

India in Climate Change

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In this paper we try to suggest an alternative interpretation and approach to the understanding of Climate Change and related concerns in the Indian context than that officially espoused. One that we think more accurately describes what is happening and why. Certainly it is not competent to offer systematically collected and collated data such as that vast and detailed array presented in reports such as India's Initial National Communication or the technical specialization of its several scientific investigations and reports on various aspects of climate change related phenomena over the years. This paper however, will seek to critically examine the trends, or at least some of what we are led to believe are significant trends, evident from such data gathering and presentation exercises and from important policy decisions of the Government of India and its agencies, and from what we consider significant outcomes of the implementation of such policies. It will also suggest other, different, policy approaches that take into consideration environmental rehabilitation and restoration, an alternative paradigm and trajectory of human development and a fundamental shift in the approach to governance. Without all these or similar, perhaps even more radical changes, we doubt that either climate change, development dilemmas or governance and human rights issues will find resolution.

India occupies only 2.4 per cent of the world's land area, but supports about 16.2 per cent of the world's human population. India also has only 0.5 per cent of the world's grazing area, but supports almost a sixth of the world's livestock population.

...over a billion people speaking different languages, following different religions and inhabiting rural and urban areas, live in harmony under a democratic system

India's Initial National Communication: Chapter 1

The report, like others of its genre, goes on to enumerate India's achievements in the economic, social and political spheres since independence, reiterating insistently issues of population, poverty and technological handicaps with the unobtrusive sub-text of recent colonialism and current forced liberalization-globalization with its draining of the country's native wealth as excuse for its current situation. However much recent colonial history or coerced re-structuralisation of economies has to answer for, there are substantial issues that both ante-date these and are more contemporary for which India itself must accept full responsibility. The same report also states that:

Developing countries such as India have low adaptive capacity to withstand the adverse impacts of climate change due to the high dependence of a majority of the population on climate-sensitive sectors, such as agriculture, forestry and fisheries, coupled with poor infrastructure facilities, weak institutional mechanisms and lack of financial resources¹

¹ underline by author for emphasis

The basic characteristics of the mainstream or dominant Indian socio-economies² has, for centuries before the British arrived, been basically extractive and exploitative, accreting wealth and power in the hands of the higher castes and excluding the productive mass of peoples as lower caste, slaves³ or worse. The exception to this is the more autonomous indigenous/tribal societies which until very recently⁴ did not exhibit the extreme and endemic poverty (or the inappropriate and inequitable wealth) of the so-called mainstream societies, despite being maligned as “primitive”, “backward” and other similar disparaging appellations, even in official government documents. The main argument put forward when emissions reductions are sought to be levied on India is the low individual consumption and emission per capita due to the poverty of the vast majority of India’s population.

INDIA'S EMISSIONS DISAGGREGATED BY SOURCE

7,43,820 Gg of CO₂-eq GHGs, i.e., 61 per cent of the total GHG, emitted from all energy activities were mainly from the combustion of fossil fuels. Among the fossil fuels, coal combustion had a dominant share of emissions, amounting to about 4,75,530 Gg of CO₂-eq GHGs i.e., about 64 per cent of all energy emissions. The non-CO₂ emissions in this category are from biomass burning and fugitive emissions released from coal mining and handling of oil and natural gas systems. An analysis of the distribution of the total CO₂-eq emissions across all the sub components of all energy activities indicates that the major emitters were energy and transformation industries (47 per cent) constituting mainly electric power generation, industry (20 per cent) and the transport sector (11 per cent).

Of the total GHGs released in 1994, eight percent i.e., 1,02,710 Gg CO₂-eq were from the industrial process sector. These include CO₂, CH₄ and N₂O emissions from production processes of chemicals, metals, minerals, cement, lime, soda ash, ammonia, nitric acid, calcium carbide, iron and steel, ferro-alloys, aluminium, limestone and dolomite use. Of the total CO₂-eq GHGs emitted from the industrial processes, 42 per cent was from iron and steel production, 30 per cent from cement production, 14 per cent from ammonia production, 6 per cent from limestone and dolomite use and the rest of the processes contributed the remaining 8 per cent.

In 1994, the agriculture sector contributed 29 per cent of the total CO₂-eq GHG emissions, amounting to 3,44,485 Gg CO₂-eq. The agriculture sector primarily emitted CH₄ and N₂O. The CO₂ emissions due to the energy use in the agriculture sector are accounted for as a part of all energy emissions. The emissions sources accounted for in the agriculture sector are enteric fermentation in livestock, manure management, rice cultivation, agricultural soils and burning of agricultural crop residue. The bulk of the GHG emissions from the agriculture sector were from enteric fermentation (59 per cent), followed by rice paddy cultivation (23 per cent), and the rest were contributed by manure management, burning of agriculture crop residue and application of fertilizers to soils. The disposal of waste and the processes employed to treat these wastes give rise to GHG emissions. The two main sources of GHGs from the waste sector in India are municipal solid waste disposal and wastewater handling for commercial and domestic sectors. The collection of waste primarily takes place in large cities. In smaller cities and towns, waste decomposes under aerobic conditions and thus, methane is not emitted. Industrial wastewater in India is treated as per the mandate of the MoEF by large industrial units. The total GHGs emitted from the waste sector in 1994 was 23,233 Gg CO₂-eq, which is 2 per cent of the total national CO₂ equivalent emissions. Out of this, the major contribution was from municipal solid waste disposal activities (53 per cent), followed by domestic waste water, which contributed 32 per cent of the total GHG emissions from the sector.

GHG emissions from land use, land-use change and forestry (LULUCF) sector are an aggregation of emissions from changes in forests and other woody biomass stock, forest and grassland conversion, abandonment of managed lands and forest soils. The net CO₂-eq. emission from this sector was 14,292 Gg, which includes CO₂ emission and sequestration, as well as the emission of CH₄ and N₂O. The LULUCF sector emitted 14,142 Gg net CO₂ in 1994. Methane and N₂O emissions from this sector in terms of CO₂ equivalent were 136.5 Gg CO₂-eq and 12.4 Gg CO₂-eq respectively.

India's Initial National Communication:

The problem of the country high emissions is attributed to the massive population and the poverty of that population is made the justification for increasing emissions⁵. There are two facts or perhaps sets of facts that make such claims untenable. The first is that

² deriving from the rigidly stratified caste system underpinning a powerful feudal society

³ such as bonded labour

⁴ less than the last 40 years

⁵ development and improved standards of living being assumed to be synonymous with more contaminating and intensive consumption and production patterns

by far the maximum amount of emissions is put out by industrial processes or to feed industrial processes that produce luxury goods or profits for people who themselves live high emission lifestyles at the cost of and replacing use of those same resources for low emission lifestyles and livelihoods of the poor. The second and perhaps even more controversial, if less obvious, is that the paradigm of development currently assumed to bestow benefits (even if it trickled down micro-droplets in the far distant future, and which is, further, assumed to be essential to both poverty alleviation and to environmental recovery) to poor sectors or countries in fact does quite the opposite.

