A DESERT ON THE MOVE

- Darryl D'Monte

The Rajasthan desert, which covers some 2,90,000 sq km, is spreading inexorably. After each successive year of drought, the region is being seen as “India’s Sahel”. Can the ecological challenge posed by the degraded environment of Rajasthan be met.

With the onset of summer, the century’s worst drought appears set to take its toll of Rajasthan. The Desert Medical Research Council, affiliated to the Indian Council for Medical Research (ICMR), has admitted that deaths are occurring in the most crucially affected districts of Barmer and Jodhpur. Indeed, western Rajasthan and parts of the neighbouring state of Gujarat are increasingly being seen as “India’s Sahel” the grim portents of neglecting to protect the environment.

Already, the desert covers some 2,90,000 sq km in Rajasthan, and is spreading inexorably. Barely a few Kms outside a city like Jodhpur, for instance, the landscape quickly turns brown, shorn of all vegetation; the sand replaces soil all too readily. By mid-afternoon, a dim haze surrounds everything in sight as the desert sand is wafted by winds. In an area which has only two per cent forest cover, even the roots of trees are exposed mercilessly to sun and wind.

This is the fourth year in succession that the rains have failed to keep their appointment with western

This article appeared in The Indian Express of March 20, 1988. The points discussed are relevant today, perhaps more relevant than they were two decades earlier. Copies of this were published by Bhagat Puran Singh and distributed free of cost for generating public awareness.
Rajasthan; shortage of drinking water and fodder are acute. In fact, the region has learnt, to its dismay, that the spectre hovers over its people every 30 months, so that even a reasonable rainy season is a brief respite from an almost omnipresent phenomenon.

It will be all too easy to blame the present plight of the Thar desert on the rapid population increase there. From around 3.4 million people at the turn of the century, the area now holds about 13 million: the population is increasing at over three percent per year, higher than the average for India as a whole. Although there are only 35 people every square kilometer - around one-seventh the density of India as a whole - the Thar is reckoned to be the most densely populated desert in the world.

The question arises: has nature been hostile to man in the region or man hostile to nature? The answer is simple and yet exceedingly complex. For even the area around Jaisalmer, in the middle of the desert, does not receive less than 200 mm of rainfall in an average year. While this is low by national standards, one has only to recall that the US mid-west, considered the bread-basket of the world, also gets the same average rainfall. It is therefore a matter of how resources are used by humans; records show that 7,000 years ago, Rajasthan was fairly well endowed with trees and shrubs.

As speakers at a recent workshop on the desert ecosystem organized by the Delhi-based Centre for Science and Environment in Jodhpur pointed out, the problem stems from the failure to treat the desert as a unique ecological niche. Its terrain is more suited to animal husbandry rather than intensive farming, and over the years, the gradual conversion from pasture to cropland has placed severe stress on the carrying capacity of the land. The amount of cropped land has doubled in the last 30 years, which has forced herdsman to deplete foliage and shrubs to serve as fodder for their animals. In western Rajasthan grazing lands decreased by two million hectares.
or 16 percent between 1956 and 1978, while the animal population increased by 40 per cent in the same period. It is this process which gives rise to desertification over a long period.

For some reason, agriculture has acquired a social respectability, unlike animal husbandry. Probably, this has a lot to do with the fact that herders are nomads and thereby outside the pale of village society (and politics, for that matter). Indeed, the conversion of what used to be common village grazing lands to private farms took place under the land reforms of the early 1950's. The pattern is being repeated, under our very eyes, with the introduction of the Rajasthan canal, which is bringing water from rivers in Punjab to 'green' the deserts. Along the canal, the land use pattern has altered: intensive farming has been given precedence, pushing nomadic herdsmen off the land.

The canal, and the kind of development it will usher in, can hardly irrigate more than 50,000 hectares in all; "greening the desert" is an illusion. What, then, is the alternative? Should Rajasthan be left to impoverish itself further and be ruined irreparably? The way out, surely, is to recognise the strengths of this specific ecosystem and to strengthen it, rather than attempt to "tame" it.

Parts of the state are certainly suited to the cultivation of cereals. A district like Ganganagar in northern Rajasthan is heavily irrigated and virtually indistinguishable from Punjab and Haryana. As it is, the state accounts for some 13 percent of the country’s wheat crop. However, coarse grains like jowar and bajra are far more suitable in vast areas which do not enjoy intensive irrigation; pulses which are shrinking in acreage throughout the country are yet another choice.

But there is every reason why animal husbandry should be encouraged in western Rajasthan, in preference to intensive agriculture. In general, Rajasthan is considered a “basket case” in the Indian context, in perpetual need of relief. And yet, it stands ninth in the list of the
nation's food producers. It accounts for 40 million heads of livestock the third largest in the country. What may come as a surprise to many is that the state provides one-tenth of the nation's milk and half its wool.

The official attitude towards animal husbandry is one of benign neglect, while towards nomads, it is positively hostile. Even environmentalists condemn the hardy goat as the main culprit in denuding desert areas of their vegetation. As a situation report on India's environment prepared by the central government states, "Nomads in present day society prove a menace to the whole society and their sedentaryisation is inescapable." This view negates the actual resources which western Rajasthan possesses: not just an abundance of animals but, what is more, the knowledge of herdsman who have learned how to cope with the vicissitudes of life in the desert for generations. In other words, the most "scientific" use of this ecosystem is to encourage animal husbandry, since it assumes the shortage of water as a fact of life and works around it. Indeed, the desert has adapted to this environmental need: just a few millimeters of rain, for instance, is sufficient to enable sewan grass to grow in profusion and serve as fodder for grazing animals. The khejri tree, likewise, is a bulwark against drought, since its leaves are browseable and it grows in minimal moisture; its wood is an excellent source of cooking energy. Ironically, official forestry schemes are propagating non-browseable species like eucalyptus in arid areas.

Instead of spending vast sums of money on the Rajasthan canal expected to cost at least Rs 1,000 crore by the time it is completed by the turn of the century as well as on relief schemes, which have become almost a permanent feature in western Rajasthan, it would make more sense to develop an integrated economy in the Thar which relies on agriculture to a certain extent, afforestation, reclamation of soil and pastures for animal husbandry.
“Culturable wastelands” in the 11 districts which fall in the desert are ideally suited for planting with trees, bushes and self-regenerating grasses and legumes, as the National Commission on Agriculture had pointed out over a decade ago. For this to succeed, of course, people have to be involved. Once the entire village economy is upgraded in this holistic manner, not only will the process of desertification be arrested and distress alleviated but the population density in the region may gradually decline as people have access to biomass and water in greater quantities and do not need to produce children to perform all the tasks that survival in this inhospitable terrain demands.

Rajasthan thus poses a challenge to those responsible for halting the degradation of the nation’s environment. If its ecosystem can be salvaged, as is scientifically proven and socially demonstrated by desert communities like the Bishnois, there is hope for every other region as well.

---

“The Future of India hangs not in the political but in the physical balance... ... the shape of things to come a couple of hundred years hence will depend on how we conserve our soil... ... how, in short, we protect OUR forests.”

- Shankar Ranganthan

The wise say that the Universe was created out of five elements: air, water, fire, soil (earth) and the sky. These five elements are the source of all life, and in Indian culture they are deified. To keep them unpolluted and to conserve them is our moral duty.

- Dr. Inderjit Kaur
How much paper do you waste? Newspapers, advertising mail that goes unread, old magazines, scrap papers, large note sheets that have only a small scribble on a corner, leaflets, paper boxes from restaurants, cereal packets and fruit juice cartons, biscuit wrappers, old wrapping paper, letter envelopes, torn carrier bags, paper napkins, tissues, egg boxes, bread wrappings, cigarette packets, political party posters, confectionary covers, Diwali and New Year cards that are bought and thrown away in lakhs in January each year.

Every year, more than 10 million trees are cut down to cater to our demand for virgin paper. That means that we are continually planting poplars, eucalyptus and coniferous trees in tight plantations, destroying the natural habitat and leaving all forms of wildlife unprotected, and in the process, changing the weather. “Friends of the Earth” estimate that an average family uses six trees worth of paper a year. How many of you realise what you are doing to the environment when you use paper unnecessarily? When you throw away a child’s half used copy, when you use a long sheet to jot down a phone number, when you have memos needlessly triplicated, when you send two-line information notes printed on foolscap-length sheets, when you throw out an old calendar or diary.

Every time I see a new newspaper or magazine I feel irritated especially if it has nothing to contribute, but has been started as a business, an ad machine. Almost like opening another slaughter house. I feel the same emotion about greeting cards - in fact I never buy them.

My mother-in-law preserved all gift wrappings, each
carefully opened and put away in a trunk. We dipped into it at present-giving time. That habit has stayed with me.

**RUBBISH DUMPS**

It costs the Government several crores of rupees to dispose of rubbish, 50 per cent of which is packaging. We are using landfills to dump the litter. Countries like the USA are already finding it difficult to find dumps and we will find ourselves in the same position soon, as we fill more and more land with our rubbish, increasing pollution as we go.

The smell from the main rubbish dump of Delhi, a place I pass on my way to office, is unbearable even half a mile away. It is also a health hazard. Garbage dumps foul the environment, causing cancer, birth defects, nervous disorders, skin diseases and grave danger to water supplies. Waste incinerators have dense smoke, smudging the country-side around.

Plastics never disappear. Your cellophane wrapper, your cling film is not biodegradable. It will live longer than you, tainting the soil and spreading the taint with each rain. With refined detection methods we can now find traces of waste in water, soil and air. There is no provision in the Budget for the clean-up of waste dumps. In fact we have no national programme to eliminate toxic waste. Eighty per cent of your thrown-away paper and cans and bottles could have been reused or recycled, saving both money and the environment.

**GREEN BINS**

Germany has introduced the Green Bins where householders put their recyclable waste. Holland has bottlebanks and all the Scandinavian countries have machines where you put in your tins and get a coupon worth 10 pence.

Today I went to my hospital after several weeks and found a dump constructed outside. Next to it several vendors had set up eating stalls. My drains were com-
pletely blocked with waste paper and plastic.

You can scream at the Government but ultimately the only choice is to give the problem more attention individually. First, stop using paper and plastic unnecessarily and see that each bit is used before being thrown away. If you know Calendar, Diary, Cards or any other luxury paper item manufacturers, ask them to use recycled paper. Don't take unnecessary paper or plastic carrier bags. Individual garbage cans are almost unknown in this country. Get one instead of littering the city in the open dumps. In England, the local authorities in each town have opened recycling centres and citizens go down to give their paper and metal. Ask your town authorities to start a few centres like that.

If the Government, which uses vast amounts of paper every day, decided to use only recycled paper, it would set an example for conservation. It costs far more to use virgin paper than to use the recycled variety.

Few people realize that they are killing trees, destroying animals and birds and wreaking havoc on an already overloaded eco-system when they use paper extravagantly. Being a good citizen means that you conserve national energy - of which trees form the base. Make austerity in paper a resolution. And also, to make up for the paper you do use, let your family plant six trees a year. Not quick growing ones but trees that will have an impact on the environment like Neem, Imli, Peepal, Mahua, Sheesham and all the fruit trees you can think of.

Matsya Purana says: "One who sinks a well lives in heaven for as many years as there are drops of water in it. But to dig ten such wells equals in merit the digging of one pond; digging of ten such ponds was equal to making a lake; making of ten lakes was as meritorious as begetting a virtuous son but begetting ten such virtuous sons had the same sanctity as that of planting a single tree."
BURY THE DEAD, SAVE WOOD  
- K.M. Singh

There are a few sects in the world who cremate their dead. In India, Hindus and Sikhs cremate their dead and this not only consumes huge quantity of wood but also pollutes the air as also the rivers and ponds where half-burnt bodies and ashes are ultimately dumped. On the average 10 maunds of wood is burnt to cremate a body. If we assume a modest figure of 10,000 bodies being cremated daily in our country, we will be consuming one lakh maunds of wood every day i.e. 365 lakh maunds every year. Again assuming that on the average, a tree yields 10 maunds of wood, we unproductively destroy 10,000 trees every day i.e. 36,50,000 trees every year alone for cremating the dead. It is a colossal figure and will go on rising with the increasing trend in population.

In addition, unimaginably and unavoidably, huge quantity of wood is used as domestic fuel in the countryside as also in producing wood-based products in the industry and in construction of buildings, with the result that the deforestation is taking place with immense speed which in turn has upset both atmospheric cycle and ecological balance. We also need to remember that it takes efforts of many years to grow a full tree.

In such a situation, we definitely need to minimize the avoidable uses of wood and also to supplement the existing forests. The Government has its own plans to reduce deforestation and to plant trees wherever some place is available. To this effort, it will be ideal to stop use of wood

This letter appeared in The Hindustan Times, of Sept. 12, 1986. Copies of this were published by Bhagat Puran Singh and distributed free of cost for evoking public awareness.
in cremating the dead and take either to burial or electric cremation wherever such facilities are available.

Some Hindus might plead against the burial of their dead on sentimental and religious grounds like those who pleaded against ‘Sati’ when that movement was initiated by Raja Ram Mohan Roy in the 19th century. Those orthodox people have to rise above the narrow religious views in the present changed situation for the sake of healthy survival of the present and future generations.

We religiously cremate the dead perhaps for hygienic reason and there is of course some truth in it, but it can also not be denied that no harm has occurred to the whole lot of people in the rest of the world who do not cremate their dead. Hindus and others should not unnecessarily get panicky and pessimistic. The society should now think of burying their dead deep into the Hollowness of the mother earth at unhabited places around rather than destroying so much of our forest wealth. This will also increase the fertility of land on account of the chemical contents of human bones.

The Government should encourage construction of electric crematoriums wherever possible and should also, as is done for family planning schemes, think of providing incentives to people who avoid use of wood for cremation and opt for burial of their dead which is the quickest and cheapest method.

In this process, however, we need not create graveyards everywhere as open space too is shrinking on account of large scale construction activities to provide for ever increasing human population.
SOIL EROSION
THE GREATEST DANGER CAUSED BY
DEFORESTATION

- Prof. Amrik Singh Bhatia
(M.A. (Eng. Hist., Urdu.) Gold Medalist)

Homo sapien is undeniably the crown creation of nature. Among all the species of life existing on this planet, he virtually stands supreme. He is the undisputed ruler over the earth with its everything i.e. vegetation, trees, insects, animals, etc. The health and peace on earth is possible only if there is harmonious co-existence among all these things. The health and peace of the earth is likely to be splintered if there occurs any irregularity in its ecological equilibrium. But the human being, for the last two centuries, has been playing havoc with the nature and its limited resources with the result of landing the whole life on earth in jeopardy. Man, today, through his thoughtless actions, in the name of scientific and technological advancement, is leading the earth fast towards erosion of its soil which preserves all life here. It is only about eight inches of top soil on which depends everything that grows biologically around us. It is a part of the earth that contains the soil bacteria, fungi, other microscopic forms of life and earthen worms.

There have been instances of rapid soil erosion in small areas during the entire history of this planet. But, as per the reports of the best soil experts, there has been more erosion of top soil during the last two hundred years than in all the previous history of the world put together.

SOIL EROSION AND VANISHING OF CIVILIZATIONS
A peep into the history will reveal that nearly every
Empire throughout history has ended in desert. Today's denuded Morocco, Tunisia and Algiers were once the wheat growing areas of the Roman Empire. The dreadful erosion in Italy and Sicily is another product of that empire. The present desiccated lands of Mesopotamia, Syria, Palestine and parts of Arabia were the sites of the great empires of Ur, Babylon, Sumeria, Akkad and Assyria. Persia was once a great empire. Now it is largely desert. Greece under Alexandra was an empire; now its land is mostly barren. The soil of the land of the empire of Tamerlane now produces only a small fraction of what it did in his days.

