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MAUSAM

.... talking climate in public space



EDITORIAL

People all over the world concerned about ecological crises have been emboldened by a remarkable statement from an unusual quarter: the recent statement by Pope Francis, the head of the Roman Catholic Church, which draws our attention to the systemic roots and causes underlying a range of contemporary ecological crises. Known as an encyclical (which are papal communications to bishops or, in more recent years, public statements from the Pope to people at large on matters of grave importance; there have been roughly three hundred in the 2,000 year history of Christendom), Pope Francis' encyclical *Laudato Si: On Care for Our Common Home* issued in June 2015 highlights a range of contemporary ecological crises – climate change, the lack of fresh water for drinking and other essential needs, the loss of biodiversity – and beyond: the decline in the quality of human life, social fragmentation and the breakdown of societies, inequality on a global scale, the need for dignified employment, etc. The Pope's statement is vast in the range of issues it touches upon and remarkable for the lucidity with which it discusses them.

What makes it extraordinary is a combination of factors: one, whom it has come from, the head of the Catholic Church worldwide, which ensures it will be read and discussed among the billion-strong followers of the Catholic Church and Christians of other denominations. For instance, in Mangalore (and doubtless elsewhere in India), it was discussed by meetings of Catholic priests to understand it better, some of them then wrote brief pieces about it in Konkani and Kannada. Priests we met and spoke to about the encyclical said its contents would be discussed at Sunday mass and among Church followers at large. The encyclical is a document worth being translated into Indian languages in its entirety and widely discussed in India beyond the Church, among students, people's organizations, unions, mass movements. In a recent interview on *Democracy Now*, Naomi Klein, the author of *This Changes Everything*, has said how movements in Brazil, against large dams, against oil drilling and other social movements are making the encyclical more popular, translating it into local languages, making radio ads and videos based on it, etc (interview with Amy Goodman, *Democracy Now*, 4 August 2015).

The encyclical is also extraordinary for the lucidity with which it weaves together a range of causes that underlie ecological crises, and its precision in identifying them: "The problem," it says, "is aggravated by a model of development based on the intensive use of fossil fuels, which is at the heart of the worldwide energy system." It blames the throwaway culture of modern life, reckless consumption by the rich, and persistent inequality. One basic problem is the way humanity has taken up technology

and its development ... attempting to “extract everything possible from things”. As a consequence, we have accepted, it says, “the idea of unlimited or infinite growth, which proves so attractive to economists, financiers, and experts in technology. It is based on the lie that there is an infinite supply of the Earth’s goods, and this leads to the planet being squeezed dry beyond every limit.”

Some issues touched upon in the encyclical find resonance in some of the pieces in this, the fourth issue of *Mausam*. The article by Sayantoni Datta makes clear how the poorest are the ones to be most impacted by climate change, sometimes in ways that we can barely anticipate (in this case, forced human trafficking in the Sunderbans). As does the piece by Anshu Ogra on the impacts on coffee plantations in southern India. MV Ramana’s critique of Professor James Hansen’s advocacy of fast breeder reactors warns us that a technocratic solution would scarcely be the way forward to combat global warming. Soumya Dutta’s piece on the so-called ‘hiatus’ reminds us that the problem of global warming has not gone away, and continued greenhouse gas emissions will necessarily mean a hotter planet. And there’s the strong statement issued by organizations who participated in the Climate Space at the WSF in Tunis in March 2015, which begins: “The capitalist system has exploited and abused Nature, pushing the planet to its limits, so much so that the system has accelerated dangerous and fundamental changes in the climate.”

Both the Tunis statement and the Pope’s encyclical have been timed to appear in the public domain before the 21st Conference of the Parties (COP21) in Paris, later in December this year. A number of countries have made public either their national contributions (INDCs) or their governments’ positions on energy matters, the latest being the Obama government’s position on coal emissions (in our view, the US government’s policy measure, while partially a welcome step, will be limited in its actual gains as far as climate change is concerned). India’s own INDC is expected in September. It is however debatable whether the framework in which these COP discussions take place can address the key issues that underlie global warming and other ecological crises, which is relentless consumption by the better-off, and the underlying logic of endless accumulation and growth.

However, even as an economic alternative to capitalism is clearly at the heart of the matter, the struggle continues at many levels, and each of them remain meaningful – the popular pressure needed to push for a more just INDC from the Indian government; the growing worldwide campaign against fossil fuels which enables the climate justice movement to identify a key enemy in the battle against climate change; the need for alternative practices to cushion climate impacts (such as agroecology, discussed in this issue), and the centrality of linking climate justice with economic and social justice (and hence their respective movements), as discussed by Jutta Kill in her interview we carry. We are clearly at a key moment in planetary history, as the Paris COP will determine what unfolds in these next few key years regarding climate change, as to whether we can ensure that global warming remains below dangerous levels. But the key determinant will be popular pressure from below, before and beyond the COP at Paris, to ensure a safe space for other species and for future generations to come.



CLIMATE CHANGE IMPACTS

Experiencing the Change: Climate Change and Everyday Life in Coffee Plantations of South India

Anshu Ogra

“Unseasonal rains lashes North India”
NDTV, March 2, 2015

“Heavy rains lash North India, crops destroyed”
The Times of India, April 19, 2015

“Potato farmers incur heavy losses due to untimely rains”
The Times of India, April 19, 2015

Recent rainfall events in North India occupied front page news in almost all national dailies. The news channels emphasized that this rainfall was bad for the farmers because they had standing crop in the field that was ready to be harvested. The government jumped into action by doling out relief packages for farmers who suffered crop loss due to this unprecedented weather “event”. The news agencies or government bodies conveniently treated it as a weather aberration or an as isolated odd weather event. But on the ground, are these aberrations merely a one-day weather event that can be fixed by a certain sum of money? How do famers who have been negotiating with weather or local climate for generations comprehend these abnormal weather events? What happens to the local knowledge when abnormal weather events become the new normal?

In this article we explore these questions by looking at the specific case study of coffee growers in South India. The article reflects on coffee growers’ experience of normal, abnormal and probably the new normal rainfall patterns. This article is based on field work carried out over a period of seven months spread over four years (2011-2015). During this period, over seventy coffee growers were interviewed in the Chikmagalur, Hassan and Coorg districts in Karnataka and Dindigul (Palani) and Salem (Yercaud) districts in Tamil Nadu.

Normal weather for coffee

The coffee plant is extremely sensitive to weather conditions and is therefore correctly considered to be a highly unpredictable crop. Weather is so crucial a factor that coffee traders closely monitor the weather conditions of the major coffee producing countries before making investment decisions. The specific conditions required for its growth are available only in subtropical regions at an altitude of 1,800-3,600 feet and in tropical regions at an altitude of 3,600-6,300 feet. A slight variation in its physical conditions, including the weather pattern, is markedly reflected on the crop.

Botanically speaking, the coffee plant is a woody perennial evergreen plant that belongs to

the *Rubiaceae* family. Its two main species that are cultivated today are *Coffea Arabica*, known as Arabica coffee, and *Coffea canephora*, known as Robusta coffee. Arabica coffee is grown in relatively cool climates in the region. The optimum temperature required is between 15-24°C (59-75°F), year round. Photosynthesis slows down when the temperature rises above this range, and frost damage can occur when temperatures hover around 0°C. Ideally, 1,500-2,500 mm of rain ought to fall over a nine-month period with a three-month dry season coinciding with the harvest. A period of moisture stress (rain after a dry spell) helps cause a homogenous flowering and therefore promotes a clearly defined harvesting season.

Coffee growers in South India, as I discovered, probably because of the plants sensitivity to precipitation, have a habit of maintaining rainfall records at their plantations. Rainfall is usually recorded through a calibrated rain gauge that is kept in an open area, generally the drying yard. Measurements are taken every day, almost like a religious ritual. Therefore, it would be fair to conclude that coffee growers' experience of weather fluctuation, at their particular estate, can be backed by objective data.

OBSERVATIONS FROM THE FIELD

a) Lateral shift in the monsoon

The beauty of the monsoon pattern in the shade growing coffee regions is its distribution. In coffee, the quantum of rainfall is not as important as the distribution pattern over the period of five months, which is crucial. Instead of being distributed over five months, the major chunk of monsoonal rainfall is now concentrated within two months. Dr. Anand Perriera, a grower known for his extensive investments in irrigation systems, claimed that "there is a lateral shift in the monsoon". According to him, if twenty years ago the temperature touched 32°C it meant that they would have a downpour. But in 2010, the temperature touched 33°C and yet there were no sign of clouds. This he felt was adding to the unpredictability with an increase in "sudden downpours". He further added that this kind of downpour leads to soil erosion, making coffee plants more fragile and thus enabling new kinds of pests and diseases.

b) Rains during the dry spell and untimely blossoming

Traditionally mid-November to early February is considered as the dry period in the belt receiving the south-west monsoon. However, the dry spell is not entirely dry any more. Sporadic showers are recorded during this time. Geetha Suresh, another planter, while mentioning the importance of the dry period in determining the success of the following rainfall, mentioned that early December is the period when the soil had been recently manured and this is halfway into the period of the dry spell. Thus even a sprinkle would initiate blossoming. But this untimely blossoming will wither away. This untimely blossom in turn dilutes the impact of the *Revathi* (blossom shower, first rainfall of the season that initiates blossoming). And by the time the full force of the *Revathi* comes these buds would already be lost and hence there would be a net loss even if *Revathi* delivers as per expectation (Suresh, recorded interview, 5 December 2011).

During the interviews carried out in the year 2011, the rainfall in November and December were considered as an abnormality. But by 2014 coffee growers considered this abnormality as the new normal. Growers appeared worried about the implications of this new normalcy. For growers, this meant harvesting small crops 2-3 times a year instead of harvesting a big crop once a year as they have been doing traditionally. This change will have further implications on labour costs (Dr. Pereira, 21/2/14).

c) Delayed blossom showers

Blossom showers, or Revathi Malay, is the first shower of the crop cycle. It is expected after the dry spell of 90 days. It initiates blossoming and triggers the fruits cycle. The time and amount of the blossom shower is extremely crucial for the entire year's crop. For Robusta coffee, blossom showers are expected between early- to mid-March whereas for Arabica they are expected between early- to mid-April. The most common observation was increasingly unpredictable blossom showers. Unlike Arabica, Robusta can be artificially irrigated to ensure that crop cycle begins at the right time. The lack of confidence in the timing of blossom showers is reflected in the increased investment in the irrigation systems. More importantly, growers are shifting from Arabica to Robusta. One of the reasons for this shift is Arabica's complete dependence on blossom showers for initiating flowering.

d) Sudden downpours

T.Krishnamurthy, in Palani hills, Tamil Nadu, mentioned that steep slopes which are a characteristic feature of local topography is becoming a difficult terrain to negotiate as rainfall is getting increasingly concentrated in a two-month period. The sudden downpour, leading to heavy runoff along with relatively above-normal temperatures, result in reduced moisture in soil. The plant as a result suffers from water shortages even if the cumulative amount of rainfall received is as per expectation. Therefore he identifies drought not by the inches of rainfall received but by observing a bubble effect in coffee fruit. "Upon squeezing the fruit if there is gap or air between the pulp and the outer skin of the fruit that means either the fruit has not developed properly or shriveled due to insufficient water availability" (Krishnamurthy, recorded interview, 26/2/14).

e) Pests and diseases

Rainfall is just one variable in the chain of weather events occurring at any plantation. Another important variable is temperature. Exposure to high temperatures for a prolonged period results in high pest and diseases incidences. Plantations located in Hassan district in Karnataka State have been witnessing serious infiltration by White Stem Borer (WSB) in *Arabica* plants. Coffee White Stem Borer, *Xylotrechus quadripes*, is a serious pest of *Arabica* coffee causing a yield loss up to 40 per cent in all coffee-growing areas of India (*The Hindu*, 22 May 2014). *Robusta* plants, on the other hand which are relatively resistant to White Stem Borer, are attacked by Berry Borers. The coffee berry borer, *Hypothenemus hampei*, is a small beetle. *Arabica* growers in Palini Hills maintain



Coffee ripe and unripe same time



Coffee flowering in december

thick shade cover in order to protect their plantations from White Stem Borer. They in turn are infected by leaf rust. Leaf rust is another name for *Hemileia vastatrix*, a fungus.

The worst infestation of White Stem Borer (WSB) was experienced during the drought of 2002-2005. It is known that during drought conditions, infestation incidences increase due to lack of rainfall. But unlike previous drought incidences, *Arabica* has not been able to recover in this region since then. According to H.R. Bassana “temperatures are relatively higher. WSB stays dormant during the rainy season but appears again once the rainfall stops” (Bassana, recorded interview, 21 November 2011).

Drought is thus associated not just with failure of one or two crop cycles but with loss of the entire plant due to infestation. In order to break this cycle of infestation, growers are increasingly switching to Robusta in agro-climatic zones that permit this transition. As is evident now, risk assessment of drought for a grower also includes the investments in redesigning the plantation from *Arabica* to *Robusta*.

Response strategy and concluding remarks

Traditionally India is an *Arabica* coffee grower. However, *Robusta* is increasingly replacing *Arabica* even though *Robusta* fetches a lower market price in comparison to *Arabica*. This transition is because a) *Robusta* is less susceptible to White Stem Borer b) *Robusta*, unlike *Arabica*, can be artificially irrigated c) *Robusta* needs less manual care and is thus less labour-intensive. *Robusta* does not need thick shade either. This means that native tree cover is dispensable in the *Robusta* plantation. Moreover, to ensure returns on investment the native tree cover is being replaced with silver oak which is treated as a timber crop in ten years or so. However, this technique of hedging returns in the face of unprecedented weather variations has implications for the local climate in the long run.

For a coffee grower, weather events are not isolated incidences. Due to the increasing number of unprecedented weather variations, growers are forced to modify their negotiating stakes with the local climate. Switching to a different coffee variety and relying on other sources of income from the plantation are visible reflections of these modified negotiations. In such circumstances a relief package to compensate for the deviance from the normal weather event fails to capture the implication of the variations as experienced locally.

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Human Trafficking and Climate Disasters

Sayantoni Datta

While human trafficking is a complex problem that plays on a number of vulnerabilities that facilitate the crime, slowly disaster-affected areas or those areas impacted by climate change are increasingly showing evidence of becoming danger zones or source areas of human trafficking.

A new dimension needs to be included in the work of disaster and relief workers- human trafficking. There is growing evidence to show that climate affected regions hit by a regular spate of disasters have slowly begun to emerge as source zones of trafficking. The climate-affected southern part of West Bengal, the Sunderbans, is no exception. In recent reports along the Indo-Nepal Border similar trends are visible calling for a need to keep vigil and surveillance on trafficking along the Indo-Nepal Border.

Gender-based violence and human trafficking have only recently been incorporated as an important lens to risk reduction in disaster work. However no clear strategies exist to combat the risks of human trafficking in climate affected parts of the country.

The human trafficking issue is most often conflated with issues of migration. While there is a tendency to intermingle migration with human trafficking, the characteristic nature of human trafficking has an intrinsic criminal element of force, which resembles modern day tactics and technologies of enslaving the vulnerable. It is here that the narratives of migration and human trafficking depart and take on their own journeys, one where elements of choice and free citizenship are present and the other of violence, threat, loss of mobility, freedom and a life in servitude.