At this point we will examine the policies being implemented or envisaged to promote India's development indicators and reduce its environmental footprint in view of the findings of India's own reviews and previously assessed policies and programmes, along with other pertinent evaluations and assessments, where these are available. We will do this through a process of identifying incontrovertible and key needs of poor people, in the light of traditional and indigenous practice regarding the use of these resources and evaluating the impact of changes wrought by more contemporary usage or the projections of these on the environment and on poor peoples lives.

Water:

India is ... seriously concerned with the possible impacts of climate change, such as: Water stress and reduction in the availability of fresh water due to potential decline in rainfall.

The preliminary assessment has revealed that under the GHG scenario, the severity of droughts and intensity of floods in various parts of India is projected to increase. Further, there is a general reduction in the quantity of the available run-off under the GHG scenario

... ground water levels have already declined in about 0.34 million km².

The glaciers and the snowfields in the Himalayas are on the decline

The model showed an overall decrease in the number of rainy days over a major part of the country. This decrease is more in western and central parts of the country (by more than 15 days) while along the foothills of Himalayas (Uttaranchal) and in north-east India the number of rainy days is found to increase by 5-10 days. An increase in GHG concentrations may lead to overall increase in the rainy day intensity by 1-4 mm/day, except for small areas in north-western India, where the rainfall intensities decrease by 1 mm/day. The model results also indicate that there will be an overall increase in the highest one-day rainfall over a major part of the Indian region. This increase may be up to 20 cm/day.

However, in some parts of northwestern India, a decrease in extreme rainfall up to about 10 cm/day has been noticed

Precipitation response is more variable with a decrease over the land towards the west and an increase over the Indian Ocean.

An overall decrease in the number of rainy days over a major part of the country

An overall increase in the rainy day intensity by 1-4 mm/day Luni, the west flowing river of Kutchh and Saurashtra occupying about one-fourths of the area of Gujarat and 60 per cent of the area of Rajasthan are likely to experience acute physical water scarce conditions.

The river basins of Mahi, Pennar, Sabarmati and Tapi are likely to experience constant water scarcities and shortage. The river basins of Cauvery, Ganga, Narmada and Krishna are likely to experience seasonal or regular water-stressed conditions

Although efforts are being made for improved water management practices, like water conservation, artificial recharge and watershed management, utilization of non-conventional energy and integrated water development, the projected water demand of a minimum 980 BCM during 2050 will require intensive development of ground water resources, exploiting both dynamic and in-storage potential. It is apparent that the projected climate change leading to global warming, sea-level rise and melting of glaciers will disturb the water balance in different parts of India and quality of ground water along the coastal track. Possible effects of climate change on ground water are:

- _ changes in precipitation and evapotranspiration may influence ground water recharge;*
- _ rising sea levels may lead to increased saline intrusion of coastal and island aquifers;*
- _ increased rainfall intensity may lead to higher run-off and less recharge; and*
- _ increased flood events may affect groundwater quality in alluvial aquifers.*

It is, in the context of development priorities, worth noting that these areas indicated as vulnerable to drought and therefore to biodiversity, soil and consequently social degradation are those of the highest population density, infrastructure investment, industrial development and industrialized agriculture in India. These areas also suffer from some of the highest rates of female foeticide and infanticide, child marriages, violence against women, trafficking in women and children, dowry related violence and sati or widow burning. These areas also have the some of the wealthiest and a greater proportion of the poorest people in India⁶, suffer from extreme fundamentalist religious, ethnic and political violence, oppression and conflicts, The figures of infant and maternal mortality and morbidity and of education especially girls education are also the worst in these areas and the acceptance of birth control poor therefore with an unsustainably high population growth rate.

The perceived gradual increase in environmental degradation, the early signs of which are becoming visible in areas that benefited largely from the Green Revolution technologies, is further compounding the problem. There is now great concern about declining soil fertility, change in water table depth, rising salinity, resistance of harmful organisms to many pesticides, and degradation of irrigation water quality as, for example, in north-western India. Nutrient removal by crops over time has exceeded its application and consequently, farmers now have to apply more fertilizers to realize the same yield as achieved 20-30 years ago. The introduction of canal irrigation in Haryana has resulted in almost 0.5 Mha being affected by soil salinity. The rapid increase in the number of tube-wells during the last three decades has resulted in over-exploitation of groundwater in many blocks, leading to declining water tables. In some canal irrigated districts, on the other hand, the water table has risen, resulting in increased problems of salinity. Several pathogens and insect pests have also shown a tendency to increase under the intensive farming systems such as ricewheat system. Species which are adapted to wider environmental gradients would spread faster and dominate the ecosystem, while those with narrow environmental adaptation would become marginalized. This may affect biodiversity. Corrective steps must be taken to avoid the elimination of plant species due to weather change.

Ironically, despite this assessment, so-called remedies are being introduced of the same genre but on an even larger scale.

Some of the possible supply side measures may include augmentation of the supply of water by sustainable extraction and use of surface water and groundwater in the local area, and long distance transfers of water from surface and groundwater sources.

Improving the water availability through the year, revival of diverse and community-based irrigation systems, soil and water conservation, equitable water distribution, traditional water conservation practices, and groundwater recharge, are examples of adaptation strategies. The Government of India is also envisaging the linking of rivers to mitigate droughts, as well as floods in the long term.

An additional over 250 dams and contingent canal systems are being either planned or already in process of being built or implemented in the country. Of all the strategies listed here, more than two-thirds of the investment in financial terms is intended for the dams and canal systems, or of deep bore wells, i.e. the larger, environmentally more risky projects⁷. Over several million Ha of land will undergo radical land use change directly due to this and much of the land use change will be from prime forest and agricultural lands.