**DEFORESTATION - THE MAJOR CAUSE**

Chief among the causes that bring about soil erosion is reckless cutting down of the trees. Tree appeared on the earth far earlier than man. In a way, tree is man's elder brother. But today the younger brother is making the elder an object of ruthless slaughter. In order to supply the needs of timber and paper pulp, trees have to be killed. In today's Europe the consumption of wood exceeds new forest growth by more than 20 per cent. According to an estimate, only one Sunday edition of the New York Times requires ten acres of big trees to supply the necessary wood pulp for its paper. Certainly, the modern industry shall devour up all the forests if their genocide is carried on at this pace. Soon the trees will become extinct and their traces may be found only in the picture books of children.

Not only shall the thoughtless felling of trees convert the earth into a barren globe, quite hideous to look at, but also bring about the erosion of the soil which keeps flame of entire life aglow. If we are a little concerned with the smooth and unstinted going on of the mother earth, if we are to save the present civilization from vanishing into a vast desert, we must stall forthwith sacrificing the innocent trees at the altar of the monster of modern industrialism and do our best to prevent soil erosion.
The Chairman of the University Grants Commission, Prof. Yash Pal has made a forceful plea for evolution of "a global religion of ecology if the humanity wants the planet earth to continue to throb with life."

Addressing the annual convocation of Kurukshetra University, Prof. Yash Pal, an eminent scientist in the field of cosmic rays and high-energy physics, said that gone were the days when human beings could take liberties with the environment without disturbing the ecology. Now the human beings had become a geological force, capable of wiping out all life form the earth. "Unless a new code of ethics is developed, this planet is going to die, and with it humanity will die", he warned.

Another challenge to the humanity, he said, came from population explosion, which started about a century ago and was showing no signs of abating. About 3,000 years ago, the world population was only 100 million whereas now it stood at 4.5 billion and by the turn of the century it would be 10 billion. The population growth had to be checked, he stressed.

Opposing those who pleaded that India should buy technology form the "world supermarket" Prof Yash Pal said "this concept" had relevance till about 100 years ago when "the premium was more on being a curator of knowledge than on being a creator of knowledge." This "borrowed modernity" would not take India far. India, which had been a curator of knowledge in the distant past,

*This article appeared in The Tribune, Thursday, May 1, 1986. Copies of this were published by Bhagat Puran Singh and distributed free of cost for evoking public awareness.*
did not pursue creativity for a long time. He was, however, confident that India would not live on “borrowed modernity” and would contribute to the world’s progress.

Advising the graduates to continue learning while working, he said if they failed to do so they would lag behind. He said: “From the vibrant distant past you must create a vibrant future. This is the demand of the new philosophy of ‘karma yoga’ which must be written according to the needs of the time”.

“...The nation will survive only if the people live simple lives based on truth, if they do not try to deprive others of their rights. They should live compassionate and contented lives, and should use the handmade rural articles such as handspun cotton cloth, hand-made shoes made in villages and utensils of brass and clay made in the countryside.”

These things may appear ridiculous in the present machine-age, but if we do not follow Bhagat Puran Singh’s teachings, the nature will, in the end, punish and make us to do them.

-Dr. Inderjit Kaur

Civilization can be measured in man’s ability communicate the greatest amount of knowledge in the shortest possible time.

-M. V. Kamath
FOREST MEMORIALS

-Khushwant Singh

I have been to Israel many times. I have also visited its neighbors—Syria, Jordan, Lebanon and Egypt. The one thing that struck me forcefully was the difference between the land occupied by the Jews and that occupied by Arabs. One was green, the other brown. You did not need a map to tell where Israel ended and Arabic deserts began.

Forty years ago Israel was exactly like its neighbors—a waste of sand dunes, cacti and camel thorn. Today it has as much forest and greenery, even wild life, as any country in Europe. There are some people who turn green pastures into deserts; others turn deserts into green pastures. The common saying in Israel is that Arabs are not sons of the deserts but its fathers: where ever they go, they make a deserts. We Indians are closer to the Arabs than to the Israelis because we are fast turning our once richly afforested country into an arid waste.

The population of the world increases by more than 70 millions every year. A good one-third of that increase is in India which is already bursting at the seams. As foolishly as we multiply, we wantonly destroy our forests. At every Vana Mahotsav we are served with a prasad of false statistics of the number of saplings planted. None are furnished about those that perish through neglect or are eaten up by cattle. The worst enemies of trees are goats, camels and human beings. The order could be reversed because goats and camels need leaves as fodder. Humans

This article appeared in The Tribune September 3, 1988. The points discussed are relevant today, perhaps more relevant than they were two decades earlier. Copies of this were published by Bhagat Puran Singh and distributed free of cost for arousing public awareness.
destroy trees to make homes, furniture, fuel and to dispose of dead bodies. All these can and must be prevented. Homes can be built of stone and concrete; furniture made of steel and plastics; power and heating produced from biogas and electricity. Bodies should be disposed of by burial next to the earth without any graves or tombstones and be ploughed over after four or five years. There is nothing in the Hindu dharma (lit) that obligates disposal by fire and many Hindu communities in Southern India bury their dead.

I have written on this subject many times (in the hope that some State governments and voluntary organizations will give afforestation top priority). Let me again quote the example of Israel. Along all the highways of this small country are dense forests of pine, fir and deodar. The land is owned by the State; the trees planted by families. Every block has a plaque with the name of the dead person in whose memory the trees were planted. Tree planting and not raising statues, buildings or organizing memorial lectures is the Israelis’ first preference to commemorate their ancestors.

I have been in correspondence with B.N. Prasad, a retired forest officer who, though he generally agrees with me, is not as despondent as I am. He suggests a multi-pronged attack: reduction of waste in processing wood (almost 60 percent is wasted by sawing and chiseling); conservation of forests by selecting a few varieties of trees for felling and leaving others untouched; import of timber for 10 years to allow our forests to remain unmolested; extensive use of bagasse and waste material for manufacture of paper and newsprint; and extensive plantation of fast-growing trees. (I don’t agree with him on this point. I believe, in the long run, the slow-growings are hardier and more beneficial.)

Would some Indian millionaire set an example by leaving all his money in his will for a forest to be named after him?
A SUB-SAHARAN DROUGHT IN INDIA?

- B. L. Bose

Drought conditions are prevailing over several parts of India. While in 1984-85, 167 districts in eight states were afflicted by drought and two-thirds of Maharashtra's total area came under its grip, the situation this year seems to have taken a turn for the worse with over one million people in nine states having been affected. According to reports, 13 out of 19 districts in Karnataka, 26 out of 27 districts in Rajasthan, 17 out of 19 districts in Gujarat and 19 out of 23 districts in Andhra Pradesh have been hit by drought. The situation is not very reassuring in five other States.

The financial implications give a measure of the deteriorating situation. The Central relief assistance during 1985-86 touched almost Rs 1,000 crores, as against Rs 570 crores in the previous year. Karnataka, where the drought is reported to be the “worst this century”, is spending Rs 1 crore each day on relief and the demand for central assistance placed initially at Rs 89 crores, has already gone up to Rs 271 crores. The total demand for central assistance from the States is now reported to have reached a staggering Rs 8,000 crores.

THIN EDGE

Yet this is perhaps only the thin edge of the wedge. With the advent of summer and despite numerous bore and

This article appeared in the Statesman, April 18, 1986. The points discussed are relevant today, perhaps more relevant than they were about two decades earlier. Copies of this were published by Bhagat Puran Singh and distributed free of cost for public awareness.
dug well constructions, the situation, particularly in respect of fodder and drinking water will perhaps worsen. Receding water levels and failing power supply hampering pumping operations and causing a slowing down of the wheels of industry may further aggravate the situation.

A third large-scale monsoon failure may well push India into a grim position notwithstanding large food grain reserves and the prospect of a bumper wheat harvest. The fact that in the last seven years, India has experienced four large-scale droughts, the last two occurring in succession, cannot be a matter of small concern.

The report that between one-third to a half of the country is virtually wasteland and that a quarter of the land is subject to erosion as a result of the felling of trees, which are almost one and half million hectares per year, not only substantiates fears about an ecological disaster, but also introduces a worrying dimension to the present situation. If we add to this scenario the impact of the existing 250 million heads of cattle and another 130 million animals with their almost run-away multiplication rates and the continuing land degradation, we have perhaps, as has been exemplified by droughts in Africa, a recipe for a catastrophe.

Even the fact that agriculture is being pushed to marginal areas, more suited for pastures and forests, points to the Sub-Saharan situation prevailing before the drought. Overuse of ground water, intense cropping, and excessive cattle population feeding on sparse vegetation and thereby removing the vegetative cover, degradation of grasslands, etc., are said to have contributed to the persistent droughts in the sub-Saharan region.
KILLING TREES

- Madhav Gadgil

For the tribals of New Guinea Highlands, land is the most precious resource. And in the uniquely human tradition that goes back thirty thousand years, they periodically engage in mass warfare over control of their territory. Often these wars are stand-offs; but once in a while one of the tribes is defeated and flees from its territory. On overrunning the vanquished neighbours’ lands, the first thing the victors do is to cut down all the fruit trees. Then they retreat waiting to see if the defeated tribe would reoccupy the lost territory. If they do not do so for some months, the victors claim the newly conquered territory as their own. But whatever happens, the fruit trees are an inevitable casualty.

The bison, which once roamed the Prairies in millions, is another famous victim of wars. The herds sustained the native Amerindians who fiercely resisted European expansion. To weaken them the colonisers plotted to destroy their major food supply. So bison were recklessly massacred; their carcasses left to rot while just their tongues were consumed as a delicacy. Within a few years this magnificent beast all but vanished; and in the wake of its destruction the Amerindian resistance too collapsed.

This is how the logic of wars operates. Vying for control over each others’ resources, warring parties destroy just what they are after. That is of course what is happening in the Gulf today as has happened in all wars since time immemorial. Ultimately the victim is the Earth.

This article appeared in The Economic Times, February 23, 1991. Copies of this were published by Bhagat Puran Singh and distributed free of cost for public awareness.
What happens in wars also happens in struggles within countries. One such ongoing struggle in India is that for control over forest resources. The forest dwellers want the forest to serve as their habitat, a habitat that shelters and feeds them. The larger economy would like the forests to serve as a warehouse of commodities, timber and softwood, cane and bidi leaves. The most prized commodity from tracts of moderate rainfall is teakwood; and over large tracts, foresters have converted natural forests into teak plantations. But while natural species-rich forests, such as those dominated by sal, support the tribals in many ways, teak monocultures offer them nothing. That is why the Jharkhand activists have raised the slogan: “Sal is Jharkhand, teak is Bihar.” What is tragic of course, is that the protest has taken the form of destroying teak plantations.

It seems inevitable then that so long as there is inequity and struggle amongst people to prosper at each others’ expense, nature would have to pay a heavy price. This has been going on since time immemorial and will perhaps continue for a long time to come. Unfortunately, the price that nature is forced to pay has now become astronomical. Both Iraq and United States are talking of using nuclear bombs and a full scale nuclear war could in one sweep wipe out much of life on earth. And even if that does not happen all future wars would result in ever more severe destruction of environment. Fortunately, the technological advances that render a modern war so frightening have also produced tools that can counter this threat. These are the tools of modern communication, which are loosening the hold of a narrow elite over the apparatus of the state and enabling people at large to make their voices heard.

Everywhere, the majority of people want freedom from strife, want to spare nature from destruction. Everywhere it is the narrow vested interests of power-
hungry politicians, of unscrupulous businessmen and corrupt bureaucrats that want to thrust war, that want to thrust destruction of nature upon an unwilling citizenry. Modern means of communication are now fast approaching the stage that direct democracy could become a reality even for whole nation states with millions of people. In Sweden, or California, all people already vote directly on vital issues such as use of nuclear power. In a few decades at the most this would be possible for all the citizens of the earth. When genuine empowerment of people at grassroots becomes a reality, one has every hope that they would vote for a halt to all violence amongst men and against nature.

SEVEN GREATEST DANGERS FACING THE WORLD:

1. If land erosion, destruction of fertility of the soil, destruction of humus, and the growing population, are not halted, the very existence of mankind will be endangered.

2. Violence, wars and internal disputes, terrorism, harmful economic, religious, social and political activities are posing serious danger to our survival.

3. The wide gap between rich and poor and economic disparity between castes and communities.

4. Excessive influence and interference of political, economic, industrial and trade organisations.

5. Flawed thinking on the part of leaders that to meet fixed targets in a region, any means could be adopted.

6. Dishonest and immoral activities of government officials and organisations.

7. Lack of resolve on the part of leaders and organisations to maintain harmonious relationship with each other and live in mutual peace.
CONTROLLING FLOODS

- Mira Behn

Again the North of India has been swamped with floods pouring down from the Himalayas. Nothing else can be expected, whenever there are heavy rains, until the Himalayan Oak (Banj) is reestablished in its natural habitat, and the Chil Pine is drastically reduced. While I was working in the Himalayas I pleaded time after time for this, and sent detailed articles to the press, for I was living right in the midst of the Oak devastation of the Ganga catchment area. Pandit Jawaharlal Nehru put me in touch with the top people of the Forest Department, and they listened to me in a friendly way, but that was all. To resuscitate the Himalayan Oak and drastically diminish

CHILL PINES

Mira Behn was Gandhiji's ardent follower. This article was written in 1973. As many as 40,000 copies of this were published by Bhagat Puran Singh in the form of a pamphlet and distributed for arousing public awareness.
the Chil Pine would have completely upset their finances. The Himalayan Oak is not a commercial tree, whereas the Chil Pine yields both timber and resin and is, at the same time, very easy to cultivate as it seeds itself like a weed.

The choice before the Government is absolutely clear – either to let the soil erosion of the Himalayan catchment areas continue, leading to ever worsening flood devastation with its enormous cost in money as well as human life and suffering, or to restrict the Chil Pine to below the 5,000 contour line and resuscitate the Oak from the 5,000 contour line up to at least the 8,000 line.

Nature had provided this belt of Oak, with its broad-leaf foliage and its thick undergrowth of bushes and grasses, to catch and absorb the torrential rains that fall along that altitude. Now where the Chil Pine has spread, the rain water rushes down head-long to the mountain valleys where the streams become raging torrents all converging on the exits of the great rivers on to the plains. The accompanying illustrations show the staggering difference between the Chil Pine and the Oak.

How “Independence” has fostered the destruction of the Oak forests I have explained in some of my articles, but I will not go into details here, as people now-a-days have little time for such reading, and I do want this article to be read!

I fully realise that the re-establishment of the Himalayan Oak would be a long-term project needing both patience and firmness of purpose. For one thing, the cooperation of local villagers would be essential, for which assistance in the form of compensation for loss of fodder facilities and firewood would be required until Nature’s balance has been restored, and also the Forest Department’s staff in the Oak belt would have to be considerably increased for the permanent control of lopping and cutting by the villagers. But the most vital need of all, without which nothing could be achieved, would be the honesty of the Government staff. As things stand at present, corrup-
A boat sinks when its belly becomes heavy. By this he means that when people increase their expenditure beyond their means and are unable to meet it through honest means, they resort to dishonest ways of getting money. To stay honest one needs to lower one's expenditure to a level which is well within one's means; he should avoid spending money on non-essential things, things he can do without. Those who do not consider it necessary to stay honest, have no compunction about adopting dishonest ways of getting money.

- Shaikh Sadi

Man has lost his capacity to foresee and forestall, he will end up by destroying the earth and with it of course himself pollute and perish.