Climate Change Impacts in the Sunderban Delta

A severe cyclonic storm, 'Aila', made a landfall over West Bengal coasts after a long gap of about 20 years. It crossed the coast in the morning of 25th May 2009. Aila evolved from a tropical disturbance in the central Bay of Bengal. The disturbance developed into a tropical cyclone on 24th May moved in northerly direction and further intensified into a severe cyclonic storm early on 25th May centered over northwest Bay of Bengal near Lat. 21.5° N / Long. 88.0° E on the West Bengal coast. It may be mentioned that the movement forecast given by India Meteorological Department for cyclone 'Aila' before 24 hours of its landfall was almost the same as its observed track. It continued to move in a northerly direction after landfall and weakened into a cyclonic storm at 1500 UTC of 25th May, 2009 over Gangetic West Bengal, close to Kolkata.

The areas and districts affected by the cyclone in West Bengal include East Midnapore, Howrah, Hooghly, Burdwan, South 24 Parganas and Kolkata. In West Bengal state, more than 100,000 people, were left homeless as a result of Aila. At least 100 river embankments were breached by the storm surge produced by the cyclone. Throughout the country, at least 150,000 people were left homeless. In a small island bordering the biosphere reserve and close to the Bangladesh border near the southernmost tip of West Bengal, off Hingalganj, people received

the warnings. However, they treated it just like any other storm that passes by these coasts and only took routine safety measures. They were unable to predict the extent of damage through the warnings. In a village M off the border, near Hingaljanj, while not many people died during Aila, many people went missing, a few months after the cyclone had hit the village.

The Sunderbans: Accumulated disaster risks

The Sunderban Delta is the largest contiguous mangrove delta in the world. It is a fragile ecosystem designed by the unique intermixing of saline and fresh waters as the rivers meet the sea. The formation of mud flats with the continuous flow of sea tides depositing fresh silt along the edges of the deltaic islands make the ecology of the Sunderbans dynamic.

Retreating coastlines have resulted in many people being displaced from Sunderbans, as embankments have not been able to withhold the entry of the sea.

Besides a retreating coastline, according to the Geological Survey of India, about 50 percent of the Tiger Forest Reserve is already under sea level. The increased shortage of wildlife space and the increase in population and heightened dependence of locals on forests in fast shrinking mangrove forests has created a constant man-animal conflict in the region, where people engaged in fishing, agriculture and honey collection activities are regularly attacked by crocodiles, tigers, snakes making all these activities extremely hazardous in nature.

The dynamics in Sunderbans have been steadily changing due to an overall change in global climates. It is predicted that more than half of the delta region will get submerged due to Sea Level Rise (SLR). That is, 50 percent of the islands will disappear and this comprises 96 percent of the habitat of the tigers living in forest reserves that border the sea. Besides Sea Level Rise (SLR), the coasts being submergent, there is a rise in sea level naturally due to natural subsidence of the islands hence enhancing the sea level rise locally to higher levels than global average estimates.¹

The rate of erosion and loss however is not uniform and different parts of Sunderbans face different degrees of loss with many local factors influencing this change. Recent satellite images have shown that 9,900 hectares of land in Sunderbans was lost in one decade due to coastal erosion. Islands such as Ghoramara have shrunk to half its size.²

There is a frequency in flooding of the islands due to breach of embankments after rising sea levels which has resulted in increased salinity levels in soil and water, making both soil and water unfit for agricultural and domestic activities in the inhabited parts of the islands. This was a particularly dramatic impact observed after Cyclone Aila hit the islands and created untold devastation in the region. Several years after the disaster, communities are still trying to come back to normalcy and resume their livelihoods and rebuild their assets.

Future climate change scenarios predict that with increase in sea level temperatures, there will be an increase in the vulnerability to tropical cyclones and flooding and a rise in wind speed due to increase in sea surface temperatures. The risks of flood and cyclones is very high with high mortality levels, projected yields in rice production will however be higher in the coming fifty years, and there will be loss of some specific plant and animal species due to over exploitation and due to environmental changes, biotic pressures and change in habitat

1 While global estimates on sea level rise have been recorded at a rate of 3 mm/year, regional scenarios (which still need more elaborate research) are at 3.24mm/ year (UNEP, 2004) in the Sunderbans. Studies have shown that 85 sq km of forests in last twenty years and 200 sq. km of land has been lost in the last seventy years due to sea level rise. (UNEP, 2004)

2 <http://www.thehindu.com/news/cities/kolkata/sunderbans-losing-green-cover-and-land-mass-says-isro-study/article6972057.ece>

conditions. This places the islands in a situation of creeping and accumulated disaster risks.

Demographic Shifts due to Climate Change

It is said that after Aila, huge out-migration started from the villages to the rest of the country. There is a growing exodus from the low-lying islands facing the Bay of Bengal.³ Due to loss of lands and sources of livelihoods and shelter with regular floods and disaster, people have continued to migrate to nearby cities and towns in search of work. Post Aila, adjoining small town areas closer to the mainland are seeing staggering increases in population. Between 2001 and 2011, Jaynagar town in the Sunderbans saw a 64 percent increase in population, Patharpratima, a 51 percent rise, Minakhan a 46 percent increase and Kakdwip a 35 percent rise.⁴

However during the phase when out-migration happened, there has also been a growing evidence of human trafficking. Several instances have been found of people reported to have been missing, after leaving the village for work. Most of them have not returned since the last four years.

Trafficking after the Disaster

Aila is one of the most dramatic memories amidst the regular frequencies of storms and silent floods that hit the Sunderban people. The immediate impact of Aila was loss of valuable sources of livelihood and many lives. Fish, cattle, livestock and other animals died soon after the floods hit. Several people were left homeless since the flood demolished the fragile mud and bamboo structures that they lived in almost immediately.

The preliminary impacts reported after the disaster was that houses were destroyed, the water was contaminated and people rendered homeless. There was a lack of food and water to drink. Since government support came only after 15 days, it was community and NGO support that reached the village first. In many cases there was an increase in acts of robbery in the area. After 3 days there was an influx of people, but there was no clear picture, aid came from many unrecognised sources and communities. This had its pros and cons.

Bringing in relief into the area meant a lot of outsiders coming into the area as well. At this time they received rations from the government for six months and continued relief and support from NGOs and others. A local NGO worker reports, "Seeing the vulnerabilities, many parents decided to send off their children to better or safer places. So, parents were told that children would be taken to a relatives' place nearby, but instead they were trafficked outside. While there was need to keep a migration register by the Panchayat, this only recorded names of adults and not those who were underage." At this point people were migrating out because the living conditions were extremely grim, for the homeless, this was challenging. Thus many people got trafficked during this time. A local leader observes, "It was post Aila that so many people migrated out to Tamil Nadu, Gujarat, and elsewhere. There were many people who came across the border from Bangladesh as well."

Village child protection committees or those who keep vigilance on trafficking under ordinary circumstances did not get the time to monitor events of movement of people. Migration registers were not maintained and in most cases underage populations were not being recorded in them even though adult movements were tracked. There have been large numbers of minors trafficked from the area.

The area became vulnerable to trafficking of all kinds. So deep were the vulnerabilities that a

3 <http://in.reuters.com/article/2015/04/07/india-sundarbans-migration-idINKBN0MY0B420150407>

4 *Ibid.*

network of traffickers, were able to penetrate into the village and build local networks, which were wide enough. So strong were these networks at the local level that there is a regular stream of people being trafficked from these regions now.

For four years after Aila, normal cultivation was not possible. There was a loss of fodder and fuelwood. Fish stocks had died and due to high salinity, water could not be used for domestic or agricultural purposes. Remoteness of the islands, made ferrying of these articles an extremely expensive affair. Thus for months, people along the riverside who lost their homes, lived in plastic tents, had limited sources of income and food. Many had lost their lands, as their lands were now submerged under the sea. Villages bordering the river had an abnormally high number of widowed households.

During this time many migrated through less used transportation routes such as the coasts and seas. Families got fragmented leading to compounded vulnerabilities. While men went in search of work, women lived alone with children in hazard-prone areas where there was a shortage of food and resources. They were thus vulnerable to exploitation. In many other parts, children had no food to eat. Parents, who were helpless, relied on unknown people to take the children to safer places to stay. In many cases, traffickers promised work against sums as low as Rs 200 to not more than Rs 2000.

Most missing persons in these parts fall within the 14-18 year category. The number of females in this age group category are higher and the maximum are reported missing from this age group category. In village M, off Hingaljanj, post Aila, 13 girls from age 14-20 have gone missing since 2009 and not been found. Only 3 girls have been found and restored back to their families. The numbers are equally high in neighboring villages.

Most of the girls went with others in search of work since there was nothing to sustain family needs at home. In most cases, the conditions of work were of bonded nature for both men and women. Where girls went missing and did not return, there was a clear suspicion that the girls had been trafficked into the sex trade in cities like Delhi, Kolkata, Bangalore among others. Girls in village M were also taken to Bangladesh, Manipur and other destinations

After six years, several attempts are being made at the community level to improve and recover from the damages and be better prepared. Livelihoods are slowly being explored. Farming has begun and harvests have been better. Embankments are being constructed and afforestation begun. The trafficking networks have however become larger and better connected. Less prosecution and reporting as a crime have created a lot of immune systems for the networks to operate.

As disaster vulnerabilities reduce, the crime is morphing into more complex forms exhibiting increased violence, in genuine methods of hoodwinking victims before kidnapping them, use of chemical substances to disorient victims which have life long impacts, threats to family and infiltration into local systems through sophisticated corruption. The need of the hour is therefore better vigilance, bringing structural changes in local law enforcing agencies to keep increased vigil on the crime and better ways to bring in protection of livelihood and adequate compensation for the accumulated disaster risks faced by the people of the Sunderbans.

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Betting on the Wrong Horse: Fast Reactors and Climate Change

MV Ramana

In the last decade or so, many people who would likely identify themselves as environmentalists have turned to nuclear power as a way to deal with climate change. Among them are James Lovelock, Patrick Moore, James Hansen, and George Monbiot. Of these, Hansen has to be, and in some circles has been, taken most seriously. He is, after all, arguably the scientist who has done the most for raising concerns about climate change. What is also notable about Hansen is that he argues not just for any kind of nuclear power, but one based on a specific kind of a reactor — a fast reactor.

Climate change is such an important threat to our planet that it is quite justified to assess whether nuclear power should be deployed to a much larger extent as a way of reducing carbon dioxide emissions. This article does not — deliberately — address that question in general, but focuses on whether fast reactors could play a significant role in such a strategy. I argue below that because of the multiple problems with such reactors, relying on fast reactors to combat climate change is misguided.

In his book, *Storms of my Grandchildren*, Hansen explains the details of the reactor and how he came to believe in the potential of this reactor system:

“When asked about nuclear power, I am usually noncommittal, rattling off pros and cons. However, there is an aspect of the nuclear story that deserves much greater public attention. I first learned about it in 2008, when I read an early copy of *Prescription for the Planet*, by Tom Blees, who had stumbled onto a secret story with enormous ramifications — a story that he delved into by continually badgering some of the top nuclear scientists in the world until he was able to tell it with a clarity that escapes technical experts. I have since dug into the topic a bit more and observed how politicians and others reacted to Blees’ information, and the story has begun to make me slightly angry — which is difficult to do, as my basic nature is very placid, even comfortably stolid.

Today’s nuclear power plants are “thermal” reactors, so-called because the neutrons released in the fission of uranium fuel are slowed down by a moderating material. The moderating material used in today’s commercial reactors is either normal water (“light water”) or “heavy water,” which contains a high proportion of deuterium, the isotope of water in which the hydrogen contains an extra neutron. Slow neutrons are better able to split more of the uranium atoms, that is, to keep nuclear reactions going, “burning” more of the uranium fuel.

The nuclear fission releases energy that is used to drive a turbine, creating electricity. It’s a nice, simple way to get energy out of uranium. However, there are problems with today’s thermal nuclear reactors (most of which are light-water reactors). The main problem is the nuclear waste, which contains both fission fragments and transuranic actinides. The fission fragments, which are chemical elements in the middle of the *periodic table*, have a half-life of typically thirty years. Transuranic actinides, elements from plutonium to nobelium that are created by absorption of neutrons, pose the main difficulty. These transuranic elements are radioactive materials with a lifetime of about ten thousand years. So we have to babysit the stuff for ten thousand years—what a nuisance that is!

Along with our having to babysit the nuclear waste, another big problem with thermal reactors is that both light-water and heavy-water reactors extract less than 1 percent of the energy in the original uranium.

Most of the energy is left in the nuclear waste produced by thermal reactors. (In the case of light-water reactors, most of the energy is left in “depleted-uranium tailings” produced during uranium “enrichment”; heavy-water reactors can burn natural uranium, without enrichment and thus without a pile of depleted-uranium tailings, but they still use less than 1 percent of the uranium’s energy.) So nuclear waste is a tremendous waste in more ways than one.

These nuclear waste problems are the biggest drawback of nuclear power. Unnecessarily so. Nuclear experts at the premier research laboratories have long realized that there is a solution to the waste problems, and the solution can be designed with some very attractive features.

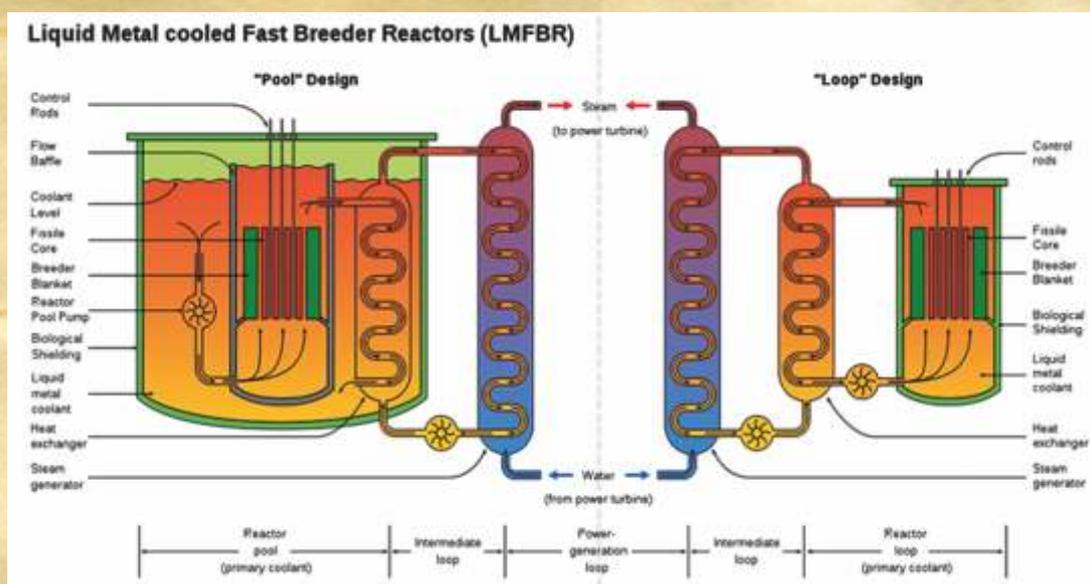
I am referring to “fast” nuclear reactors. Fast reactors allow the neutrons to move at higher speed. The result in a fast nuclear reactor is that the reactions “burn” not only the uranium fuel but also all of the transuranic actinides — which form the long-lived waste that causes us so much heartburn. Fast reactors can burn about 99 percent of the uranium that is mined, compared with the less than 1 percent extracted by light-water reactors. So fast reactors increase the efficiency of fuel use by a factor of one hundred or more.