Food security, nutrition and food sovereignty

⁶ See Census of India data and Economic Survey of India for details of this information

⁷ Planning Commission Reports, Depts. of Irrigation and Power projections and budgets

The quality of food is significantly affected by temperature in most crops. An increase in temperature may have significant effect on the quality of cotton, fruits, vegetables, tea, coffee, aromatic and medicinal plants. The nutritional quality of cereals and pulses may also be moderately affected which, in turn, will have consequences for our nutritional security. Research has indeed shown that the decline in grain protein content in cereals could partly be related to increasing CO₂ concentrations. Food grain production in India has increased spectacularly due to the Green Revolution from 50Mt in 1951 to 212 Mt in 2002, and the mean cereal productivity has increased from 500 kg ha⁻¹ to almost 1800 kg ha⁻¹. These increases were largely the result of area expansion, large-scale cultivation of new highyielding semi-dwarf varieties since the early 1960s, and the increased application of irrigation, fertilizers and biocides, supported by progressive government policies. Today, we have 190 Mha gross sown area (142 Mha net sown area), and 40 per cent of this is irrigated. There have been similar revolutions in the production of milk, fish, eggs, sugar, and a few other crops. India is now the largest producer of milk, fruits, cashew nuts, coconuts and tea in the world, the second largest producer of wheat, vegetables, sugar and fish, and the third largest producer of rice. As a consequence, the per capita availability of food grains has risen in the country from 350 gm in 1951, to about 500 gm per day at present, from less than 125 gm of milk to 210 gm per day, and from 5 to 30 eggs per annum despite the increase in population from 350 million to more than one billion. This growth in agricultural production has also led to considerable surplus food stocks with the government. The droughts of 1987, 1999-2000, and of 2002-2003 could generally be managed and did not lead to severe problems of food security because of these buffer stocks

Given these vast quantities of food being produced and stocked for “emergencies” and “disasters”, it is indeed extremely difficult to comprehend the widespread malnutrition endemic in substantial segments of the population⁸, without presuming planned or deliberate misdistribution or incompetence or the control of commodities prices and supply to the detriment of the poor and the advantage of traders. A strange anomaly in a country that claims to support...over a billion people speaking different languages, following different religions and inhabiting rural and urban areas, (who)live in harmony under a democratic system. Apparently such widespread endemic hunger is not an emergency, being a chronic situation, and does not bring into question either India’s claims to democratic functioning or of peace and burgeoning prosperity.

Strategies under consideration to address the impending food crisis are

- _ Utilization of wastelands and un-utilized/ underutilized lands.
- _ Reclamation/ development of problem soils/lands.
- _ Rainwater harvesting and conservation for the development of rainfed areas.
- _ Development of irrigation, especially minor irrigation.
- _ Conservation and utilization of biological resources.
- _ Diversification to high value crops/activities.
- _ Increasing cropping intensity.
- _ Timely and adequate availability of inputs.
- _ Strengthening of marketing, processing/value addition infrastructure.
- _ Revamping and modernizing the extension systems and encouraging the private sector to initiate extension services.
- _ Bridging the gap between potential and farmer’s yields.
- _ Cost-effectiveness while increasing productivity.
- _ Promotion of farming systems approach.
- _ Promotion of organic farming and utilization of organic waste.
- _ Development of eastern and north-eastern regions, hill and coastal areas.
- _ Reforms to introduce proactive policies for the farm sector

From these proposals taken together with the policy and legal supports for land acquisition⁹, it is clear that a good bit of what is envisaged is large scale, intensive mono-cropping, industrial farming with expanded mechanization, chemical application, bio-

⁸ About 40 per cent of India’s population is undernourished and about half of that figure acutely

⁹

engineering and irrigation, demanding the consolidation and corporatization of collective, small and marginal holdings, the fiscalization of inputs and globalization of markets. Given the disastrous experience with this kind of farming (including the numbers of suicides, bankruptcies, evictions and population displacements that both accompany and amplify food insecurity and political instability) the only surprise is that these policies haven't been reversed.

The obvious contradiction between action and stated intent is even more drastic when experiences of the productivity and sustainability of organic or natural farming by small and marginal and collective holdings are increasingly common and well publicized:

The farmer who supplies the NPM (No pesticide/fertilizer) vegetables to the cooperative store (in Hyderabad) comes from Manchal village, 50 km away from Hyderabad. Srinivas Reddy, the 25-year-old farmer, started supplying pesticide-free tomatoes, okra, brinjals, gooseberries, chillies and leafy vegetables to the store five months ago.

"To meet the high demand other farmers send their produce through me. Many of them are switching to NPM in my village," he said. His increasing profits reflect the demand for the vegetables. From the initial Rs 1,500 a month, his profits have gone up three times.

Like Srinivas, other farmers are discovering that growing pesticide-free vegetables, grains and pulses is profitable. They have been able to cut the cost of cultivation by doing away with chemical pesticides-the costliest input in agriculture here. The yield remains more or less the same and the net profits go up.

In Manchal Mandal, a women's self help group has cultivated a field with 29 varieties of vegetables and pulses. The state government's Society for Elimination of Rural Poverty (SERP) and the horticulture department have helped to set up these vegetable farm models in a number of villages. Farmers are provided seed kits at 90 per cent subsidy. Several earn profits up to Rs 50,000 a year. Farmers have been able to reduce the cost of cultivation by Rs 2,500 to Rs 5,000 per acre (0.4 hectare) by doing away with pesticides.

The trend of NPM farming has grown steadily since 2005. NPM started as a campaign of non-profits to get farmers to give up pesticides to earn better. The state rural development ministry took it forward through SERP, which is currently implementing NPM in 3,000 villages across 18 of the 23 districts.

With farmers saying no to pesticides, dealers of pesticides and fertilizers have had to shut shop or switch to alternate vocations. Twenty seven-year-old Krishna Reddy of Todalapalle village in Kadapa district is one of them. From a fertilizer and pesticide dealer, he switched to products made from neem and other bio-formulations used to control pests and improve soil fertility.

Krishna now sells neem powder, seeds and pheromone traps (for luring and trapping pests) among other things to the villagers. "Eighty per cent of the farmers in my village had stopped using chemicals and asked me to keep bio-products. Though my earnings from the shop have gone down from Rs 10,000 to Rs 8,000, I am able to cover up the deficit by selling my own farm produce grown without pesticides," Krishna said.

NPM has made entrepreneurs out of some women. There are those who sell bio-products used for NPM farming. K Keija, a 30-year-old mother of two, earns up to Rs 3,000 profit by selling bio formulations from the shop she set up in Kondapatturu, Guntur district, two years ago. She sells ghanajeevastra, neemastra and brahmastra, which she makes by sourcing raw materials such as cow dung, cow urine, milk, curd, chillies, garlic, neem. She can also afford the treatment for her daughter who has polio. "My husband works as a farm labourer and earns very little. I could not take our daughter to the government hospital in Guntur for treatment earlier, but things have changed," Keija said.

Khairunnisa Begum of Vattam village in Mahabubnagar district is another woman entrepreneur. She set up her shop to promote NPM farming in 2007. "I give my products free to poor and needy farmers," said the 45-year-old. She now plans to have two more shops in nearby villages. Khairunnisa was a treasurer of a women's self help group (SHG) in the area. Many such groups operate in the districts and they train farmers to set up NPM stores. Currently, there are 300 NPM shops across the state.

