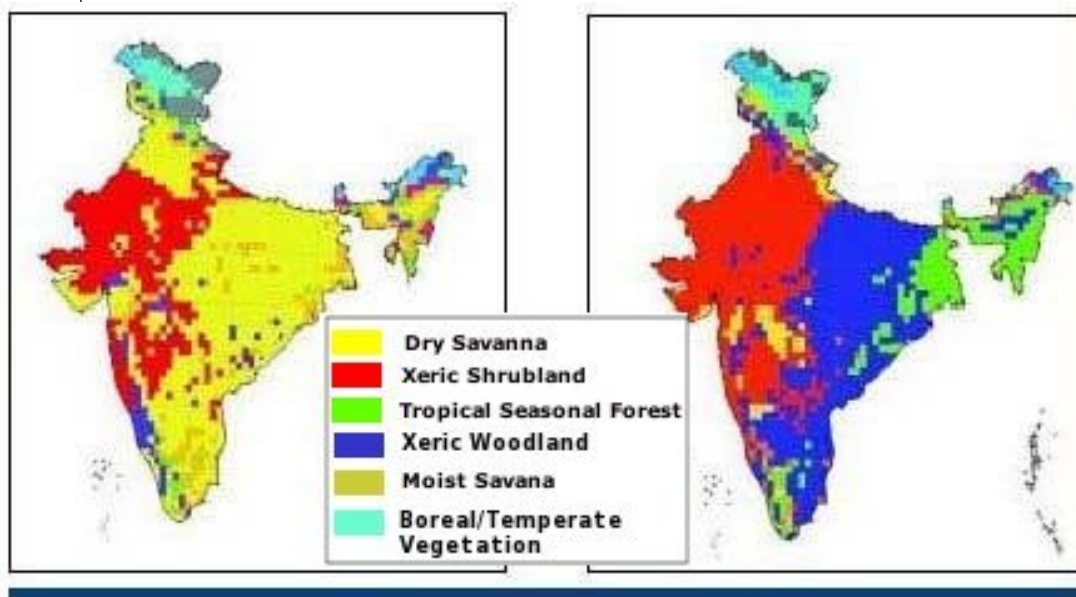
Dr. Simon Lewis, a leading scientist on climate change and forests, shows that over the coming decades climate change-induced drought may cause some of the Amazon rainforest to become savannah. He says that these models do not provide exact predictions as such, but highlight how sensitive the Earth System is to rapidly rising carbon dioxide emissions, and that such dramatic and abrupt changes are plausible.<sup>iii</sup>

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Changes in climate could alter the configuration and productivity of the forest ecosystems. Non-timber forest products are likely to be more vulnerable to changes in the climate system than timber production. These products have indirect and incremental impact on local economies, food security and health.<sup>iv</sup>

India's Initial National Communication to the United Nations Framework Convention on Climate Change, GOI, 2004.(

[http://data.undp.org.in/ene\\_pub/inatcom.pdf](http://data.undp.org.in/ene_pub/inatcom.pdf)) show shifts in forest boundary, changes in species-assemblage or forest types, changes in net primary productivity, possible forest die-back in the transient phase, and potential loss or change in biodiversity. Enhanced levels of CO<sub>2</sub> are projected to result in an increase in the net primary productivity (NPP) of forest ecosystems over more than 75 per cent of the forest area. Even in a relatively short span of about 50 years, most of the forest biomes in India seem to be highly vulnerable to the projected change in climate



Vegetation map for the year 2050(right) under GHG run of HadRM2 considering all grids of India and potential vegetation (including grids without forests). The control run (without GHG increase) is shown on the left.

Source: India's Initial National Communication to the United Nations Framework Convention on Climate Change, GOI, 2004. [http://data.undp.org.in/ene\\_pub/inatcom.pdf](http://data.undp.org.in/ene_pub/inatcom.pdf), <http://el.doccentre.info/eldoc1/e31d/16jun04goi1.pdf>

About 70 per cent of the vegetation in India is likely to find itself less than optimally adapted to its existing location, making it more vulnerable

to the adverse climatic conditions as well as to the increased biotic stresses.

Prof. Ravindranath et al, predicted shifts in forest boundary, changes in species-assemblage or forest types, changes in net primary productivity, possible forest die-back in the transient phase, and potential loss or change in biodiversity. They have estimate that about 75% of India's forests are projected to change in character irrespective of the nature of change by the end of the century.<sup>v</sup>

Thus Climate Change will have adverse socio-economic implications for forest dependent communities and the national economy.

Biodiversity is also likely to be adversely impacted. Rising temperature, changes in availability of water, and enriched CO<sub>2</sub> are expected to bring significant changes in species composition in approximately one-third of the forests worldwide.<sup>vi</sup> The populations of threatened species are expected to be at greater risk which means that those species that are currently classified as “critically endangered” will become extinct (IPCC)

**Genetic diversity:** Climate Change may have a serious impact on genetic resources in tropical forest trees. It may result in extinction of many populations and species.

**Ecosystem Boundaries:** Changes in precipitation and temperature can cause the boundaries between eco-systems to move, allowing some ecosystems to expand into new areas, while others diminish in size as the climate becomes inhospitable to the species they contain.

### **Impact of Forests on Climate Change**

The forest sector, through tropical deforestation contributes about 17-20% of global CO<sub>2</sub> emissions leading to global warming. Thus it is the second largest source of global green house emissions, the first being the energy sector. According to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, deforestation, forest degradation and forest fires are the major carbon dioxide contributors in



the developing countries. Practices such as overgrazing, over harvesting of fuel wood, illegal logging of timber and even forest fires account for the release of huge amounts of carbon dioxide.

As already seen, the projected climate change has a cascading impact on forest ecosystems and biodiversity. By 2050, forests globally will become a significant net source of CO<sub>2</sub> emissions which will lead to even greater emissions of carbon dioxide, contributing to a climate change cycle already well-underway(UK Meteorological Office).<sup>vii</sup> At the same time the forest sector has potential to sequester about 2 gigatonnes of carbon annually to mitigate climate change.

Forests accumulate carbon over a period of time through the growth of trees and the increase of organic carbon in the soil. Immature forests sequester carbon at high rates, while in mature forests carbon sequestration eventually equals decomposition; that is, the carbon balance of the ecosystem reaches a steady state. The forest is a 'carbon reservoir', but no longer acts as a carbon sink. Thus forest will act as reservoirs or as sinks depending on factors like the age of the forest, the management regime, other biotic and abiotic disturbances (e.g. insect pests, forest fires, etc.) and human-induced deforestation.<sup>viii</sup>

**Carbon Sink** is a natural or manmade reservoir that stores carbon-containing chemical compounds. Other than oceans, plants act as natural carbon sinks, absorbing huge amounts of carbon dioxide, through photosynthesis.

**Carbon sequestration** refers to any process which removes from the atmosphere and stores it in these sinks

In order to mitigate the effect of climate change, scientists have sought to use the concept of "carbon sequestration". According to the IPCC the cumulative amount of carbon that could potentially be conserved and sequestered over the period 1995-2050 by slowing deforestation (138 million ha) and promoting natural forest regeneration in the tropics (217 million ha), combined with the implementation of a global forestation programme (345 million ha of plantations and agroforests) would be about 60-87 GtC.