- Albert Schweitzser
God has lent us the earth for our life. It is a great entail. It belongs as much to those who are to come after us and whose names are already written on the book of creation as to us, and we have no right, by anything we do or neglect, to involve them in unnecessary penalties, or deprive them of benefit which it was in our power to bequeath. And this is all the more because it is one of the appointed conditions of the labour of men, that in proportion of the time between the seed sowing and the harvest is the fullness of the fruit, and that generally, therefore, the farther off we place our aim and the less we desire to be ourselves the witness of what we have laboured for, the more and wider and richer will be the measure of our success. Men cannot benefit those that are with them as they can benefit those who are to come after them; and of all the human voice which is ever sent forth, there is none which reaches so far as one from the grave. Nor is there indeed, any present loss in such respect for futurity. Every human action gains in honour, in grace, in all true magnificence by its regard to things that are to come. It is the far sight, the quiet and confident patience, that, above all other attributes, separate man from man, and take him near to his maker; and there is no action nor art whose majesty we may not measure by this test. Therefore, when we build, let us think that we build for ever. Let it not be for present delight, nor for present use alone; let it be such work as our descendants will thank us for, and let us think that as we lay stone on stone, a time is to come when those stones will be held sacred because our hands have touched them, that men will say as they look upon the labour wrought substance of them: “See this, our fathers did for us.” For indeed the greatest glory of a building is not in its stone or in its gold, its glory is in its age.

Every person in the world faces a series of pressures and problems that require his attention and action. These problems affect him at many different levels. He may spend much of his time trying to find tomorrow’s food for himself and his family. He may be concerned about personal power or the power of the nation in which he lives. He may worry about a world war during his life-time, or a war next week with a rival clan in his neighborhood.

These very different levels of human concern can be represented on a graph like the one given below. The graph has two dimensions, space and time. Every human concern can be located at some point on the graph, depending on how much geographical space it includes and how far it extends in time. Most people’s worries are concentrated in the lower left-hand corner of the graph. Life for these people is difficult and they must devote nearly all of their efforts to provide for themselves and their families, day by day. Other people think about and act on problems farther out on the space or time axes. The pressures they perceive
involve not only themselves, but the community with which they identify. The actions they take extend not only days, but weeks or years into the future.

Although the perspectives of the world’s people vary in space and in time, every human concern falls somewhere on the space-time graph. The majority of the world’s people are concerned with matters that affect only family or friends over a short period of time. Others look further ahead in time or over a larger area — a city or a nation. Only very few people have a global perspective that extends far in to the future.

A person’s time and space perspectives depend on his culture, his past experience, and the immediacy of the problem confronting him on each level. Most people must have successfully lived the problems in a smaller area before they move their concerns to a larger one. In general, the larger the space, the larger the number of people who are actually concerned with its solutions.

There can be disappointments and dangers limiting one’s view to an area that is too small. There are many examples of a person striving with all his might to solve some immediate, local problems, only to find his efforts defeated by events occurring in a larger context. A farmer’s carefully maintained fields can be destroyed by an international war. Local officials plan can be overturned by a national policy. A country’s economic development can be thwarted by a lack of world demand for its products. Indeed there is increasing concern today that most personal and national objectives may ultimately be frustrated by long-term global trends such as those mentioned by U Thant.*

* Thant was Secretary-General of U.N.O
CREEPING PERIL

The great Indian desert, said scientists of the Central Arid Zone Research Institute two years ago, has been stationary since its formation in the mid-Miocene period, that is some 20 million years ago. But recent topographical surveys made by the Planning Commission show that Rajputana desert is advancing at the rate of eight kilometres a year into Haryana, desert sands palpably affecting soil fertility. This contradiction is proof enough that not much is known yet about such a puzzling organism as a desert. Land mismanagement (over cropping and over grazing which invariably lead to erosion and the disappearance of trees) worsens the situation allowing the peril to creep along surely, though imperceptibly. Last April, the Haryana Government initiated a Rs 29 Crores lift irrigation scheme in Gurgaon district, as a supplement to the Rs. ten crore integrated desert reclamation plan drawn up by the Central Desert Development Board for Haryana, Rajasthan and Gujarat. The problem is largely ecological and trees are the basic solution. Geologists insist that underneath every desert there are lakes and rivers. A most remarkable enterprise in desert reclamation was undertaken by an English lady, Wendy Campbell-Purdie, who initially encouraged by the FAO, went to the Sahara to plant trees. First she tried the desert's edge at Tiznit in Morocco. Seedlings grew in four years into tall trees; but politics drove her out. In Bou Saada, once a large dune in Algerian Sahara, there today are thousands of flourishing trees - and the desert has been pushed back. The technique used by her is to plant hardy trees (like eucalyptus) in a wide circle to form a protected area, within which she plants tree belts as wind breakers and sand-halters. A similar thing can be done in selected areas in Rajasthan
and elsewhere; given persistence and patience, trees can be made to beat back the creeping peril.

*The Times of India, May 6, 1972.*

**BAN ON EUCALYPTUS TREES ON FARM LAND URGED**

The noted environmentalist, Mr Sundarlal Bahuguna, has called for an immediate ban on plantation of eucalyptus trees on farm lands.

"Mass plantation of eucalyptus may make India a big producer of pulp and rayon but it may also uproot a large number of agricultural labourers and ultimately increase the city slums," he said in a statement at the end of a tour of seven states.

He said environmental activists in Uttar Pradesh, Bihar, West Bengal, Orissa, Andhra Pradesh, Tamil Nadu and Karnataka had expressed concern over eucalyptus monoculture and the spread of the parthenium, among the seven most dangerous weeds in the world.

Studies in Tamil Nadu and Karnataka had confirmed that eucalyptus monoculture has a disastrous effect on the ecology and economy, the Chipko leader said. Large-scale plantation of eucalyptus on farm land deprived agricultural labour of employment, the poor of their staple food, the cattle of fodder and birds of shelters.

"Should we utilise our land, even marginal and sub-marginal land, to grow raw material for the affluent, and at the same time pollutant industries like pulp and rayon, or should we plant it with soil-improver tree species of multiple use, especially food, fodder, fuel and leaf fertiliser giving species," Mr. Bahuguna asked.

The situation, he added, demanded an immediate review of the land use policy by the Planning Commission.

Mr Bahuguna said another ecological problem before the country was the spread of the parthenium. The worst affected areas were Rishikesh and Hardwar in Uttar Pradesh, Bangalore and its surrounding areas in Karnataka.
and Secunderabad in Andhra Pradesh.

Several allergic diseases like asthma, bronchitis, hay fever and dermatitis are caused by the pollen grains or disseminated parts of the plant. Besides, parthenium causes a severe fodder problem because cattle do not graze on it.

Mr Bahuguna said he met groups working to keep the Ganges clean in Varanasi and Bhagalpur. He felt that an electric crematorium in Varanasi would go a long way in checking pollution in the river. In Bhagalpur, the sources of pollution were big private and public sector industrial units. The fishermen of Kahalgaon were affected by the industrial effluents.

-The Times of India, August 21, 1983.

BEST DEPOLUTANTS

This will delight that gallant band of conservationists, the friends of the trees, and other plant-lovers generally. The most sensible way to fight pollution (which is slowly fouling our planet’s biosphere) is not to cause it in the first place. That being impractical at the moment, the next best thing to I do is to devise ways to encourage depollutant activity. And the most effective depollutants belong to the plant kingdom, older by far than men and animals, and are equipped with tricks we can never hope to emulate.

The solution quite simply is to grow more trees; the right kind of trees, preferably but in the absence of expert botanical knowledge, any kind of trees. Experiments conducted in West Germany show that one large tree can in one season absorb the lead content of 130 litres of petrol from the atmosphere. The poisonous metal is converted by the tree into lead phosphate which is insoluble in water and is stored in the trunk, where it can damage neither itself nor people and animals.

Sulphur-dioxide, another dangerous atmospheric pollutant, presents a tougher problem. It seems there is a limit beyond which trees will not absorb this gas, and if
they take in too much they start to shed their leaves, making everything so much the worse. The obvious remedy is to increase the pace of reforestation and to insist on a minimum number of trees in every large city.

*The Times of India, March 9, 1972.*

**MORE OF EUCALYPTUS**

The most deplorable example of monoculture in forestry at present is the eucalyptus, an alien species from Australia. The landscape over large parts of the country has undergone change in the last 15 years or so with extensive industrial plantation of eucalyptus after clear-cutting the forests, and also planting of these trees along highways. That this tree grows fast and plantations can be harvested en masse within a short period of about 5 to 10 years, are the arguments advanced in its favour by its advocates. While this may be true it must not be forgotten that eucalyptus trees cannot sustain any wildlife, and they also adversely affect the flow of water in the streams etc. Another important factor often ignored is that there is no natural return of nutrition to the soil, and the humus content in the soil is completely lost.

Being evergreen, eucalyptus has hardly any appreciable leaf fall. Its leaves contain a large quantity of aromatic oil which is itself an insect repellent. The leaves are thick and leathery and combined with their bitter taste would neither rot nor be consumed by animals. They just dry on the forest floor or are washed by in heavy rains. So, nothing is returned to the soil.

The sleek, glistening, bare stems of eucalyptus do not provide any camouflage to wild animals or birds. There can, therefore, be no question of any animal organic matter or litter being fed back to the same soil. The plantation is harvested at short intervals; hence the question of building up of any microclimate, eco-system or environment also does not arise.

A natural forest has a triple storey canopy consisting
of bushes at the ground level, small trees forming the middle storey and tall trees making the upper storey. Besides other effects, the greatest advantage of this three tier effect is the interception of rain and protection of soil from drip erosion. In a regimented plantation of eucalyptus where the foliage is very thin, trees are very tall, and the lowest branch may be above a height of 30-40 ft., the erosion of bare soil underneath is vastly accentuated by direct drip. No humus collects on the ground to soak the rain water and retard the run-off. This would naturally affect the storage of sub-soil water and affect flow of water in the springs, nullahs and streams.

Fortunately we have so far been spared the tragic phenomenon of “leaping fires” experienced in Australia, the home of eucalyptus. The volatile oil distilling out of the leaves during hot, dry summers collects in the atmosphere and bursts into flames, leaping several miles from one place to another and causing large scale damage to life and property.

-The Hindustan Times, February 27, 1978.

THE WORSHIPFUL COMPANY OF TREES

When I am dead, people may say for a few weeks: he wrote pieces for the newspapers. For a few years they may say: he was the father of so and so. But long after that, long after the name is forgotten, but there will be great trees in which the birds of the air will make their homes, and under which the sons of men will find rest - the trees that I planted. In the life of my trees, I shall lift my face to the sun and cast my shadow upon the earth for a hundred years.

-Bruce Barton

mmm
DEATH OF A PLANET

- Satyapal Anand

The world has got by so far with the pattern of thinkers who think, almost wholly about themselves and their personal problems and about those immediately around them - family, friends, pet animals, work associates or people of their own town, region or country. Very few indeed have our planet as a whole within their horizons and the men, women and children that inhabit it.

There, however, looms ahead the problem of the very survival of mankind which requires a far greater concentration and application of cerebral activity and statesman-like wisdom than has marked the past or is evident in the world today. This problem, though universal in scope, will directly affect only the younger amongst us, will begin to have an impact on our children, and could profoundly affect the lives of our grandchildren and following generations.

The obvious reference is to the exponential growth in population, in food consumption, in industrialization, in depletion of natural resources, in pollution, all interacting in a closed global system. The system is large and consequently considerable development is possible within it but because it is finite, there are limits to such development. Warning lights are flashing that these limits may be reached during the 21st century.

This article appeared in The Tribune, Sunday, Oct 29, 1989. The points discussed are relevant today, perhaps more relevant than they were about two decades ago. As many as 30,000 copies of this article were published by Bhagat Puran Singh ji and distributed amongst public free of cost for promoting general awareness as also awakening the government officials and NGOs.
There is a tendency to look at individual factors of this interrelated system such as population or pollution, in isolation, and often only in a national or even regional context. Any broader view involves so many complexities, variables and “unknowns” that the mind boggles, and attempts at qualitative extrapolations are shaky at best.

Nevertheless, thinking people have been experiencing increasing concern regarding world developments and have felt intuitively that dangers of quite a different order to those that have faced mankind in the past appear to lie ahead. But because of the involved interrelationships and great complexities, it requires a deep knowledge of interacting systems, dependable statistical data, and powerful computing facilities to achieve quantitatively meaningful interpretations.

The Club of Rome:

With the advent of systems dynamics as a science and of powerful computers, and with the increasing worldwide availability of statistical data, it has become possible to study the inter-relationships of complex universal problems and make projections, even though tentative, of developments deep into the next century. The Club of Rome, an informal international group of men interested in fostering an understanding of the interaction of economic, political, natural and social components of our global system, and specifically concerned about what they have defined as the Dilemma of Mankind, initiated such
a study in 1970. The report "The Limits to Growth" by Meadews et al was published in 1972.

We are all familiar with the idea of a model of something that in simplified form and generally on a small scale represents some large of complex concept or project. Architects make two-dimensional drawings and sometimes three-dimensional models of projects as concepts of real things they want to create. Physicists make physical or mathematical models of the structure of the atom as a means of getting some conception of highly complex invisible system. Engineers, economists and systems analysts are some of the professions that apply mathematical models to assist in visualizing and solving practical problems.

At the request of the Club of Rome, a team of systems analysts working under Dr. D.L. Meadews, at the Massachusetts Institute of Technology (MIT), where they had access to one of the most powerful computers in the world, used their wide experience of systems dynamics to model the complex quantitative interrelationships in global developments brought about by man on this planet. This model, like most models, is based on assumptions and on incomplete data; consequently and inevitably it suffers from over simplifications and resultant uncertainties; but it is nevertheless the most comprehensive model yet developed anywhere and contains the most dependable data that the modelers could glean from the sources at their disposal in 1970.

FROM 1970 TO 2070:

Because the study was based on extrapolations of trends in all those factors forming part of the world socio-economic development pattern, it provides a prognosis of what lies in the foreseeable future and beyond for the next hundred years. It is useful to consider the pattern of the important interacting development factors - population growth, food supply, depletion of non-renewable resources, increase in industrial investment and pollution. They all
display exceptional growth, i.e. they all double in particular periods, and double again in the next period of equal length. So, for equal time periods we have the exponential progression 1, 2, 4, 8, 16, 32, 64 etc., expanding rapidly with time. Such a progression has a cardinal characteristic that any figure in the series is equal to the sum of all the previous figures (less one).

Take population growth. Up to the 15th century world population probably - we have no dependable statistics - increased on average at some 0.2% p.a. At this rate it would double every 350 years, quite a reasonable rate. Man having in the meantime conferred on himself the benefits of greatly improved health services and more abundant food, world population now doubles every 33 years. At this rate the world will have a population of 28 thousand million a hundred years from now, i.e. eight times the 1970 figure.

No one knows the future. The projections on population growth are based on the most dependable evidence available - that of the immediate past growth rates. All that can be said about them is that they therefore have a high probability of being dependable. There are, moreover, no known factors affecting human population growth which would bring about a drastic departure from past growth rates. Wars, pestilences, famines - factors which in past times have decimated populations - have at most caused only ripples on present-day population curves. The pill and all the other contraceptive devices and practices have so far had only very limited global affects, and then only in high income communities, minority areas in the population - spread.

A DENUDED PLANET:

The exponential growth of population is only one interacting component of our global system. We are depleting non-renewable natural resources like ores and fossil fuels also at exponential rates. The MIT team, using the latest world statistics available, have shown that, at
current exponential rates of the use of known reserves, we will run out of aluminum in 31 years, copper in 21 years, iron in 93 years, tin in 15 years, natural gas in 22 years, petroleum in 20 years, coal in 111 years and so on.

Undoubtedly large new deposits of all these commodities will be found, and so extend their periods of use. The earth has tremendous resources, e.g. in unexplored regions, at deeper than yet exploited levels, and under the oceans. But its resources are not unlimited. And new discoveries may not extend them for very long because of the exponentially accelerating exploitation. For instance, the MIT team has calculated that if actual reserves were five times the known reserves – the prodigious quantities indeed – it would extend the depletion period of aluminum by a mere 24 years, copper by 27 years, iron by 80 years, natural gas by 27 years, petroleum by 30 years and coal by 39 years.