NPM farming has benefited from the centrally administered National Rural Employment Guarantee Scheme (NREGS) after the state government integrated the latter into NPM. Labourers were paid from funds for rural employment scheme to dig farm ponds to irrigate NPM fields.

Ramachandrapuram in Khammam district was the first village to introduce employment guarantee scheme in fields under NPM cultivation. The works taken up under the scheme included digging of farm ponds, making compost pits, land development and removing silt from dried water tanks and ponds that can be used for improving soil nutrients. Other villages like Punukula, Mulukallapalle and Vepakoyyaramavaram, in Khammam, followed suit.

G Subbalakshmi, a 40-year-old farmer from Chhinnarasupalli village of Chhinnamandem mandal had no irrigation facility till about seven months ago. She was cultivating dry land paddy and other crops that need very little water. After a farm pond was dug in her field under NREGS, she sowed paddy on her 0.6-hectare plot. She stopped using pesticides. "From 10 bags of

paddy last year, my yield may go up to 25 bags this year. I have also saved Rs 2,500 by not using pesticides," Subbalakshmi said. Now she is planning to take up pisciculture to augment her income.

According to D V Raidu, the state project advisor for NPM, digging farm ponds helped farmers irrigate their fields and recharge groundwater. "About 400 farm ponds were dug in Nizamabad district and as a result, groundwater levels rose by 4.5 metres in Ellareddy mandal," Raidu said. He added that work orders to the tune of Rs 6.76 crore had been executed and funds totalling Rs 2.44 crore had been disbursed.

With NPM making agriculture profitable, there is a noticeable decline in suicide deaths in the state. "There were no debt-related suicide deaths in any of the 3,000 NPM villages in 2007," said G V Ramajaneyulu, executive director of Centre for Sustainable Agriculture, a non-profit spearheading the NPM programme

Though there is no study to link decrease in farmers' distress with decline in suicide deaths, farmers said that debt drove many to consume pesticides readily available in all households. "Women constantly feared their husbands or sons would consume pesticides. But now, even if they want to, the only immediate choices are bio-pesticides made from cow dung and urine, which they won't drink," said Khairunnisa, the NPM shop owner of Vattam village.

The motive for discontinuing the use of pesticides may have been to cut cultivation costs, but farmers are realizing that their medical bills have gone down. Most farmers used to complain of giddiness, skin problems, breathlessness and burning sensation in the eyes while spraying pesticides. "Some even had to be admitted in hospitals for treatment," said P Lalitha of Chittapur village in Rangareddy district. Her family's health improved after use of pesticides was stopped. "Our visits to the hospital have ceased altogether," she said. Lalitha earned Rs 30,000 from paddy and Rs 20,000 from vegetables in 2007. She no longer worries about the health of her family and has enrolled her children in good schools.

Sixty-year-old Doodakule Ghousia, another resident of Chittapur village, said her husband used to complain of stomach problems, nausea and restlessness when pesticides were in use. "At times he would get fits during the spraying season. We had to go to the hospital every other day and each visit used to cost Rs 500.

That has stopped now," Ghousia said.

Official figures for Ramachandrapuram village say there were nine serious hospitalisation cases due to spraying of pesticides between 1994 and 2003. There have been none since. The farmers of all the six districts Down To Earth visited—Warangal, Guntur, Mahabubnagar, Khammam, Kadapa and Rangareddy—said they are leading healthier lives after discontinuing the use of pesticides.

A board with bold letters announces the chemical free and GM free status of Enabavi village in Warangal district. The village stopped using pesticides 10 years ago and adopted organic farming five years later, much before the state rural development ministry decided to officially recognize NPM.

Enabavi, with over 110 ha of farmland managed by 52 families, has now become a learning centre for neighbouring villages. Located 80 km from the state capital, it has become a mandatory stopover for members of non-profits, ministers, planning commission members and international organizations keen to gain firsthand knowledge of how organic farming is changing lives for the better. Enabavi made news in Delhi last month at the Indian Organic Trade Fair organized at PUSA Institute where Enabavi rice packets sold like hot cakes.

The fields in the village look unkempt as friendly weeds are allowed to grow. "Now we don't spray bio-pesticides as there are no pests," said Ponnamm Mallaiah, a 60-year-old farmer who owns about 8 ha. He grows paddy, red gram, sesame, tobacco and vegetables in his fields.

The villagers used pest repellents for just the first two years. After that pest attacks stopped, said Narasamma, Mallaiah's sister. "We have also stopped using urea as it makes the plants grow faster and succulent, which attracts pests. Organic farming has created a balance between friendly and harmful pests," she said.

Twenty-year-old Ettaboina Mahender said only natural fertilizers are used. "Cow dung, cow urine and vermicompost is used while preparing the soil for cultivation." Demand for cow dung in turn has led to villagers increasing their livestock. "Now we use cattle for ploughing and have stopped using machinery," he said. Tractors used for ploughing charged Rs 2,000 per acre, but bullocks on lease charge Rs 1,000. Mahender is thus saving Rs 1,000 per acre.

In place of synthetic urea, farmers use azolla, a fern-like plant, as fertilizer in their paddy fields. "Azolla spreads rapidly. It helps to suppress harmful weeds. Panchagavya, prepared by combining cow dung, urine, milk, ghee and curd, is used as a growth enhancer. It improves the taste, colour and texture of vegetables and fruits," Mallaiah said. The paddy fields have a one-foot-wide gap after every three meters to help aerate the plants and also prevent snakes, rodents and the brown plant hoppers from destroying the crops. The pests use the alleys to move about and leave the crops alone. The savings per acre of paddy by creating alleys is over Rs 5,000, said SERP officials. The villagers ensure seed quality through mutually beneficial arrangements. The farmers who grow good quality grains are offered incentives for preserving their harvest as seed. "A farmer gets Rs 900 for a quintal of paddy. If his grain quality is good, he is asked to keep the yield as seeds for the next season and paid extra for his harvest

One of the driving forces behind Enabavi's success story is R Lingaiah, secretary of the Centre for Rural Operation Programmes Society (crops), a non-profit. The village has become famous in the neighbouring districts and people travel miles to buy Enabavi produce, Lingaiah said.

Organic farming has helped the villagers repay their debts. "If the farmers had continued to use chemicals, their debts would never have got cleared," Narasamma said.

Ramachandrapuram is another success story. The village has over 120 ha of farmland and nearly half of it was mortgaged by 2005. The farmers of the Koya tribe who were growing cotton, the most vulnerable of all crops, started mortgaging their land after yields started decreasing and farm input prices went up.