This is equivalent to 12-15 percent of the projected cumulative fossil fuel and deforestation emissions over the same period.

Thus, Forest can play a three fold role in the struggle against Climate Change:

- they are carbon pools
- they become sources of CO<sub>2</sub> when they burn, or, in general, when they are disturbed by natural or human action
- they are CO<sub>2</sub> sinks when they grow biomass or extend their area.



### Forest Communities and Climate Change

As highlighted by the Millennium Ecosystem Assessment (2005), 'Most of the world's 2.7 billion poor people depend on natural resources (water, forests, seas, soil, biodiversity, and so on) for survival and economic development; but the environment and the world's natural resources are already being substantially degraded and increasingly being affected by changes in the climate.'<sup>ix</sup>

Forests constitute an integral part of social life of tribals and others living in and around forest areas and contribute substantially to the food supply of tribal populations. During periods of drought and in times of scarcity, the dependence on forests for food increases. The main foods collected from forests include fruits, flowers, tubers, leafy vegetables, bamboo shoots, honey, mushrooms, etc. Most of the people living in and around forests use medicinal plants collected from forests for medicinal value. The availability of non-timber forest products are affected as a consequence of climate change. Dwindling availability of these resources has deprived the rural poor from a supplementary source of both income and food. Non-timber forest products are likely to be more vulnerable to changes in the climate system than timber production. These products

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have indirect and incremental impact on local economies, food security and health.<sup>x</sup>

Forests can greatly assist vulnerable communities adapt to the impact of climate change, if managed properly. If they are not managed sustainably, forests will exacerbate these impacts. Similarly, because of their ability to take carbon dioxide out of the atmosphere, forests have the potential to offer solutions to climate change. However, if forests are destroyed, the increasing amount of carbon in the atmosphere could lead to the destruction of what remains. The Director General of CIFOR (The Center for International Forestry Research), Francis Seymour says "The imperative to assist forests and forest communities to adapt to climate change has been poorly addressed in national policies and international negotiations. The adaptation challenge is being treated as secondary to mitigation, and yet the two are inextricably linked".<sup>xi</sup>

However, some of the challenges forest communities face today include, lack of indigenous knowledge system and the transfer of such knowledge from one generation to another; Biodiversity maintenance; effects of climate change; Lack of economic incentives; limited access to markets, insufficient capital and generally weak bargaining power; Weak coordination, communication and monitoring; and last but not least to mention is the bureaucratic hurdles.

**Community Forest Management (CFM)** can address the needs and priorities of the forest dependent communities only when we realize that it is not only important to see who manages the forests but in how forests are viewed. A community based rights regime with in-built safeguards to access for forests-dependent communities could be a solution to sustainably manage forests as well as local livelihoods.

JFM	CFM
<p><b>JFM: How Participatory?</b></p> <ul style="list-style-type: none"> <li>• Decisions taken by the communities need ratification by Forest Department.</li> <li>• Diverse, flexible local institutions replaced by uniform institutional arrangement.</li> <li>• Rigid, unilaterally defined benefit sharing formula</li> </ul>	<p><b>Guiding Principles of CFM</b></p> <ul style="list-style-type: none"> <li>• It is a democratic, decentralised and inclusive process to carry everybody along.</li> <li>• It is based on localised rules and management practices to meet local needs.</li> <li>• Its institutions are based on local socio-cultural traditions, practices and institutions.</li> </ul>

- <sup>i</sup> Regenerating India's forests, by SUSHIL SAIGAL, Deccan Herald, 26 March 2002.  
<http://www.nls.ac.in/CEERA/ceerafeb04/html/documents/forest>
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<http://moef.nic.in/downloads/home/home-SoE-Report-2009.pdf>
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<http://royalsociety.org/Content.aspx?id=5321>
- <sup>iv</sup> Climate Change: Global Risks, Challenges and Decisions, Jyotish Prakash Basu, IOP Publishing, Series: Earth and Environmental Science 6 (2009) 382011. [http://iop.fileburst.com/ees/ees9\\_6\\_382011.pdf](http://iop.fileburst.com/ees/ees9_6_382011.pdf)
- <sup>v</sup> Impact of climate change on forests in India, N. H. Ravindranath, N.V. Joshi R. Sukumar and A. Saxena, Current Science, Vol. 90, No. 3, 10 February 2006, <http://www.ias.ac.in/currsci/feb102006/354.pdf>
- <sup>vi</sup> The Role of Official Statistics in Measurement of the Impacts of Climate Change: Indian Experience by Sourav Chakraborty Social Statistics Division, Central Statistical Organisation Ministry of Statistics & PI, Government of India, New Delhi, India  
[http://unstats.un.org/unsd/climate\\_change/docs/papers/CCPaper\\_INDIA\\_session3.pdf](http://unstats.un.org/unsd/climate_change/docs/papers/CCPaper_INDIA_session3.pdf) <http://el.doccentre.info/eldoc1/e31d/080416zzz1B.pdf>
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<http://assets.panda.org/downloads/po6forestcarbonsequestration.pdf>
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[http://www.gppi.net/fileadmin/gppi/Streck\\_Scholz\\_2006\\_Forests\\_Global\\_Climate\\_Change\\_3.pdf](http://www.gppi.net/fileadmin/gppi/Streck_Scholz_2006_Forests_Global_Climate_Change_3.pdf)
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[http://www.reliefweb.int/rw/lib.nsf/db900sid/KHII-8587GV/\\$file/doc18002-contenido.pdf?openelement](http://www.reliefweb.int/rw/lib.nsf/db900sid/KHII-8587GV/$file/doc18002-contenido.pdf?openelement)
- <sup>x</sup> Climate Change: Global Risks, Challenges and Decisions, Jyotish Prakash Basu, IOP Publishing, Series: Earth and Environmental Science 6 (2009) 382011. [http://iop.fileburst.com/ees/ees9\\_6\\_382011.pdf](http://iop.fileburst.com/ees/ees9_6_382011.pdf)

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<sup>xi</sup> Climate change puts forests and people at risk, adaptation needed to avert crisis, The Hindu, November 28, 2008, <http://www.thehindu.com/holnus/008200811281902.htm>



## **IV** The Western Ghats

## THE WESTERN GHATS

The Western Ghats - also known as the Sahayadaris, is one of the world's ten hottest biodiversity hotspots. It has four major forest types and 23 floristic types as well as the unique high altitude grasslands. The WG also contain more than 30 percent of India's plant, fish, bird and mammal species.

The area has also provide the stock for domestication of animals. Amongst goats breeds endemic to the Western Ghats ecoregion include *Marwari* (Kerala), *Chigu and Beetal* (both from Maharashtra). Sheep breeds native to the ecoregion are in Mandya (Karnataka), Coimbatore, Nilgiri and Vembur (Tamilnadu). Hill cattle are locally preserved in Uttara Kannada (*Malnad Gidda*), Kerala (*Vechuri*) and in Tamilnadu (*Malaimaddu*).<sup>(1)</sup>

The Western Ghats have also provided several cultivars of rice (*Oryza sativa*), including Sannakki a localized basmati variety in the remote hills of Uttara Kannada.

