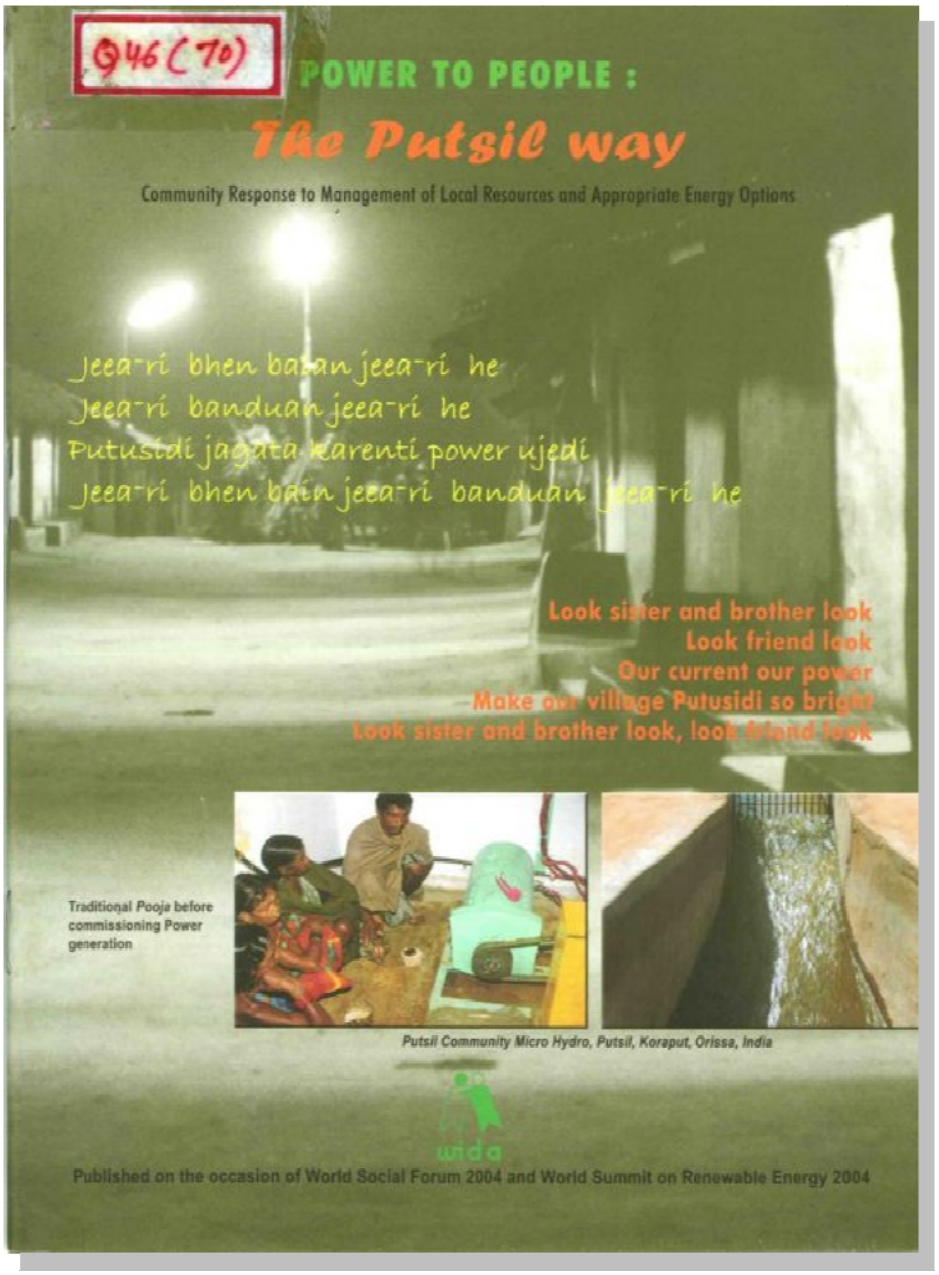

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