Fast reactors also produce nuclear waste, but in volumes much less than slow (thermal) reactors. More important, the radioactivity becomes inconsequential in a few hundred years, rather than ten thousand years.”

All of this description clearly suggests that Hansen thinks of fast reactors as a good, if not perfect, solution. Elsewhere he has expanded on the various other virtues of fast reactors. What Hansen does not talk about, however, are the various problems with fast reactors. And we have about six decades of experience with those problems.

Hansen actually does refer to the long history of fast reactors in his book, saying: “The concept for fast-reactor technology was defined by Enrico Fermi, one of the greatest physicists of the twentieth century and a principal in the Manhattan Project, and his colleagues at the University of Chicago in the 1940s. By the mid-1960s, the nuclear scientists at Argonne National Laboratory had demonstrated the feasibility of the concept.”

The demonstration of the feasibility of fast reactors actually goes back to the early 1950s, with the Experimental Breeder Reactor constructed in Idaho in the United States. The term breeder is significant. It refers to the fact that in some fast reactors, those neutrons that are escaping the core are captured by a blanket made of “fertile materials”, which then eventually get transformed into a new element that is itself fissile, i.e. can be used as a fuel in a reactor core. An example of



2 Schematic diagram of a Fast Breeder Reactor (generally liquid sodium cooled)

such a fertile material is uranium-238, which gets converted into a fissile isotope of plutonium, plutonium-239. Uranium-238 is the most common isotope of uranium, constituting about 99.3 percent of naturally available uranium. It is this process of conversion of uranium-238 into plutonium-239 that makes a fast reactor utilize uranium much more efficiently.

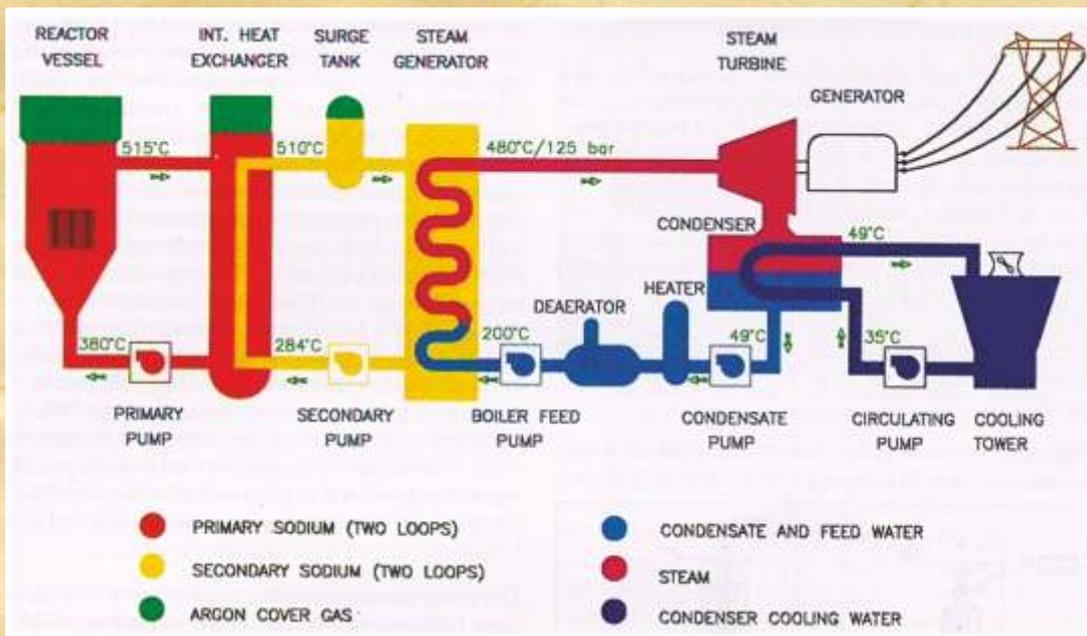
If the fast reactor is designed suitably, it could produce more fissile material in its blankets than is consumed in its core. It is then said to “breed” plutonium and these reactors are called breeder reactors. The long-standing attraction of breeder reactors for nuclear power proponents is that when nuclear power was first developed, uranium was thought to be scarce and there was widespread concern that global resources would be insufficient to support the anticipated large expansion of nuclear power. This is why the United States started constructing the EBR-I so early into its nuclear power program.

Nuclear Meltdowns

Indeed, on December 20, 1951, EBR-I became the world’s first electricity-generating nuclear power plant when it produced sufficient electricity to illuminate four 200-watt light bulbs. On June 4, 1953, the U.S. Atomic Energy Commission announced that EBR-I had become the world’s first reactor to demonstrate the breeding of plutonium from uranium. About two years later, on November 29, 1955, the reactor had a partial core feed meltdown, not something that Hansen appears to talk about in any detail.

A decade later, in October 1966, it was the turn of Fermi-1 (yes, named after the famous physicist), a demonstration fast breeder reactor located in Lagoona Beach, Michigan, which suffered a partial core meltdown. What is more interesting is the cause of the accident. Pieces of zirconium from the “core catcher”, a safety system that is supposed to prevent molten fuel from

liquid sodium into a part of the core, leading to those fuel elements melting down because they could not be cooled. The implication; additional safety features, could, under some circumstances, end up causing accidents in unexpected ways.



3. Schematic of the Indian Fast Breeder Test Reactor at Kalpakkam (40 MW thermal),

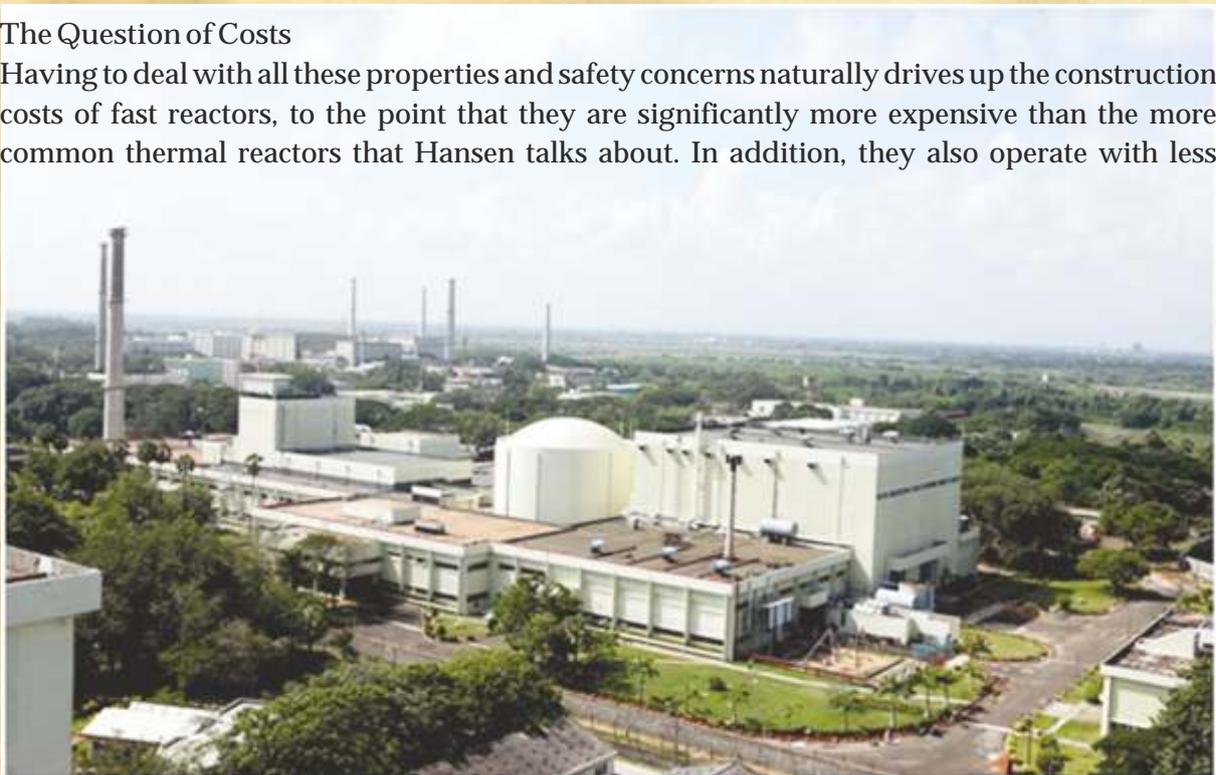
These meltdowns also have a different cause that has to do with operating a nuclear reactor using fast neutrons. In fast reactors, when fuel starts melting locally and coming closer together, it increases the rate at which the chain reaction occurs. If this process were not stopped extremely fast — for example, by the insertion of control rods that absorb neutrons — the runaway reaction would cause the pressure inside the core to rise fast enough to lead to an explosion. Again, it was an illustrious physicist, Hans Bethe, who pointed out this possibility back in 1956. Such an explosion could fracture the protective barriers around the core, including the containment building, and release large fractions of the radioactive material in the reactor into the surroundings. This so-called “core disassembly accident” has therefore been a longstanding safety concern with fast reactors.

A second difference between breeder reactors and the more common thermal reactors is their choice of coolant. Because breeder reactors do not have any moderator to slow down neutrons, their cores, where most of the fissions, and thus energy production, occur are smaller in size as compared to thermal reactors. Thus, their power density will be much higher. Efficient transfer of this heat requires the use of liquid metals rather than the more commonly utilized water. The coolant that has been used in all demonstration breeder reactors to date is a liquid metal that melts at relatively low temperatures — sodium.

Though sodium has some safety advantages, it reacts violently with water and burns if exposed to air. This makes fast reactors susceptible to serious fires. Almost all fast reactors constructed around the world have experienced one or more sodium leaks, likely because of chemical interactions between sodium and the stainless steel used in various components of the reactor. Finally, since sodium is opaque, fast reactors are notoriously difficult to maintain and susceptible to long shutdowns.

The Question of Costs

Having to deal with all these properties and safety concerns naturally drives up the construction costs of fast reactors, to the point that they are significantly more expensive than the more common thermal reactors that Hansen talks about. In addition, they also operate with less



4. The Indira Gandhi Centre for Atomic Research, where FBTR is located.

reliability. Economically, therefore, fast reactors have proved to be uncompetitive with current-generation thermal reactors.

This is the main reason that decades after breeder reactors were piloted, no country has successfully built a commercial breeder reactor. France, the country that is most reliant on nuclear power in the world, did try. The Superphenix started operating in 1986, experienced a series of accidents, and was shut down in 1997. During this period, it generated less than 7 percent of the electricity of what it could have done at full capacity. Currently, only a few demonstration reactors are being built or operated, the Prototype Fast Breeder Reactor that is being constructed in Kalpakkam in Tamil Nadu being one such reactor. This result is not for want of trying; just the OECD countries, between themselves, have spent about \$50 billion (in 2007 dollars) on breeder reactor research and development and on demonstration breeder reactor projects.

In today's electricity markets, with nuclear power rapidly losing ground to cheaper renewables, the idea that fast reactors would establish an economically viable path forward for nuclear power is far-fetched, to say the least. Hansen's advocacy of fast reactors therefore seems a little at odds with current economic realities.

What of Nuclear Waste?

What of the other argument Hansen makes; about the ability of fast reactors to deal with the nuclear waste problem. Here again, what is not mentioned is as important, if not more important, than what is said. First, actinides are not the only long-lived radioactive materials produced in a nuclear reactor. There is also what is called fission products, some of which have a very long radioactive half-life; Technitium-99, for example, has a half-life of 200,000 years. Second, there are so many actinides and they have a variety of nuclear reactions that are trying to "transmute" (i.e., convert) them into elements that have shorter lifetimes, or even radioactively stable elements, requires an elaborate strategy involving the reprocessing of spent fuel, multiple rounds of special fuel fabrication, and irradiation in fast reactors. In 1996, the U.S. National Academy of Sciences examined the potential benefits of such a scheme and concluded: "none of the dose reductions seems large enough to warrant the expense and additional operational risk of transmutation". Third, just in the process of doing this transmutation, a large quantity of radioactive materials that are currently held within the spent fuel from nuclear reactors will be released into the biosphere in the form of liquid or gaseous wastes. This is what happens at all reprocessing plants and estimates of the radiation dose to populations around the world from just the gaseous fission products routinely released by reprocessing plants suggest that these exceed the doses from future leakage from geological repositories.

To conclude, James Hansen's advocacy of a nuclear solution to climate change based on fast reactors is misplaced. The six decades of global experience with breeder reactors shows that they are very problematic, much more so than nuclear power in general. So any strategy based on rapid construction of these untested technologies is very likely to suffer from setbacks. There is simply not enough time for us to go down these blind alleys.

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FALSE SOLUTIONS

Institutionalizing forest diversion and legitimizing institutional fraud: The new Compensatory Afforestation Bill a recipe for disaster

Soumitra Ghosh

This article has two parts. The first takes a general look at the process and mechanism of compensatory afforestation and Compensatory Afforestation Fund Management and Planning Authority (CAMPA), and how communities are affected by this. The second is a point-by-point critique of the Compensatory Afforestation Fund Bill introduced in the Spring Session of Indian Parliament.. It has been since sent to the MoEFCC(ministry of Environment, Forests and Climate Change) Standing Committee for review.

PART 1 :

DEFORESTATION AND COMPENSATORY AFFORESTATION

Communities Victimized Twice

India's forests continue to be diverted for non-forest purposes to provide land for development projects routinely cleared by the concerned regulatory authorities: despite a number of legislative safeguards (as provided by acts like Forest Rights Act and PESA), such diversions usually happen without the consent, and often, knowledge, of communities whose sustenance depends on the forests being diverted. The forests being destroyed not only signify loss of precious natural landscapes and biodiversity-rich habitats but also displacement of people who have been traditionally part of those. This displacement is seldom recognized and recorded during official rehabilitation and resettlement processes that sometimes form part of the big projects — the compensation is measured and quantified only in terms of monetary value, that too in a very narrow and limited scale: people's livelihood links and cultural associations with forests have seldom been taken into account while identifying project-affected communities eligible for compensation. These provide the context for the first layer of displacement in cases of forest diversion: destruction of natural habitats and landscapes and, inseparable from that, destruction as well as extreme disruption of community economy and ecology. This displacement is visible and palpable — forest landscapes change to mines, industries, reservoirs and housing complexes, physically displaced people are found to migrate elsewhere while those remaining are left to deal with loss of livelihood resources as well as a badly altered environment on their own.

The second layer of displacement associated with any case of forest diversion, however, goes largely unnoticed. This stems from the concept of compensatory afforestation (CA), which means raising of plantations largely in land not officially recorded as forest, in lieu of forests being diverted. Not much can be or is normally known of such lands where such plantations come up — sometimes lands quite distant from a project site are used. Neither statutory Environmental Impact Assessments (EIAs) usually undertaken prior to forest diversions for large projects nor forest and environment clearances issued by state regulatory authorities and the central MoEF provide detailed information about the legal status, existing users and physical characteristics of lands selected for compensatory afforestation. Questions related to social and environmental impacts resulting from allocation of such land are usually ignored.