*Finally, the Ghats support a population of over 4.5 million, most of them either forest dwelling or forest dependent communities like the tribal communities of Kerala, Tamil Nadu and Karnataka, who are exclusively dependent on these forests for survival.*

### Notings quiet on the Western Ghats

Traditionally, shifting cultivation (known as Kumri, Hhakkal, supported partially or entirely endogamous caste groups of farmers such as *Kumri Marattas, Kunbis, Kari vokkals, Halakki vokkals* and *Mukris*. Although shifting cultivation was prevalent, a sizeable portion of the forest in



every village ranging from a few hectares to several hundred hectares was conserved as a sacred grove. These sacred groves have been refuges for rare plant species.

The British then began large scale teak logging. Natural regeneration did not take place and foresters initiated vegetational changes as they went in for teak monoculture. Later these were transformed into commercial plantation for coffee, rubber, spices and Eucalyptus. This had serious consequences for the indigenous people who were engaged in hunting-gathering, shifting cultivation and pastoralism.

Post independence, also saw major deforestation, due to mining, tourism, infrastructure, and power and hydro and now nuclear energy projects. Annual deforestation of .57% over 70 years between 1920s and 90s, result in the loss of 40% of natural vegetation. The loss of 25.6% of the forest cover was during the period 1973 to 1995, during which time the dense forest was reduced by 19.5% and open forest decreased by 33.2%. As a consequence, degraded forest increased by 26.64%, grasslands by 28.73%, plantations by 6.78%, and agriculture by 11.15%

In Karnataka, nearly 12% of the forests have been completely lost in the past two decades. During the same period, in a region like Kodagu (Coorg), coffee cultivation has increased by nearly 100%, with a concomitant loss of 18% of forest area.

Besides the loss of forest to plantations, development activities have posed a serious threat in the fragile Western Ghats, which supplying water to the rivers of Southern India and acting as natural carbon sinks and climate controllers”.

### **Mining:**

Government data tabled during the monsoon session of the Goa assembly(2010) reveals that 182 of Goa’s 300-odd mining leases in the state are located in close proximity of water bodies. (2) The Prevalent open cast mines endup removing whole mountains and excavation of deep pits. The quarries located on hilltops, are left denuded after the extraction. In 2006, mining generated 1.84 billion tonnes of waste – most of which has not been disposed off properly. (3) An estimate during 2005-06 says that Iron-ore mining used up 77 million tonnes of water.



In Kudremuch in the state of Karnataka, the debris left behind after mining ceased following court intervention, is causing major problems in this rare 'Shola' forest ecosystem. Every monsoon nearly 20 million tonnes of withered iron ore that has lain untouched begins to seep down the hillsides polluting the river Bhadra which is the main source of water for this region. Experts observe that 60 percent of the total siltation in the river is due to mining activities.

In 2004, massive mining operations were underway at the Kodachadri hills, recognised as one of the hyper-sensitive forest areas of the Western Ghats. According to leader of Vriksha Laksha Andolana, Ananth Hegde Ashisara, an AP-based mining company had quietly begun a massive mining at Ambaragudda near Marati in Nagodi Ghat of the Western Ghats. The thick forest area of the Kargal forest range would be destroyed if the mining continued. Road work had been taken up in Ikkibeelu, Kasagodu, Muralli and a labour housing complex had come up at Nagodu.

In Maharashtra stretch of the WG which is rich in iron ore and bauxite, the government has granted 32 mining leases. Of the 56 villages with deposits, mining is on in four and the effects are proving to be disastrous.

Mining of bauxite and iron ore, according to Leo Saldhana of the Environment Support Group, "has destroyed vast areas of highly sensitive tropical evergreen forests, polluted rivers causing losses to local farming communities, wiping out aquatic species and threatening the health of the people and wildlife in the area". (HT)

**Power projects:**

**Uttara Kannada – a major source of Power, and yet very little development:**

Almost all the power that is generated from the district is exported to other regions. **Uttara Kannada uses only 17 MW of the electricity produced.** Many parts of the region languish in darkness. A brief overview of major power generating sources in Uttara Kannada and the installed capacity is provided below.

Dam	Installed capacity
Supa dam power house	100 MW
Nagjari power house	855 MW
Kadra dam power house	150 MW
Kodsalli dam power house	120 MW
<b>Nuclear</b>	
Kaiga Nuclear Station	440 MW
<b>Total</b>	<b>1665 MW</b>

Source: 6 Major Dams, A Nuclear Power Plant, A Paper Now Another Dam? Memorandum To Chief Minister of Karnataka, by Kali Bachao Andolan, June 5th, 2003 <http://www.esgindia.org/>

Heavy precipitation, coupled with the steep westward slopes of the Ghats has rendered this as an ideal location for the generation of hydroelectric power. There are about major 50 dams along the length of the Western Ghats with the earliest project up in 1900 near Khopoli in Maharashtra. Most notable of these projects are the Koyna Dam in Maharashtra, the Parambikulam Dam in Kerala, and the Linganmakki Dam in Karnataka.

In Karnataka alone, most of the hydroelectric projects of the state (about 3,000 MW out of the installed hydel capacity of about 3,500 MW) are in Western Ghats. The destruction, submersion and fragmentation of the Western Ghats due to hydel projects alone have been so massive so far that its sensitive ecology has been irreversibly damaged. Recently, the Minister of Environment and Forests announced a moratorium to the proposed Gundia Hydro-electric project.

Other power related projects that need to be looked at closely for its impact of deforestation are: Thermal projects based on fossil fuels like coal, diesel and gas, nuclear power projects and large size windmills.

The Konkan belt of the Western Ghats (in Maharashtra) is set to emerge as the energy hub for western India. The 720 kms stretch from the northeastern corner of Mumbai down to Goa is the site for some big-ticket energy projects. The centerpiece of this ambitious plan is the 9,900 MW Jaitapur Nuclear Power plant that will come up in a 983 hectares plot of land in Ratnagiri district of Maharashtra.

The Nuclear Power Corporation of India (NPCI) has entered into an agreement with French giant AVRO for Jaitapur nuclear plant- the largest nuclear power plant based on the European-pressurised water reactors (EPRs) technology in the world. It is the first practical outcome of the civilian nuclear deal that India concluded with nuclear suppliers in 2009. The NPCI-AVRO deal signed during the recent visit of President Nicolai Sarkozy to India.

Local people are also up in arms are protesting against the project. Vaishali Patil of the Konkan Bachao Samithi believes that. "This is the death knell for Konkan, our lives will be nighmarish".

The government of Maharashtra meanwhile also proposes to set up new power projects for a total capacity of 19,240 megawatts (MW) along the narrow Konkan coastal strip in the next five years. A total of eight imported coal-based projects with a total capacity of 15,200 MW are planned. These include, amongst others, two 4,000 MW ultra mega power projects (UMPP), one of which has been awarded to Reliance Energy Limited (REL) and a 1,600 MW plant to Tata Power Company (TPC). The proposal also includes a 3,000 MW nuclear project and a 1,040 MW gas based project.

A common impact of all these categories of power projects is the diversion of sizeable chunks of forest lands for transmission lines. Transmission lines are needed to evacuate power from large size power plants to be transmitted /over large areas. As compared to micro-power plants, which will cater to the local electricity needs, large size power plants have huge transmission network destroying the forest cover, fragmenting the forests, and opening up the thick forest cover leading to accelerated deterioration.