Going two steps further, still using present exponential rates of exploitation, I have calculated that for aluminum the time of depletion for 20 times the known reserves would be 75 years from now; the corresponding figures for petroleum would be 81 and 120 years. These figures provide dramatic evidence of the effects of exponential growth in exploitation. The conclusion that can be drawn is that if exponential growth in usage of these commodities continues as heretofore, most of the non-renewable natural resources on which our way of life today so largely depends, will be dissipated between the years 2000 and 2100.

**WHOSE BIRTHRIGHT?**

Each person of the world's exploding population has a birthright to a share in world resources. Increasingly the less privileged seek, even demand, that what the more privileged have, should also be theirs. The majority of the privileged do not agree but of late the truth is dawning upon them. In years to come they may tend increasingly to agree and to seek ways of sharing the earth's riches and
the products of an expanding technology with the under-privileged. This has so far hardly been marked by spectacular success. But if it had, what effects would it have on the non-renewable resources?

It is said that one quarter of the world’s population has three-quarters of its wealth. If all the world’s have-nots became have-sorts overnight, the rates of consumption of raw materials would be about three times the present rates. If exploitation at three times the current annual consumption started in 2000 AD, but the percentage growth rate for each commodity remained as at present, taking just two examples, known resources of aluminum, instead of being depleted in 31 years as calculated by the MIT team, would be depleted in 17 years, known resources of petroleum would last less than nine years instead of 20.

The inevitable, byproduct of increasing agricultural, urban and industrial development to meet the needs and wants of an expanding world population is pollution through solid, liquid and gaseous waste products. This has shown rapid exponential growth. The examples are: mercury in sea fish which has recently increased in some waters to levels dangerous to man, and deposits of airborne lead decreasing in successively deeper layers of the Greenland icecap. Already the oceans, previously considered an infinite sink, are showing the strain of man-made pollution. Although counter-measures are being applied in many countries, the choice facing an expanding world society will be between increasing average living standard with material increases in pollution, or less pollution with very much lower standards. The MIT prediction is that a very considerable increase in pollution will occur over the 21st century, counter-measures notwithstanding.

The demand for food is growing exponentially. This can be met as long as increased acreage of land can be found, improved food producing strains of plants and animals developed, and the sea foods of the oceans further exploited. The Club of Rome study shows that, even with
Much improved yields, the limit to world food production will be reached in the first half of the 21st century, whereafter world population will decrease dramatically due to malnutrition and famine. Thus the much discredited prognosis of Malthus made in 1798 could become reality before the year 2050.

It is a rather depressing tale. It concerns what more and more thinking people regard as the most important world problem of our era, and one which individual countries can ignore only at their peril. It, therefore, requires urgent attention from individual governments as well as from those who aspire to World government, from universities, from research establishments, from organized industry and commerce, from the professions, from the communication media.

The statistics, the systems dynamics approach, the model technique are available. The skeptics should provide their own model for the future, showing the growth they expect and the quality of life of the peoples in the 21st Century and explore why these depart from the extrapolations of the past. Or if they believe that man will find solutions to these, how this will come about and what authorities or agents will in fact intervene and by what processes they will achieve their ends.

It is possible to avoid a catastrophic fate for mankind. But this will require a revolution in the political and economic thinking of today and fundamental changes in man’s sense of values. The governments, all governments, will have to introduce effective measures to stem population growth. This factor overshadows all others and profoundly influences each of them. Secondly, a new socio-economic ethics based on a value system different from that at present enthroned, one that has quality of life as criterion, will have to be universally adopted. This includes an appreciation of the importance of the natural environment, not only from the aesthetic point of view, but as essential to survival.
DEFORESTATION MEANS DOOM

- Chandi Prasad Bhatt

It is important to keep the various components of nature in full harmony to maintain a balance in the environment, a fact which is being increasingly realised these days. Forests constitute the most important element of nature.

The pressures of population growth and the culture of increased consumption are pushing the human race towards industrialization, and industrial development has not only led to an excessive exploitation of nature and alienation of human beings but has left man with no other alternative except joining the rat race to industrial and consumption centres, that is the cities.

It is necessary to realise that the human pressure on forests has increased so much that green belts near various settlements have disappeared.

DEPLETION

The raw material for the industry comes from the rural hinterland. Because a consumer does not have the real picture of a rural hinterland, he takes on the role of an exploiter along with the raw material consuming industries with no sensitivity towards the survival of the original resource and, therefore, makes a totally unstrained use of it.

Nobody seems to have paid sufficient attention to Gandhiji’s warning: “Nature has enough for everybody’s need but not enough for everybody’s greed.” In the race to

This article appeared in The Tribune of June 6, 1986. Copies of this were published by Bhagat Puran Singh and distributed free of cost for arousing public awareness.
obtain raw material, the earth and its protective elements like forests and vegetation are being exploited. This has led to an acute shortage of firewood, fodder, building wood and raw materials for village industries, all affecting the rural people. There are also the prospects of climatic changes, troubled ecosystems, soil erosion and air pollution.

Ideally, a third of the total area of any country should be under forests. In India forests do not cover even half of the required area and the existing forest cover is declining rapidly because of the growing demands. Satellite pictures prove that India is losing forests at the rate of 1.3 million hectares a year. Not only are our forests logged; forest land is being used for various development projects like dams, industries, roads and agriculture. Between 1951 and 1976, as much as 4.2 million hectares of forest land was used for development projects.

The Government is a culprit in the matter of exploitation of forests in the name of “human welfare and development”. Officials claim that the forestry programmes undertaken by them are scientific, but the declining forest areas clearly indicate that the Government’s conservation programmes have not proved a success.

This gave rise to the “Chipko” movement. People in the economically backward Uttarakhand region in the Central Himalayas raised their voice against the possible threat to humanity through deforestation and its adverse effects on the environment. The “Chipko” movement has now spread to many parts of the country.

The people of Uttarakhand depend on forests for their survival. The Himalayan region is known for its flora. It keeps the atmospheric circulation in balance over a large part of the subcontinent.

Forests help in preventing soil erosion and any disruption of this inter-related system has a direct impact on the food and water systems for the people.
UTILITY ASPECT

The systematic destruction of forests in the Himalayas has caused degradation of the environment, leading to discontent among the people. But the biggest shock for them came when, under a working plan, trees were cut on a large scale, which ultimately caused the devastating floods in the Alakananda in 1970.

The deluge destroyed bridges and killed hundreds of people and cattle in 101 villages. Over 604 houses, besides crops on over 500 acres of agricultural land, were destroyed.

About 300 km away, the Upper Ganga Canal which emerges beyond Haridwar was silted. The canal had to be blocked. This affected crops on lakhs of hectares of land in Saharanpur, Meerut and Muzaffarnagar districts. About Rs 1 crore was spent to desilt the canal. The losses amounted to several crores of rupees while the exploitation of the forests gave an income of about Rs 10 lakh only.

The “Chipko” movement has a six-point programme. A memorandum prepared on this basis suggests that the development and conservation of forests should be undertaken keeping in view the needs and expectations of the people living in forests and forest areas as also the needs of the forests themselves.

The nature of forestry conceived by the “Chipko” movement demands that forests should be conserved and forest areas affected by landslides and soil erosion as well as such areas as are crucial to the conservation of water resources should be identified and reserved. The minimum needs of the people living near the forests, who have been customarily using them for their survival and for boosting the village economy, should be assessed. The administration should be such that the appropriate rights are exercised easily by them. The contractor system should be completely abolished in the matter of forest conservation, development and exploitation, and people living in the forest areas should be organized to undertake all such activities.
It has been highlighted several times that despite all the rights, privileges, means and technical knowledge available to them, the survival rates of the trees planted by the Forest Departments are far less than of those planted by the people whose will and labour are genuinely productive.

The “Chipko” movement believes that the development and conservation of forests cannot be made possible simply by making laws or passing prohibitory orders.

A survey of Asian forests clearly shows that the degradation of forests is the direct result of Government policies. The priorities and needs of village people are never taken into account.

**CONSERVATION**

On the one hand the Government’s forest conservation policy allows the export of forest produce besides sale in domestic urban areas, and on the other hand, people living in forests who customarily meet their firewood, building wood, fodder and other needs from forests are deprived of them. We must recognize that forests are a basic need of these people.

Women of Reni, situated in an extremely sensitive region of the Alakananda catchment belt, consider forests as their “mayaka” (mother’s home). They told lumberjacks: “This forest is our mother’s home. If the trees are cut, the soil will be washed away. Landslides and soil erosion will bring floods, which will destroy our fields and homes. Our water sources will dry up and all other benefits we get from the forests will be lost.”

In the same way, in 1975, about 200 women from Gopeshwar waged a struggle against the district authorities to save the oak forests in the area.

The Dasholi Gram Swarajya Mandal, the mother organization of the “Chipko” movement, understands the psychology of the villagers. Apart from participating in “Chipko” programmes, the Mandal has been active in
Making villagers aware of the importance of forests and vegetation and in seeking their participation in afforestation and forest conservation.

The Mandal organizes camps on environmental education in rural areas and most of the participants are women. Scientists, youth workers and students attend these camps. Tree plantation is also undertaken at these camps.

**EXPERIMENT**

The Mandal has been promoting agro-forestry as a means to the improvement of soil and promotion of water conservation as an experiment in two dozen villages along the Alakananda River and its tributaries. The villagers have been assisted to build stone walls around their fields which are frequently attacked by wild animals. Soil erosion around the fields has been prevented and grass and other fodder are grown near the cultivated land. In recent years, the Department of Environment has provided considerable assistance to the eco-development camps.

Trees that will satisfy the needs of particular groups of villagers should be chosen for afforestation programmes. This will ensure the participation of people in forest conservation projects in a practical way.

In short, much of the forest development work will have to be undertaken according to the wishes and aspirations of the people at the village level. In this task their active and responsible participation has been rightly sought.

Today, the effects of deforestation on the overall ecological balance are not restricted to a particular country. It is a worldwide problem. It can be solved only with the participation of the common man. (P.T.I.F.)

Mr. Chandi Prasad Bhatt, a noted environmentalist and founder of the Chipko Movement in the South, is the Winner of the Megsaysay Award.
According to environmental experts, the earth has, on an average, irretrievably lost 12 million hectares of rain forests every year since 1980. In other words, 50 acres of rain forests are approximately cleared every minute somewhere in the world. However, the felling trees that yield rains at this terrific pace spell disaster for biological survival and hence must be a matter of grave concern for everyone.

In the estimation of ecologists, tropical forests cover only six per cent of the total global area and still contain more than 50 per cent of the world’s animal and plant species. This implies that the indiscriminate destruction of tropic forests deprives the fauna and flora in them of their natural habitats and eventually causes what ecologists call the loss of bio-diversity. In a nut shell, it upsets the balance in nature, with far-reaching consequences.

It is common knowledge that the unabated burning of vast stretches of rain forests emits carbon-dioxide in large amounts. This noxious gas in turn not only pollutes the atmosphere but also accelerates global warming. Nevertheless, this assumes added environmental significance in the wake of the finding of the United Nations of inter-
governmental panel on climatic changes that the earth will
grow warmer by one degree centigrade by the year 2025
and by three degrees centigrade before the turn of the next
century, unless timely steps are taken to check this
catastrophic phenomenon.

Moreover, the clearance of fertile forest areas often to
give way to capital-intensive, but ecologically dubious
projects, results in the forcible evacuation of indigenous
forest dwellers, let alone their cultural genocide. Soil erosion
is yet another deleterious consequence of deforestation.

It may well be that plundering the forests under
surveillance, of their timber by the greedy for gain in
collusion with forest guards and authorities themselves is
also an important factor in forest damage and destruction
in recent decades in our country. Economic development
and environmental conservation become incompatible only
when the former is short-sighted, inappropriate, and far
from sustainable. However, it is high time we strove for a
form of progress that simultaneously allows for the
meeting of real human needs and for the enrichment of a
complex biosphere.

Perhaps it is simplistic to view the enormous problem
of deforestation simply as a domestic matter of the
countries directly involved. Given its far-reaching global
implications, it needs to be seen in a global perspective.

In the UN’s high profile environmental summit due to
be held at Rio de Janeiro next June, the countries with
large rain forests should be persuaded to bind themselves
to specific commitments on their protection. The
industrialised countries have already contributed consider-
ably to the ecological crisis by cutting down their trees. As
a matter of course, they should come forward in the earth
summit to make amends liberally to the poor countries in
aid and technology in the coming years. In any case, the
planet’s green lungs must be preserved in good condition
for the future.
ENVIRONMENT:
ASPECT OF INDIAN SECURITY

- T. N. Khoshoo

When one talks of national security one thinks, usually of the security of geographical borders and of the maintenance of law and order within the country. This is based on the premise that threats always come from across the borders and from anti-national elements within the country. But it is also important for a country to defend its environmental assets like the people, air space, water and land, and all that is on and under land, including forests, ecosystems, heritage sites, minerals, underground water, etc.

Our well-being is irrevocably intertwined with long-range ecological security. Most of us are undermining ecology all the time; in fact, here the enemy is within each of us and we are at war with our precious environmental assets. Judged from this angle, most of us commit crimes against the country and mother nature. We deprive the use of environmental assets not only to our poorer brethren in this generation but also to generations yet to be born. Further, we leave the country dirtier and increasingly uninhabitable. All these constitute very serious non-military threats to our very survival.

I was led to think about ecology when I saw excerpts of a letter from Mr. C. S. Rana which says: “I was in the West Bengal Rifles for over 27 years and I fought in three wars. I have now returned to my village. My enemy is no longer Pakistan or China, it is now landslides. We live in fear of landslides. I have put my gun away. My weapon is

This article first appeared in the Times of India of January 26, 1990.
now trees to prevent landslides." This set me thinking.

There is also enough historical evidence about six civilisations having reached their zenith some 6000 years ago, but having simply crumbled just because they totally ignored ecology. Nearer home, we have the glaring example of the Indus Valley civilisation. It is therefore, not something elitist that one is talking about but something very real which affects the lives of all of us, particularly the poor who constitute more than 75 per cent of our population.

ECOLOGICAL SECURITY

Ecological security implies continued access to clean air and water bereft of toxicants, healthy and productive topsoil for productive agriculture and animal husbandry, and some minimal forest cover to preserve the stability of the climate, the conservation of soil, water and biodiversity; and supply of goods for the rural and some even for forest-based industry. We also need environmentally clean energy systems and pollution-free industrial development for the welfare of our people.

No war machine, however strong, can repel the dangers to our ecological security. Furthermore, there is no technology available anywhere in the world which can recreate soil, bring to life extinct species or restore degraded ecosystem to their original form.

To expect the ministry of environment to ensure all this would indeed be a tall order. In fact, the subject of environment has ceased to be the concern of only this ministry. In most countries it involves ministries/departments and public and private institutions spread both horizontally and vertically because environmental dimensions have to be kept in mind in each and every sector, including foreign affairs involving diplomacy on environmental issues.

In view of the importance of the subject as its transsectoral and multidisciplinary nature, a considered view
was taken in 1980s that, at least for the foreseeable future, this ministry should always remain under the overall charge of the Prime Minister with a minister of state helping him.

This was to ensure implementation of environmentally benign preventive and rehabilitative strategies across the board and, whenever needed, the formulation of policy as well. This would, it was recognised, need joint action on a war footing involving many ministries, departments and public and private institutions. This is particularly so in India because three (land, water and forests) out of four components of the life-support system are state subjects, and are being dealt with at the Centre by different ministries. Under the circumstances, considerable coordination is needed between the various ministries and departments.