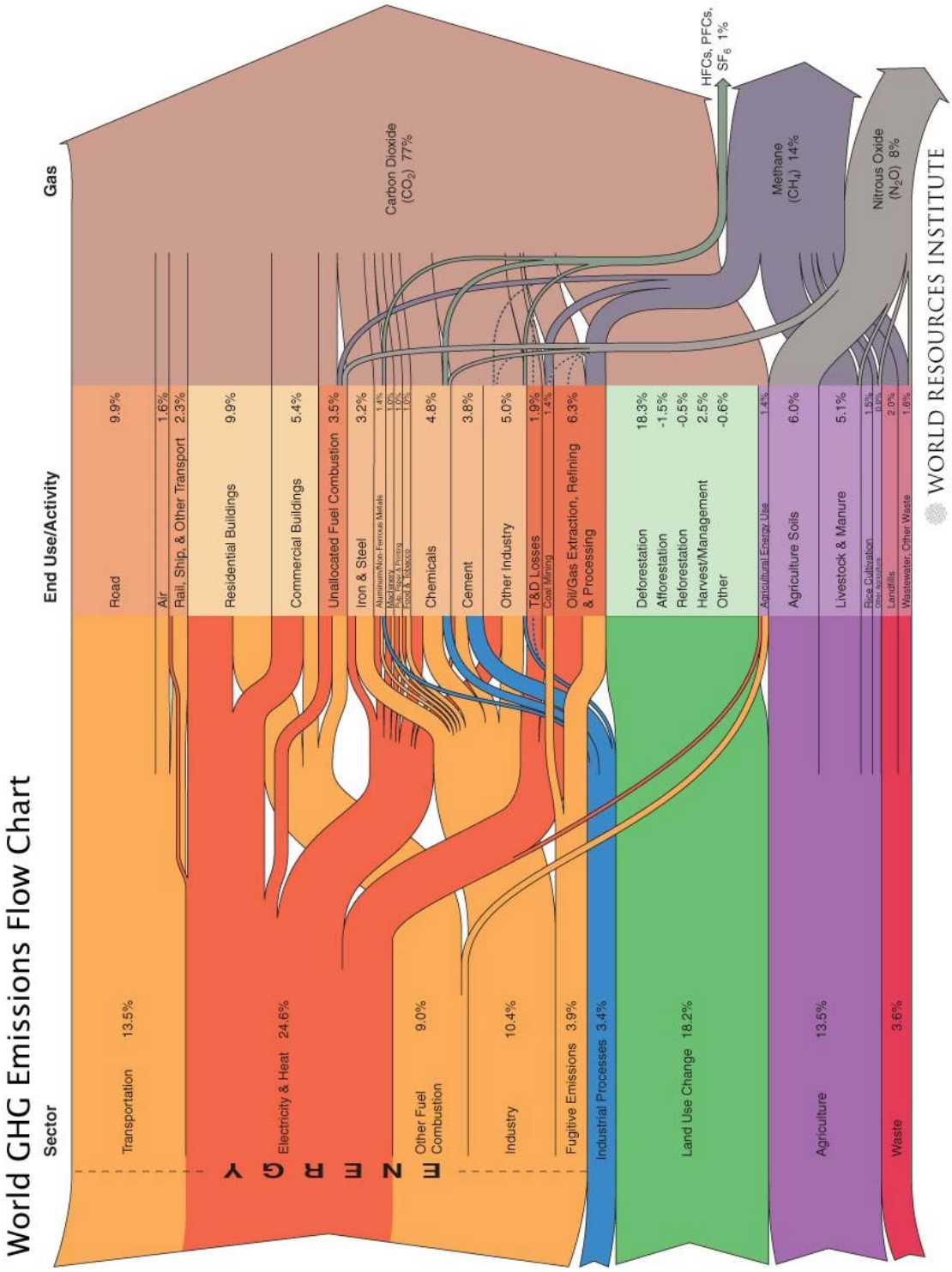
What is to be done