"Within two years of switching to NPM farming, the villagers were able to free their mortgaged land," said Lakshmi, who along with her husband M Rajulu, was the first to take up NPM. Besides reclaiming their mortgaged land, 10 farmers in the village have also taken about eight ha on lease.

Rajulu has been recognized as the best farmer in the district for growing high yielding non-Bt cotton using NPM methods. "I have managed to grow eight to 10 quintals of cotton along with a quintal of green gram and 15 kg of pulses and millet in just one acre of land," he said. Rajulu expects to net Rs 15,000 on an investment of just Rs 1,500. His paddy yield has also gone up to 18 quintals per acre as against six quintals an acre when he was using pesticides. Ramachandrapuram was nominated by SERP this year for the Citibank's change makers award given out by US based Ashoka Foundation after it became completely debt free.

The farmers of Ramachandrapuram now send their children to private schools for education. Lakshmi's son, Ramesh Babu, is the first postgraduate in the village. From debt-ridden status to a debt-free society; the villagers of Ramachandrapuram have made their own destiny through hard work.

Source: CSE/Down To Earth Feature Service The New Nation, 23 Jan 09
<http://nation.ittefaq.com/issues/2009/01/23/news0448.htm>

Such initiatives have been time and again proven efficient, effective and to be the solution to both environmental and development needs of the rural poor. Quite unlike large scale high-tech engineered capital intensive approaches which tend to cause more problems than they solve both in terms of human gains and environmental sustainability. There seems to be some question as to whether the much apprehended food crises are really to be expected and are inevitable or whether they are in fact being ensured as part of the profiteering that now characterizes governance and trade.

One of the key's to the apparently incurable poverty of the larger mass of people in India is the religious and social validation of inequity and injustice. One of the paramount obstacles to deep and extensive change in the social and economic configuration of Indian society is the presumption of inevitability or fatalism in regard to poverty or other unfortunate circumstances or events, again justified by religious beliefs. While this religious-philosophical assumption engenders high tolerance of their own unfortunate conditions from women, lower caste and class persons of either sex, it also incites members of certain castes/classes to assume it is their duty to extract and accrete wealth as a fulfillment of their social and moral obligation. Consequences of this activity are considered beyond the bounds of their responsibility, including larger social, political and of course environmental consequences. Offloading these on the unfortunates whose "karma" is already "bad" and therefore have a necessity and a duty to invest in it is merely the logical if absurdly so, next step.

Land Use and Land Use Change

Of the strategies being implemented to favour food security several have substantial implications for LULUC.

- _ *Utilization of wastelands and un-utilized/ underutilized lands.*
- _ *Reclamation/ development of problem soils/lands.*
- _ *Development of irrigation, especially minor irrigation.*
- _ *Diversification to high value crops/activities.*
- _ *Increasing cropping intensity.*
- _ *Revamping and modernizing the extension systems and encouraging the private sector to initiate extension services.*
- _ *Bridging the gap between potential and farmer's yields.*

- _ *Cost-effectiveness while increasing productivity.*
- _ *Promotion of farming systems approach.*
- _ *Development of eastern and north-eastern regions, hill and coastal areas.*
- _ *Reforms to introduce proactive policies for the farm sector*

Taken together with the massive infrastructure and urban expansion, already on-stream, and additionally with the acceleration of industrialization including primary sector industry such as mining and the production of steel and other construction materials, the vast expansion of production of luxury consumer durables and convenience luxuries, the sheer extent and character of land use change (such as the need for even larger garbage disposal) will cause serious and extremely unpredictable micro level and enormous ripple effects in the environment including emissions outputs. The social and political consequences are likely to trigger even more unpredictable changes.

There are also some fundamental classification issues. The proposal for *Utilization of wastelands and un-utilized/ underutilized lands* for instance. So called unutilized lands are a critical necessity as buffers for all sorts of “natural” events and even more so for those which are partially or completely human in origin. Dry land wastes, for instance maintain, for one thing, wind and therefore rain and humidity cycles and patterns, critical in a country like India, so deeply dependent on the monsoon. Wetlands on the other hand are aquifers that provide key reservoirs for absorbing high precipitation or run off, moderating floods and storing this water for drier seasons. Being at the surface they also maintain air temperatures and humidity balances. We will not even begin to introduce issues of bio-diversity or other matters in this particular discussion. Similar issues might be raised in the context of *Reclamation/ development of problem soils/lands*. What kinds of such problem soils are we referring to? Is it those which have been contaminated by industrial processes? If so what kinds of proposals are on the table for this? Are we also talking of restoring these lands to those people from whom it was taken in the first place? What would be their opinion on how and for what purpose these lands need to be restored?

Again, putting into context the stated intentions regarding development strategies of reducing populations’ dependence on the farming sector to secondary and tertiary livelihood options, this implies the augmentation of an already unmanageable urbanization process and again further accelerates and intensifies dependence on polluting or high risk technologies (such as chemical/mechanized mono-culture and the use of bio-engineered crops) and the capital intensive economic model neither of which have proven their value, quite in fact to the contrary.

The stated intentions of *Development of eastern and north-eastern regions, hill and coastal areas* are particularly of concern in the context of the climate change scenario and economic models being sought to be implemented in these areas. These models incorporate the conversion of large tracts into tourism facilities, roads and other access infrastructure, SEZs or Special Economic Zones where neither Labour nor will Environmental protection legislation of the country be in force, the intensification of extractive industries: minerals, water, energy, food and forest products including timber, and a host of other natural resources. Some capitalization and fiscalization of so-called environmental services is also to be introduced on a substantial scale in these areas.

Evidence of these intentions is quite easily accessible from plan documents: the 5-year plans of the Planning Commission, the “Look East Policy” detailing, the Regional

Strategy Development Plans which have caused massive public outcries in every region, and the new Coastal Zone Management Plans, which are equally controversial.

One of the most significantly precarious and problematic issues when one speaks of “productivity” and “unproductivity” of natural phenomena such as lands, or waters (or air or life forms for that matter) is the standard and criteria of assessing these as economic goods, whether assets resources or products and services. These assessments must always be contingent upon the markets and the markets depend not on physical realities but on maneuverable and manipulatable constructs controlled by dominant political and economic entities whose objects in making these assessments are more self interested and short term, not to mention often purely fiscal.