CRITICAL INPUT

If we want to ensure success of the bottom-up approach to development enunciated by the Prime Minister in his address to the Nation, the most critical input will come from environment not in its restricted traditional sense of some wildlife, pollution, and manmade ugliness, but in the larger context of a sustainable developmental strategy.

Such development must be environmentally harmonious, economically efficient and targetted towards equity with social justice and local self-reliance. This is what Mahatma Gandhi cherished. The area of environment has already become a very important concern, and for a variety of reasons, a favourable outcome can be guaranteed only when the ministry of environment performs a watchdog function.

To guarantee basic human needs to our people in perpetuity, we need guaranteed ecological security. In fact, if the global events during the past two years are an indication, the U.N. will in future involve itself increas-
ingly with security, in this broader dimension, at the global level. The present U.N. Security Council may, in its actual working, change itself into an environmental Security Council. This is being now openly suggested at the global level.

The National Security Council would be incomplete if it deals only with the traditional security ignoring ecology. We all understand and feel worried about the low rate of economic growth, fiscal deficit, huge foreign and national debts, but we have always ignored the mounting ecological deficit that the country accumulates year after year.

Both traditional security and ecological well being are important and should, therefore, come under the purview of the National Security Council. We should widen the concept of national security accordingly. For various reasons, different aspects of environmental security are not covered adequately in any of the existing ministries or departments, and these need the overall attention and examination that a National Security Council can provide.

Scientists warn that maize crop in Mexico has been contaminated by contact with genetically modified maize crop in America.

According to one study, half the land in North America has lost its flora and fauna. Two hundred thirty-five species which include milk cattle, reptiles, birds and amphibious animals are on the verge of extinction.

Compared to the year 1998, the rate at which glaciers are melting has now doubled. It is also estimated that by the year 2100, sea level will rise by 27 cms.
FOOD AND FORESTS

The FAO-sponsored meeting in Bangalore last weekend on forestry and food production has not received the public attention it deserves. India faces grave challenges in both food production and forestry. A recent FAO study stressed the need for raising agricultural production by 60 percent in the next 15 years by the developing countries. India will have to share a major part of this responsibility. But the mood of the policy makers in India is marked by misplaced optimism. The Worldwatch Institute (Washington) in its latest study, “State of the World 1988”, warns that India will be able to weather the poor monsoon of 1987 because of massive grain reserves, a repetition of monsoon failure, if it takes place in 1988, will lead to “serious trouble”. There are a growing number of experts abroad who tend to think that the recent drought in many parts of the globe is not just a casual phenomenon but is part of a major secular shift in the climatic pattern and “warming” of the earth caused by pollution.

The study, at least by implication, comes to the conclusion that agriculture development in India has faltered in the last two decades, as in Africa, in contrast to the success achieved by China. In 1970, production in Africa, China and India ranged between 160 kg. and 200 kg of grain per person in a year.

In Africa, the per capita grain output has since fallen by one-fifth. India’s per capita food production has not gone up and possibly could turn downward. In China; the per capita grain production has gone up by one-third since 1970. Thanks inter alia to reforestation and soil conserva-

This article appeared in The Economic Times of February 20, 1988. Copies of this were published by Bhagat Puran Singh and distributed free of cost for public awareness.
tion. In this scenario the Institute's following warning to India is significant: "If India fails to check population growth and reorder priorities by shifting resources into the battle to restore its soil and water base, it is more likely to follow Africa than China."

Soil erosion which plays havoc with food production in India is caused to a large extent by the destruction of forests. India is estimated to be losing tree cover at the rate of 1.3 million hectares a year. This means India will lose most of its remaining 31 million hectares of forest by the end of the century if new Delhi does not adopt an action plan with utmost urgency an ambitious target of reforestation of 10 million hectares as has been provided for in the seventh plan. But in many a state, corrupt government machinery has failed to stop the destruction of forests.

---

Paper is made from trees. Trees in the country have been reduced to a worrisome level, due to which the land is turning into desert. Due to deforestation, soil erosion is taking place, and the dams like the Bhakhra Dam are filling up with silt due to the soil washed down from the hills. Canals emanating from these dams are also silt ing up. Thoughtless cutting down of trees has already produced many serious dangers and is likely to pose still more problems. There is serious possibility that all the fertile land in India will turn into deserts in the coming 100 years. You should therefore take a thali, tray or other container from home with you while going for the purchase of sweets from market. Do not pack sweets in cardboard packets. And remember that the packet is not free, but you pay at least Rs. 2 for each one. A man who brings home four or more packets of sweets is not wise. One man crossed all bonds of foolishness: he sent about a hundred packets of sweets to us on the occasion of Diwali. What use were these packets to us?
FORESTS: GULF BETWEEN IDEALS AND PRACTICE

- Sunder Lal Bahuguna

The 9th World Forestry Congress held in July 1985, at Mexico coincided with the International Year of Forests. Both the Congress and the Year concluded with a hope of Peace, Prosperity and Happiness to humankind by making the Earth green again. The World Forestry Congress appealed to all human beings of all nations to recognise the importance of forest resources for the biosphere and the survival of humanity and to devote themselves to safeguarding and promoting this resource, which will provide humanity with food, raw materials, energy, rural well-being ecological protection and improvement in the quality of life. The tragedy with the forests in India and other countries of the world, which have been aping the developmental policies of the so-called developed countries, has been that their policies and practices have been contradictory. Nobody in India still knows the contents of the National Forest Policy, as the document has not yet been finalized. Still, from the report presented by India in the World Forestry Congress, it can be guessed that it will be an ideal document. The basic Objectives, according to the report, likely to be enunciated in the policy, are:

1. Maintenance of environmental stability;
2. Conservation of biological diversity and genetic resources of the country;

This article was reproduced from daily Delhi Patriot, 20 March 1986. The points discussed are relevant today, perhaps more relevant than they were about two decades ago. As many as 40,000 copies of this article were published by Bhagat Puran Singh Ji and distributed amongst public free of cost for arousing awareness.
3. Checking soil erosion;
4. Increasing forest/tree cover;
5. Meeting the requirements of fuel-wood, fodder and minor forest produce;
6. Increasing the productivity of forests;
7. Encouraging more efficient utilization of forest produce; and
8. Creating a massive people’s movement to achieve the above objectives.

These high-sounding ideals and actual practice in the field with which a common man is confronted remind the following lines from Shelley’s poem ‘Ode to the West Wind’:

Wandering in the high skies of ideals, he suddenly falls down and cries:

‘Oh’ I fall upon the thorns
Of life; I bleed

I have actually seen people bleeding, who said, “We do not want our dense forests to be destroyed.” It was in the small town of Paikmal in Sambalpur district of Orissa, where a public sector undertaking ‘Bharat Aluminium Company’ (BALCO) secured the lease of 107 hectares of forest land for bauxite mining. The mining area was on a 2,000-ft. high plateau, which was reached by a road through the dense Gandhamardan Hill Forest, full of variety of plant species. For BALCO and policy-makers deciding the fates of people from Delhi and Bhubaneswar, it was simply a question of ‘few hectares of forests’, which while swearing by environment they promised to replace by compensatory afforestation”.

But for the Adivasis, their very survival was at stake. They got wild fruits, roots and all their food from this forest; the water, and employment through the collection of medicinal herbs and bamboos for basket making. They also knew that the fertile top soil in their fields was the product of this forest. When the powerful company armed
with the authority of the Government started destroying the forests by bulldozing it to widen the road and make space for 5 kms long and 30 meters wide ropeway, the tribal folk, mostly women, fell flat on the ground in a last bid to save the forest. It was 12 February 1986. The police came, arrested and lodged them in jail, because they were obstructing ‘development’.

This is not an isolated incident. Forests all over the country are being sacrificed for ‘development’. A few days before Paikmal incident, I visited Bodhghat in Bastar district, where work on a World Bank financed 4,750 million rupees power project was going on in full swing. The engineers were expecting the clearance from the Govt. of India under Forest Conservation Act, 1980 to deforest 5,704 hectares of forest land over which dense natural sal and bamboo forest with more than five million trees was standing. The Project Authorities, including the local administration, did not bother about Centre's permission and felled dense forest from an area of about 75 hectares for the construction of motor-road leading to the proposed VIP guest house. It is ironical that the experts of Department of Environment okayed the project as early as April 1984, saying that the Project Authorities should do compensatory afforestation. I have seen a few plots selected for this purpose which is degraded land: what to speak of forests, even bushes cannot thrive over such land.

There is another side of the coin. Though the Forest Department still holds that the forest area in the country is 22.7 per cent, the State Ministry for Forests and Environment has admitted that the actual forest area is only 13 per cent. There is still a veil on the information about the density of forests.

Forests below 60 per cent density are of little value so far as conservation of soil and water is concerned. Whatever may be the actual situation, the nation has realized the urgency of planting trees and several plantation schemes have been undertaken. The most publicized
of these are those financed by international funding agencies. The new concept of forestry has also come from the financiers.

In Europe and other industrialized countries, where nature is regarded as a resource, plantations of trees growing raw material for the industries and especially for industries serving the well-to-do, are raised. In India, eucalyptus plantations have been raised on a mass scale under these projects. Till recently 80 per cent new plantations were of eucalyptus. In the hills, where after wasting millions of rupees on eucalyptus plantations to cover the denuded hill catchments of Bhakhra Dam, poplar plantations are being raised. In the Kashmir Valley the slogan of 300 million rupees World Bank Social Forestry Project is: 'Plant Trees; Grow Money.'!

The much publicized objective of Social Forestry projects is planting trees for fuel and fodder, but everybody knows that eucalyptus and poplars only feed the pulp factories. At the same time the village women in Kashmir collect dried leaves of poplars to be used as fuel in the 'Kangris'. The existing forests are disappearing in the city hearths and heaters. Srinagar and Shimla, which are the State Capitals of the two Himalayan States and tourist centres, have not only destroyed the forests in the vicinity of these cities, but get their supplies of charcoal from distant places. Only during this winter 2,000 truck-loads of charcoal from Jammu Shivaliks were sent to the Valley. Burning charcoal has become most profitable industry of Kathua district in Jammu. Similarly, in Himachal Pradesh heaps of charcoal on roadside in Bhali tells the sad tale of the slaughter of mixed forests in Nurpur division.

Thus, in the coming years, we shall be losing more and more forests to meet the urban demands. The new plantations in the long run will impoverish the rural areas of its precious fertile soil and create water famine. This situation cannot be averted till our policy-makers accept the real definition of the forest.
A forest is a society of living things, of which tree is the greatest. There are big and small trees of different species, bushes, grasses, herbs and wild-animals. What we are made to take as forests are tree fields – trees of a single species and even age, which ultimately serve as a ‘timber mine’. This is a heinous crime, as this is mining of soil showing dividends by exhausting the capital, i.e. soil and water, which are the products of natural forests.

Forests are the factories of soil manufacture and the mother of rivers, while the tree fields or mono-cultural crops need in the long run artificial manures and moisture too in many cases. Who owns and manages the forests is also a crucial factor in the success of a forestry programme.

I again quote the recommendations of 9th World Forestry Congress which if implemented will certainly solve the problem.

"Forestry policy should provide special attention to the role performed by forest resources in the development of agriculture and animal husbandry in meeting daily needs of rural communities and in the promotion of social welfare and betterment of the environment."

"Forestry policy should become an instrument of participation, training and development of forestry knowledge to facilitate the support provided by national community to its postulates and strategies."

Regarding forest-based industries, the following recommendations give clear-cut guidelines:

"It was stressed that technology to be used in production should be adapted to local conditions and taking into account economic and social aspects, which would affect the choice of technology."

"The participation in industrial projects for the people living in and around the forests was very strongly emphasized so that they would benefit to the maximum extent from the industrial activities. At the same time, a warning was given against the possibility that forest
corporations might become instruments of exploitation of the rural population if they do not sufficiently take into account its interests."

“In considering forest-based industries, attention should be given not only to wood products but also to non-wood products.”

On why rural participation is needed, the Congress declared: “It is realized that the forests are being degraded at a greater rate than they are being planted, and isolated government efforts have been useless in curbing and reversing this trend. In order to face this situation, full and genuine popular participation is required”.

The greatest calamity which is facing the world now has been produced by the burning of fossil fuels such as coal, diesel and petrol by motor cars, motor cycles, buses, railway engines and factories. As a result of the burning of this fuel toxic gases such as the CO₂ and carbon monoxide are produced. These gases are being produced at such a rate that they can annihilate the animal and human life. Before that happens, by the year 2020, which is not very far off, the ice mountains at the poles would melt and raise the sea level by 24 feet. This would submerge many large cities and towns near the sea shore. If you want to escape these calamities, you should live simple lives. You have a give up many harmful things and activities brought about by the Industrial Civilisation.
MARCH 21: INTERNATIONAL FORESTRY DAY
IF ONLY TREES COULD VOTE
- P. K. Khosla

TODAY the World celebrates ‘World Forestry Day’. It reminds us that the survival of mankind depends on maintaining balance, afforestation, and conservation of our natural resources by adopting sustainable practices.

Although India is proud of its green revolution, it is still to be seen whether we can increase our annual grain production from 175 million tonnes to 250 million tonnes by the turn of the century for feeding 1000 million people. This can only be achieved if we diversify our crops, tap our rained areas by adopting agro-forestry and rehabilitate the wastelands by planting trees yielding food, fuel, fertilizer, fiber, timber and other products of daily and industrial use.

In the 19th century a Forestry Research Institute was established at Dehra Dun and training of forest rangers began in 1867. The training of superior officers was done in Britain until sometime around 1930 after which the officers too were trained in this country. British foresters did pioneering work and India became the leading centre in tropical forestry. In the West, forestry education found a place in the universities while in India it followed the path of the Indian Administrative Services. India continued to select its forest administrators from among the science graduates and then impart special training to them, rather than train students in forestry in the colleges and universities and then select those with administrative potential. To this day, we in India do not differentiate

This article was published in The Tribune, March 3, 1991. As many as 20,000 copies of this article were published by Bhagat Puran Singh ji and distributed amongst public free of cost for arousing awareness.
between education and training, research and technology, and extension and development when it comes to forestry.

The system was ideal for the days of “His Majesty’s Forests” but today it is the people of India who are sovereign, and needless to say no programme of forest conservation or expansion can succeed without their participation. The old paramilitary package is no longer suitable. What we see now is that although forestry now figures in the curriculums of many universities, the Forest Service is not quite ready to accept the forestry graduates. Why this hesitation? In addition to the administrative component, a forester today needs a strong background in science. Foresters have to copy the system of the agricultural sciences which gives the farmers new varieties and management practices through research and extension services.

To date very little emphasis is laid on the use of better genetic material. Seed is collected from the forest floor or from crooked trees which are easy to climb. The concept of seed certification as yet has no place in Indian forestry. It is only at a few places that the plantations are raised from seed being produced in seed orchards. If we have to plant trees we must plant better trees so that by reducing rotation age, through genetic maneuvering, we can use the same unit of land time and again. We must enter into an era of instant forestry so that along with conservation we are also able to feed our industrial needs.

Plantation forestry which is supposed to narrow the gap between afforestation and deforestation is the talk of the day. The Government of India has established a National Wasteland Development Board in order to green five million hectares annually. It is universally accepted that this target cannot be achieved until and unless we meet the aspirations of the people and involve them in plantations; choice of species should rest with them. At the same time we must teach them to choose wisely so that funds are not wasted.
Often there is a clash between ecology and economy. The present forest lands cannot sustain the species which are economically desired by people. The species choice has to be matched with land capability classes in order to attain higher survival percentage. There has to be mass awakening so that people appreciate this edaphic apathy to their advantage.