In addition to the forest lands needed for the 'Right of Way', such transmission lines lead to deterioration of forest ecology due to dust and noise pollution during the construction activities such as forest clearing, excavation, debris dumping, temporary shelters for workers, chopping trees for firewood etc. Frequent movements of vehicles add to the problems.

### **Tourism & Waste**

Tourism is changing from adventure and nature seeking activity to a luxury consumption exercise generating a lot of waste and consuming critical natural resources like water and land. Construction boom physically alter the appearance and ambience of the forests as well its peripheral neighbourhoods. Ooty, Kodaikanal, Lonavala-khandala, Munnar are some of the more popular hill stations along the western ghats, which have become concrete jungles over the last decade.

### **Infrastructure projects**

Infrastructure projects, seen as engines of progress, have been responsible for large scale deforestation. The Konkan railway, even

though resisted by locals calling for re-alignment, saw the Courts supporting development at the cost of what it called a few acres of Khazan lands. Since then, every year has seen major landslides causing further deforestation. Similar is the fate of mangrove forests which are to be destroyed by the second airport to Mumbai at New Mumbai.

After the advent of privatization, the land grab in one name or the other has continued unabated. The entire Konkan belt, which is an ecologically sensitive coastal region, has plans for 33 SEZs, including multi-product, port-based captive power generation and real estate projects. There is wide spread opposition to SEZs by coastal communities in Raigad district in the western ghats, which is probably one of the few districts in India that is literally being swamped by companies wishing to set up SEZs.

Normally such resistance is dismissed as peripheral or promoted by fringe groups. One Collector dared hold a referendum which led to the cancellation of plans for the SEZ concerned.

A similar attempt to label opposition as anti-development or fringe groups, is the case of the Lavasa Lake City, which has sought to develop over 12,500 acres of verdant forests around the Varasgaon dam, into what it calls a planned Hill Station. Scores of full page advertisement in newspapers set out to convince people that the area is more green now, than it was a few years ago, through comparing picture taken in pre-monsoon summer with post monsoon greenery. The environment ministry has raised objections, but most observers feel that ultimately the project will continue to destroy forest, as it will be asked to make a few changes, much like the case of the New Airport in New Mumbai.

### **Impact of Climate Change on Western Ghats**

Climate change over the next 30-40 years will take its toll on at least one-fifths of the Western Ghats. Studies from the Indian Institute of Science have shown that the mountain regions of the Western Ghats featuring a mixture of stunted evergreen forest and grasslands with sharp ecotones are a sensitive indicator of past climate change. With an increase in temperature and reduction in incidence of frost, the montane forests

dominated by Lauraceae and Rubiaceae could potentially expand into the grasslands.

The Indian Network for Climate Change Assessment (INCCA), forecasts the temperature to rise by up to 1.8 degrees Celsius in the Western Ghats by 2030s (when compared to the 1970s), and rainfall to increase by 6 to 8 per cent and also incidences of “extreme rainfall.” An increase in the temperature-humidity index in the Western Ghats by the 2030s could also lead to severe thermal discomfort of livestock and... have a negative impact on livestock productivity” INCCA also predicts a reduction in the productivity of cash crops, including a 24 per cent drop in coconut productivity.

In two decades from now a staggering 18 per cent of the Western Ghats could be in the throes of transformation brought on by climate change. As a result of this change a “sizeable” population that depends upon forest resources stands to lose out on income.

#### **Socio-economic impacts of climate change**

Scientists at IISc have also studied the impact on the livelihoods. According to Prof. Ravindranath et al., in Uttar Kannada, under the most likely scenario, the aggregate quantity of non-timber forest products (NTFPs), potentially available for extraction is likely to increase in the evergreen and semi evergreen forest areas with projected increase in area under these forest types. However, there is uncertainty regarding the transient response of vegetation to climate change and this could lead to forest dieback and loss of vegetation.

946 (70)

POWER TO PEOPLE :

## The Putsil way

Community Response to Management of Local Resources and Appropriate Energy Options

Jee-ri bhen basan jee-ri he  
Jee-ri banduan jee-ri he  
Putusidi jagata karenti power ujadi  
Jee-ri bhen bahn jee-ri banduan jee-ri he

Look sister and brother look  
Look friend look  
Our current our power  
Make our village Putusidi so bright  
Look sister and brother look, look friend look

