

## Global Warming and its implications on Kerala

Special address by

**Dr. Vandana Shiva**

*Navadanya Research Foundation for Science Technology and Ecology (NRFSTE),  
Dehradun, Uttarakhand.*

**It was an earlier change made, when I was a young girl and joined the ‘Chipko Movement’.** It was realized that Forests have many functions and the water and soil conservation functions of forests became critical. Along with that came the logging ban in the high Himalayas and out of that period came the concerns of protecting heritage sites like Silent Valley and it is told that several members from the State came out in protest and held that Silent Valley is not a man made construction, but its an amazing place that nature has created. Since many of you are Foresters I would also like to mention that I am also a Forester’s daughter. My father was a Conservator of Forests, in what that point used to be Uttar Pradesh, but is now independent Uttarakhand State. So my reflections on Global Warming and climate change come mostly from the informal learning that anyone has by living long time in the forest. And especially living in a period when forests were rain forests where we entered on horseback in the mountains or elephant back in the Terai. The roads were hardly there. And every half an hour we found some big game. Very rapidly we have lost most of our forest cover. It is not because of the work of Foresters themselves, but the diversion of forest land for other purposes. In effect, the climate change problem is nothing but replacing the current solar energy that has been captured through the photosynthesis processes and the chlorophyll molecules. Replacing that current balance with



millions of years of fossilized accumulated solar energy and burning it instantaneously. Very clearly that must accumulate Carbon dioxide at levels that the system cannot re-cycle. The whole issue really is of putting more burden on the atmosphere than the natural capacity of the carbon cycle. And I think it is very important to keep this fundamental scientific principle in mind for two reasons. The first is that there are still people who would like to say that climate change is **not** happening because suddenly you get extremely cold winter and you get the snow all over. You know that right now Obama was taking the pledge and the Washington weather was exceptionally cold. London, which does not get snow had snow in Winter, but that extreme cold is part of climate change. When we talk of Global Warming, we talk of two processes. One, the phenomenon of creating a greenhouse blanket around the earth with the accumulated **pollutants** and you just have to try to see the black layer that is building up, totally black and it is no more grey. That is what is called Greenhouse effect and that greenhouse effect traps the energy of the sun, and does not allow it to escape and that again is a scientific process. There is no debate about that. The other debate is about the trends of warming that on the average, the temperatures are increasing. But in particular places at particular years, you might have extreme cold weather too, as part of that change, which is why I actually prefer to talk about this as not a climate change, which suggest a predictable direction of change, but as climate chaos because the systems that maintain the climate have been disrupted. And these systems include, as I said, the first and foremost, the recycling of Carbon, of Nitrogen, and that **result** has to be linked to the absorptive capacity of the Earth.

The second disruption of course is taking place by the fact that with the overall warming you are changing the very temperatures, for example, of the oceans and as a result of changing the temperature of the oceans, the ocean currents are changing and the ocean currents have created your climate, literally deciding where rain would fall and when. In all this, forests have a vital role because they are the natural sink. They are literally nature's lungs given to the Earth. And I think it is an amazing miracle that within limits the Carbon dioxide that we put out is taken back by plants. Well, that's a miracle. Of course, beyond limits that pollutant cannot be absorbed. But unfortunately, all of the climate discussions starting with the Rio Summit –in which I had a big role in the Earth Summit in 1992. The science of climate change was fully understood already in the late eighties, which is why we got a climate change Convention, the United Nations Framework Convention on Climate Change and the Intergovernmental Panel on Climate Change – where, with 2500 scientists worked nonstop to generate the kind of data that we now have to work with. And because it is inter-**disciplinary panel**, they have come up with, a recognition of the results that the changes that our climate is going through now are clearly human induced. They are induced by human action and they are way beyond the level of natural changes of the kind that we know. And you just have to see that the data that has been put out by the IPCC as well is very good. Reports done by AlGore, we have to say that he made it very simple and very accessible. Forest question in all of this, comes up at many levels. There is also a very important report put out by the UK Government “**The Stern Report**”. According to this **Stern Report**, the greenhouse gas emissions are 24% for **Power** 14% for industries, 14% for transportation, 8% from buildings, 18% from land use, and the latter is a very interesting category. I don't know why they don't talk about forests because when they are talking about land use, they are