The Himachal Pradesh government has introduced the "Van Lagao Rozi Kamao Yojna" to green the Himalayas in general and H.P. in particular. Recalling the discussion during the seminar held at New Delhi on February 4, one must conclude that policy-makers are concerned more with revenue rights and ownership issues than with greening. The entire debate in the seminar was confined to this issue and there was very little discussion on the technical aspects ensuring the success of the project. Let us ask the policy-makers as to which will be more desirable: to have green lands in the Himalayas, may be under the ownership of the people, or to have denuded and deserted lands eroding the plains with floods but with the government’s ownership undisputed? As a student of environmental sciences, I hold that the issue of ownership is secondary and greening of the Himalayas is the primary challenge.

Another development is that the H.P. Government has put a moratorium on tree harvesting. Does it include bushes and shrubs also? I do not know because I often see trucks loaded with roots of barberries, passing down the roads of Solan district. The roots are bound for the factories of pharmaceutical companies where they are used in the manufacture of a medicine for the eyes. To extract this root the harvesters have to dig down as far as five feet. One can imagine the harm this does to the fragile top-soil of the steep mountainsides. Out of its prevailing rate of Rs 135 per quintal, about Rs. 90 to 100 are spent on the labour charges, so the sellers do not get much out of these bushes. Near the Dr. Y.S. Parmar University
campus, I recently saw some five bighas of community land
dug up to get a mere 10 quintals of this root. For a net
income of only about Rs 350, the priceless soil of the hills,
formed over thousands of years, has been disturbed and
made vulnerable to washing away with the first good rain.
Devil’s bargain!

People are simply not aware, and so far forestry
projects do not include a component for generating
awareness. I should think that every forestry project
should set aside at least 20 per cent of the total budgeted
amount for demonstrations, training and awareness-
generation. Plantation cannot make an impact until people
are conscious of the need for maintenance and conserva-
tion of existing resources. To change the attitude of the
people we must first wake up those at the managerial
level. We cannot have our foresters isolated from the
masses especially when, besides greening the government
forests, they must also turn their attention to about one-
third of the country that requires forests.

Economic development should take place at such sustainable
rate that there is no adverse impact on the environment and
natural resources. For this we will have to conserve our soil,
increase the forest cover, control the growth of population and
make a more efficient use of energy. Our industrial develop-
ment should take account of the fact that our natural
resources are limited. We should not have only short-term
benefits in mind while using them.
LET A HUNDRED TREES BLOSSOM
- Nergis Dalal

The challenge for us today is finding the scale at which we can live in harmony with nature without perverting, altering or deforming it.

There are many people who mistakenly feel that the developing countries and impoverished people cannot afford the luxury of preserving and safeguarding the environment. Environmental problems and the science of ecology are only for affluent countries, they say.

Developing countries must use every possible resource available to them, make use of artificial fertilizers and spray with pesticides to improve crops and get the maximum possible turn over from agricultural land. Forests should be developed for social and commercial use and not for preserving the ecological balance of the land.

Animals must be slaughtered for skins, fur and feathers, or trapped and sold to countries which will use them for nuclear research. In short, the land is exploited to the utmost on the assumption that resources are endless and that the immediate needs of the people are paramount.

This is not only unintelligent and shortsighted, it is suicidal. If the common man cannot look far ahead or even ten years ahead, certainly our planners, our administrators, and the powers responsible for shaping our policies, must look ahead into the not-so-distant, and the distant, future.

Fifty-three per cent of India's land area faces serious environmental degradation, and 70 per cent of the available water is polluted. So desperate is the situation

This article first appeared in the Times of India of September 25, 1983. Bhagat Puran Singh reprinted several thousands of copies and distributed free of cost for evoking general awareness.
that the Jammu and Kashmir government is considering introducing a law to arm the state's forest protection force with powers to shoot at sight those found smuggling timber or engaged in illegal felling of trees.

Desperate situations need desperate measures to deal with them. “But how will the poor people live?” say those who consider environmental concern or control as something that should concern other people and other nations.

But it is the people who are most affected by massive deforestation. In 1978, 60,000 villages were inundated by monsoon floods, 2000 persons were drowned, 40,000 heads of cattle were swept away. Damage to crops was estimated at Rs. 7,000 million. The country's exchequer had to dish out Rs. 2,000 crore per year between 1953 and 1978 to provide relief and to repair damage.

This year's terrible floods have still to be accounted for in damage to crops and in loss of life and cattle. Unfortunately the forest department seems to think of forests in relation to industry alone, instead of providing cover for the bills and to prevent desilting, and destruction of top soil.

This year, Kerala had the worst drought in history, and there was little or no flow in the rivers. Hydel power for water and irrigation are always from projects situated in deep forests. The Silent Valley project caused such uproar that it has finally been shelved but the deliberate destruction of other forests continues through the forest development corporation, making the once green and fertile state a tropical desert.

Since the first National Forest Policy was formed in 1952 we have lost forest areas equivalent to the whole of Tamil Nadu – i.e. 130,357 square kilometers of land. In 1980, the Prime Minister pointed out that only 10 per cent of the country's geographical area had good forest cover, although the official record was 23 per cent.

**DISASTER AHEAD**
Official policy thinks of forests only in terms of utility value. The new forestry programmes support the location of industries close to the forests with ‘scope to export forest products.’ They have also advocated homogeneous plantations or monoculture – a very dangerous trend since there is increased danger of whole forests being wiped out by pests or fires.

Trees of ‘commercial value’ are planted, such as teak, bamboo, sal and eucalyptus, instead of mahua, mango, jackfruit, neem, kendum, etc. which are useful to the tribals and which provide them with wood as well as food, and which hold the top soil together. Meanwhile, 6000 tonnes of top soil is washed away each year. The soil is then ‘enriched’ with artificial fertilizers which after a few years, harden the soil and leach it of its nutrients. Experts tell us that top soil, the main ingredient for good growth of plants and trees, takes more than 600 years to form in any given area.

Every state is eager to build dams and hydro-electric projects to meet their immediate water and power needs, but these are invariably built in heavily forested areas, so that the forest must be cut down and destroyed in order to give place to the projects. But dams and projects have very short life spans because deforestation silts up the rivers.

The main and basic role of hill forests should be to maintain a balance in the rivers, climatic conditions and the fertility of the plains, and not to yield revenue to the state.

The morphology of the Himalayas is such that they are periodically shaken and loosened by earth tremors. If this natural erosion is added to by man, then there can be nothing but disaster ahead of us.

Mining in the Mussoorie hills by crude methods has not only silted up rivers and changed their courses, so that both Mussoorie and Dehra Dun are suffering from desperate water shortages, but also affected about 20 small villages whose inhabitants have been made homeless.
and impoverished.

IS IT TOO LATE?

The Supreme Court petition by these villagers through the Nehru Yuva Kendra Rural Litigation Society is fighting both for the environment and for themselves, since both are inter-dependent, one on the other. Jhandukhala village has been totally destroyed and its families scattered all over.

Another village, Bandiwal will soon be totally ruined since the two quarries located just above the village are raining down an endless torrent of boulders, stones and rubble. Although the mines have been closed, illegal work continues.

Mr. Sunderlal Bahuguna’s Chipko marchers found exploitation of forests all along their route in the Himalayan region. “Private forest contractors, enjoying political patronage are active in these districts. They obtain signatures of the farmers to fell the trees and the local officials readily oblige for obvious reasons.”

Economic development has made man an enemy, not ally, of nature. The result is an imperilled ecology, irremediable pollution of atmosphere and oceans, overpopulation, the depletion of resources, environmental diseases, a vanishing wilderness, uncontrolled technologies and endangered species on land and sea.

What does this mean in terms of human life? Scientists tell us that with the vanishing wilderness, with high-rise buildings and the loss of green parklands and reserves, humans react with anxiety, boredom, loneliness, alienation and mental illnesses. Ecology is the system of the interaction of all elements of the natural world.

Plant, mineral, animal, and human, and a healthy ecology is one in which all of these are in such harmony that none dominates or destroys the other. The challenge for us is finding the scale at which we can live in harmony with nature without perverting, altering or deforming it.
If India is not to become a waste land, we need to take steps now. The wettest place in the world - Cherapunjee - is today a barren area with a rainfall of 5486.4 mm instead of 9144 mm. Salinity and water logging are destroying cultivated land and the area prone to floods has increased to 40 million hectares. Dwindling vegetation and forests, acid rain, interference in sanctuaries, destruction of wild-life, and the indiscriminate use of pesticides and chemical fertilizers is playing havoc with the ecology. Is it already too late?

The nations of this earth should do the following to keep the environment clean:

Ž To prevent pollution instead of trying to cure it.
Ž To increase energy efficiency.
Ž To use clean fuels.
Ž To promote non-polluting energy sources such as solar energy, wind-power and hydro-electric power.
Ž To promote the use of less polluting means of travel; travel by rail instead of by aeroplane.
Ž To slow the growth of population.
Ž To take account of pollution and its clean-up cost while fixing prices of various kinds of energy.
LET US GO DEEPER, BELOW THE DECORATIVE GREEN COVER

- Jayanata Bandyopadhyay

Today there seems to be an ascendency of the green fashion the world over. This year we not only had June 5 as the World Environment Day, but also added another day of celebration, April 22, as the Earth Day.

Beyond this, there is a series of regular meetings in many parts of the world that are being held to discuss preparations for the forthcoming World Conference on Environment and Development to be held in Brazil in June 1992.

Officials of the international agencies as well as institutions are busy making trans-Atlantic or trans-Pacific flights to talk about Ozone layer depletion, global warming, tropical deforestation and so on.

The use of the word “sustainable development” is spreading, although its meaning remains elusive. Commenting on this magic spread, British environmentalist Redclift said that “its very strength is its vagueness; ‘sustainable development’ means different things to different people.”

To comprehend the undercurrents on this situation, where every erstwhile protagonist of the growth model of development has suddenly taken a “greener than thou” attitude, it is necessary to examine the not so lengthy process through which environment was brought to the centre-stage of development critique.

Following the universal application of the growth model of development, especially in foreign-aided development activities in the Third World countries, a broad critique of this model emerged.

This article appeared in the Times of India, June 29, 1990.
Rethinking on development was urged by many on the grounds of accentuation of inequity, enlargement of the debt trap, centralisation of knowledge and information, environmental degradation, direct threat to survival from resource conflicts etc.

From the 1970s, one sees the emergence and propagation of environmental criticisms on such a large scale that other significant elements of the critique of the growth model became marginalised.

There has been a very impressive growth in voluntary environmental activism while major supporters of the growth model, financial institutions such as the World Bank, have now committed huge funds for environment. The multinational corporations are not inactive and it is reported that a large international environment bureau has been set up by them in Geneva.

Environmental movements established deep roots in the Third World countries during the 1970s and 1980s. Voluntary action groups have played a historic and leading role in this impressive achievement. Today, if there is any well-coordinated international pressure group in a position to influence decisions or public opinion, it is the network built up by the world's environment movements.

The strength of these movements lies in the direct links established by the activists, with the millions of marginalized and threatened people, and in their commitment and courage to fight the governments and the international financial institutions on the issue of ecologically destructive development.

This enhanced awareness of environmental threats, although emerging at the cost of side-track from some equally important elements of development critique, was backed up by documents such as “World Conservation Strategy” or the “Brundtland Report”, which contributed significantly to globalisation of environmental issues.

The strongest criticism of the Brundtland Report has been based on its support to the process of traditional economic growth and the concern for its sustainability.

Its inability to qualify the specific needs of this
growth, in specific regions, among specific groups, for specific resource bases, lends obvious support to the same Laissez Faire model of economic transformation, largely negating the very purpose of the Commission's establishment.

'Sustainable development', thus, may in practice become "sustainable economic growth" together with a package of technological fixes for solving environmental problems. If the proceedings of the "Global - 90" conference on sustainable development held recently in Vancouver, is any indication, environmental mobilisation the world over may end up as merely a search for new technologies rather than a search for a 'new way of living and relating to nature.'

The environmental struggle is far from over and there is little justification for gloating over ceremonial tree planting by ministers or officials as a sign of environmental commitment.

Take, for example, the most talked about issue of the "greenhouse effect." There is hardly any serious discussion about controlling the burning of heavy amounts of fossil fuel in the industrially advanced countries while world attention is focussed on the less important contribution of tropical deforestation.

The solution to global warming is identified as a halt in Amazonian deforestation while even a conservative estimate projects a doubling of carbon dioxide concentration in the atmosphere in about 50 years, mainly from the industrially advanced countries.

Globalising the marginal issue of Third World deforestation and marginalising the main issue of an energy intensive lifestyle in the first world (and soon the second world too) is not a matter of chance - it begins to look more and more like an organized process. The politics of the environment are evolving in new dimensions.

A new and much more difficult task lies ahead for environmental activists the world over. This is to actually provide an alternative way of achieving socio-economic transformation.
NATURAL DISASTER ON THE RISE

The number of natural disasters, which has risen in each of the past three decades, will increase further unless environmental degradation is checked, says Mr. Wilfried Thawitz, senior vice-president for policy, research and external affairs at the World Bank.

At a seminar held at the Bank's economic development institute, he said: "Clearly, there is a correlation between environmental degradation and the frequency and severity of catastrophic disasters."

Disasters take about 25000 lives worldwide each year and cause about 40 billion dollars in physical damage, retarding economic development and harshly affecting the world's poor, according to Alcira Kreimer, the colloquium coordinator.

The UN has designated the 90s as the international decade for natural disaster reduction. Kenneth Piddington, director of the bank's environmental department said: "Even if we omit global climate change from the discussion, experts predict that the incidence and severity of natural disasters will increase. Population growth and demographic shifts will cause many more people to live in high-risk areas, and the vulnerability of these areas will be rapidly affected by human actions."

"Environmental degradation will continue to cause natural disasters."

Land mismanagement, deforestation and interference with water run-off are all phenomena that have an impact on the "extreme events", the participants in the seminar said.

This is a news item that appeared in the Indian Express of July 8, 1990. The message conveyed is as relevant today as it was then; and we are, therefore publishing it in this book.
However, they stressed, there were options to promote environmental protection and natural disaster management, and the benefits of investing in disaster reduction clearly outweigh the costs.

Two possible directions for purposing environmental solutions were suggested. These are:

1) Identifying and preserving those features of nature that ensures resistance to disasters, whether they be a coral reef that protects against coastal storms or tree cover against drought fault areas that are at high risk - flood plains, earthquake fault zones, steep gradients, river deltas; and

2) Providing precautions against locating structures in these areas.

The purpose of the seminar held on June 27-28, 1990 and whose conclusions are summarized in the latest issue of the Bank’s Newsletter, was to mobilize “Intellectual Firepower” to improve resilience in the developing countries that are disaster-prone, and to share the lessons that the developed and the developing countries have learned.

The World resources institute, warning that tropical forests are now vanishing at a rate of 40 to 50 million acres a year - 50 percent faster than earlier estimates - has called for an international convention to arrest global deforestation, promote afforestation, and the sustainable use of forest resources.

Such a convention, says the institute; a private environment-oriented think bank, should also consider the importance of forests in providing economic and social development opportunities for the people of forest-rich countries, in preserving biological diversity, and in mitigating global warming.
NATURE OF CONSERVATION

- Don Moraes

The other day in Bombay I went to the Prince of Wales Museum, where the Director, Dr Sadashiv Gorakhshakar, was in the process of mounting an exhibition concerned with the preservation of the environment. This exhibition first formed part of a larger show, created in Delhi by the Ministry of Environment. The Ministry was the one created by Mr. Rajiv Gandhi, and it really became active after he made his speech in Belgrade, telling us all how concerned he had suddenly become with ecology, and how he wanted to raise $18 billion from the nations of the world in order to preserve the planet.

It struck many people at the time that he might have been better employed in thinking how to preserve this country. In any event, the Ministry, organized a huge exhibition, called “Our Environment - Our Future” and drew Dr Gorakhshakar away from his duties in Bombay to organise a part of it; which had references to the Indian tradition of conservation and preservation of the human environment.