World GHG Emissions Flow Chart
Sector
End Use/Activity
Gas
ENERGY
Transportation 13.5%
Road 9.9%
Air 1.6%
Rail, Ship, & Other Transport 2.3%
Electricity & Heat 24.6%
Residential Buildings 9.9%
Commercial Buildings 5.4%
Unallocated Fuel Combustion 3.5%
Other Fuel Combustion 9.0%
Iron & Steel 3.2%
Aluminum/Non-Ferrous Metals 1.4%
Machinery 1.0%
Pulp & Paper 1.0%
Food & Tobacco 1.0%
Chemicals 4.8%
Cement 3.8%
Industry 10.4%
Other Industry 5.0%
T&D Losses 1.9%
Coal Mining 1.4%
Fugitive Emissions 3.9%
Oil/Gas Extraction, Refining & Processing 6.3%
Industrial Processes 3.4%
Land Use Change 18.2%
Deforestation 18.3%
Afforestation -1.5%
Reforestation -0.5%
Harvest/Management 2.5%
Other -0.6%
Agriculture 13.5%
Agricultural Energy Use 1.4%
Agriculture Soils 6.0%
Livestock & Manure 5.1%
Rice Cultivation 1.5%
Drainage 0.6%
Waste 3.6%
Landfills 2.0%
Wastewater, Other Waste 1.6%
Carbon Dioxide (CO_2) 77%
HFCs, PFCs, SF_6 1%
Methane (CH_4) 14%
Nitrous Oxide (N_2O) 8%
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 CO2 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.

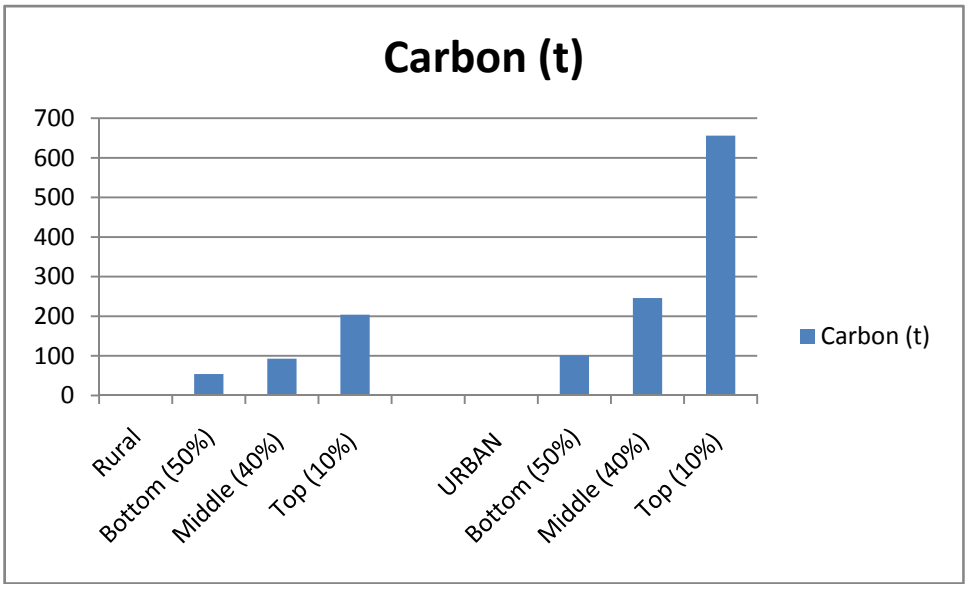
A similar divide operates inside each country. For example in India, the top 50 million people (which is the population of many European countries, like France, UK, Italy) have emissions on par with the European average.
Table 1 shows the distribution of direct and indirect consumption of coal, oil and 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