Another problem is the reality that Climate Change will very soon ensure that these definitions of productivity themselves alter, in themselves as well as in regard to the lands to which they are applied. For instance what will be the comparative values ascribed to living forests as compared to lumber, as the extent and quality of forest cover decreases? Moreover there is a kind of confusion or ambiguity of terminology that renders most of India’s development planning suspect. For instance, *Diversification to high value crops/activities* implies cash crop cultivation; *Bridging the gap between potential and farmer’s yields* implies use of intensive chemical inputs as does the strategy of *Increasing cropping intensity, Cost-effectiveness while increasing productivity* could probably mean mechanization and consolidation into large holdings from small marginal and even medium sized holdings. All these strategies suggest that ecologically sensitive policies are not in fact going to be implemented. The licensing of bio-technology, investments in chemicals and farm machinery production, economic policies and land acquisition patterns that indicate quite clearly the consolidation of agricultural holdings to the interests of corporations and large landholders rather than smallholders, collectives or cooperatives, are other clear indicators. The implications for precious bio-diversity are recognized to be dangerous, but that does not appear to merit more than mere acknowledgement in passing.

Independent of climate change, biodiversity is forecast to decrease in the future due to multiple pressures, in particular, increased land-use intensity and the associated destruction of natural or semi-natural habitats. While there is little evidence to suggest that climate change will slow species losses, there is evidence that it may increase species losses. Changes in phenology are expected to occur in many species. The general impact of climate change, is that the habitats of many species will move poleward or upward from their current locations. Species that make up a community are unlikely to shift together. Ecosystems dominated by long-lived species (for example, long-lived trees) will often be slow to show evidence of change and slow to recover from climaterelated stresses.

Qualitative observations about the likely impact of climate change on wildlife species were made. If woody plants including exotic weeds invade montane grasslands of the Western Ghats, there would be serious consequences for the endemic Nilgiri tahr. Upward altitudinal migration of plants in the Himalayas could reduce the alpine meadows and related vegetation, thus impacting the habitats of several high altitude mammals including wild sheep, goat, antelope and cattle. An increase in precipitation over north-eastern India would lead to severe flooding in the Brahmaputra and place the wildlife of the Kaziranga National Park at risk. Any large-scale change in vegetation to drier types over central and north-western India would also have consequences for the fauna of these regions.

Thus, even in the relatively short span of about 50 years, most of the forest biomes in India seem to be highly vulnerable to the change in climate. As estimated earlier, about 70 per cent of the locations are expected to experience a change in the prevailing biome type. In other words, about 70 per cent of the vegetation is likely to find itself less optimally adapted to its existing location, making it more vulnerable to the adverse climatic conditions as well as to the biotic stresses, which it is subjected to from time to time. As a result, during the process of take-over of one biome type by another, large-scale mortality might be expected. The actual negative impact may be more than what is initially expected from the above description.

This is because different species respond differently to the changes in climate. So, even in the region where there is no shift in the biome type, changes in the composition of the assemblages are certainly very likely. Thus, one expects that a few species

may show a steep decline in population and perhaps result in local extinctions. This, in turn, will affect the other taxa dependent on the different species (i.e., a 'domino' effect) because of the interdependent nature of the many plant-animal-microbe communities that are known to exist in forest ecosystems. This could eventually lead to major changes in the biodiversity.

The north-western region of the country seems to be more vulnerable to climate change, since it is likely to experience the effect of two negative influences: a large temperature increase together with a decrease in precipitation. The vulnerability of the north-eastern region stems from a very different cause. The major increase in precipitation expected in this region is likely to shift the vegetation towards the wetter, more evergreen vegetation. Since these are rather slow growing, the replacement will take much longer, and increased mortality in the existing vegetation may lead to a decrease in the standing stock. _ Forest fragmentation leading to loss of biodiversity by hampering migration of species.

- _ Forest degradation leading to loss of biodiversity, affecting forest regeneration.
- _ Dominance of monoculture species under afforestation increase vulnerability to fire, pests, etc.
- _ Absence of fire protection and management practices enhance vulnerability to fire.
- _ Non-sustainable extraction of timber, fuelwood and NTFPs leading to degradation of forests,
- _ fragmentation of forests and affecting shift of forest boundaries and regeneration of plant species.
- _ Inadequate fuelwood conservation programmes increases pressure on forests, leading to degradation.
- _ Inadequate and less-effective implementation of the different conservation programmes leading to forest degradation.

Moreover, plain targets which would indicate in their achievement, an obvious investment in the systemic correction of institutional contributors to poverty (such as the universal access to quality basic education) have, despite vast mounds of paperwork and statistics no actual progress on the ground. Similarly, attempts to meet government obligations to provide accessible safe potable water to all is undermined by the privatization of water sources. While land reform in favour of marginal and small holders and tenants has been on the books since the early 1960s implementation is so poor that more than half the rural population has no access to land. Other development schemes, costly in both financial and environmental terms, such as industrial development, subsidies to mines or industrialized agriculture, the generation of hydro power and large irrigation projects have actually forcibly displaced between 80 to 150 million people in India, mostly tribal or indigenous or the rural poor, tripping them over into absolute destitution, from reasonable subsistence economies with strong social safety nets and rich and productive environmental resources held in common and conserved through the ages for generations to come.

Most of all the land use changes caused by these policies have done incalculable damage to the precious natural world most of which might shortly be irreversible. On-going encroachment into remaining prime and even secondary forests is the inevitable outcome of these policies and will not halt let alone reverse until price ceases to be the value against which these lands and their resources are estimated for conservation and preservation.

Time and again, in every instance one might say, at least in every documented instance, small to medium scale initiatives (that is projects that cover a few villages or at most a couple of districts at a time) work best. They can be phased to replicate approaches in a step by step manner, rather than entire models; after learning by doing, testing and constantly re-testing on a scale and to an extent that does not demand high investment or rigid commitment to a blue print that might not be appropriate in entirety. They can also be structured to take into account that every project generates substantial changes not only in the area of implementation but in ripples through contiguous areas as even information about it spreads, merely by the fact of it existing, not only by the specifics of what it does. And every subsequent activity or stage of the project can and must, without incredible cost, most of which is not a financial cost, be modified to take these changes into account.

This is particularly true in applications in sensitive eco-systems (and right now every eco-system is sensitive and at tipping point into something quite unknown). Additionally we must at least now, recognize and factor in the understanding of the world environment not as a monolithic set of elements which is how economic breakups and breakdowns of projects take environmental realities into account. That is why approaches such as aggregating carbon emissions is found acceptable however inapplicable to reality. The global environment is made up of an uncountable collage of overlapping and interacting micro ecologies and the only way to address a clean up or maintain a clean up is to address these micro-ecologies individually and with respect for their diversity while at the same time keeping a close watch on how each of these affect the interlocking micro-ecologies. Every child for example knows that in a jigsaw puzzle of the sky, every piece has to still go into the right place even if they are all mostly blue. Repairing our shattered environment is going to be a whole lot more complicated than that. And to work the strategies and projects must be conceptualized and generated from the ground, from each different piece of ground, differently. India's much touted diversity, cultural, geographical and genetic has to be in fact respected and promoted by its government certainly in addressing climate change and bio-diversity conservation and renewal, if in nothing else

Energy

The fact that energy, as an input to any activity, is one of the important pillars of the modern economy, makes the energy policy inseparable from the entire national development strategy... Since important economic sectors such as petroleum, steel, cement, aluminium etc. are energy intensive, the consumption of energy is bound to increase with the development process. India is at present aiming at 8 per cent growth rate, its energy requirements are bound to increase manifold in the near future. Thus, increase in green house gas emissions is inevitable in near future.