The exhibition was mounted in Delhi, at great cost, and it was an utter flop. The main reason for this was that Mr. Gandhi, in his calculations about the planet, had not included an important factor: the national elections. These coincided with the opening of the exhibition by the Duke of Edinburgh. The Duke failed to draw crowds of reporters and photographers, as planned.

The representatives of the Press said sadly to Dr. Gorakhshakar, “We are very sorry; all this may be very interesting, but we have no time to do anything about it.” Dr. Gorakhshakar now says sadly: “Even Doordarshan did
nothing about it." But he is a determined man, and after many difficulties brought his part of the exhibition to Bombay, where it was displayed at his museum. Before this event, Dr. Gorakhshakar and his assistant, Dr. Kalpana Desai, took a few minutes off to explain the whole nature of their brainchild to me. It was kind of them, and it came as a surprise to me. They explained a tradition which no longer exists.

This tradition, Dr. Gorakhshakar said, probably started with certain matters which Kautilya discussed in the Arthasastra, around 1300 B.C. Kautilya spoke of creating a park to which animals should be invited like welcome guests. "This," said Dr. Desai, "is surely the idea of a game sanctuary. Kautilya also speaks of the necessity for a special elephant forest, in which the animals would be preserved." This conservational care apparently dated back to the roots of many Indian religions.

Dr. Gorakhshakar pointed out replicas of old Indian paintings and sculptures, part of his exhibition: "Mahavira's mother dreamt of an elephant. The Buddha's mother also dreamt of the animals of the forest. In ancient Hindu sculpture, you also see all created things, including plants and animals, emerging from the body of a supreme being. These plants, these animals, multiply, to unify. All living things are together, all are part of one self. So you see, in this sculpture, the Buddha accepts honey offered to him by a monkey."

"In this painting," he added, moving from exhibit to exhibit, "you see the bears and monkeys of the forest taking part in Rama's procession. See how beautifully the monkeys are depicted. It is like the Ramliila. Quite apart from animals, look at this sculpture, in which one branch of a tree is shown pouring water into a pitcher that was made by human hands. Long ago, the ancient Indians knew the connection between plants and rainfall. For example, there is a legend about Krishna, who told people of a certain area that they should cease to worship Indra and
instead worship the mountain Govardhana. They did so, and Indra was incensed. He sent down torrential rainfall upon the people. But Krishna explained that it was the forests upon Govardhana which drew the rain, and he raised the mountain above the people to shelter them. "This celestial umbrella was evidence, said Dr. Gorakhshakar, of the old tradition of ecology, and Krishna, moreover, was in the habit of extinguishing forest fires to protect trees.

There were numerous exhibits to prove the tradition of conservation. Dr Desai, in 1987, made a video film about tree worship and the way in which trees were studied in ancient Hindu culture. When a town or a village was built, there was supposed to be a forest around it. This could have been for defensive purposes, against invading armies, but it could equally have been to preserve the health of the people. There were also certain directives about which trees should be planted around a house when it was built. These trees should be planted to the north or south of the house, or to the east or the west, according to the nature of the prevailing winds in the place, or how the sun fell. Certain trees were not beneficial if they were planted around houses, but if they existed already, they should not be cut down, instead other trees should be planted, which would counteract the effects of the original vegetation. Always, as Dr Desai pointed out, there was deep respect for the properties of trees.

There were severe penalties, under various Bindu kings, for the killing of animals or the indiscriminate felling of plants. If you killed an elephant or a cow, you could have a limb amputated. Dr. Gorakhshakar noted that, in the days when these laws were passed, elephants were military weapons, valuable to a king's army, and that cows were the wealth of the people. Hence the numerous other edicts that asked people to grow grass, and to grow trees, and to dig wells, whereby not only men but animals could flourish. But, as Dr. Desai said, these edicts were passed not only for human welfare but for the welfare of
animals. There were bird and animal hospitals all over the country then and a few remnants of this practice still exist among Jain communities. Also, as was demonstrated in numerous exhibits, there were rewards for those who abstained from the eating of meat, and for those who planted trees. He who plants trees will not suffer in his next life, for the trees will be as his sons.

If you happened to be a woman, the scriptural rewards were also great: that is, if you planted a forest your breasts would become like wood apples, and your thighs like the trunks of the plantain tree. I do not know if these would be fringe benefits to a green-fingered lady, since I do not know what the sizes of wood apples or the trunks of plantain trees are, but there was another assurance the woman concerned would be granted prosperity.

With all this going for them, the citizens of ancient India must have been a fortunate lot. Encouraged by the authorities, they grew trees and plants with a full knowledge of their properties: they knew the relationship between human and animal life. Ancient India must have been a place of forests which were sought out by people who wished to teach, learn, do penance or meditate. Amidst these forests animals lived, who were spiritually in tune with the people, and who in one sense or the other guided them. Perhaps, perhaps, this was so: perhaps it is true.

This exhibition was a beautiful one, but when, I asked Dr. Gorakhshakar and Dr. Desai, did the relationship, in India, between man and nature end? They were not entirely certain. Hindu, Buddhist and Jain philosophies stand, at least in their origins, for such a relationship. There are a great number of Hindus in India now, obviously, but very few Buddhists or Jains. The present Hindu attitude towards plants and animals except for sacred plants and sacred animals, can be described as very casual. Anyone who has seen a bullock being whipped under the yoke, or a dog being kicked aside in a village,
or living trees being felled for firewood, can testify this. Mrs. Maneka Gandhi, the present Minister for Environment, has been (before her elevation to Ministership) talking about these happenings. Was it colonialism of various kinds, I wondered, which was responsible for the change? Neither Dr. Gorakhshakar nor Dr. Desai had a clear opinion. But this kind of change has taken place all over the world.

Tree worship, plant worship, a sense of the relationship between animals and people has occurred all over the planet, not only in India. In both ancient Europe, and what we know of the early civilization of the Americans, these motifs have recurred. Even in the Australian deserts, where there are few trees, there is, in cave painting, the image of a life-giving plant or tree. There is also a strong association between the idea of animal life and human life being mutually dependent and interconnected. So far as India is concerned, the exhibition mounted by Dr. Gorakhshakar and Dr. Desai is very important, because Indians seem to have forgotten this connection more than other races. Cruelty to animals is nowhere more clearly demonstrated than in India, and so far as respect for one's environment is concerned, I only had to step out of the exhibition room to see its failure. Dr. Gorakhshakar is probably the best museum director in India. In the Prince of Wales museum he has made a silk purse out of what was left to him as a sow's ear.

But in the museum itself, the horde of visitors, which descends each day leaves huge quantities of unnecessary litter. Childish fingers, unchecked by parents, have ripped canvases of old paintings. The nose of an ancient Hindu statue has been rubbed so often that it shines like the proboscis of an American cartoon drunk. Upstairs, a relatively modern statue has highly polished shoes, created by many industrious fingers, and not the intention of the sculptor. There is no respect for environment here. Some quality, which the exhibition tried to indicate, was intended for Indian posterity to follow, has been com-
pletely lost somewhere along the way. The huge and noisy city around the museum has caused this great loss of a tradition, but unless Mrs. Maneka Gandhi is willing to include the unchecked growth of human population and industrialization, both of which are irreversible, in her catalogue of why the environment in India is so badly treated by those forced to live in it, I do not think that she or anyone else will get very far in changing the picture.

_Courtesy: Associated News Features_

---

_The nations of this earth should do the following to keep the environment clean:_

Ž _To prevent pollution instead of trying to cure it._
Ž _To increase energy efficiency._
Ž _To use clean fuels._
Ž _To promote non-polluting energy sources such as solar energy, wind-power and hydro-electric power._
Ž _To promote the use of less polluting means of travel; travel by rail instead of by aeroplane._
Ž _To slow the growth of population._
Ž _To take account of pollution and its clean-up cost while fixing prices of various kinds of energy._
PLANS IN INDIA, PLANTS IN CHINA

-Usha Rai

In India, people’s participation in forestry is a much bandied about phrase but in China you can see it being practised. Barely 10 per cent of the forest area is the responsibility of the forest department. The rest is with the people.

The army has assisted rural communities to plant 140 million trees between 1982-84. Even today the greening of areas around barracks is the responsibility of the army. The Youth League has spearheaded the youth movement for afforestation and railway workers have planted trees along 24,000 kms of railway lines. Highway labourers had planted trees along 270,000 kms of road.

In India the inroads of industry into afforestation is being resisted by environmental activists who legitimately fear that the unscrupulous industrialists once allowed into forestry may be difficult to dislodge. But in China pulp and paper mills have been allotted 60,000 hectares of waste-land and planted trees on 33,000 hectares.

Where industry is unable to physically take charge of plantation work, it invests the money and gives the responsibility of growing trees to a collective or an individual. When the trees mature, 65 to 70 per cent of the crop goes to the industry and the rest to the individual farmer or collective. This is another sphere that India could draw from and the government earmark specific

This article appeared in the Times of India, June 6, 1987. Bhagat Puran Singh excerpted it and distributed 10,000 copies hereof to cause general awareness, and awaken the Govt., the local bodies, and NGOs. It is never too late. The Govt. and local bodies can still learn from the experience of China.
areas of its vast "resource of wastelands" for industrial plantations.

Oilfield and refinery workers planted 38.29 million trees by the end of 1983. The water conservancy department planted trees in 50,000 hectares of land and the education department incorporated afforestation in the work study programme of schools. In illir province which has over 10,000 rural schools each student has planted about 70 trees.

So conscious is the entire country of the benefits of afforestation that there is inter-cropping of wheat fields and vegetable gardens with timber and fruit trees suitable to the region. For miles on end you can see the neat rows of trees spaced across the wheat fields. In India we feel that crops under cultivation would suffer if it was interspersed with trees.

The question that kept gnawing my mind as I drove and flew over some 2,500 km of green area from Beijing south across the provinces of Henan, Hunan and Guangdong to Guang Zhao or Canton was "How have they done it?" The most simplistic explanation is that it is the political system that has made all this possible. But it is more than that. The planning of the afforestation programme, monitoring its implementation and mobilisation of the masses for forestry has been undertaken with military precision.

BUREAU SURVEYS

In 1978, the Land Design Bureau with a team of 190 experts in forestry, soil conservation, agriculture and water resources headed by an expert from the Chinese Academy of Sciences surveyed and studied with the help of the existing maps, records and village level support the state of the land and the people's social and economic needs. It also decided where and how much land would be allotted for commercial, fuel and timber forestry. At the same time each county had to grow enough food grains to meet its requirements plus have some extra for the needs
of bigger cities as well as for export.

Maps were prepared county-wise and village-wise mentioning the amount of land needed for afforestation and spelling out the species to be grown. Where necessary, the Bureau changed the use of land from agriculture to forestry. All slopes of over 25 per cent were converted into forests. No agriculture was permitted on them. For three years villagers provided food and other support to those families whose land use was being shifted from agriculture to forestry.

If a reservoir was indicated in an area by the Bureau and a few farmers had to forgo their land for it, the rest of the villagers provided the necessary compensation of land, etc. The Chinese philosophy is quite simple. It is villagers who would benefit from the reservoir and they should compensate those who may be the losers.

Disputes on land transfer are settled by the land development bureau which works directly under the people’s government in the county. The massive national land design pattern was worked out at a cost of 100,000 Yuan or Rs. 4 million and the land needed for different kinds of forestry spelled out.

Of the 115 million hectares of forest area 73 per cent is timber forest, 10 per cent economic forest, nine per cent protected forest, 3.5 per cent is fuel forest, 3 per cent bamboo forest and 1.2 per cent forest for special uses.

Targets set on afforestation have to be achieved. Representatives of the forest department from the country come thrice a year to check the growth and survival rate of the trees on the land leased out. An 80 per cent survival rate is the norm. If the progress is tardy the land allotted can be cancelled and given to another collective or even an individual farmer who has excelled in the afforestation programme.

Sometimes the state reduces its investment in the no-effect forest farm project and gives more incentives to the
each province is expected to afforest a certain specified area in five years. If it is unable to do so its target for the subsequent five years is reduced to what it can achieve. Fines up to 20 Yuans per moo (one-fifteenth of a hectare) are also levied on those who have taken afforestation responsibilities and failed miserably. Excellence in forestry programmes is rewarded, very often with coveted TV sets. Since TV sets are considered a great luxury (which every girl seeks to get as her bride price), it serves as a great incentive. In a particular village (township) visited in Hunan province 24 TV sets were given in prizes.

The government also gives loans of 50 Yuans (Rs. 200) per moo for timber plantations which is half the investment needed. If after a few years a farmer decides to leave the village to get married or moves on to the city for a job, he can sell his half grown trees to the state or a neighbour and pay back the loan. This seldom happens but is illustrative of the great detail with which the forestry programme has been worked out.

**CATTLE GRAZING**

In India some 400 million cattle on the prowl nullify all efforts at afforestation. China has half of India’s cattle population and indiscriminate grazing was stopped some 36 years ago. A farmer whose cattle damage wheat fields or forest projects is fined anything from seven to 10 Yuans which may be a tenth of his monthly income. Cattle are largely stall fed on agricultural residue and cut grass by the farmer. You can hardly see any unattended cattle in China. In Guangdong province where the fields were lush green with paddy leashed cattle was led into the fields. Occasionally the cowherd could be seen riding the buffalo Indian style, ensuring that it did not stray into protected paddy fields. Herds of cattle as well as milk are a rarity in China.

In India another major problem is illegal felling not
only of prime forests but any tree. This is largely because of the acute fuel shortage in the country. In China too many provinces, particularly in the north, face acute fuel shortage and the state supplies them with their minimum requirement of 150 kgs of coal. But in most areas of rural China 43.7 per cent of the fuel requirements is met by agricultural residue, 39.9 per cent by firewood and 16.4 per cent by electricity and biogas.

**ILLEGAL FELLING**

In a season of acute fuel shortage three to five cases of illegal felling may be reported. But generally forest guards are alert and the fine for poaching serves as a deterrent. The amount of fine is decided by the village committee. Sometimes it is three to five times the cost of the tree cut down. Imprisonment of three to four years for removing the bark of trees and even death sentences have been awarded for large scale illegal felling in forest areas.

But in most areas farmers grow trees around their huts to meet their fuel wood requirements. Others provided labour in state owned forests and are allowed to collect the thinning of trees.

At Ta Liu Wang village in Ka Fien county of Henan province every person owns 57 trees. A drive around the village revealed huge stacks of agricultural residue as well as thinning of trees in each courtyard. In Wei Shi county in the same province each person has 96 trees.

This does not mean that China has solved its fuel problem or that everyone has plenty of firewood. It only means that China has been facing the problem by systematic planning. In Beijing where two million of the nine million people suffer fuel wood shortage, some 6,500 hectares of fuel wood plantations are planned so that by 1990 there is no fuel wood shortage. Burial of the dead was stopped in China 10 years ago because graveyards were occupying space on which agriculture and forestry could be practised and coffins required wood, a precious
commodity. Today most people cremate the dead using diesel to burn the bodies. You still do however see a few graves of people buried in wheat fields.

Now with farmers ploughing in the fruits of afforestation there is no looking back. Planned development of the last eight years has increased economic benefits to the tune of 70 per cent. In some of the richest villages of Hunan 750,000 to 100,000 kgs of paddy is produced per moo annually through two crops. Even the yield of wheat fields adjacent to the afforested Gu Long mountain has shot up by 750 kgs per hectare.

Forty years ago “plant trees to fix sand,” “forests break winds” and “plant trees and turn China green” were mere slogans. Today they are a reality with the results visible even to visitors.