Traditional Pooja before  
commissioning Power  
generation



Putsil Community Micro Hydro, Putsil, Koraput, Orissa, India

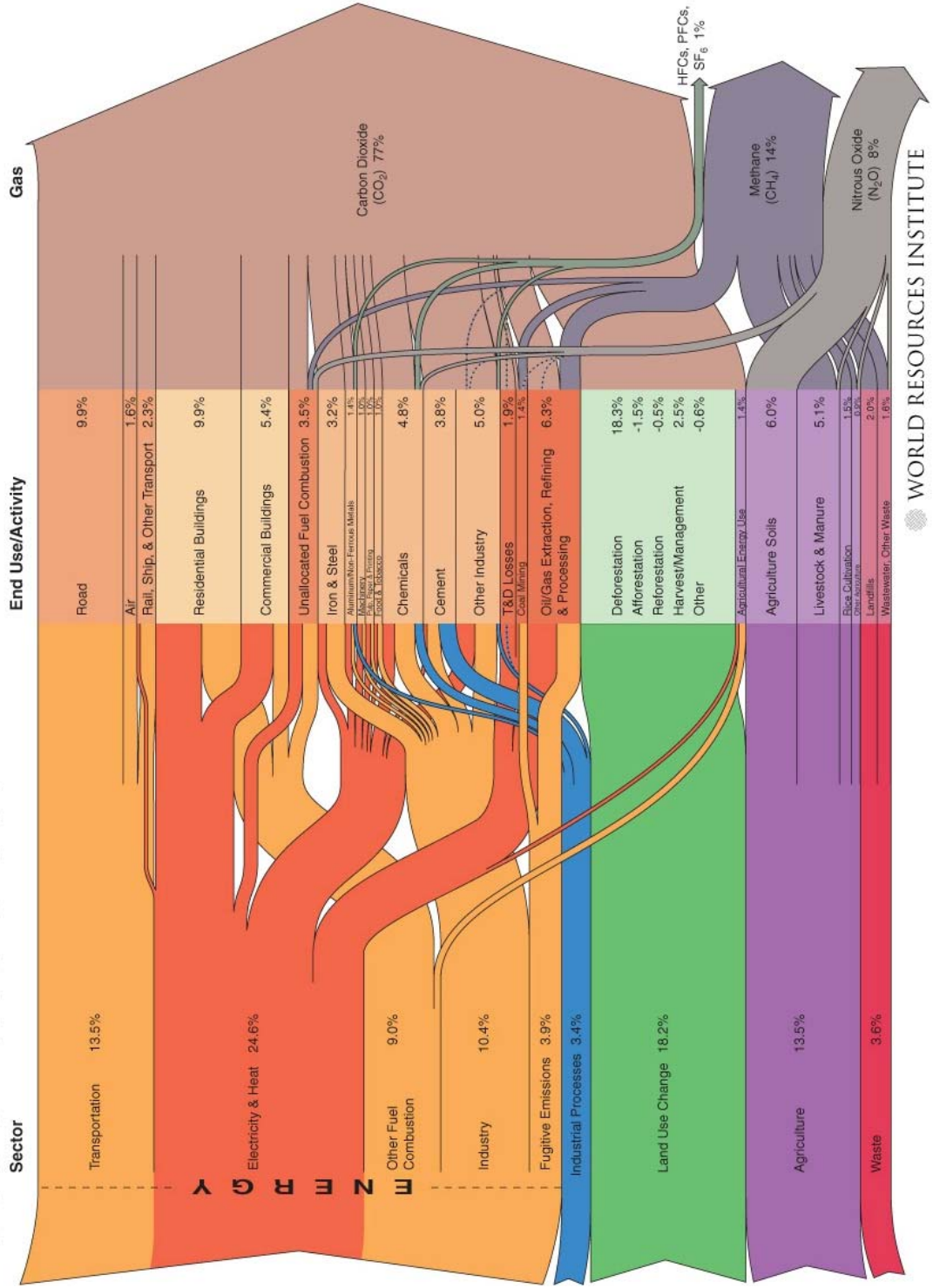


Published on the occasion of World Social Forum 2004 and World Summit on Renewable Energy 2004

V

What is to be done

# World GHG Emissions Flow Chart



WORLD RESOURCES INSTITUTE

It is human activity - particularly the burning of fossil fuels – that has made the blanket of greenhouse gases around the earth "thicker". The chart (opp. Page) indicates the relative contribution of different sectors and sub-sectors to GHG emissions in the year 2000. It also correlates each sub-sector to the end use activity on the right side and the gases it emits.

The sector contributing the maximum emissions 64 %, is the energy sector, with transportation contributing 13.5 percent, of which transportation of food itself ( & materials required to grow it) is about 9.9%. Another large sub-sector is Electricity & Heat (24.6 %) which alongwith other fuel combustion is 33.6%. Of this, residential building contribute to 9.9 %, and commercial buildings 5.4% and industries 22.4%.

Land Use Change: is 18.2% out of which Deforestation is the biggest culprit - 18.3 %.

Agriculture contributes 15%. And the bulk of it is methane emission 9% and nitrous oxide a little over six percent.

A reading of this chart, therefore provides a clue as to which sectors are critical contributors to global warming all of which seem to be related to the growth model of development that humans have chosen. It begs the question, what are our priorities? And within these priorities what alternatives are there to reduce emissions.

The Earth Policy Institute has estimated that the following measures would cut global net CO<sub>2</sub> emissions 80% by 2020”

- a) Raise the energy efficiency of buildings & appliances, through better insulation, efficient lighting, and nano-technology controls for appliances.
- b) Substitute fossil fuels by with renewable: Wind, Solar, Geothermal , Bio-mass and small scale Hydro, Tidal and Wave Power projects.
- c) Improve manufacturing efficiency for carbon emissions heavyweights (chemicals, petrochemicals, steel, and cement) offers major opportunities to curb energy demand)
- d) Restructuring transport to emphasize rail, light rail, and bus rapid transit.
- e) Ending net deforestation and planting trees to sequester carbon



All these measures rely for their success on the generation of a new economy around energy efficient products, grid connected power generation from renewable source, like wind farms, solar farms, charging points and systems including batteries for plug in hybrid electric vehicles etc.

If there is a free market, such a new economy will not work unless fossil fuels are disincentivised through a tax on carbon emissions. The suggestion is to raise tax on carbon emissions by \$20 per ton each year, so that the tax will exceed \$200 per ton of carbon by 2020.

## **Climate Change and Equity**

The developed countries are reluctant to take such emission based taxation steps, as the proceeds from such a tax would legitimately belong to the commons, and that too a commons which knows no state borders. Even if it were to be used for developing new technology, it would be common property.

For obvious reasons the developed countries want to start from current status of emissions, and legislate a percentage reduction from there, as that would maintain its relative position of economic strength. For example the US energy secretary has argued for a tariff on imports from countries, like India who did not have mandatory cuts prescribed in the Kyoto Protocol. They say that such measures were necessary to “level the playing field”, especially given the then recession conditions. French President Sarkozy favours a carbon tax on imports from nations that have lower environmental standards than France. China counters this by emphasizing consumption, and says that its emissions because of exports should be the responsibility of the receiving country. Thus the arguments are all based on the need to preserve the economic dominance of the developed countries rather than an equitable sharing of sharing emission responsibility.

A similar divide operates inside each country. For example in India, the top 50 million people (which is the population of many European countries, like France, UK, Italy) have emissions on par with the European average.

Table 1 shows the distribution of direct and indirect consumption of coal, oil and electricity by different rural and urban income groups and their corresponding carbon emissions. It can be seen that the bottom 50% of rural people emitted in 1990 a mere 54 kg of carbon per person per year. The richest 10% of urban people emitted 12 times as much at 656 kgC

What is to be done

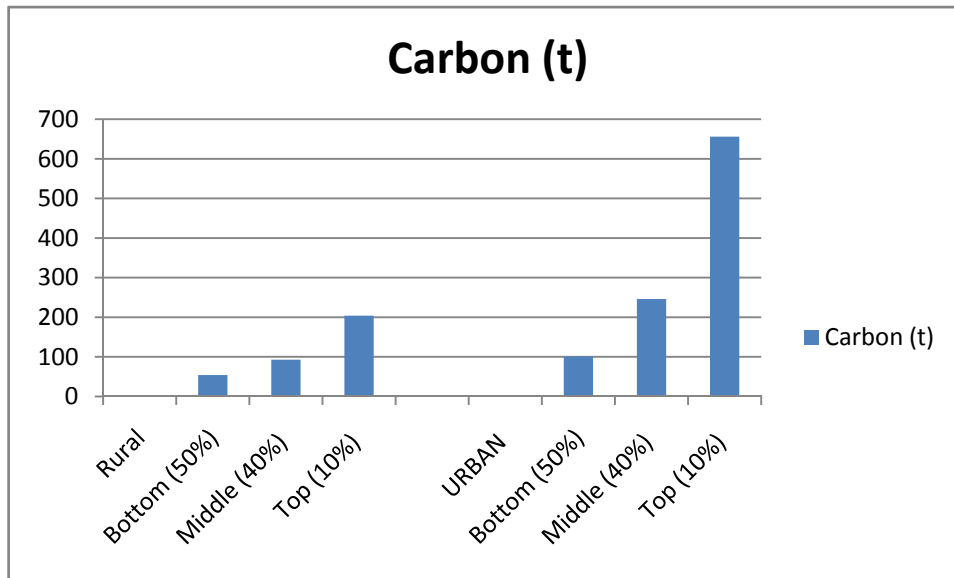
per person per year, which is still way below the world average of 1.1 t and much below the average emission in developed countries.