actually talking about conversion of forest land to non-forest use. Changes in land use are primarily deforestation. But I think there is a fear of saying it as deforestation, so a neutral sounding term called land use, **is used** that is 18%, one of the highest contributions, agriculture 14%, waste 3% and others 5%. Work that has been done in these inter-related subjects shows a number of new discriminations we need to build. The first is that of agriculture 14%. Not every kind of agriculture has the same kind of contribution. In fact an industrialized agriculture based on chemicals and long distance transport have overall contributed to climate change and my assessments are between 35 to 40%. With the combination of Greenhouse gas emissions from Industrial forms of farming. And the three major greenhouse gases emissions are Carbon dioxide from the use of fossil fuels, Methane from the use of intensive feed for animals as well as actually new research is showing that dams are becoming a major source of Methane emissions. I notice one of you has come from Uttarakhand, but if you see the Tehri Dam which **is built on the confluence of what** used to be the running Ganga and the running Bhagirathi, with absolutely no emissions, today it has miles of **blanket of green muck** and that is emitting methane. Unfortunately dams are part of the Clean Development Mechanism and dam building is getting a lot of financing through the Kyoto protocol arrangements which is why every little stretch of water anywhere is being dammed. Of course we know we have a very powerful industry. **We have just witnessed the Satyam scandal.** But every dam construction has a Satyam story behind it. You should know because you will have to, under pressure, give our precious forest land for ridiculous dams which never gave irrigation and never gave power. And I think we definitely need a white paper to see what a failure large dam construction has been in this country. Tungabhadra dam, there is an island of silt emerging. You go to Tehri dam, in a matter of two years time an island of silt is emerging. These are reservoirs of silt not reservoirs of water. Because they destroy the very catchments with which both created the microclimate as well as the stability. The third very important gas which normally gets ignored is Nitrogen oxide that comes from chemical fertilizers. And it is 300 times more lethal than Carbon dioxide as a Global Warming gas. Now, if you look at the data, Carbon dioxide concentrations from pre-industrial period which is 250 years, has increased from 280 ppm to 379 ppm in 2005. Methane has increased from 714 to 1774 and Nitrogen Oxide has increased from 275 ppm to 319 ppm in 2005. So we have the huge accumulation. There is also now a scientific consensus that if the average warming has to be kept within 2 degrees, because beyond 2 degrees, there would be absolute devastation, then all the accumulated greenhouse gases have to be kept within 350 ppm. There are huge campaigns now. It has crossed 350. To maintain below 2 degrees, we have already crossed that safe limit. And yet all of these negotiations that take place in the UN talk about 5% reduction on the basis of **1990 data.** We need a 90% reduction of Greenhouse gases. Nothing less than 90% will do. Now, where does India come into the picture and our forests come into the picture. I think we are actually fortunate that we are not a fossilized civilization.

As a country we can actually have an advantage to make this transition if only we could get the construction lobby off our backs. Because the construction lobby is behind the dams and superhighways, which won't get completed. I think never. I travel the length and breadth of this country. The Golden quadrangle will never become Golden. It will be bullock cart speed at 50% of the roads and 8 lane



Highways in 50% of the roads. And with the financial meltdown, the dreams of 1991 have become illusions. The idea that there will be a free flow of money and money can be made very very easily through all kinds of new financial instruments, that dream melted with the meltdown at Wall Street last September. So not only do we need to make a transition to a low fossil fuel future, we need to make a transition back to the normal system of affordable future. Yesterday, I was reading in the flight over to Trivandrum that airport privatization is getting stuck because they assume they have to make certain kind of money, which is all based on greed. They don't want to serve India. They just want to make lots of money. But they haven't been able to raise the kind of money they thought they can raise to be able to put up Hotels and shopping malls that would bring them the money. Not just servicing of the airport traveler, but all these additional things, they are not getting the money. And I think, just see this whole fancy glittery airports half built and then not raising the money in future. The same is the case for the idea that we can give up our tiny little businesses which are very low carbon businesses because they don't refrigerate, they don't take power and the "Theliwala" is absolutely, the perfect climate change answer, when he brings the push cart with vegetables to your doorstep. Supermarkets aren't able to sell. Shopping malls are empty because the rents are too high. Again, driven by greed they thought they would rent out for Rs. 2 lakh a month. Nobody can sell. So the model is collapsing in front of our eyes. That little model that moved into a heavy dependence on high energy carbon fossil fuels. Now the catalytic change to the other model which is the living model, the Biodiversity model, the sustainable model, the climate friendly model has Biodiversity at its centre. Part of that Biodiversity is the vegetation of the forest, and all the animals that dwell on it. Part of the Biodiversity is the cultivated Biodiversity. And I think in Kerala, there is a unique situation because it doesn't have a very forced divide between forests and cultivated land. I don't know how many of you, as Foresters, have ever read a report on Forestry in India by Volker in 1980. They don't make you read at your Indira Gandhi Academy. No. Well, you must try and get hold of it. I have a photocopy lying somewhere in my library. What Volker said, in India you cannot think of Forestry as a separate **entity**. And when I was a child, one of the Conservators of Forests in UP, Shri. M. C. Chaturvedi, a very eminent Conservator, who had done a calculation about the trees on the farms of Uttar Pradesh and the trees in the Forests. He projected that agriculture is also a place for forestry. I have been doing a very detailed scientific analysis of carbon return. And what we have found is that comparing chemical systems, chemical farming systems with organic farming systems, there is a 50% increase in Carbon sequestration. But once you add in the organic system Agro-forestry, then we had a 200% increase in Carbon return to the soil. 200% increase. What a great contribution? Kyoto negotiations have a 5% **reduction**. We are talking about a 200% difference that can be made today. Coming back to the issue of Kerala, it is actually a continuum. It is a continuum between rainforest and mountain forest, the home gardens which mimic the forest because they are based on permanent agriculture, based on perennial crops. And then into the coastal areas, where **large tracts** are being destroyed. The Mangroves in Orissa, after the Super cyclone, started to rejuvenate. And it's very clear that as far as Coastal protection is concerned, rejuvenating of Mangroves is absolutely vital. When the Tsunami happened, I have traveled up and down the length of Tamilnadu, every village which had protected its Mangroves survived, every village where the mangrove had gone, for the shrimp