This more or less appears to sum up India's attitude to its responsibilities in the Climate Change scenario. There appears to be little or no questioning about the use of such energy generated by polluting processes. There is no doubt that the path of development that will be followed in the established mode, despite every evidence that this is sustainable neither for the environment nor for the population. Indeed all evidence points clearly to a reality that further excursions into this development mode will aggravate economic, political and ecological instability all beyond the tipping point where probabilities of predictions of outcomes are impossible and consequences inevitably disastrous.

Along with India's rising economy comes a mounting hunger for energy, and it cannot sustain growth in the long term without continually boosting the country's energy supply. So India, the world's fifth biggest energy consumer, (and it 10th biggest polluter) is projected to surpass Japan and Russia to take third place by 2030. India will have to at least triple its primary energy supply and quintuple its electrical capacity in order to maintain its growth profile.

India has four main energy ministries: Coal, Petroleum and Natural Gas, Non-conventional Energy Sources, and of Power. Several other government agencies, including the Planning Commission and Department of Atomic Energy, play a role in energy policy. The non-conventional energy department a sort of sub-section of the Environment Ministry has little influence or control over the energy policies over the

country. It has an equally marginal share of money for the scale of investment in alternative technologies required to make an improvement in either the living standards of the people, poverty eradication or the emissions level or therefore the climate change situation

Coal depletion and pollution. Coal accounts for more than half of the country's energy consumption. The poor quality of Indian coal, coupled with a lack of infrastructure to clean it, poses a major environmental threat. Corruption and poor productivity dog the industry. Although it is the world's third biggest coal producer after the United States and China, India's coal reserves could run out in forty years, according to the Brookings report though India's own estimates suggest that they will last another 100 years. The largest number of CDM projects currently in India is in relation to cleaning coal and industrial energy consumption. These projects directly increase industry profitability with negative spillover to the general populations since every offset allows for increase in polluting industries.

Rising oil imports. Oil consumption, which accounts for roughly a third of India's energy use, has increased six fold in the past twenty-five years. India now imports about 65 percent of its petroleum. With energy demands rising, the figure could be as high as 90 percent by 2025, according to a report by the Center for Strategic and International Studies. The oil demand has pushed India to make deals with countries—such as Sudan, Syria, and Iran—that raise supply concerns.

Natural gas demands. Natural gas consumption has risen faster than any other type of energy source, but India's limited domestic gas reserves spell a need for foreign dependency in this sector as well. The government has slowly been switching from highly polluting coal-fired power plants to plants using natural gas. India's natural gas needs have resulted in negotiations with nations of concern in terms of reliability, including Iran, Bangladesh, and Burma.

Inefficient electric systems. Although 80 percent of the country has access to electricity, unreliable power grids cause regular blackouts. Furthermore, inefficient electric systems result in at least a 30 percent loss of power along the delivery chain (Forbes.com). State electricity boards run the infrastructure behind the country's power distribution and own a large portion of electrical output. The boards are in poor financial shape, largely because they provide power at highly subsidized rates, particularly to farmers. Although the government has loosened limitations on foreign investment in the power sector, private investment is certainly not going to undertake the supply of subsidized power to a dispersed rural population.

Nuclear energy. With fourteen nuclear power plants run by state-owned companies, nuclear energy accounts for just 3 percent of India's energy consumption. New Delhi hopes to boost this sector through a deal allowing U.S. companies to sell equipment, nuclear fuel, and reactors to India. Even though large scale expansion of the nuclear energy sector will likely take decades because of slow implementation and the relatively higher expense when compared to other forms of energy, the preparatory work in installations.

Non-conventional energy. Hydro power is the source of choice with over 250 large and medium dams and half as many again of small run of the river projects on the cards. At present about 25 per cent of electricity is generated from this source, the rest from solid fuel (except for the 3 per cent of nuclear energy). Wind and solar power are negligible at present; geo-thermal and tidal sources are not presently viable for consideration.

The main point in this summary of India's energy utilization is to emphasize that the far greater part of this is towards the production of industrial goods: cement and other construction materials, iron and steel production, refineries, the chemicals industry etc. A substantial proportion is in the manufacture of consumer durables and luxury goods, little of which benefits the poor. Few of these energy production systems are directed at providing the low energy needs of poor rural communities. The centralized systems of production that the technologies and economic paradigms are currently predominantly ensuring investment require large consumption by few consumers for profitability. Due to the national grid system over 30 and perhaps as much as 40 per cent of power generated (which means 15 to 25 per cent of the fuel consumed) is wasted in transmission losses alone. A good proportion of these losses will be ascribed to rural electrification. So why is India not investing primarily in local small scale renewables? Can it be that the aim of enhanced energy production is to further the enrichment of the elites making these decisions for India rather than to actually address energy poverty issues? If so, why should this pollution be written off against the poor sections of society that do not benefit from the economic growth of the country but rather suffer from it? Is a large poor population an offset asset? In which case how will development and climate change be addressed in the existing paradigm and set of priorities?

Gender Implications of Climate Change and current Policy measures

What issues might reasonably be identified as "gender" concerns in a situation of economic meltdown, chronic political dysfunction and climate disasters? It would probably need more than a small part of a small analytical paper to comprehensibly examine these. Particularly in a complex set of societies as is India. We may try however to summarize some of the most drastic and the most obvious repercussions of bad policy in this climate and social environment. certainly the constant and almost only allusion to women's needs or issues in say energy issues is a reference to smokeless chulas or in the case of economic motivators, micro-finance, which are peripheral to the core issues of change.

Given that the entire technological, economic and political infrastructure of today's Indian society is eminently patriarchal and caste-discriminatory in its outlook, objectives and functioning, gender sensitization would require serious overhauling of the entire set of systems. The range of policies and laws recently emerged and still emerging on the Indian scene are both individually and taken together, directed at concentrating wealth even more in the hands of the even fewer.