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*

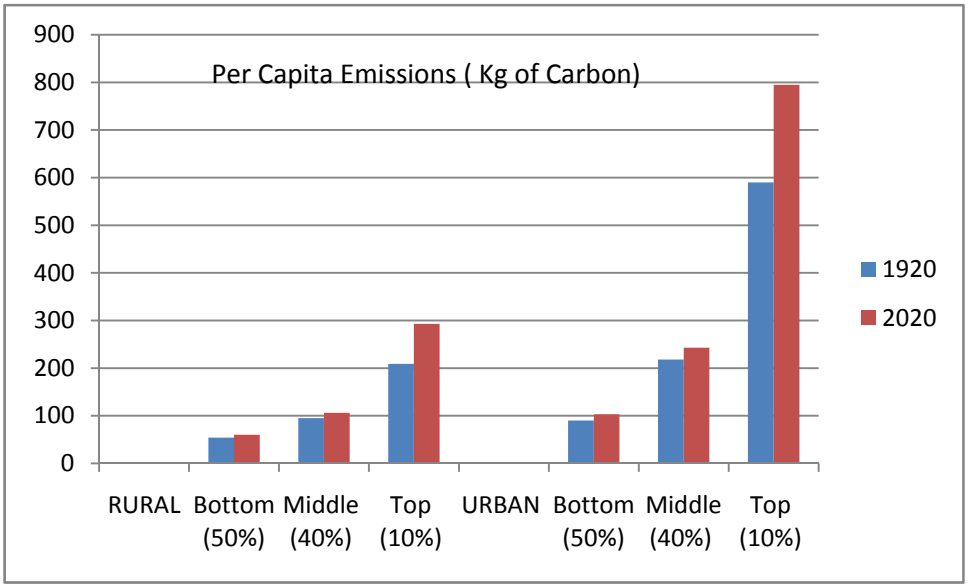
Income Group	Coal (kg)	Oil (kg)	Elec (kWh)	Carbon (t)
RURAL				
Bottom (50%) Middle (40%) Top (10%)	74 127 262	22.5 39.7 89.8	95 152 284	054 093 204
URBAN				
Bottom (50%) Middle (40%) Top (10%)	130 302 765	45.6 118.6 332.3	164 366 858	101 246 656
EDR[@]	10.3	14.8	9.0	12.0

*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[b] of expenditure (at 1990 prices)	Per capita expenditure rupees[b] (at 1990 prices) *1920* *2020*	Per capita emissions (kg of carbon *1920* *2020*
RURAL			
Bottom (50%)	30.6	1764 1964	54 60
Middle (40%)	30.3	3168 3503	95 106
Top (10%)	31.4	6688 9345	209 293
URBAN			

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

[b]Direct and indirect carbon emissions due to private consumption of respective classes. Per capita emissions due to other clen of final demand like government consumption and investment is not included. [b]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.

Low Carbon Development Path

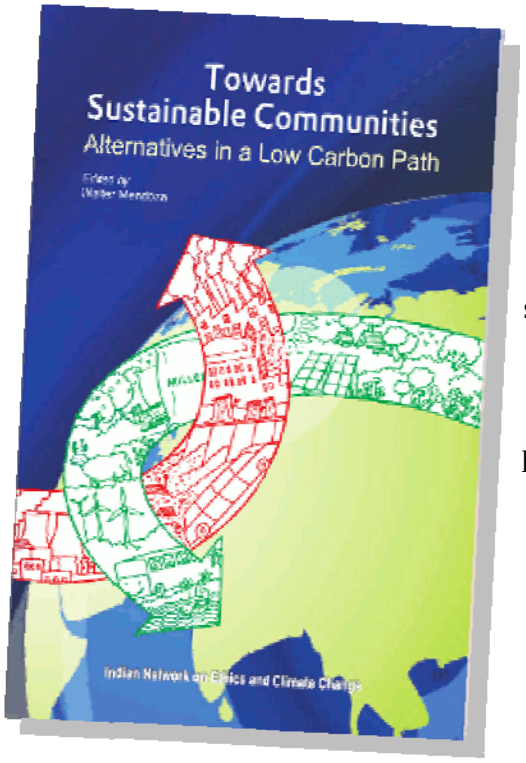
LCDP is a part of sustainable development. It
(i) restrains energy demand growth,
(ii) drives production towards low carbon sources,
(iii) promotes an economic growth which works with secure energy
(iv) Uses low carbon and renewable substitutes to fossil fuels

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

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 suistainable 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 CO2 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 CO2 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 polices 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

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 alongwith 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_2 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…