**Table. 1 Per capita Annual Energy Use (Direct and Indirect) 1989-90\***

Income Group	Coal (kg)	Oil (kg)	Elec (kWh)	Carbon (t)
<i>RURAL</i>				
Bottom (50%)	74	22.5	95	054
Middle (40%)	127	39.7	152	093
Top (10%)	262	89.8	284	204
<i>URBAN</i>				
Bottom (50%)	130	45.6	164	101
Middle (40%)	302	118.6	366	246
Top (10%)	765	332.3	858	656
EDR <sup>@</sup>	10.3	14.8	9.0	12.0

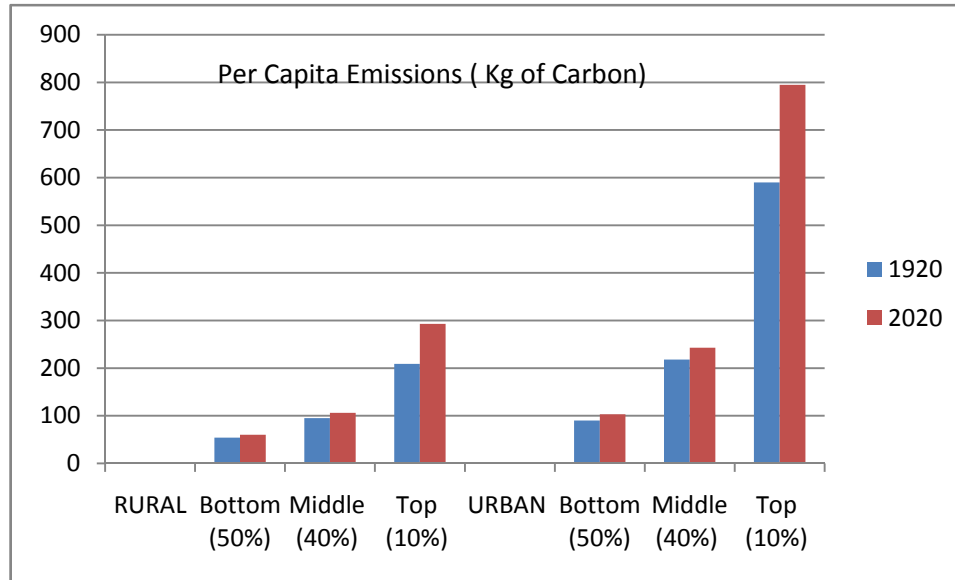
\*Excluding energy used directly and indirectly to make deliveries to other than demand for private consumption

@ Extreme Disparity Ratio -Urban top/ Rural bottom



This is not surprising if one sees Table 2, which shows that the per capita expenditure of even the urban top 10% income group is about \$1000 in 1990. Even the projected emission for 2020 show, Table 2, that the bottom 50% of rural population would emit a mere 60 kgC per person per year and the top 10% in urban areas 795 kgC. Their projections assume an annual growth rate of per capita real income of 3.5 %.

**Table 2. Per capita expenditure and carbon emissions by income classes in India**



Income classes	Emission intensity: Kg of carbon per thousand rupees <sup>b</sup> of expenditure (at 1990 prices)	Per capita expenditure (at 1990 prices)		Per capita emissions (kg of carbon)	
		1920	2020	1920	2020
<i>RURAL</i>					
Bottom (50%)	30.6	1764	1964	54	60
Middle (40%)	30.3	3168	3503	95	106
Top (10%)	31.4	6688	9345	209	293
<i>URBAN</i>					

(Bottom 50%)	33.2	2739	3122	90	103
Middle (40%)	35.2	6226	6922	218	243
Top (10%)	36.3	16273	21901	590	795

<sup>b</sup>Direct and indirect carbon emissions due to private consumption of respective classes. Per capita emissions due to other class of final demand like government consumption and investment is not included. <sup>b</sup>1US\$ -Rupees 17 in 1990

(Sources: Murthy et al. (1997a) and Murthy et al. (1997b))

In addition to this inequity, the first half of India lives very highly polluting lives, and does not seem to be taking any responsibility to reduce its emissions. While only 55 percent of Indian households have access to electricity, annual per capita electricity consumption is increasing every year. Obsolete technologies, air-conditioning and other forms of power consumption, compounded by poor building design, have led to over consumption of electricity, often generated in highly polluting ways. Except for a few green workplaces, office spaces are among the most culpable. Malls are also huge consumers of, usually, 'dirty' electricity.

India's growing transport sector, which relies on fossil fuels, is also a key contributor to carbon dioxide emissions. The number of motor vehicles is growing due to opening up of the country's economy that led to a spurt in private car owners.

At the same time, there is nothing explicitly stated in the National Policy, the NAPCC or any development plans that this consumption has to be reduced to sustainable levels, or that they should be carbon taxed appropriately.

There is nothing in the policy which would give a comparative advantage on the supply side to development of those production systems which have been out of the fossil fuel or main stream economy. The emphasis seems to be on some notions of energy efficiency, all of which work only on a higher scale, where there would

**Low Carbon Development Path**

- LCDP is a part of sustainable development. It
- (i) restrains energy demand growth,
  - (ii) drives production towards low carbon sources,
  - (iii) promotes an economic growth which works with secure energy
  - (iv) Uses low carbon and renewable substitutes to fossil fuels

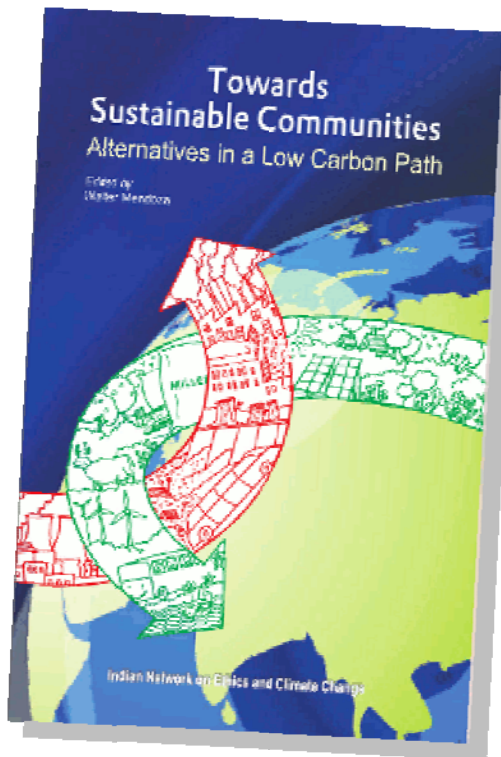
be a higher absolute consumption of fossil fuel, and therefore a higher net emission. The fact remains that the vast, huge majority of people is totally out of the fossil fuel economy, and the efforts to develop these economies in the low carbon path is more or less absent..

The real fact is that the development activities as well as plans, while aiming to increase growth and therefore emissions, are actually further marginalising the poor and whatever livelihood they may have had.

## Sustainable Development?

Sustainable development has become a buzzword in all climate change policy discussions. The Brundtland Commission defines sustainable

development as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ Economic well being, social equity and environmental sustainability are integral to this process. How does this concept of sustainable development play out in policy terms in a large country like India is a large developing country where nearly two-thirds of the population depending directly on the climate sensitive sectors such as agriculture, fisheries and forests.