Smallholdings and marginal landholding, collectively owned land and common lands are all in process of being consolidated for:

- privatized, large scale farming using intensive chemical inputs, demanding intensive irrigation and opening opportunities for bio-engineered crops
- afforestation, plantations and conservation projects industrial and commercial development, urban expansion

All these intensified land use changes have consequences not only for women's livelihoods but also for food access and water access of families and communities. The assurance of these is the most important responsibilities of women and the absence or denial of access to resources that produces these, the cause of more than merely additional burdens on women.

Loss of such access and management control, even more the appropriation of lands is the prime cause of migration of men, children or entire families to more urbanized centers where they hope to gain work enough to survive. Social problems linked to this forced migration are trafficking, usually of women and children, bonded and child labour, intensification of homelessness, hunger, disease related to malnutrition and communicable diseases, substance abuse, denial or lack of access to schooling, early marriages with higher infant and maternal morbidity and increased violence against women and children due to their amplified vulnerability without homes or stable incomes. Environmental outcomes are the depletion of the lands, waters and bio-diversity due to intensification of productivity by mechanical and chemical forcing, the additional emissions due to large scale land use changes. Loss of food security and food sovereignty for the poor, since large scale “productive” farming usually focuses on distant markets and monoculture cash crops. Given India’s determination to shift a sizeable segment of its fuel needs to domestic consumption, a substantial quantum of these appropriated lands can be anticipated to be devoted to agro-fuels production.

None of these impacts are gender neutral; though to assume the worst impacts on women are direct might be a mistake. With traditional relations and safety nets of community living wiped out with evictions and migrations, women also suffer secondary consequences of the psychological, emotional and economic trauma experienced by their men. With traditional livelihoods and roles eradicated (and with these hope for their futures), men frequently experience acute disempowerment which manifests itself in desertion of families and the responsibilities they find themselves unable to bear, suicide, self harm through substance abuse and the expression of their fear and frustration in violence. Women are not only expected to endure all this as primary scapegoats, very often, but also to hold families and communities together through all this, putting additional strains on their coping capacity, their own health, both physical and mental, and their own prospects which have to be held aside prioritizing the survival of the family.

The high priority accorded “industrial development” in terms of subsidies, grants, tax breaks and other preferential treatment certainly does no good to gender balancing societies which are already elitist and male dominated. Most industry offers better employment to men if not exclusively to men so the increase in industrial investment offers unequal opportunity even if all other factors were equal. Most of the investment anticipated is in the core industries (the primary, “heavy” industrial production of extraction and raw material processing) which is increasingly mechanized if not robotic and computerized to the extent where the demand for labour is really a demand for highly skilled professionals: a market that the poor and displaced, especially women who have even less access to education than the men, certainly cannot tap, and which is itself shrinking. The present expanding demand for services first of all cannot last very long, given the state of the world economy. It is unlikely that any political regime in any country will survive the unchecked export of desperately needed jobs no matter how effectively this reflects in corporate balance sheets.

Whether we accept it or not the global meltdown will (as a mere side-effect, perhaps) radically reduce the number of service sector jobs that semi-professionals are finding (such as call centers). Other services such as tourism and hospitality industries will also suffer a reduction of market as the impact of the recession or depression comes home to professionals over the next two or three years. All these sectors prefer to employ and do largely employ women as do piece work contractors and for similar reasons.

Unexpectedly large numbers of women with limited skills will be unemployed and as unemployment in general threatens the middle classes, semi-professionals and professionals, women of these classes with themselves suffer similarly to poor women and from similar problems.

Pollution, contamination and poverty all affect women, their health, livelihoods, and their roles and status far more radically than these do men for at least one simple and biological reason: women are child bearers and this makes them more vulnerable. There are of course other social, economic and political vulnerabilities many of them direct extensions of the childbearing role, many only remotely so if at all. In what can only be described as a “hard core” patriarchal set of societies like India this vulnerability is magnified proportionately.

Of course one obvious and much implemented or should we say rather attempted strategy is the selective empowerment of women: economically politically and socially. Unfortunately backlash to such preferential programmes is already a recognizable phenomenon and in situations of economic depression or social upheaval, such as those likely to be caused by and amplified in the coming Climate Change scenario, is likely to erupt in magnified phenomena of violence and repression, very often reversing decades of slow and small steady gains for the status of women.

One more major outcome of climate change and its natural impacts coupled with current policies will exacerbate is armed conflict. This has been reiterated so often it is unnecessary to repeat it perhaps. However we do need to factor in the horrendous and compounding effects of such conflicts whether international or internal on women. Wars over natural resources are already rampant over the Middle East and Africa. Similar wars are also happening in South America and Asia but at a somewhat lower intensity and disguised by labels such as terrorism, secession, communalism, ethnic and similarly dismissive and disenfranchising descriptions. The by far greater majority of these conflicts is also described as “domestic” i.e. contained within national borders, and is therefore somewhat exempt from official and formal international scrutiny or intervention. This exemption of course merely magnifies the horrors of events and permits on-going atrocities to escape justice. It also allows such conflict to expand and spread, officially unseen, even if at a terrible price to all parties.

In India itself despite government’s ingenious and glib assertion that *...over a billion people speaking different languages, following different religions and inhabiting rural and urban areas, live in harmony under a democratic system* there are more than 16 states with chronic and worsening conflict scenarios; in some states in the North eastern region for instance, there are and have been multiple such conflicts for decades now. All these extremely violent disputes have substantial numbers of women and children indeed even men civilians as casualties; in fact as has been pointed out in numerous reports of human rights violations and UN human rights mechanisms assessments of the Indian situation women and children have often been targeted as valuable and vulnerable strategic marks.

In conclusion

It is probably safe if depressingly so to say that gender concerns are not perceived as a fundamental issue to be incorporated at all levels of the climate change discourse in country across all policy lines or internationally, despite the lip service accorded to

women, women's issues and women's potential contributions, even despite the unavoidable evidence that women are being impacted differentially and mostly worse than men, carrying a heavier burden as direct consequence and have more to gain from actively participating in solutions.

This exclusion is compounded of course by all the usual multipliers: race, ethnicity, religious affiliation, caste and class. It is also passed on inter-generationally, further compounded: poverty breeds greater poverty unless adequate and effective resources are introduced to change the basis of the poverty cycle. no micro schemes whether of finance or principle or any other goods or service will replace what is required: a complete revaluation and redirection; from the inside out affecting all policy, programmes and laws and ensuring that inevitable lacunae are addressed on-going.

There is so far more at stake than a cultural bias or a flourishing economy: what is at stake is survival of human beings, of future generations and more than that. However as has been said several times during the UNFCCC discussions, what we cannot learn the climate will teach us. It seems certain that the teaching will be a great deal more expensive and tragic than most of us would like to believe. We are certainly not learning fast enough or as decision makers, perhaps at all.