The term 'compensatory afforestation' itself is objectionable and paradoxical: it first signifies a loss of forest, and then implies that an 'afforestation' to compensate that loss will take place. Therefore the issue is primarily of negation, deforestation and displacement and not really creation and afforestation—the afforestation comes later, only when the original forest is lost.

What is Compensatory Afforestation (CA)?

The mechanism known as compensatory afforestation derives from the Forest (Conservation) Act, 1980 (hereafter "FCA"), which stipulates that any diversion of forest land because of development projects or for other reasons will be subject to the approval of the Government of India. This approval is known generally as 'forest clearance' (hereafter FC): conditionally issued by the Ministry of Environment, Forests and Climate Change (hereafter MoEF), Government of India. A forest clearance usually lays down certain 'conditions' which have to be complied with: if a 'user agency' (the agency which applies for FC) fails to prove compliance, the clearance can be suspended, or if necessary, revoked. One important obligatory condition is that of compensatory afforestation — the applicant agency has to 'compensate' the loss of forests either by raising and maintaining plantations on its own, or paying someone (usually the Forest Department) to do so.

Though initially FCA was conceived as a deterrent to rampant and rising events of organized and largely government-sponsored deforestation in various Indian states, and did not provide for compensatory afforestation, its subsequent Rules and executive 'Guidelines' framed and issued by MoEF from time to time kept on coming out with elaborate and constantly changing prescriptions about compensatory afforestation. *Interestingly, the Act itself (including the Rules) does not define it at all – or provide for it in so many words: the FCA Rules as amended in 1988 and 2003 started to include applications forms in which user agencies would apply for using forest land. One item in the form was compensatory afforestation; which meant that the applicant agency had to furnish details of proposed compensatory afforestation.*

From the mid-1990s on, the Supreme Court of India started taking an interest in the matter, and one could say that its interventions are responsible for the present mechanism of compensatory afforestation, which has gone way beyond raising plantations, and incorporated the forest/biodiversity valuation mathematics central to all offset systems. It is no longer enough to raise plantations — the user agency has to pay full 'value' of the biodiversity content and environmental services of a forest it seeks to divert to compensate for forest loss, in addition to raising plantations.

Valuing forests: emergence of twin concepts of NPV and CA

The notion of compensation for loss of forests and destruction of biodiversity, which is at the heart of compensatory afforestation, came to be expanded with the adoption of Net Present Value (NPV) for forests being diverted; from 2006 onwards, the MoEF adopted this mechanism on an-all India basis. It is unclear however, which concept came first — in a way compensatory afforestation too entailed a primitive kind of value exchange — land for land, and trees for trees. The Supreme Court's rationale in accepting the NPV mathematics of forests was that compensatory afforestation was an inadequate means and a poor substitute for natural forests.¹

The adoption of NPV meant that for each approved instance of forest diversion, the concerned state government and MoEF started getting paid: the more such forest diversions, the more money deposited with the governments. It was the issue of management of funds collected by the state from CA that eventually determined the future mechanism and resulted in the setting up of an apex body that would centrally manage and control funds collected towards compensatory afforestation and Net Present Value.

CAMPA: structure, mandate and functions

The compensatory afforestation fund, made of payments deposited by user agencies for NPV, CA, CAT (obligatory Catchment Area Treatment that user agencies have to carry out in cases of land-based projects like mining and dams) and other purposes, is currently managed under the ad-hoc Compensatory Afforestation Management and Planning Authority (CAMPA), a body that was constituted by the Supreme Court in July 2006.² Before this, the MoEF framed guidelines in February 2004³. Payment received as NPV will help recreate forests, and strengthen existing conservation; it is envisaged as a multi-pronged miracle machine that will destroy forests and yet churn out whole forests complete with wildlife.

The ad-hoc CAMPA currently manages around Rs 38,000 crore⁴, a sum collected since 2009 under the broad categories of compensatory afforestation and Net Present Value.

The dangerous illusion of compensated forest diversion: communities under attack

Instead of halting deforestation and strengthening conversion of forest habitats and forest biodiversity, CA is legitimizing destruction of forests and hurting community stakes in those. A study⁵ carried out by independent researchers and civil society organisations in 2013-14 came up with enough evidence to prove that both the concept of 'no net loss'/'compensatory forests' and the money it produces are being used against forest communities. The attack against communities is happening in broadly four ways: 1. community-held forest lands, agricultural areas and pasture are being acquired by state and user agencies in the process of obtaining land for CA plantations. 2. The money in CAMPA fund is being used in extending the territorial limits of existing wildlife conservation areas like wildlife sanctuaries, national parks and critical tiger habitats, often directly encroaching upon community lands and facilitating the displacement of forest communities. 3. Both these processes are leading to completely illegal denial of a range of old and new community rights, tenurial as well as others, and severely curtailing community access to forests. 4. Most important of all, by creating and sustaining the illusion that destruction of natural forest habitats can be compensated in monetary terms and by raising plantations, all ecologically and socially impermissible deforestation events are being green-washed and legitimized. In reality, much of the money is probably being misappropriated, and plantations as claimed are seldom if at all coming up: there is not even the required amount of land to raise such plantations

PART 2 :

A CRITIQUE OF THE

COMPENSATORY AFFORESTATION FUND BILL, 2015

About three-fourths of the new Compensatory Afforestation Fund Bill tabled in the Lok Sabha consists of the proposed institutional mechanism for receiving and spending the money that has been accumulating in the ad-hoc Compensatory Afforestation Management Planning Authority, deposited by various user agencies who had used forest lands for various activities in the past, and continue doing so. Most of it does not merit attention and below, we present questions/comments only on certain portions/aspects of it, followed by a few general observations.

Preamble

...monies received from the user agencies towards compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, net present value and all other

amounts recovered from such agencies under the Forest (Conservation) Act, 1980; constitution of an authority at national level and at each of the State and Union territory Administration for administration of the funds and to utilise the monies so collected for undertaking artificial regeneration (plantations), assisted natural regeneration, protection of forests, forest related infrastructure development, Green India Programme, wildlife protection and other related activities and for matters connected therewith or incidental thereto.

The phrase “and other related activities” and for matters connected therewith or incidental thereto” gives the widest possible latitude to proposed disbursement and utilization of funds, meaning that any and all sorts of activities can be sponsored through CAMPA funds.

“AND WHEREAS absence of permanent institutional mechanism for utilisation of funds collected by the State Governments and Union territory Administrations is the main reason for accumulation of huge unspent funds in the ad hoc Authority”

Absence of institutional mechanism cannot be realistically cited for a reason for huge unspent funds in ad hoc CAMPA; 2013 CAG report on Compensatory Afforestation and CAMPA rightly pointed out that even in cases where state forest departments had money for plantation, not much could be shown on the ground as activities actually undertaken. Instead, CAMPA funds have been used for highly questionable purchases or in legally questionable manner. A recent report in Times of India, Nagpur, citing a monitoring report prepared by Maharashtra State Forest Department, reiterates that most of the compensatory plantations shown on paper do not exist. The independent study in 2013-14⁶, bear this out, not only for Maharashtra but for several other states. The point here is that the entire process of compensatory afforestation is a scam and falsehood rolled into one: on the one hand it helps sustain the myth of environmental offsets by promoting the idea that forests lost at one place can be replaced by raising plantations at another, often geo-ecologically and culturally removed from the original site of deforestation. On the other, the plantations that are supposed to be raised seldom come up; the money for that is either used for other purposes or grossly misappropriated.

Definitions

(d) “compensatory afforestation” means afforestation done in lieu of the diversion of forest land for non-forestry use under the Forest (Conservation) Act, 1980;

It needs to be mentioned that the Forest (Conservation) Act, 1980 does not provide for such afforestation, this provision came much later, in the subsequent rules and elaborated upon partly as a result of of judicial interventions.

(e) “environmental services” means—

- (i) provision of goods such as wood, non-timber forest products, fuel, fodder, water and provision of services such as grazing, tourism, wildlife protection and life support;
- (ii) regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soil, air and water regimes;
- (iii) non-material benefits obtained from ecosystems, spiritual, recreational, aesthetic, inspirational, educational and symbolic;
- (iv) supporting such other services necessary for the production of ecosystem services, biodiversity, nutrient cycling and primary production;

The spectrum of widely diverse tangible things naturally found within forest ecosystems, in

conjunction with an assortment of concepts and ideas, have been termed as 'environmental services', a term which should not be used in any law, because it does not agree to precise definitions. There are, at present, no scientific and universally accepted definition of what constitutes such 'services' or whether a forest ecosystem can be thus defined in terms of separate, compartmentalized and precisely identifiable services. A forest is a ecological continuum and whole, which supports and contains material things as well as concepts. Its so-called 'services' distinguish the natural system, but cannot be rationally alienated from it as 'services'.

(j) "net present value" means the "quantification of the environmental services" provided for the forest area diverted for non-forestry uses, as may be determined by an expert committee appointed by the Central Government from time to time in this regard;

"Net present value" is yet another questionable term that cannot have any place in the law. The entire issue of valuation of forests is highly controversial and no established models exist which take into consideration the myriad tangible and intangible values, most of those non-commercial, economic or financial in any definable way, a forest system supports and contains in a given point of time. The definition of environmental services as provided in the Bill also includes "non-material benefits obtained from ecosystems, spiritual, recreational, aesthetic, inspirational, educational and symbolic". How can these be valued in economic terms? Or will the net present value calculation exclude such 'non-material' benefits?

II. 3(5)

(5) There shall also be credited to the National Fund—

(a) grants-in-aid received, if any, by the National Authority;

(b) any loan taken or any borrowings made by the National Authority;

(c) any other sums received by the National Authority by way of benefaction, gift or donations.

One questions why a fund created primarily because of judicial intervention and for a specific purpose will be free to receive 'grant-in-aid' and other funds by way of 'benefaction, gift or donations'? Is it a legal authority under the management of the central government, or a charitable trust set up by benevolent citizens for philanthropic reasons? Is the real reason for keeping these provisions to have a ready institutional set-up to receive international (including bilateral) funds which might accrue in the wake of future international negotiations on climate change and the Convention on Biodiversity (CBD) ?

4. (3)

There shall be credited into the State Fund established under public accounts of a State—

(i) the unspent balance of all monies which has been transferred by ad hoc Authority to the State Compensatory Afforestation Funds Management and Planning Authority constituted in such State in compliance of guidelines dated the 2nd July, 2009;

(ii) all monies transferable from the National Fund under clause (a) of section 5;

(iii) receipt of all monies from user agencies by such State towards compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, net present value, catchment area treatment plan or any money for compliance of conditions stipulated by the Central Government while according approval under the provisions of the Forest (Conservation) Act, 1980; and

(iv) the funds recoverable from user agencies by such State in cases where forest land diverted falls within the protected areas, that is, areas notified under sections 18, 26A or 35 of the Wild Life (Protection) Act, 1972 for undertaking activities relating to the protection of biodiversity and wildlife.

In effect, the above provides for transfer of the larger parts of the money currently being held in

ad-Hoc CAMPA fund (38 thousand Crores and more) to the state CAMPA authorities. In addition, the state authorities will be free to collect money from other sources, such as grants-in-aid, benefaction, gift or donation. Once again, the same questions need to be asked—why should a specialized agency constituted for carrying out a specific task (which, in this case, is to utilize a specific fund) should need to collect additional money for discharging its duties?

(4) A State Government may also credit to the State Fund constituted by it—

(i) grants-in-aid received, if any, by the State Authority constituted in such State;

(ii) any loan taken or any borrowings made by the State Authority constituted in such State;

(iii) any other sums received by the State Authority constituted in such State by way of benefaction, gift or donations.

5. Save as otherwise provided in this Act, the monies available in the National Fund shall be disbursed and utilised in the following manner, namely:—

(a) ninety per cent of all the monies collected by a State, which has been placed under the ad hoc Authority and the interest accrued thereon, shall be transferred to the State Fund established in such state under sub-section (1) of section 4;

6. Save as otherwise provided in this Act, the monies available in a State Fund shall be disbursed and utilised in the following manner, namely:—

(a) the money received for compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, catchment area treatment plan and for any other site specific scheme may be used as per site-specific schemes submitted by the State along with the approved proposals for diversion of forest land under the Forest (Conservation) Act, 1980;

(b) the money received towards net present value and penal net present value shall be used for artificial regeneration (plantation), assisted natural regeneration, forest management, forest protection, infrastructure development, wildlife protection and management, supply of wood and other forest produce saving devices and other allied activities in the manner as may be prescribed;

(d) all monies realised from the user agencies in accordance with the decision taken by the Standing Committee of the National Board for Wild Life constituted under section 5A of the Wild Life (Protection) Act, 1972 or the orders of the Supreme Court involving cases of diversion of forest land in protected areas shall form the corpus and the income therefrom shall be used exclusively for undertaking protection and conservation activities in protected areas of the States and the Union territory Administrations and in exceptional circumstance, a part of the corpus may also be used subject to prior approval of the National Authority;

Instead of defining what precise activities will be eligible under the law, broad ranges of 'activity categories' have been proposed: "forest management, forest protection, infrastructure development, wildlife protection and management, supply of wood and other forest produce saving devices and other allied activities in the manner as may be prescribed". None of these activities are activities per se, or have been defined as such. Instead, each one of those can be interpreted as a bundle of separate activities as may be 'prescribed'. It is expected that the prescription would come from the state CAMPA authorities, consisting mainly of forest officers. This is nowhere provided that utilization of money from CAMPA fund has to be pre-planned, budgeted and spent in consultation with and with consent of concerned gram sabhas and other democratically elected institutions such as district councils and Gram Panchayats from whose areas forest land/s have been diverted.

The structure of National and state bodies: predominantly comprising forest officers (III,10)—it is thus clear that the money will be entirely used by state forest departments. No provision for significant involvement of the Ministry of Tribal Affairs has been kept, let alone community institutions.

v. 28(2) The annual report of a State Authority shall, inter alia, provide for—

- (i) the number and location of each reforestation, afforestation and conservation activity subject to the requirement of this section;
- (ii) the amount and location of lands in hectares, cleared, conserved and planted in connection with the activity; and
- (iii) the amount of afforestation money collected and expended.

Given the dismal experience of compensatory afforestation throughout India, and concerns over gross financial irregularities raised by various official agencies from time to time, there is no point in assigning the state bodies a monitoring role — there will obviously be a conflict of interest. Monitoring of actual plantations raised with funds from CAMPA must be done by neutral agencies in close collaboration with community institutions like the Gram Sabha.