farm or some other reason was badly affected. And Mangrove rejuvenation must become a very major activity of Forest Department. So we are at that moment where I think, Forestry can be a very major solution.

Due to Global Warming extreme events are happening. And the extreme events are more intense droughts, more intense floods, and more intense cyclones. In terms of the cyclones, you know, I remember the Orissa Super cyclone, we lost 30,000 people, we had more recently the Nargis, Cyclone Nargis, at Myanmar, 1 lakh people were killed, before that we heard of Cyclone Sidr in Bangladesh where a million people were displaced and around 4000 people were killed. These intensities are increasing- All the data is showing intensification of drought in Bundelkhand in parts of Central India which covers part of Madhya Pradesh and part of Uttar Pradesh. For 4 years they had a drought – 900 to 1000mm average rain was reduced to 200-300 mm. And this year, they had rain, but because the soil has lost its water absorption capacity It has resulted in lowering of water table. When you return Carbon to the soil, whether you do it as humus in the forests or you do it as humus through Composting in organic farming and both are the same processes- One happens naturally and one happens with our efforts. Otherwise we have instant runoff and even if you have rain you don't have recharge.

The mitigation and adaptation are similar in event, you know, that whenever we have an extreme event, the interesting thing is that it doesn't matter what the extreme event is- It could be extreme drought, it could be extreme flood, it could be extreme cyclone, ultimately the two measures are **enhanced** in climate change. The first is enhancing Biodiversity and second is enhancing the resilience of the soil to manage water.

When all of this happens, your role is key for two reasons. First because you are managers of this vast forest resource. But you are doubly key because you are managers in a State which is still awake. The rest of India is sleeping. It's very tragic. But you have a very privileged situation that here you have sensitive leaders who are willing to make the right change at the right time. And combine that with the fact that, Kerala is God's own country. It's Nature's own country because of the Biodiversity that is being protected. You cut down the forests and still have the beaches and no tourists will come. None will come for the beaches alone. They come for the green mantle that covers this State. And I think the challenge is intensify the green mantle, make it more healthy, because we also know, not every species functions the same way in terms of the Carbon cycle or in terms of the Hydrological Cycle. And our challenge now is to do the reforestation in a massive greening, but with the species that increase the resilience. So far, Forestry was about species that could be turned into pulpwood or which could be turned into timber and the period is over. Let the pulp industry find its pulp from wherever they can have it. I think, now the role of the Foresters has to be Hydrological stability, climate stability and Biodiversity conservation. And those three functions actually go together. Biodiversity conservation secures Hydrological stability. Hydrological stability is what we need to help adapt to climate change that **is** inevitable, in terms of the past **pollution** - And both water and Biodiversity management come into play in terms of mitigating **climate change** for the future so



that the intensification of these **trends** is known to us. I hope these changes that you are addressing will now be implemented. As we are working with the States on the Agricultural policies and this is the first State that has declared itself to be GMO free. Yesterday also, Agricultural Minister has reiterated the same.

I think the State who put a similar example on the forest management issue and put an example of course for the country and also for the World. People sometime underestimate the contributions of small actions. I am among those who believe that everything big starts with small actions. And I do hope that Kerala would **remain God's Own Country**.

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