### Agriculture

Agriculture too presents a similar developmental question. India's agriculture policy, in focusing only on conventional agriculture to the exclusion of traditional agriculture still practiced by lakhs of small farmers, has remained myopic and witnessed stunted growth. The emphasis on wheat and rice through the National Public Distribution System (PDS) has, for instance, forced people to grow water-guzzling paddy in rain-fed arid zones by marginalizing coarse cereals that had the double advantage of being suited to the agro-ecological zones and being more nutritious than wheat or rice for poor farmers who cannot afford to buy food from the market to keep malnutrition at bay.

Several farmers practicing sustainable agriculture have also found that traditional crop varieties, and even local animal breeds, are more resilient to the changing climatic impacts than 'imported' crop varieties and animal breeds or cash crops grown as a single, stand alone crop.

The approach of the Mission, however, is not pro-small farmer and continues to be technology and market driven, ignoring several studies and field experiences that have proved that small and marginal farmers, who produce most of the food in developing countries cannot afford purchased inputs and large machines but need vitality of local natural resources to ensure sustainability of agriculture.

A lot more money and resources will be spent on bio-technology, finance company friendly risk management options, than on strengthening non-chemical inputs systems, which are responsible for most of the agriculture related emissions.

### **Fisheries**

A study of CO<sub>2</sub> emissions per ton of fish catch should that mechanized boats emit more than double per tone of fish catch.

Mechanised boats: trawlers- 1.67 tce, gillnetters: 1.79 tce, dolnetters: 1.45 tce, and compared to 0.48 of motorized boats, and almost negligible for traditional catamarans.

Yet, in the field of fisheries and coastal livelihoods too, we find that the emphasis of developmental efforts is on development of large aquaculture farms, and mechanized fishing by setting of fishing harbours, rather than promoting local beach landing sites and small marketing yards.

### **Energy**

According to an expert committee of the Planning Commission on Integrated Energy Policy. (august 2006), 'India needs to sustain an 8% to 10% economic growth rate, over the next 25 years, if it is to eradicate poverty and meet its human development goals. While it is true that the development of marginalized populations living in rural areas would require exponential increase in energy, what needs to be questioned is which parts of the 8 to 10% economic growth will actually benefit these populations, and which parts will only increase CO<sub>2</sub> emissions, that ultimately impact and worsen the situation of the 60 %. These population are Adivasis , Dalits , fisher-folk, small-scale farm families, livestock

who largely depend upon local natural resources and eco system services. Their energy needs are largely fulfilled by these decentralized energy resources.

The share of decentralised energy (energy which is locally managed and controlled) is hardly recognized. Further small scale projects serving the energy needs of remote habitations, especially Adivasi communities, are left isolated. Technological development and upgrading of these system have at best been museumised. In fact, most of the renewable resources have been usurped by the centralised energy in manners and proportions that make these resources non-renewable.

An important example of these are the large wind farms which have been put up in hilly terrains. These farms have cordoned off high forest tracts which local populations accessed for their fuel, and food needs. Shabbily done roads to these mills, cut through verdant forests, and dump debris all along the slopes destroying natural vegetation and disturbing habitats. Trees are not allowed to re-generate as they interfere with the so called wind flow. Worst of all the electricity generated goes over the heads of the local populations.

Civil Society groups have played a pro-active role in demonstrating the potential and in influencing policies based on grassroots realities - working a on wide range of DEOs: solar, micro hyrdo, smokeless 'chulha', bio fuels, etc. The results of such experiments and innovation are lessons in sustainable living; and need to be included in any 'planning' for a low carbon alternative.

## **Forests**

The REDD scheme is essentially based on the laudable idea of reducing deforestation. The idea was to add to the reduction of emissions. However, Cancun discussions are taking it in the direction of transferring of funds via a CDM like route to poor countries. Besides the real and present danger of forests, and forest lands going further into the control of commercial interests, the scheme does not take into account that any genuine interest in protection of forests, lies with the forest dwellers whose very survival is dependent on the forest. They do not need carbon credits to support their work. In fact, a money oriented economy only increases the prospect of non-sustainable lifestyles being encouraged in the forests areas, the next proximate reason to commercialization of forest.

The National Federation of Forest People and Forest Workers (NFFPFW) has in a petition to the government delegation at Copenhagen warned that “ a carbon-trading model involving private companies will create a huge financial incentive for wholesale takeovers of forests. With such funds, there will be a rush by private companies seeking access to public forestland for plantations as well as control over official forest protection programs. Reliance, ITC and other companies have been demanding access to 'degraded' forests for commercial afforestation for many years, and this scheme could legitimise their demand. The lack of legal rights combined with such pressure will make land grabbing very likely.” Post Cancun however Jairam Ramesh has delinked the development of forests from the REDD funding process, and connected it to the Green India Mission.

Tribal communities living in close proximity with biodiversely rich landscapes, having evolved location specific and innovative livelihood strategies based on their traditional knowledge. The communities are interact with the impacts of Climate change. If livelihoods are to be maintained or improved, it is important to enhance indigenous ecological knowledge and improving marketing structures for forest-based communities. NTFP harvesting must be accompanied by appropriate incentives to minimise ecological impacts, even as we seek long-term livelihood alternatives.

Some potential measures that can be taken up to protect forests by promoting natural forest regeneration; strengthening legislation for forest conservation; adopting sustainable timber extraction practices; prevention of forest fragmentation etc.

Dr. Sudarshan of the VGKK Trust(*Vivekananda Girijana Kalyana Kendra*) for tribal development in the Biligiri sanctuary 25 years ago, says the country's rural employment scheme should be implemented specifically for ecological rehabilitation in Western Ghats, like the setting up rainwater harvesting and watershed constructions, and:



- Sustainable harvesting of NTFP and processing – such as Honey, Amla and herbal medicines.
- People's action against forest fires, poaching and quarrying.
- Capacity building of Tribal Co-operatives.
- Environment education in schools.
- Conservation education and eco-tourism.
- Sustainable agriculture – organic farming and seed bank promotion.
- Forest Gene Banks as a new approach for in situ conservation of genetic resources

Involving stakeholders (the communities) in decisions making is vital for developing and implementing any successful conservation plans.

Lured by carbon credit euros, Large high tech capital intensive projects as well as those which destroy natural forests like mini hydel projects are being promoted. The government terms hydel power projects generating in the range of 20 MW as “Mini hydel projects”.

The purpose of CDM is also supposed to be sustainable development. And to pursue that we should bring carbon credit business at the doorsteps of poor, marginal communities, such as

### **Tribal Communities and Adaptation to Climate Change**

by *Louis B. Figaredo*

*... the tribal people of Wayanad, one of the backward districts in Kerala, ensure their food security in the time of climate change. The district experiences in some years heavy rain and flooding and in some years severe drought.*

*Drought or flood, in order to ensure food security, over the decades the tribal people have developed certain agricultural practices. They have developed varieties of paddy seeds that can withstand drought as well as flooding. They have developed paddy seeds that can produce rice plants which can withstand flooding for more than two weeks. They have also developed paddy seeds which can be sown and raised when there is no rain. They have paddy seeds that suit every agro-climatic condition. They also have developed farming practices to produce rice in any climatic conditions. To put it in a nutshell, they interpret climate change positively and develop strategies and implement it. All over the world tribal people survive drought and flooding, marrow freezing cold and searing heat, drawing lessons from traditional knowledge and the rich experiences of their ancestors. To the tribal people climate is a changing phenomenon. It will go on changing whether man likes it or not. In order to survive in the changing climatic conditions, man has to develop diversified adaptation strategies specifically suitable to every land and region. That is what the tribal people preach and practice.*

[http://pipaltree.org.in/uploads/Climate%20change%20conference\\_Louis.pdf](http://pipaltree.org.in/uploads/Climate%20change%20conference_Louis.pdf)

the Micro-hydels such as the Putsil project (which currently generates 7kW, provides power supply for 72 households with domestic lights, street lights and for milling & grinding machinery, or the cluster DEO projects promoted by INECC partners in the Eastern Ghats of Andhra and Orissa, having a mix of local, direct use energy sources including solar, improved wood stoves to go along with sustainable local firewood generation, microhydel etc.