General Observations

The *Statement of Objects and Reasons* appended to the bill repeatedly mentions the CAG's (Comptroller and Auditor General, India) observations about Compensatory afforestation and ad-hoc CAMPA, and states that the present bill has been framed keeping in mind and in accordance with those:

The Comptroller and Auditor General in its report on Compensatory afforestation in India (21 of 2013) observed that given the substantial amounts of funds being collected under the compensatory afforestation, the expenditure therefrom, the overall objectives of conservation, protection, regeneration and management of forests, conservation, protection and management of wild life and its habitats and compensatory afforestation; the clear public purpose involved in the work relating to CAMPA, *“there is need to review the existing paradigm of CAMPA”*. *“The Comptroller and Auditor General recommended that this should be done in a way that enhances transparency, brings CAMPA within the broader focus of both Parliament and State Legislatures and in greater public view so as to ensure the largest possible stakeholders' participation.”* (italics added)

The present bill apparently is not creating anything substantially different from ad-Hoc CAMPA, other than providing for that state forest departments will have almost total control of the huge funds already lying with the ad-Hoc CAMPA, and the new money that will be deposited. Instead of making the exercise more transparent and bringing it to greater public view, the bill effectively takes the fund and its disbursement away from judicial scrutiny and legitimizes an institutional structure that allows for more corruption and financial irregularities, and potentially empowers the state forest departments and the Ministry of Environment, Forests and Climate Change to utilize the funds for any purpose they deem fit, thus excluding and hurting interests of entire communities who lose most when forests are diverted. The funds need to be utilized for the welfare of those communities who are being dispossessed, in consultation with them, and through their direct agencies. The same holds true about compensatory afforestation — land for the same has to be demarcated, and plantation exercises taken up in the same manner. By vesting control of the funds in the strong forest bureaucracy in the country, it facilitates a scenario of yet more injustice and rights denial at the grassroots. It will obstruct the implementation of FRA and PESA, because one apprehends that the funds will be utilized to undermine those.

More importantly, the state forest officers will see this as a direct incentive to promote and expedite forest diversion — the red tape and jurisdictional ambiguities over ad-hoc Campa funds have hindered large-scale tinkering with the funds so far. In the present scenario, the CAMPA Bill smoothens the process of unimpeded access to those funds and takes away hindrances.

The Bill stands on legally as well as scientifically questionable premises, excludes most of the stakeholders whose concurrence in both forest diversion and raising new plantations have now been mandated by law (FRA and PESA), and allows for a top-down bureaucratic practice.

The Bill, in its present form, must be scrapped.

Notes

- 1 T G Godavarman Thirumalpad v Union of India, (2006) 1 SCC 1, paragraph 13 at p.15.
- 2 Order dated 5.5.2006 in T N Godavarman Thirumalpad v Union of India, W.P. (C) No. 202/1995, pending. By an earlier order dated 29/30 October 2002, the Supreme Court directed the MoEF to frame comprehensive rules for the constitution of a body and management of compensatory afforestation funds in concurrence with the CEC.
- 3 Order S.O. 525 (E) by the Ministry of Environment and Forests issued and notified in the Gazette of India. See order dated 23.4.2004 in T N Godavarman Thirumalpad v Union of India, W.P. (C) No. 202/1995, pending.
- 4 The figure has been mentioned in the new CFA Bill, 2015.
- 5 Ghosh, S, Basavaptna, S et al, *Multiple Displacements: A critical look into cases of forest diversion and allocation of land for Compensatory Afforestation (CA) in India*, forthcoming.
- 6 Ibid.

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Has Global Warming Stopped? The case of the mysterious 'hiatus'*

Soumya Dutta

In the last few years, climate change discussion has been bombarded with the word 'hiatus', which literally means 'a pause or break in continuity in a sequence or activity'. The "breaking news" is that, somehow in the last ten to fifteen years, global warming has taken a pause or break. Or at least, that's what has happened to the Earth's warming, with the average annual temperature of the Earth taking a break from rising, which it was doing regularly for the last few decades. This is great news for recalcitrant governments refusing to take meaningful action to tackle climate change and something to celebrate by the dirty energy corporate interests. For the climate change deniers, it's manna from heaven. All these years, they claim, scientists have been creating an unfounded fear psychosis about catastrophic climate change. And this has given all the 'ill-informed activists' a great talking chance to an even lesser informed 'public'.

What is the reality? As there is a lot of material available in the public domain on this, let me confine this coverage only to the analysis of some actual instrumentally recorded data, while also pointing to a few important markers (in no particular order of importance).

1. The selection of the year from which the "hiatus" is supposedly on – 1998. The year 1998 experienced an exceptionally strong El Nino (ENSO – El Nino Southern Oscillation). In such years, the heat influx to the atmosphere from the warm Indo-Pacific ocean pool becomes very high, increasing global near-surface temperatures. Thus 1998 was an exception in the trend of rate of temperature rise. So taking 1998 as one's base year skews the comparison.
2. Temperature trends need to be looked at from at least the decadal perspective (change from decade to decade), as yearly temperatures are influenced by many factors (like volcanism, cloudiness and the like).
3. Climate change does not really mean a continuous, un-broken increase in temperature. Along with an increase in average temperature – it also brings erratic, unpredictable changes in temperatures and temperature swings, in rainfall patterns, and the like, over weeks to months to even years.
4. There are 'extraordinary' things happening recently in the 'heavens' (the Sun, specifically) that clearly influenced earth's climate. We will take a closer look at the Sun.
5. There are some oscillatory trends in both the Pacific and the Atlantic Oceans which superimpose themselves on the anthropogenic climate trends (or vice versa). That also means, climate change is a non-linear process, with local and /or internal variability superimposed on the general trend, and not all of that might be known to us yet. And climate science is continuously learning how oceans behave and respond to the changes we are forcing.
6. And – the near-surface temperature records do not cover the entire earth uniformly, with the fastest warming Arctic region (the oceanic part) covered poorly. Similarly under represented are hard to reach places like the deep Amazon, sub-Saharan Africa, Antarctica, etc.

Now let us look closer into these markers/ factors:

1. The choice of 1998 and the “origin of the hiatus idea”: The year 1998 saw an exceptionally strong El Nino (ENSO – El Nino Southern Oscillation) year. In such years, the heat influx to the atmosphere from the warm Indo-Pacific ocean pool becomes very high, increasing the global near-surface temperatures. Of course, there is a slight change from around 2004, but that is not so much discussed publicly. Thus 1998 was an exception in the trend. Look at the graph (below) of yearly temperatures, from the Scripps Institute of Oceanography.

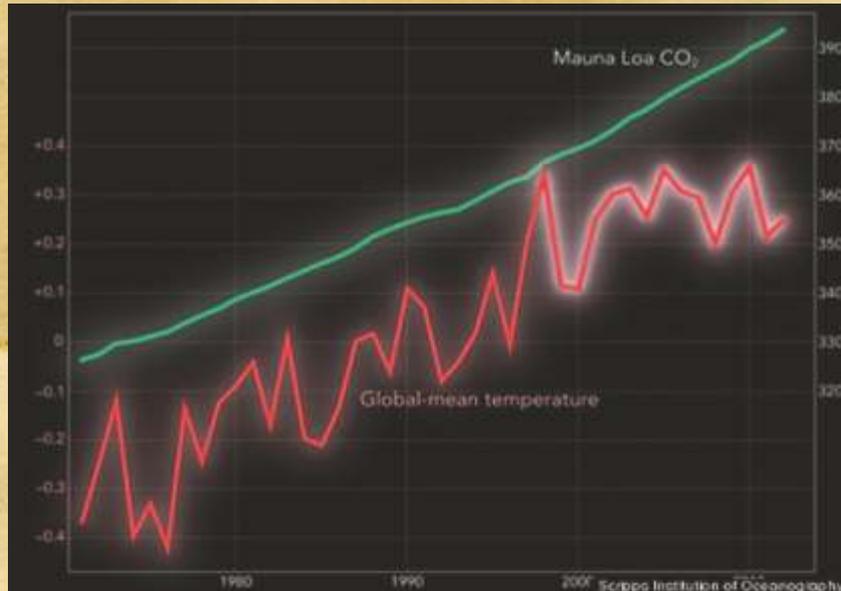


FIG. 1

The year 1998 clearly stands out as a huge anomaly in itself (as was 1973). And if we discount this one year, the temperature increase anomalies (departure from the trend) are not that great. The graph below shows this – the thin red line takes the hot 1998 as a middle point, while the thick red line considers a longer and continuous yearly trend. And the thick red line does not show a marked slowdown in temperature rise.

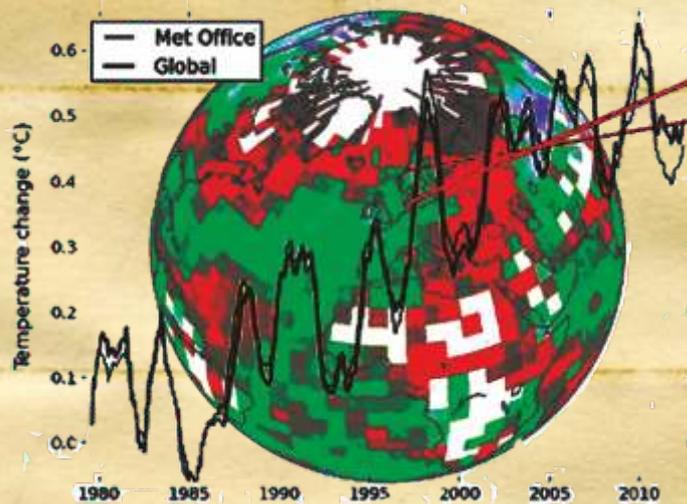


FIG. 2

In fact, the average of more number of years, or decades (pointer 2), show the decadal temperature anomalies (area under the zig-zag curve in Figure 1) are actually far closer to the ‘normal’ trend line. But if we just look at the yearly figures, and choose 1998 as the baseline year, then the idea of a “Hiatus’ can easily be formed. Just to do a counter argument, suppose we choose the year 2000 as a baseline, and see the trend? It’s a faster temperature rise than the trend. And none of these will be

showing the true picture. In spite of that, a slight slowdown is indeed noticeable from around the year 2004.

2. Time frame of temperature trends: Let's now look at the decadal temperature record of the last thirteen decades (below), from WMO (World Meteorological Organization) records.

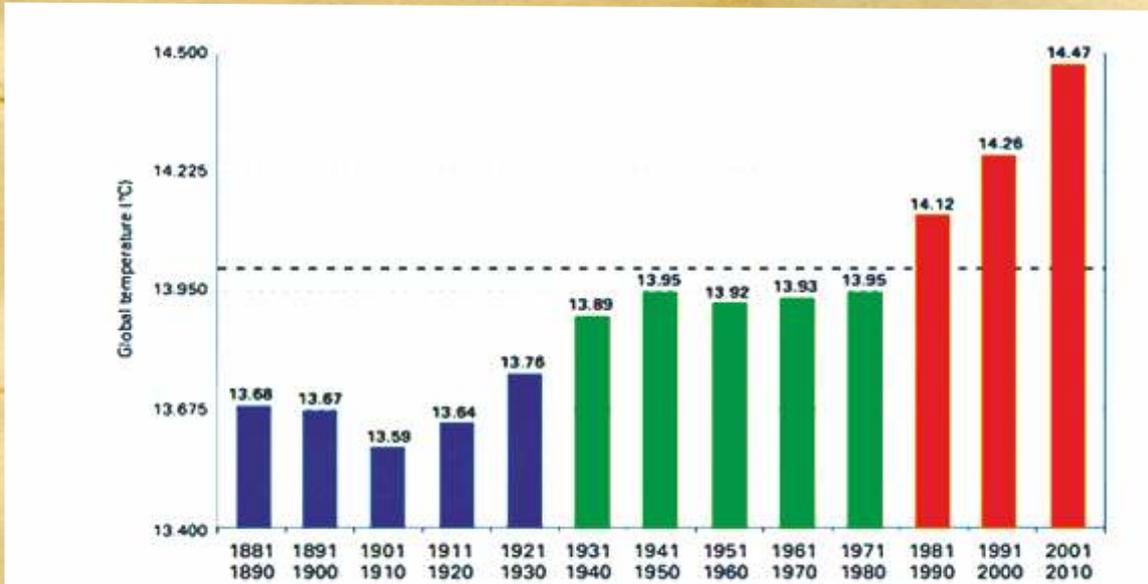


FIG. 3

early warm year, and the warming do not seem to have 'paused' after that. Actually, if there was a general 'hiatus', it was from the 1940s to the 1970s, and this was largely due to the high sulphur content in petroleum and coal, which was being emitted in the course of economic activity, sulphate aerosols having reflective properties and hence reducing incoming solar radiation. Once desulphurisation of fuels became widespread, this 'hiatus' too vanished.

Next, let us look at the recent records of the five warmest years, measured in terms of global mean temperature till date (comparative chart from RealClimate.org), from some of the best institutional records, and till 2013 (each January-end, temperature records of the previous year are uploaded).

TABLE 1

| Rank | NASA GISS | NOAA NCDC | HadCRUT4 | Cowtan & Way |
|------|-----------|-----------|----------|--------------|
| 1 | 2010 | 2010 | 2010 | 2010 |
| 2 | 2005 | 2005 | 2005 | 2005 |
| 3 | 2007 | 1998 | 1998 | 2007 |
| 4 | 2002 | 2013 | 2003 | 2009 |
| 5 | 1998 | 2003 | 2006 | 2013 |

All four series show that 2010 and 2005 were the two warmest years on instrumental records, and both came after 1998. Here too, there is no sign that the earth has stopped warming, or that all the years after 1998 (even though it was one of the strongest El Nino years) or 2004 are colder or at same temperature! Only in three of these four data sets, 1998 even figures in the top five (the one where it do not even figure – takes some measure to factor in the gap in the Arctic temperature records), and it does not top the list in any data set! Also note that all the warmest years (except

1998 itself) in all the data sets occurred after 1998, which shows that the Earth never stopped warming after that year (as climate change sceptics would like us to believe). And in January 2015, NASA, NOAA and other monitoring centres confirmed that 2014 was the hottest year on record, even warmer than 2010 or 2005. On top of that, the ten warmest years on record since 1880 all came from 1998 onwards! So, where is the 'hiatus' or pause/break, even in terms of global mean temperature?

3. The nature of climate change/ global warming: Global warming is not only manifested by just the average temperatures increasing, but also by other indicators, such as the number of very hot days in a year. In a study led by Sonia Seneviratne of the Institute of Atmospheric and Climate Science in Zurich, their research team checked existing temperature data and traced the number of extremely hot days (those days which fall in the hottest ten per cent for that particular day of the year) each year from 1997 to 2010 compared to the average for 1979 to 2012. They then mapped the amount of land area where the number of hot days exceeded a given cut-off number, like if there were 10 or 20 or more hot days than normal. Their finding is that the amount of land area affected by each cut-off/ threshold level of extreme heat increased steadily over time and increasingly, the extreme hot days are affecting – on average – more than twice the land area than similar heat events 30 years ago. According to Ms Seneviratne – *“The term ‘pause’, as applied to the recent evolution of global annual mean temperatures, is ill-chosen and even misleading in the context of climate change”*.

Next, let us also look at the climatic extreme events, which are driven by the increasing temperatures and its consequences like increased moisture in the air. The decade 2001 to 2010 (again, post 1998) was declared by the WMO as the “Decade of Climate Extremes”, as the number and intensity of extreme climate events was by far the highest amongst recorded decadal data. Both the land and Sea Surface temperatures for the decade were highest. To give figures from WMO (taken from the WMO report “2001-2010; A Decade of Climate Extremes”, http://www.wmo.int/pages/mediacentre/press_releases/pr_976_en.html);):

“The decade reported loss of Arctic sea ice, decline in the Greenland and Antarctic ice sheets and global average sea level over the decade was 20 cm higher than that in 1880. The decade was the second wettest since 1901 and eastern USA, northern and eastern Canada and many parts of Europe and central Asia were particularly wet. Floods were the most frequent climate extreme events with big floods in Eastern Europe, India, Africa, Asia (more than 2000 people died in floods in Pakistan in 2010) and Australia. At the same time, many countries in East Africa and the Amazon basin and Australia were also visited by droughts. The decade saw 511 tropical cyclones which killed more than 100,000 people and 250 million were reported to be affected. More than 138,000 people were believed to be killed or missing due to Cyclone Nargis in Myanmar alone in 2008. The decade recorded an astounding 2000 percent increase in deaths from the heat waves (mainly in Europe in 2003 and Russia in 2010) from less than 6,000 in 1991-2000 to 136,000 in 2001-2010.

According to the data of the Centre for Research on the Epidemiology, “a total of more than 370,000 people died due to extreme climate events”. No hiatus is seen in these devastating climate events either. And the present decade – with frequent and massive extreme climate events – is already showing signs of matching or even exceeding the last.

4. The Sun is also a player - Now it is time to look up from the earth's surface and the disasters that climate change brought, to the Sun, which dominates earth's climate. It is well known that the Sun has a roughly 11-year activity cycle where during the peak, the sunspot activity gets high and

the solar radiation coming to Earth also increases. The immediate previous solar roughly 11-year cycle peak was in 2001, and scientists expected the next peak around end of 2012-early 2013, when the Earth was supposed to get increased solar radiation and warm up a little (incoming solar flux varies – with sunspot activity, from around 1365 to $1367 \text{ W}^{\text{m}^2}$ at the top of the atmosphere)

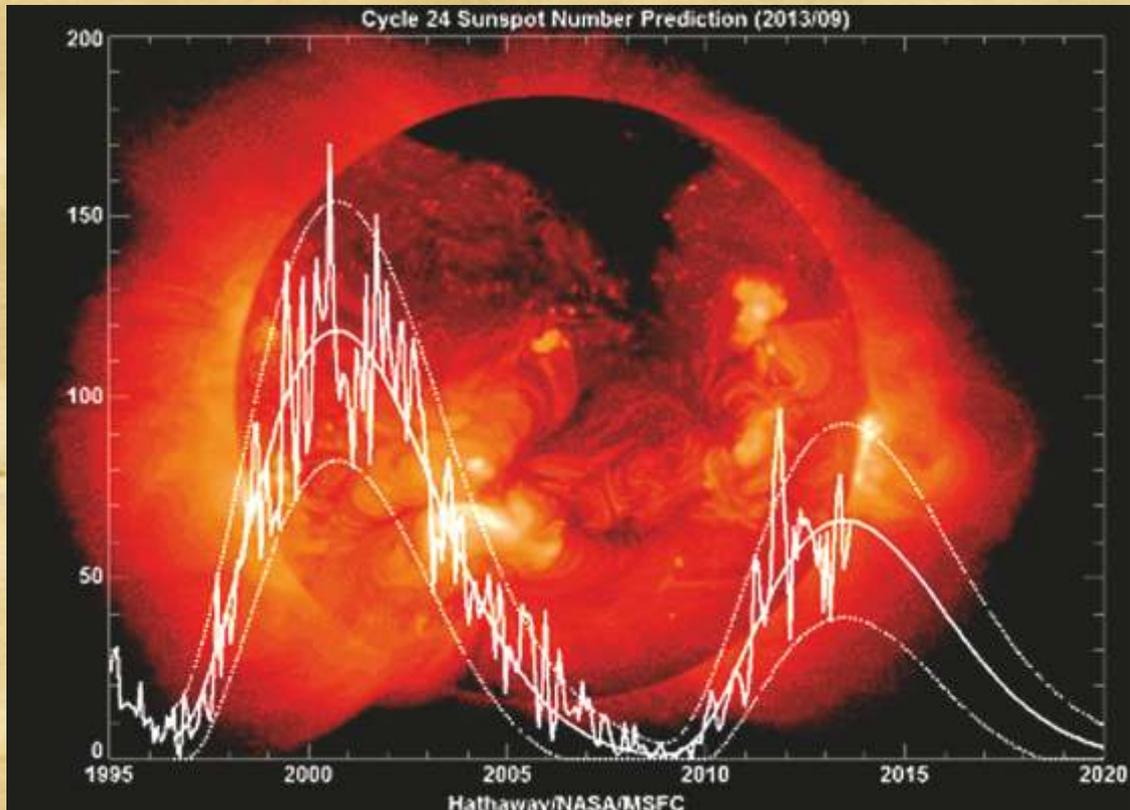


FIG. 4

But the present cycle, Sunspot Cycle No. 24, turned out to be one of the weakest in a long time (figure above – from NASA Marshall Space Flight Centre). This was evident to any regular observer (even this author, with very basic instruments, could follow that over the last 5-6 years), as the Sun played unusually “cool”. Thus the ‘expected’ solar radiation contribution to warming the Earth in the last 10 odd years was not met, resulting in a slight slowdown in warming trend in the last few years. In plain-speak, this means that for the last 8-10 odd years, the amount of solar radiation reaching the Earth’s surface is less than ‘normal’. There are instrumental records to directly prove this. The cause of this ‘cool’ behaviour of the Sun is not yet fully understood by scientists. In spite of this ‘cool’ sun, the three warmest years on record are still 2014, 2010 and 2005, from all records. This is an affirmation of the continued role of anthropogenic GHGs emissions in causing relentless global warming.

5. The role of oceans and their depths - But does that mean that this is the only reason for a slight decline in the warming trend over the last decade or so? Not exactly. The graph below has been constructed (Source: GISS, NASA) by marking year-wise temperature anomalies superimposed with El Nino (more than average warming of the equatorial Pacific waters), La Nina (cooling of equatorial Pacific) and neutral year’s information. El Nino years tend to be warmer (as explained earlier), La Nina years colder. It can be seen that in the last 10-12 years, La Nina years were more in number than El Nino or neutral years. This might have contributed to a slight dip in the rate of warming, while the warming itself continues unabated (all three coloured lines continue an upward trend).

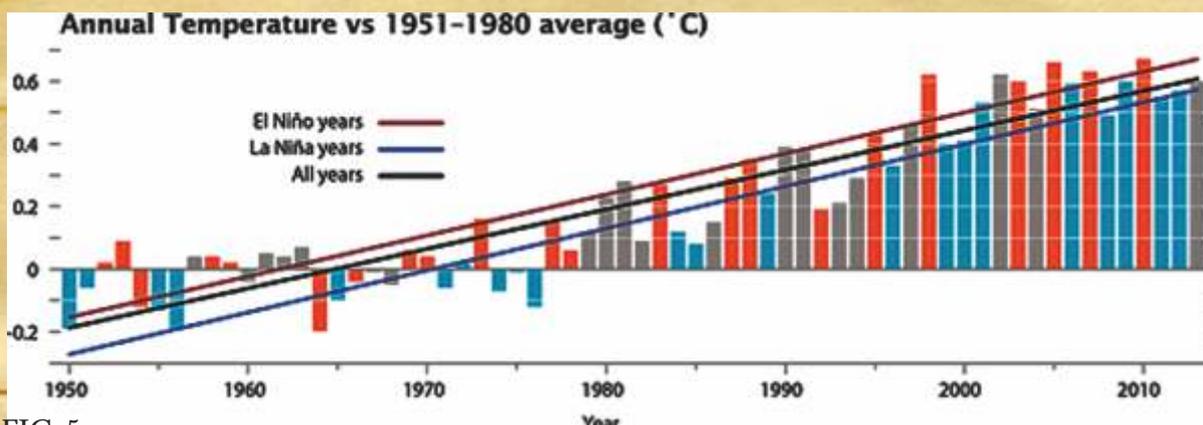


FIG. 5

Thus, no hiatus, or pause is visible, but a slight slowdown, from 2003-04 is seen. Again, if we take out the hugely anomalous year 1998, the slowdown is not very pronounced. The reason for this slowdown could be a combination of the many reasons already explained, plus a change in the ocean's heat intake. The oceans take up over 90 per cent of the additional heat flux from GHG forcings (global warming). The mechanisms for this heat exchange between atmosphere and oceans are several, but the ocean surface interactions, aided by wind, are a major driver. The ocean currents also carry heat to the depths. If we take a careful look at the graph below (from the UK Met Office), it is clear that from around 2003-04, while the surface temperature changes have slowed a little, the ocean heat content increase has speeded up. Thus, more of the GW-forced heat is now being taken up by the oceans, somewhat lessening the surface temperature rise.

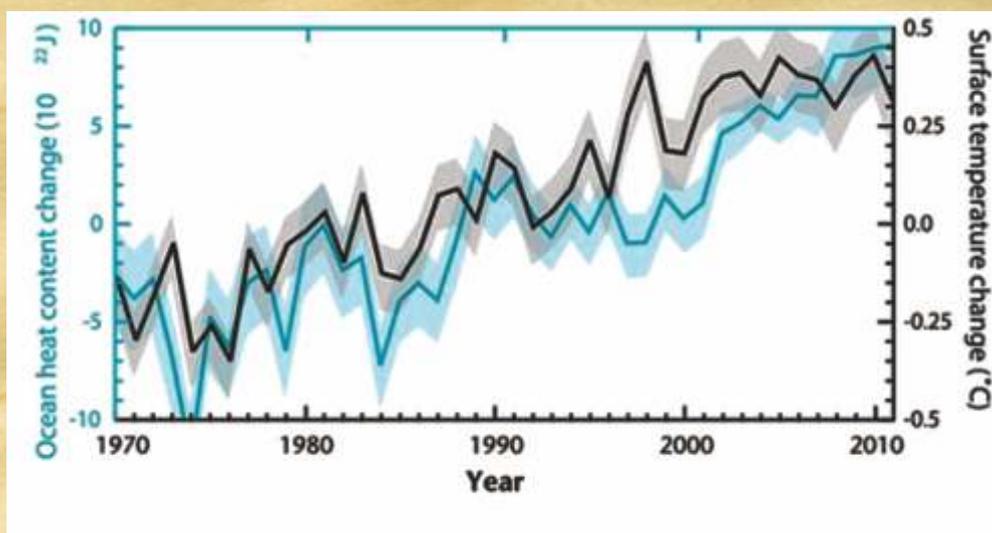


FIG. 6

Source: "The recent pause in global warming (1): What do observations of the climate system tell us? July 2013, www.metoffice.gov.uk

The driving factor for this is being debated, but a number of research efforts have shown that an increase in the trade winds ('Pacific Trade Winds Stall Global Surface Warming - for Now', University of New South Wales, <http://www.unsw.edu.au>, 10 February, 2014), which has increased the oceanic heat intake by more vigorous interaction between the air and water at the interface.

Along with that, more heat is now being transported to the deeper oceans, more than 700 metres in depth, now than earlier (NOAA figure below). This has resulted in somewhat less heat being available near the surface of oceans, for transfer to the atmosphere, thus contributing to the slight slowdown in the rise of surface air temperatures.

Another possible contributing factor has been explained in the research on increased volcanism in the last decade or more. In a research led by Benjamin Santer of the Lawrence Livermore National Laboratory in California, published in the journal *Nature Geoscience*. The team gives the most detailed account yet of the cooling impact of volcanoes in the 21st century. Their paper details at least 17 volcanic eruptions since 2000, including Nabro in Eritrea, Kasatochi in Alaska and Merapi in Indonesia, which ejected large amounts of sulphur aerosols in to the atmosphere, partly blocking the incoming solar radiation, and thus slowing the temperature rise. The 1992 Pinatubo eruption cooled the earth for nearly two years.

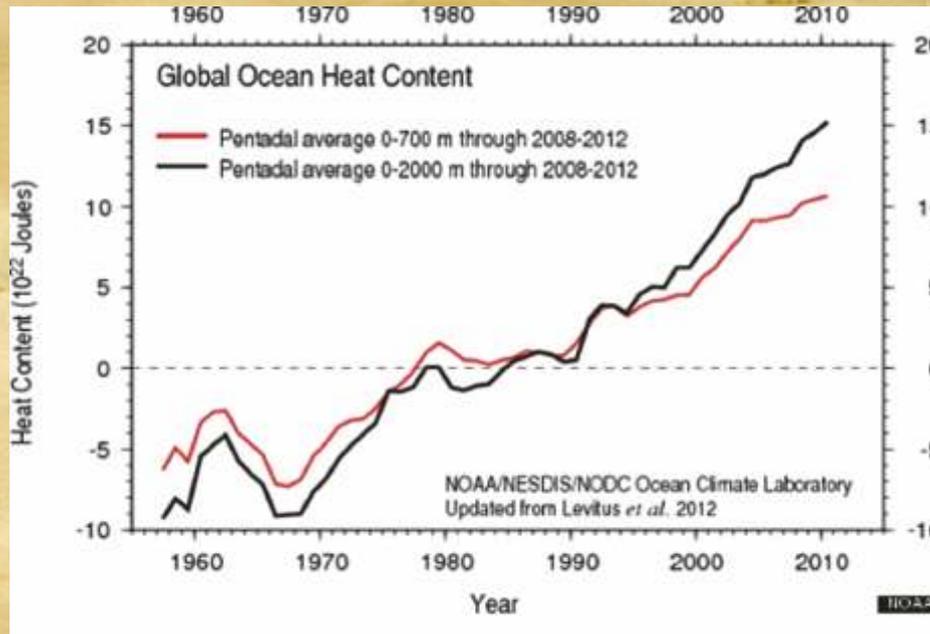


FIG. 7

It is clear that the slight slowdown in the rise of global surface temperature is driven by a multiplicity of contributing factors. No one knows for sure, but a large section of scientists agree that neither the solar activity 'hiatus', nor the excess pumping of GW-forced heat in the depths of the oceans, are going to last for long. When these 'aberrations' stop slowing the surface temperature rise, the extra heat is going to come back to the atmosphere, and the rise in annual global mean temperature – the indicator of global warming that was most publicised – is going to shoot up. The other severe impacts of climate change have not even cared to notice this 'hiatus'. Meanwhile, we continue to waste the 'window of opportunity for action' unexpectedly thrown to us by Mother Nature, by debating the global warming 'hiatus', and even the validity of climate change science!!

*This article was originally written in November 2014, and updated only slightly in July-August 2015 (Soumya Dutta is a member of the Beyond Copenhagen collective and Bharat Jan Vigyan Jatha; email: soumyadutta.delhi@gmail.com)



LIVING DIFFERENTLY

Agro-ecology and the Fight Against Climate Change

Parul Thapa, Focus on the Global South

When two strangers meet at a public spot, weather often plays the universal icebreaker. The sudden changes, heat of the last two days, the predicted showers around the weekend and even the untimely rain in a faraway district, all frame our climate discussions. Talking about the weather has always seemed to be a unifier and transcended politics. However, it is human-induced climate change that is wrapped in politics. It is an outgrowth of the local, regional and national policies built by governments and corporations. The climate change issue has been in our mainstream discourses for a long time now. Studies, conferences and debates galore, the environment sector comes alive altogether at a different level when it is time for a large conference or convention. Before and after the events – reports are tabled, resistances and disagreements are recorded and reports of emission reduction targets start pouring in. It is seen as critical to have countries join international treaties to come together and cooperatively consider what one can do to limit emissions to manage the global temperature and its effects on the planet that we inhabit. It is critical because by strengthening a global commitment, we need to control, adapt to or reverse the inevitable impacts of the changing climate. As is being increasingly demonstrated, it is not only feasible, but also economically viable and environmentally urgently required.