Despite the destruction, it is estimated that the Western Ghats today, neutralise 4 million tonnes of carbon (14 million tonnes of carbon dioxide equivalent), which is 10 per cent of the country's total greenhouse gas emissions. Since the entire vegetation of the region is sensitive to the changes in temperature and precipitation, both of which are primary effects of global warming, it will have a cascading effect on the rich bio-life of the regions 'Any disturbance to the Western Ghats is also likely to put rare and endangered species at risk and slow the process of evolution of new species.

The damage to Western ghats has to be minimised. Preventing damage to life-support systems and curtailing destruction and exhaustion of resources essential for our survival must be the priority. We must evolve sustainable and socially just measures for using these limited resources. It also means redesigning current technologies and redefining development, the development which is long lasting, that which is ecologically viable.

The challenge today is that no country has been able to delink growth from a rise in CO<sub>2</sub> emissions, or show how to build a low carbon economy or re-invent the growth path. Countries like India and China are still building their energy, transport and industrial infrastructure and therefore give the world the opportunity to "avoid" additional emissions. We can build our cities on public transport; our energy security on local and distributed systems - from biofuels to renewable; our industries using the most energy-efficient and pollution-efficient technologies. Our leaders can be key players at this critical juncture. They can provide leadership to the rich and the poor world by showing a different pathway to growth.

The Climate Action Network, South Asia (CAN-SA) has recommended in its national level consultation, that both mitigation as well as

adaptation measure must be taken. They have strongly suggested that the solutions lie in shifting the emphasis from centralized production systems to decentralized, bioregional production and that any alternative should essentially protect the lives and livelihoods of people. That should be the precautionary principle observed in planning and decision-making.

In a declaration at the National Workshop of the Indian Network for Ethics on Climate Change (INECC) titled “Peoples’ Voices in the Domestic and International Climate Change Agenda” on November 7, 2008 at Visakhapatnam, these voices said...,

The traditionally-rooted communities, usually the marginalised rural communities, have preserved the environment for centuries and they continue to do so... The country needs to find ways of responding to the issues of the ecosystem communities because they are the first to suffer the ill-effects of Climate Change.... Thus Climate Change is an issue of inequity which leads to food insecurity among the poor...

The communities and many more civil society groups have therefore to be involved in the search for alternatives, with a focus on the poor and vulnerable groups. Adaptation to and mitigation of Climate Change is possible by preserving/protecting bio-diversity, forests, using agricultural waste for bio-fuels and through livestock improvement, organic farming better governance of electric power production and distribution, undertaking renewable decentralised energy options such as micro or ‘nano’ hydro, photovoltaic solar based home lighting systems and biomass based initiatives...

What is to be done


*Missing the Community for the Woods: Forests, Communities & Climate Change in India* is a part of Eco-regional notes brought out by The Indian Network for Ethics on Climate Change (INECC). The booklets do not claim any exclusivity of research and has borrowed liberally from other sources liberally. Since the emphasis is on readability, we have removed academically required citations. While every attempt has been made to verify the data provided, the booklets do not claim any certitude. User discretion and judgment is an essential part of the education which these booklets seek to promote.



Other Titles In the Climate Education Series

 <p><b>Hardy Options</b> Eco-regional Notes on Climate Change and Semi-Arid Regions</p>	<p><b>The Coast isn't clear</b></p>  <p>Climate Change and India's Coastal Communities Regional Notes on Climate Change and what we must do about it</p>	 <p>हवामान बदल आणि किनारपट्टीवरील वस्ती योगविभागीय पुस्तिका</p>
<p>Also available in Telugu <b>బలమైన నిర్ణయాలు</b></p> <p>పర్యావరణ విస్తరణ ప్రాంతాలలోని వ్యవసాయ మరియు అర్బన్ ప్రాంతాలలోని వ్యవసాయ</p>  <p>పర్యావరణ విద్యనందించే బుజ్జిపుస్తకం</p>	<p>పనగలిగాని సముదాయాలకు అనుకూలంగా</p>  <p>భారతదేశంలో అరణ్యాలకు, అరణ్య సముదాయాలకు హాగూల జవాబును బదలించవలసి</p> <p>వనావన నిర్మాణ వ్యక్తి</p>	<p>...The little INECC book</p>  <p><b>Towards Sustainable Communities</b> Alternatives in a Low Carbon Path</p> <p>Edited by Water Meadows</p> <p>Indian Network for Ethics and Climate Change</p>

Contd. on inside cover

Trigger Films:

 <p><b>The City Calling</b> (PAL 6' 35", Eng. Subtitles) -impact of rising sea levels on high tides which affect the slum communities living on the shoreline.</p>	<p><b>I am the drum that will be heard</b> (PAL 5' 27", English Subtitles)</p>	<p>Mountains: 7min7 secs          Climate Change Urban: 8.53mins          Climate Change in Orissa: 10 min.          Climate Change in Andhra Pradesh :31 mins          Diamond in Rust: 10.6 min          Films on Climate Change,          by Documentation Research &amp; Training Centre.</p>	<p><b>Money for Nothing?</b> A Peoples perspective- CDM for sustainable development. by LAYA Resource Centre, Visakhapatnam, 25mins,]  <b>People, Power, Putsil</b> The story of the Micro Hydel Power Plant at Putsil, Orissa which was built through community initiative, 17.20 mins</p>
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<p><u>About INECC</u></p> <p>INECC is a loosely structured national network comprising of individuals and organisation representatives interested in the climate issue from a micro-macro perspective.</p> <p>It connects the issues of climate change to larger sustainable development and social justice concerns. In this context INECC perceives policy changes in favour of communities who are most impacted by the climate crisis.</p> <p>INECC, through its partners is involved in demonstrative models on grassroots mitigation and adaptation processes. Based on this experience INECC has been arguing for ensuring a link between development and energy access through relevant technologies for a low carbon pathway.</p>	<p><u>About CED</u></p> <p><b>CED</b> is about information          – Information in the democratic process          – Information for awareness, analysis, critique          – Information as education and social change.</p> <p>CED sees itself as part of the task to build, make resilient, and bring to prominence, intermediate alternative institutions. The information perspective is understanding of and resistance to dominant non-democratic, in-equitous development perspectives as well as engaging with pathways for alternative, sustainable, and equitable development &amp; change.</p> <p>The areas of focus which CED chooses for itself are: Climate Change; New Economics, Knowledge in Civil Society &amp; Just &amp; Sustainable Urbanism.</p>
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