Climate change is a complex problem, which, although partly environmental in nature, touches and has consequences for all spheres of existence of people, including the political and economic to a large extent. It impacts on and is impacted by global issues, including food, trade, poverty, economic development, population growth, sustainable development and resource management. Stabilizing the climate is definitely a huge challenge that requires planning and policies in the right directions. However, the bigger questions lie in understanding not just the ‘how much’ but also the ‘how to’ - how to reduce emission, how to produce enough healthy food and how to have clean energy?

Solutions for mitigating climate change come from all arenas in the form of creating new technologies, renewable clean energy and even changing management practices. Agro-ecology is one such practice that deals with the ‘how to’ of mitigation as well as adaptation to climate change. The agricultural sector can not only mitigate (take carbon dioxide out of the atmosphere), but is also urgently needed to adapt to the changing weather patterns in space and time. It has the potential to substantially sequester global carbon dioxide emissions in the soils of croplands, though many analyses have shown the clear and present danger in emphasising the mitigation aspect for smallholder farmers. For these to remain a viable livelihood option and to feed the world’s 7 billion plus (and increasing) population, the uncertainty of rising

temperatures, erratic rainfall patterns, droughts and the emergence of unfamiliar pests and diseases, demand a form of agriculture that is resilient, and a system of food production that supports local knowledge transfer and on farm experimentation through building adaptive capacity of farmers. In which can be called a co-benefits approach, the majority of climate change mitigation activities in agriculture are foundations of organic and natural practices. Organic production systems serve as the best widespread examples of low emissions agriculture. Organic systems are also more resilient than industrial agricultural systems in terms of withstanding environmental shocks and stresses including droughts and flooding.

Conventional (high input industrial) agriculture releases high carbon dioxide emissions due to overuse of fossil fuels (fertilisers, pesticides, diesel/ electricity powered machines and pump) and destroys endemic biodiversity. The better adaptation (with mitigation co-benefit) idea is to shift towards agro-ecological models of production that allow drastic reductions in the use of fossil fuels. There is good mitigation potential through soil and plant rejuvenation, and the flexibility as well as diversity required to allow adaptation to changing conditions. In practice, along with securing food sovereignty of the world and massive livelihood opportunities of largely agrarian communities and countries, agriculture can contribute to cooling (or not further warming) the planet in three ways: by reducing the use of fossil fuels (through reducing and/or completely removing chemical and synthetic fertilizers and pesticide production) and of fossil fuel powered transport and machinery; by positively effecting biodiversity and by slowing the release of biotic carbon.

Unseasonal rains have already led to hundreds of farmer suicides this year in Maharashtra alone. This number has been rising steadily for the last ten-months due to the drought last summer. Farmers' groups say the state's Rs 4,000-crore drought relief package translated into a very small sum per farmer since as many as 90 lakh farmers were impacted. It worked out to just around Rs 1,875 an acre.¹

One of the main challenges that farmers have in the context of climate change is the change from long-established predictability of weather phenomenon, like rain timings and amount, dry periods etc. Farmers can no longer rely on the timing of seasons and the availability of rainfall to see them through the year, though the crop varieties and cycles are still tied to these long established, predictable patterns. Using agricultural biodiversity in the fight against climate change is about responding to variety with variety. Diversity can help farmers mitigate, adapt and ensure food (and nutrition) security, by providing them with more options to manage climatic risks, and strengthen the resilience of their farms and surrounding landscapes.

Innovative Practices

There are a few simple and innovative practices that can help in transformations that would mitigate the climate change crisis. Water harvesting (gully, plugs, trenches, tanks, anicuts, ponds), integrated farming (with different livestock as well), manure from livestock waste and plants, conserving and using local seeds, building seed and grain banks with local and indigenous seeds, mixed farming and crop diversity, techniques such as mulching, SRI, vermicomposting (see the case study from the Sunderbans below), planting nitrogen-fixing legumes and growing indigenous crops can all go a long way.

¹ <http://timesofindia.indiatimes.com/india/Unseasonal-rain-601-farmer-suicides-in-Maharashtra-in-just-3-months/articleshow/46973686.cms>

CASE STUDY

Vermicomposting in the Sunderbans:

Gauri Mandal's village is in the Sunderbans in West Bengal. She owns four *bighas* of land (1.3 acres). Mostly, she cultivated paddy with some vegetables for her family's consumption. Due to the cyclone Aila in 2008, her field was filled up with saline water. Due to an erratic climate, the



Gouri Mandal preparing her vermicompost

rains have been untimely. Earlier, Gauri was also using chemical fertilizers. This, she saw, was leading to deterioration of the soil. Applying more chemical inputs was difficult as they were to be bought each time and were not performing as desired. The output decreased with every season. The soil became hard and cracked up.

In 2009, she built a vermin-compost pit in her kitchen garden. She selected a top covered but side open space so that there would be no direct sunlight on the compost. A handful of earthworms were set free in a mixture of moist loamy soil and another layer of broken bricks with coarse sand. It is highly recommended that local earthworms be used for best results. She bought the earthworms *eisenia fetida* from a local organisation. These were kept in a ring of 2m x 1m x 0.75m layout that was built with brick and mortar. Dry leaves, fresh cattle dung and organic waste from the kitchen was also added. She says that moisture is very important in the compost and to ensure that, water must be sprayed on the mixture at regular intervals. It takes about 60-90 days for the mixture to be ready. It has to be kept turning every 5-7 days as well. She has been using the vermi-compost on her field since then. Mandal says that she could see the change within a few months. The soil on her land became softer and more porous. It required less water than before. Currently she produces about 5-6 quintals per year and sells it to other farmers too. She has started growing different types of vegetables (mixed and inter cropping) throughout the year since then. She is able to consume fresh, chemical-free vegetables and also sell the surplus at the local market. She sells the surplus paddy as well (roughly 4 bags of paddy in one season).

Gauri is not dependent on the market for any kind of farming supply now. She also saves vegetable seeds for sowing. Her farming is dependent on the biodiversity of the area and not any manufactured inputs.

Agro-ecology can significantly protect farming and food production from climate change impacts positively as it builds agro-ecosystem resilience that would look at consistency and sustainability of yield even and especially so, with the changing climate. It also helps livelihood resilience, achieving diversification of livelihood options through poultry, cattle, fish breeding etc. This also helps in partially insulating agricultural practices from instability and changes in other markets, while holding assets on the farm. It also helps reduce or completely stop dependency on external (non-farm) inputs.

Smallholder agro-ecology is not only an effective solution to complex agricultural challenges, but also an affordable way to increase yields without any external inputs from outside the farm. Further, it offers low inputs, low emissions and local control over production decisions, offering food sovereignty alternative to the unsustainable agro-monoculture currently being pushed to address the food crisis. Several characteristics that are found in local or indigenous breeds will become increasingly important as climate change alters the environment and affects the produce. Local seeds and crops have a much better chance of survival in their local environment with the changing climate conditions. Their protection, along with the local knowledge is critical to their management and breeding, is extremely crucial to feed us in the future.

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Climate Space statement from Tunis WSF 2015

[The statement follows this brief note]

From 24-28 March 2015, thousands of people from social movements, trade unions, student unions, progressive civil society organizations (CSOs), individual activists, etc from all over the world, gathered in the Tunisian capital city Tunis, for the second consecutive World Social Forum. This year's WSF faced some dark clouds to begin with, as Tunis faced a dastardly terrorist attack just a week before the start of WSF-2015, which killed nearly 20 tourists and led to wide apprehension of very low participation.

The day I landed in Tunis on the 23rd of March, I saw something very different. Challenging the grim motives of the terrorists, thousands of activists, academics, grassroots workers and movement organizers had descended onto the great city with a glorious history. Even the persistent rains failed to dampen the spirits of the inaugural march of WSF 2015. Though government-arranged security was a little obtrusive in view of the recent terrorist attack, with rifle-toting armed personnel visible in every nook and corner of the El Manar University and the city (in sharp contrast to the last WSF in Tunis, in 2013), people took this in their stride. The very friendly Tunisians made this even easier by breaking into warm but laboured conversations (due to our inability to speak either French or Arabic) at the first opportunity. When words could not come, a warm smile was always a good substitute.

Continuing the tradition set recently, WSF 2015 also was successful in bringing together a wide variety of social movements – covering land rights groups, indigenous peoples' movements, workers groups, forest people's movements, climate justice groups, LGBT rights groups, women's rights movements, right to food groups into what was called "The Climate Space" in the broadest sense. One of the great successes of the Climate Space is this - its ability to build bridges and bring together a wide variety of social movements, going far beyond the traditional understanding of "climate change" groups.

In view of the impending Paris conference, CoP21 of the UNFCCC, in December 2015, huge and rich debates and actions are being held all around the world on the issue of a new global climate treaty – so that all nations take appropriate actions to keep the global temperature rise below 2 degree Celsius over pre-industrial levels. Though this conservative IPCC figure is now being questioned as to whether it is actually the 'safe limit', most governments and 'official' agenda are still pointing to this as the target. The actions that these same national governments, multilateral bodies and global business and industry are taking – in the name of keeping within this 2 C target, are far from adequate though.

As the Paris CoP21 and the preparations leading up to that are seen as key battle grounds between recalcitrant government and businesses and the people's movements, the intensity and thoroughness of the many meetings and consultations in the Climate Space were higher than seen in earlier years. There were many strategy sessions, many collaboration plans, even plans for direct actions by the scores. All that will fill volumes.

At the end of the Climate Space and this energetic WSF, the Tunis statement from the Climate Space was issued, which is appended below. This saw the contribution by a very large number and variety of groups and people, often in combinations of continents and movement areas. Over four months have passed since this statement was formulated and issued, and the climate justice actions are intensifying in many countries, particularly in Europe, as France gets ready to host the key Conference of Parties in

the first two weeks of December 2015. Many of us participated actively, and are even now communicating and contributing, but a key test will be how we mobilize our own people on these critical issues, in our home countries. In India, there's a lot to be done, even to begin. And we hope that this will come soon
Soumya Dutta

To Reclaim Our Future, We Must Change the Present. Our Proposal for Changing the System and not the Climate

The capitalist system has exploited and abused nature, pushing the planet to its limits, so much so that the system has accelerated dangerous and fundamental changes in the climate.

Today, the severity and multiplicity of weather changes – characterized by droughts, desertification, floods, hurricanes, typhoons, forest fires and the melting of glaciers and sea ice – indicate that the planet is burning. These extreme changes have direct impacts on humans through the loss of lives, livelihoods, crops and homes, all of which have led to human displacement in the form of forced migration and climate refugees on a massive and unprecedented scale.

Humanity and nature are now standing at a precipice. We can stand idle and continue the march into an abysmal future too dire to imagine, or we can take action and reclaim a future that we have all hoped for. We will not stand idle. We will not allow the capitalist system to burn us all. We will take action and address the root causes of climate change by changing the system. The time has come to stop talking and to take action.

We must nurture, support, strengthen and increase the scale of grassroots organizing in all places, but in particular in frontline battlegrounds where the stakes are the highest.

System Change means:

- Leave more than two thirds of fossil-fuel reserves under the soil, as well as beneath the ocean floor, in order to prevent catastrophic levels of climate change.
- Ban all new exploration and exploitation of oil, tar sands, oil shale, coal, uranium, and natural gas.
- Support a just transition for workers and communities away from the extreme energy economy and into resilient local economies based on social, economic and environmental justice.
- Decentralize the generation and ownership of energy under local community control using renewable sources of energy. Invest in community based, small-scale, local energy infrastructure.
- Stop building mega and unnecessary infrastructure projects that do not benefit the population and are net contributors to greenhouse gasses like, mega dams excessive huge highways, large-scale centralized energy projects, and superfluous massive airports.
- End the dominance of export-based industrial forms of food production, (including in the livestock sector), and promote small-scale integrated and ecologically sound farming and an agriculture system that ensures food sovereignty, and that locally grown crops meet the nutritional and cultural needs of the local community. These measures will help to cool the planet.

- Adopt Zero Waste approaches through promoting comprehensive recycling and composting programs that end the use of greenhouse gas emitting incinerators – including new generation hi-tech incinerators – and landfills.
- Stop land grabbing and respect the rights of small farmers, peasants and women. Recognize the collective rights of indigenous and tribal peoples consistent with the UN Declaration on the Rights of Indigenous Peoples, including their rights to their lands and territories.
- Develop economic strategies that create new kinds of ‘climate jobs’ – decent paying jobs that directly contribute to carbon reductions – in such sectors as renewable energy, agriculture, public transportation and building retrofits.
- Recover the control of the public sources to finance projects for people and nature like health, education, food, employment, housing, restoration of watersheds, conservation and restoration of forests and other ecosystems and stop the subsidies to dirty industries, agribusiness and military industry.
- Take cars off the roads by building clean public transport infrastructure that is adaptive to local, non-combustion energy sources, and make it accessible and affordable to everyone.
- Promote local production and consumption of durable goods to satisfy the fundamental needs of the people and avoid the transport of goods that can be produced locally.
- Stop and reverse corporate driven free trade and investments agreements that promote trade for profit and destroy the labour force, nature and the capacity of nations to define their own policies.
- Stop the corporate capture of the economy and natural resources for the profit of transnational corporations.
- Dismantle the war industry and military infrastructure in order to reduce the greenhouse gas emissions of warfare, and divert war budgets to promote genuine peace.

With these measures we will be able to achieve comprehensive employment for all because built into this systemic change there will be more and better quality jobs than currently exist within the capitalist system. With these measures we will be able to build an economy that serves the people and not the capitalists. We will stop the endless degradation of the earth’s land, air, and water and preserve the health of humans and the vital cycles of nature. We will avoid forced migration and millions of climate refugees.

System change requires an end to the global empire of transnational corporations and banks. Only a society that has the type of democratic control over resources which is based on workers (including migrant workers), indigenous and women’s rights and respects the sovereignty of the people will be able to guarantee economic, social and environmental justice. System Change requires a break from the patriarchal society in order to guarantee women’s rights in all aspects of life. Feminism and ecology are key components of the new society that we are fighting for.

We need a new system that seeks harmony between humans and nature and not an endless growth model that the capitalist system promotes in order to make more and more profit. Mother Earth and her natural resources cannot sustain the consumption and production needs of this modern industrialized society. We require a new system that addresses the needs of the majority and not of the few. We need a redistribution of the wealth that is now controlled by the 1%. And we also need a new definition of well-being and prosperity for all life on the planet under the limits of our Mother Earth.

While there will still be a battle inside the international UN climate negotiations, the main

battlegrounds will be outside and will be rooted in the places where there are frontline struggles against the fossil fuel industry, industrial agriculture, deforestation, industrial pollution, carbon offsets schemes, and REDD-type carbon offsets projects, all resulting in land and water grabbing and displacements taking place all over the world.

The United States, Europe, Japan, Russia and other industrialized countries, as the main historical carbon emitters, should implement the biggest emissions reductions. China, India, Brazil, South Africa and other emerging economies should also have targets for emission reductions based on the principles of common but differentiated responsibility. We do not accept that on behalf of the right to development several projects for more unsustainable consumption and exploitation of nature are being promoted in developing countries only to benefit the profits of the 1%.

The fight for a new system is also the struggle against false solutions to climate change. If we don't stop them they will disrupt the Earth's System and deeply affect the health of nature and all life. We therefore reject techno-fix "solutions" like geo-engineering, genetically modified organisms, agrofuels, industrial bioenergy, synthetic biology, nanotechnology, hydraulic fracturation (fracking), nuclear projects, waste-to-energy generation based on incineration, and others.

We are also in opposition to those proposals that want to expand the commodification, financialization and privatization of the functions of nature through the so-called "green economy" which places a price on nature and creates new derivative markets that will only increase inequality and expedite the destruction of nature. We cannot put the future of nature and humanity in the hands of financial speculative mechanisms like carbon trading and REDD. We echo and amplify the many voices that are urging the European Union to scrap the EU Emissions Trading Scheme.

REDD (Reducing Emissions from Deforestation and forest Degradation), like Clean Development Mechanisms, is not a solution to climate change and is a new form of colonialism. In defense of Indigenous Peoples, local communities and the environment, we reject REDD+ and the grabbing of the forests, farmlands, soils, mangroves, marine algae and oceans of the world which act as sponges for greenhouse gas pollution. REDD and its potential expansion constitutes a worldwide counter-agrarian reform which perverts and twists the task of growing food into a process of "farming carbon" called Climate Smart Agriculture.

We must link social and environmental struggles, bring together rural and urban communities, and combine local and global initiatives so that we can unite together in a common struggle. We must use all diverse forms of resistance. We must build a movement that is based on the daily life of people that guarantees democracy at all stages of societies.

Many proposals already contain key elements needed to build new systemic alternatives. Some examples include, Buen Vivir, defending the commons, respecting Indigenous territories and community conserved areas, the rights of Mother Earth – rights of Nature, food sovereignty, prosperity without growth, de-globalization, the happiness index, the duties to and rights of future generations, the People's Agreement of Cochabamba and others.

We have all long hoped for the possibility of another world. Today, we take that hope and turn it into courage, strength and action – that together, we can change the system. If there is to be a future for humanity, we need to fight for it right now.

April 2015

Conversation with Jutta Kill

On behalf of *Mausam*, Soumitra Ghosh had a Skype conversation with Jutta Kill, who was in Germany. Jutta, a biologist and an activist, has been associated with various social movements and their alliances, both international and national, for nearly two decades now, and has extensively critiqued carbon trading, various forms of forest-based offset trading schemes, and more generally, the menace of commodification/financialisation of Nature.

Mausam: Is there a climate justice movement per se? Can we call the largely event-based convergences a movement yet?

Jutta Kill (JK): Perhaps I am not the right person to answer these questions ... also because I have not been to international climate meetings in many years ... five, maybe six [years] ... so after the climate justice movement was formed in Bali in 2007, I believe I have gone to maybe one other UN climate meeting. I am not following directly – only through second-hand observations – the activities related to climate justice activities at UN climate meetings.

Mausam: This not going to ‘climate meetings’ any more, has it been a conscious decision? Has some kind of assessment on your part about the climate justice movement informed it?

JK: Yes. I came to the conclusion that the context in which civil society acts at these UN climate meetings was not the context I could identify with any longer. I don’t even know what was the town or the country that hosted the CoP (Conference of Parties) following the one in Bali. I think it’s now been eight years without any tangible advance in the UN climate negotiations. This time I am considering going to Paris because there, a decision is expected that can do more harm than good ... I believe thinking ‘why’ before going to international climate meetings, before spending a lot of time, energy and money is important. As to your question about a ‘climate justice movement’ per se, well ... I don’t think movements can be planned, they emerge or they do not, always have different streams within them ... the question is how well they are able to project themselves as a ‘one’, as movement ... Today’s climate justice movement going back to the Bali meetings was an initiative that was formed in direct relation to the UN climate negotiations, and we don’t see much of this coming together as ‘one’... maybe even cannot, because the reference point always remained the UN negotiations, presenting demands to the powerful rather than moving towards a movement that builds the momentum for its own vision of change to become reality.

Mausam: Yes. Then, coming to the second part of the question ... can we call the event-based convergences (they are referred to as ‘convergences’ these days) we see during the United Nations (UN) gatherings, international climate negotiations, movements?

JK: I do not call it movement...but then again language is what we mean by it. I wouldn’t call it movement because I think a movement, or an initiative for movement, emerges when there’s a simmering of discontent that has to express itself ... things can’t continue as before. Some who refer themselves as the CJ (Climate Justice) movement or part of it, maybe they see this as such

an initiative, and I take no issue with that. Personally, however, I think that a movement requires many more mobilizations outside the events, and in between the events, a different reference point, as I mentioned above. It would however be wrong to say that none of these mobilizations are happening anywhere, or that the CJ process has remained focussed only on large UN events. For instance, a large number of grassroots groups, communities and NGOs..anti-coal mining struggles...have come together in different places, including in Germany...they come together under the banner of climate justice...but they do not necessarily call themselves a climate justice movement, even though for them, 'climate justice' is an important consideration. But as to the process that started from the Bali meeting, and stays focused on the UN climate negotiations, and has evolved on the sidelines since..I wouldn't call it a movement, no.

Mausam: Nonetheless, you have to give it to the organisers, gathering-wise, that there have quite a few impressive gatherings, say the huge march in New York in 2014. How does one see this process politically? Do you think that it can coalesce into a political force one day, and can change the course of history ... in the sense, will it be able to reverse the present trends and patterns of appropriating, plundering nature? ... The way governments of the world behave, their blunt pursuing of the neoliberal agenda of economic growth, will this change because of these movements?

JK: Umm..I think history will tell. What these convergences will lead to, well...I can't look into the future. But what needs to be articulated much more clearly is that climate justice cannot be had without social justice, economic justice. In my view, putting too much emphasis on the 'climate', less on 'justice', has remained a serious limitation of the process so far. It needs to be clearly understood, that no justice, including climate justice, is achievable within the perimeters of, and without fundamentally changing, today's injustice in the dominant economic system, the capitalist economic system. So focussing too much on 'climate justice' without simultaneously saying that it is not possible to achieve such justice in the current economic regime, seriously undermines the political potential of CJ. In order to be politically relevant, we have to step out of the 'climate justice' framework, and start saying that climate justice is only possible in a world where there is also social and economic justice. What is really important is to look at the factors, the drivers behind runaway climate change – the plundering, the deprivation, which the present economic regime stands for. It is easy not to look at those while talking about climate change, and measure justice only by reduction in greenhouse gas molecules. How can such an approach, of understanding climate change in isolation of other factors lead to change? In my view, the focus on greenhouse gases has resulted in a de-politicised debate of climate change among environmental 'movements'.

Mausam: The events the CJ processes target are usually inter-governmental meetings on climate negotiations. Does this somewhat affect the scope of such processes, both physically and politically?

JK: Climate Justice discussions ... yes, they emerged in response to inter-governmental meetings; and I would be the last person to say that those who care about justice need more emphasis on inter-governmental meetings and less on starting conversations on climate justice, in our everyday lives, our daily work. At the same time, it would not be fair to say that the ongoing discussions have focused only on inter-governmental negotiations. Had they done so, one could perhaps say that the scope of these processes is far too narrow. But, that hasn't exactly been the case. Having said that, I strongly feel that politically the concept of climate justice has been narrow to begin with, in fact the narrowness was enshrined in the term ... I understand that it makes sense in the context of international climate meetings, but otherwise it somehow

limits the political reach ... it risks confusing cause and symptom and thus doesn't get to the roots of climate injustice.

Mausam: Changing the context a bit, you have come to India quite often in recent years ... I remember that you were present in that first meeting of India Climate Justice in Ranchi in 2009 ... I am talking about our alliance effort here. Despite all our efforts, we have not yet succeeded in forming a 'real', grounded alliance. The movements have their own priorities, and they talk about social, economic and political justice, but seldom, if ever, climate justice. Climate is usually seen as an isolated, scientific, technical phenomenon, and therefore climate justice becomes something intangible and alien ... it is a paradox, really. On the one hand, climate change offers us an opportunity, a space for a new, perhaps the widest possible movement convergence. On the other hand, climate change is usually perceived as a specialist knowledge domain, full of jargon and technicalities. Do you think we need to invent a new language for the climate justice movement, a kind of re-orientation perhaps, to make the issue more visible?

JK: In my experience, the issue of climate change need not be technical at all. For instance, carbon trading ... it becomes 'technical' in our own debates only if we make it so, if we perpetuate the complications and jargons that are spun in UN meetings around emissions trading, and fail to point at the injustices such trading accentuates. For those who want change, it is important and necessary to decode, contextualize and re-contextualize what happens in international negotiations, because the decisions taken there have great impacts on everyday lives of those who never get a chance to be at these meetings. It is our responsibility to tell in simple terms, without unnecessary technical words, a lot of acronyms and display of 'specialized' knowledge, what exactly is happening there, and how these UN climate discussions do relate to all of our struggles. Trading in climate is about how the economy is structured, how energy is produced by whom and for whom, how investment flows, how land is used, and so on ... these are not difficult words. While we need to know some of the technical terms in order to analyse what is happening, we need not adopt the vocabulary. Otherwise it will always be very difficult to make alliances, and to contribute to movements seeing that the injustices they fight have the same roots as climate injustice.

Mausam: I don't know why it always seems to me that the climate justice convergences are always top-down, and exclude, by the very manner in which they are organised, and also because of the rarefied 'global' space in which they usually take place, the vast majority of the people whom climate change affects the most. Coming back to what you just said, that the fight for climate justice is a fight for a different, non-capitalist social order, and unless there is an economic regime change, climate change cannot be contained. Keeping that in mind, can we really expect that governments, singly or together, will deliver 'justice'? Or that there will be a just treaty? Will saying so not perpetuate the neoliberal illusion? Instead, should we not focus more on national/regional/local spaces for organizing and mobilizing...say for instance, a struggle against coal mines, thermal power plants, or land grab that uproots/threatens communities, shouldn't we simply call those climate justice movements?

JK: If we go to these international negotiations believing that any treaty that comes out of these UN negotiations has been significantly influenced by civil society's presence in the meeting halls, I think we have not understood the role we play, nor the role we ought to play if we want our presence at these meetings to be part of movement-building. When civil society representatives start speaking as if we were the negotiators...talking about "we" when really it is not "us" but "them" taking the decisions and being the ones tasked with figuring out the trade-offs, civil society loses its voice, consents to ritualized participation at UN climate negotiations. What really can influence the decisions is how much we can mobilize outside the

event venue, mostly nationally, and mobilize for resistance, for social justice – and with that backing, how much we can be on the ‘inside’ while maintaining the grounding in the outside, the movement for radical change, for change that takes the root of the problem as its starting point.

Mausam: Yes, looking at the recent statement issued by the Tunis World Social Forum (WSF) Climate Space, and from the spirit of the statement, one can’t but agree. It says unequivocally that climate change is a direct consequence of capitalism, it is time to junk the entire UNFCCC process, and that the Paris meeting will be a sham — nothing good will come out of it. This is all refreshingly political, I’d say. However, my question lies elsewhere: what, in terms of actual resistance action, ensues from this political understanding? Once again, the call for those large marches, big convergences, in Paris, in the venue of the UN event? How do the farmers, adivasis, workers, the people who are the worst victims of neoliberal land-grab as well as the first victims of climate change, in India, or anywhere else, relate to these marches, or the grand convergences like WSFs? Do they know or understand what is happening? Do they feel a tie with the marchers in New York or Paris? Where, and what exactly, is the tie which makes people feel, empathize?

JK: The challenge will remain to not look at climate justice in isolation, but as something understood and fought for in the context of linking the root causes for climate change with those of economic injustice, plunder, land grab. Unless we succeed in making these links, mobilizing for climate justice will remain very difficult ... many people involved in grassroots resistance understand the tie. The problem starts when we focus only on climate, in isolation, without linking it to the root causes, such as fossil fuel dependence, an economic model dependent on continuous extraction for accumulation. Not that climate change is not important — it is important because climate change is a reality that affects us hugely. At the same time, however, climate change does not affect all of us equally, in the same manner. Living in Berlin — the winter might become a bit more severe, but not unbearably so, and I will still have the means to prepare myself to the change. I don’t feel threatened by climate change in the way many people in other parts of the world do, whose livelihood is directly linked to the weather, where climate extremes will hit a lot harder, and where the state will lose the ability to cope much earlier than will be the case in Germany. Existing economic injustices also will mean that climate change will not affect us all equally. The changing climate does not touch everybody in the same way — it doesn’t, just like many other injustices don’t affect all of us in the same way. If anything, the focus on climate change will become stronger, but it means little if we view the crisis as something independent of and outside the economic order that causes it.

To me, it is encouraging to perceive a willingness on the part of more and more civil society groups to move away from what has become a ritual performance at those annual UN climate meetings. Maybe this change will lead to a strong enough message that what is needed to avert runaway climate change is not fixing up imaginary targets of emission reductions, but agreement for the timeline on withdrawing from fossil fuel burning — dates for actual, physical action that leads to oil staying in the soil, coal in the hole and tar sands in the land, negotiations at the UN on how to divide up the fossil emissions [space] that is left, in consideration of the historic debt, the climate debt the industrialized would owes.

Mausam: But that brings down the sphere of action from global to national, maybe even local levels... how can you stop fossil fuel extraction unless communities resist it locally?

JK: I think there are also decisions for which the international is the right level – for governments to decide as well as for movements to come together. The point is whether the international

agenda, in particular the movement agenda, is set in a way that will reflect the realities, demands and priorities of local struggles...whatever demands we press for at the international level have to be grounded in the local. Commitment for international solidarity with local resistances against continued fossil fuel extraction is another aspect important to strengthen. Such solidarity is also important to avoid unintended consequences that increase climate injustice — for instance, if Germany stopped coal extraction but kept its coal-fired power stations running, the result would merely be importing more coal from countries like Columbia or Indonesia, something that will affect the communities in those countries yet more strongly.

This I think also brings us to the question of change: what change we are looking for, and how to bring about those changes for justice. What can we learn from those who have defended the commons that remain today, from societies built on social norms where people know and respect the limits of using what 'nature' provides?

Mausam: Yes, I agree. The climate justice movements must start talking about this crucial 'difference', the necessity for living differently. Because we shouldn't really expect the governments to agree to this, we need to look at practices where this is already happening, where communities actually are in control of how nature is being put to use or have embarked upon a new way of life...

JK: Mobilization for change has to grow enormously before we get there, and it needs to make the links between climate change, land grabs and displacement. Take the discussions in many parts of Europe today about migration. They are racially prejudiced, lack empathy for the hardship, the trauma, the existential risk that migrants face. And, there is virtually no acknowledgement in the mainstream debate on the link between migration and climate change, even less so on the link between migration and an economic model that displaces ever more people so mines, monoculture plantations, mega dams, oil pipelines etc. can continue to expand.

Another tough area for civil society to take a critical look at is our own dependences, and where they become an obstacle to change. Financial dependence is one of these questions we usually shy away from. How can we avoid [the fact] that the funding that sustains our organisations starts to guide what we do and don't do, keeps us going to UN climate meetings because that is what donors are interested in funding while we scale back the hard and slow work of connecting communities resisting fossil fuel extraction and defending their local economies because there is no funding available for these activities?

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MAUSAM

is an initiative of India Climate Justice(ICJ) collective