---

**TREES BRING PEACE**

... In reality the tree is a symbol, nay a temple of peace, in the midst of wild elemental forces of Nature. Winds, rains, floods, dust and sandstorms, heat, cold and bright light are all pacified and harmonized by the trees leading to peace in their vicinity and fertility in the locality. Remove the trees, and storms begin to take away or demolish all that was constructed and developed by man (such as houses and fields) or conserved and created by Nature (such as water and soil, flora and fauna)

*Partap Singh, Chief Conservator of forests, The Tribune, 1 July 1957*
RACE FOR DEATH
MAN IN DISHARMONY WITH NATURE

- K.C. Oberoi

The impact of global degradation will not be confined to the economically weaker regions of the world, for pollution crosses national boundaries. Therefore, says K.C. Oberoi, who is with the World Health Organization, it is imperative to have global solidarity on environmental programmes for which there should be liberal financial assistance. Spending on environment would mean investing in life.

The deafening sound of industrial wheels, smoking chimneys, polluting traffic, fading greens, depletion of the earth's treasures, stinking waters and suffocated homes form a part of an environment made by man. An environment in which he, face sunken and limbs tired, is engaged in a race for economic gains, little realizing that his activities are damaging the natural ecosystem. Efforts to improve the situation are ineffective because of the fast-growing population. Development today would, therefore, seem difficult without environmental safe-guards.

Population has been the pivot around which human activity revolves. With the growing diameter of population the circumference of its activity expanded together with its side effects on the eco-system and the sustainability of development. The primitive man first laid his hands on forests for land for shelter. But the speed with which population grew, it seems that every tree is being replaced by a man now. The evolution of the primitive man into a

This article appeared in The Statesman January, 10, 1992. Copies of this were published by Bhagat Puran Singh and distributed free of cost for arousing public awareness.
Society made him conscious of his shelter, the quality of food, comforts and standard of life. To gain these, man intensified his developmental efforts and exploited natural resources like forests, land, fossil-fuel, rivers and sea. Initially the vastness of the resources concealed their rapid depletion. But accelerated consumption gradually revealed that the treasures were shrinking.

UNFAVOURABLE TRADE BALANCE

The advent of international trade led to a race for economic achievement in which the industrially weak nations lagged behind. High commodity prices of the rich nations and un-favourable trade terms agreed to by the poor compelled the latter to resort to haphazard and unplanned development, which weakened their resource base and upset environmental stability. Further, the pressures of political dominations by foreign nations, left them with little scope to look after their environmental interests. Industrialization also led to unplanned urbanization with all its associated ills: slums or dingy homes without adequate ventilation, with the migratory population often falling victims to sociocultural lifestyles which encourage drug addiction, consumption of alcohol and often result in the industrial worker contracting sexually-transmitted diseases.

Indiscriminate deforestation, damaging the natural ecosystem; carbon concentrations in atmosphere from industrial, domestic, deforestation, and traffic activities preventing radiation of heat and causing global warming; chlorofluorocarbon emissions from industries depleting the atmospheric ozone layer and exposing human life to the carcinogenic effects of ultraviolet light; the untreated industrial and domestic wastes polluting water and air giving rise to several diseases; pesticide residue in crops, affecting human nervous system; use of explosives in fishery, extinguishing several species of aquatic life; are all examples of environmental degradation. As ecology, health and development influence the interwoven constituents of
the quality of life, the environmentally concerned global bodies are seriously worried about man’s ability to withstand the adverse effects of development.

On the other hand there are political instabilities which have led to large-scale arms acquisition by most countries. Manufacturing of defense equipment is a lucrative industry for a few. But huge investments on arms by weaker nations affect their national budgets make them still weaker and their people poorer. The use of radioactive explosives in war makes nations incapable of bearing life for years to come, affecting the neighboring environments as well.

Global military expenditure was more than $900 billion in 1985, more than $2.5 billion a day. Compare this with the cost of environmental programmes: $1.3 billion a year, which is half a day’s military expenditure and could finance a five-year action plan for tropical forests. $45 billion a year could implement the U.N. Action Plan for Desertification. $30 billion a year was needed, but only a very small amount allotted, for the implementation of the U.N. Water and Sanitation Decade. Adverse developmental effects should, therefore, serve as indicators for corrective action and be viewed as important lessons for formulating strategies for sustainable development and improved environment.

The depleting resources should be renewed or alternatives found and the environment protected from the side effects of development. Pressure on the depleting reserves of energy should be eased by harnessing other resources like the rivers, solar power, wind, biomass, etc. Hydroelectricity generators are multipurpose river projects, which not only generate electricity but also control floods and provide sustained supply of water for agriculture. Besides, they prevent loss of energy in mechanical irrigational installations by promoting extension works. Commercializing battery and solar-operated motorcars, improving the public transport system to attract private
car users, would also be good ways of reducing oil consumption and emissions.

Waste recycling saves industrial resources. Tons of metal, plastic, glass, paper, lubricating oil are discarded by industries, homes and motor vehicles. But paper must not be destroyed, for it can be recycled. If this is not done there will be more pressure on forests for wood for paper making. Lubricating oil can also be refined without losing its viscosity.

The depleting forests require immediate attention. Apart from Government schemes and legislation to protect forests, planting of trees by individuals could be made an enjoyable affair - to plant a tree on one's birthday, for instance. The village headman can set the ball rolling by planting a sapling on his birthday and look after it. The grow more tree campaign should be revived and its activity stepped up on a national scale.

Safe drinking water and efficient sewage and sanitation systems are next on the agenda for a healthy environment. Above 80 percent of the diseases are due to contaminated water and poor sanitation and people must be educated about these risks, especially women who are the principal users of water and responsible for cleanliness. Municipal laws must be enforced to prevent pollution as well.

All these endeavours must eventually reduce socio-economic gaps. Weak nations need assistance to build up their environmental base. Their impoverished condition discourages them from spending on environment but the resultant pollution will spare nobody. However, while supporting environment safety methods, the funding agencies must think twice before sanctioning loans to countries, which degrade the environment especially those indiscriminately clearing forests and accumulating deadly weapon for war.

The population explosion must be controlled first for growth in human numbers outpaces economic growth. This may be achieved with incentives for small families. This
needs strong media support to educate the people. Documentaries on family planning, newspapers and magazine reports on free health kits, incentives for the village health worker who commands respect in his community and who would profess family planning in the village, or the priest who could inculcate the sense of having a small family. This also needs external aid as over population is primarily a problem of the developing nations, which lack funds for control programmes. Following planned families should be planned homes with safe water, effective sewerage system, parks and playgrounds for the young and the old, and easy linkage with health, municipal and other essential services.

CONTINUITY OF DEVELOPMENT

The continuity of development depends on the availability of resources and a pollution-free environment. But environmental pollution has crossed national boundaries and has assumed global dimensions. Mere Government legislation to protect environment will suffice no more. People must feel obligated to safeguard their environment. Not even poor economic conditions should be allowed to be a pretext for discarding environmental concerns. The impact of the environment is not confined to a single country. Therefore, global solidarity can improve the situation to benefit all. Rich nations, donor agencies and leading banks must liberally support environmental programmes. Solidarity is a big force and its dividends are enormous. For any effort in improving the environment would mean an investment in the quality of life.

Truth comes to us with a slow and doubtful step measuring the ground she treads on, and forever turning her curious eye, to see that all is right behind; and with a keen survey choosing her onward path.

-Percival
THE FORESTER'S ROLE IN PUBLICISING FORESTS
A TALK TO FOREST OFFICERS

Know the value of the treasure you guard.

Protect the forests - they keep the desert at bay.
Forests improve the climate, attract rain.

The job of a forest officer ought to be challenging and satisfying. There are few professions which afford such a combination of business with pleasure as yours does. You are guardians of our country's wealth, and you should know the value of the treasure you protect. Perhaps the best way to evaluate this is to list the important contributions of the forests.

1. Forests, vegetation and plankton, by photosynthesis,

This article was reproduced from the booklet "Will India become another Sahara?" (Desert Land). As many as 20,000 copies of this article were published by Bhagat Puran Singh ji and distributed amongst public free of cost for evoking public awareness.
provide the earth’s supply of oxygen and control the quantity of carbon dioxide in the atmosphere.

2. Forests prevent soil erosion, protect headwaters of rivers, prevent or minimize floods.

3. Forests have a beneficial effect on climate and attract rain.

4. Forests provide timber and other produce of commercial importance.

5. Forests provide habitat for wildlife.

6. Forests provide areas for recreation.

v Need for conservation and pollution control

People have not yet realized how precious air and water are. They are beginning to grumble that what they always took for granted will now cost money in terms of pollution control. A few realise with horror that life itself will cease, at least for human beings, or will become miserable unless it is better regulated.

How many among even the literate and educated in our country know that forests contribute valuably to human existence by producing oxygen, conserving water, preventing soil erosion and so on? If you think of agriculture as an industrial activity, then forests are the buildings which protect the equipment and provide valuable off site facilities.
A certain area of the land (it has been accepted to be at least a third of a country’s area) should be under forests to provide the protection that cultivated land requires. By reducing forest cover as has happened in India, where, according to Mr. Sagreya in his book published in the early 60’s it was 17%. We are creating, by stages, deserts which are irretrievably lost or take decades to redeem.

Our people, whether literate or not, are intelligent. So, why are the forests neglected in our country? Obviously, because of an inadequate effort to arouse public interest in this subject. Publicity is essential to make people aware that almost as important as population control is the control of natural resources, and of all our available resources, land is the most important because it is irreplaceable. Therefore, it is essential to make the best use of land.

The best use of land suited for agriculture should be planned by experts in agriculture and we have many able men today in this profession. All land which is not suitable for agriculture, whether forest, grazing land or marginal, land should be managed by foresters who are best qualified to assess such land and to decide in the context of watersheds, soil and topographical features, what species of plant should be grown on it.

All work relating to agriculture and forestry should be closely coordinated and related to an up-to-date map of the country showing soil, contour, and climate.

We need a National Policy for effective land use – to be supported by all political parties.

You must help create understanding.

This seems to me the logical way of planning and controlling our land resources and I feel strongly, and I hope you will too, that the first step is to have a clearly defined national policy on the proper and integrated use of land. This is the country’s fixed asset. It must not be allowed to deteriorate and every effort must be made to
improve it. There are, however, two main deterrents to sensible implementation of such a programme, viz. (1) Pressure of human population, and (2) Pressure of the cattle population. Both these lead to encroachment of forest area and politicians at present always back such encroachment because their main concern is to win votes. But if politicians in all political parties realised that this is extremely shortsighted, that encroachment of forests will seriously affect the quality of cultivated land, that the

![Image](Life in the desert. Protect the forests they minimize floods)

people will lose far more than they gain, then perhaps they might form a joint front as during a war, against the enemy viz the desert or barren land, which is an enemy of all citizens of the country.

You should be the main spokesmen for the country’s forests and if you are true foresters, you must fight for your forests. You can do this by explaining your work to all with whom you come in contact. Your own staff, first. The villagers who live near forests. Tell them about the value of forests. Show them by means of simple exhibits and experiments how forests and vegetation prevent the loss of soil and conserve water.

- **Study of ecology**
- **Record your observations**
Television will help spread the message

Arouse public interest

Ecology, which is the study of the relationship between living beings and the environment, is a subject which has recently been receiving much publicity the world over. India too must have ecologists to help the country make wise use of her natural resources. This is a subject that should receive your attention because it is closely related to your work and the impetus to its study must naturally come from the coordinated effort put into it by foresters and agriculturists assisted by biologists, botanists, zoologists and chemists who are engaged in the study of soil, plants and animals. I am circulating the summary of Richard Bell’s article ‘A Grazing Ecosystem in the Serengeti’ which may start you thinking of the scope for game cropping or utilization in India.

You should keep a diary to note your observation of trees, birds, animals, and contribute a newsletter to this Society so that we may help publicise this information and create an interest in forests among the city dwellers, and make them aware of the great value of forests to a good life.

By working hard from now, we may be able to put together a worthwhile programme to convey as effectively as possible a message to the people of this land, about one of their great heritages which must have their urgent interest and understanding, if it is to survive as it must, in order that they themselves may survive.

You should consider the Bombay Natural History Society as your society, and I hope it will be possible to meet as we are meeting today at least once a year. For such a meeting to be fruitful, it is necessary to remain in constant touch with the Society, through correspondence. Each of you should write about at least one particular project you are working on that is worth publicising, so that we can tell the people about forestry practice, watershed control, wildlife sanctuaries, reclamation of waste sanctuaries, reclamation of waste land, controlled
grazing and so many other interesting things which form part of your work but about which few, other than you and your staff, know anything about.

- Keep abreast of latest development and practice.
- Publicity is essential.

I do not know what facilities you have to read about forestry and related subjects. It is essential that you are aware of current thinking and practices elsewhere in the world, so that you can think of applying such knowledge in your own work. The minimum reading you should do in a year is at least half a dozen good periodicals (monthly or quarterly) and an equal number of books; the books should be on a subject of your special interest. The periodicals will give you much general information on peripheral subjects.

If you do not have these facilities let us plan to start them. The Government will certainly not object to providing a modest budget for such important reading matter. Perhaps this can be done through the Bombay Natural History Society. We might consider a system similar to the one used by the Asiatic Society who send books up to country members.

You must be aware of the enormous potential of publicity. It will help you personally in your career and you will also be playing an important role, which is a rightful part of your duty as good executives and good citizens. This publicity must be properly planned and directed where it will do the most good in the shortest time. The targets are:

a. Your own organisation.
b. The people you can influence such as those who live in towns and villages close to you.
c. The people of India - through newspapers, periodicals, radio, TV etc.
d. Young people in schools and colleges.

mmmm
THE IMPORTANCE OF TREES

- Zafar Futehally

We cannot but agree with E.F. Schumacher that if we all plant just one tree a year, five years running, we could have 2000 million established trees, and the economic value of such an enterprise, intelligently conducted, would be greater than anything that has ever been promised by any of India’s Five-Year Plans.

It is recognised that at present only 10 percent of the world’s surface is being used for food production, but with the aid of trees, three quarters of the globe could supply food, fibre, fuel and shelter. Because of our favourable climatic conditions, our opportunities in this regard are better than in most areas of the world.

Much has been said about our forest problems in the past decade. A report of the National Remote Sensing Agency, released in November last year says that in the seven-year period between 1975 and 1982, the net production of forest cover has been 16.25 per cent. Putting other data together it seems that there are today only 33 million hectares with more than 30 per cent density, against the time honoured figure of 75 M.H., of forest cover in our country.

ALARMING SITUATION

This is an alarming situation because ecologists maintain that when a natural forest is thinned to below 60 per cent of its tree population it ceases to perform its ecological function – soil protection, conserving ground

This article appeared in The Indian Express of May 4, 1985. Copies of this were published by Bhagat Puran Singh and distributed free of cost for public awareness.
water through reducing the run-off, impounding water through the root system and so on.

The fact, however, that there are today 175 million hectares of degraded land in our country is a hopeful sign, for it indicates the vast potential we have for improving our material condition through increasing tree and grass cover, and the consequent improvement of the soil and of ground water.

Ever since the National Committee on Environmental Planning and Coordination was set up in 1970, there has been talk of revising the National Forest Policy of 1952, to bring it in line with the changed ecological and socio-economic situation. The fact that one draft after another has been doing the rounds of high powered committees shows what a difficult task it is to achieve something even on paper, leave alone on the ground.

Trees on public lands will not be grown by people for the sake of improving their aesthetic, climatic and long term material conditions. These trees will have to be grown by task forces specially trained for the job. This activity could provide employment to thousands of people.

On the face of it, public participation is a very desirable objective, but experience shows that in most areas, the public, both individuals and panchayats, take very little interest even in developing land manifestly to their own advantage. For example, in old Madras state, during the 1930s the forests in Bellary, Anantpur and Kurnool were transferred to the panchayats in the hope that the tree cover would be properly managed and self interest would motivate the villagers not to over-exploit the resources. Unfortunately, this was a total failure and the forests were transferred back from the panchayats to the forest department. Village forests managed by panchayats were mostly in degraded condition.

Economic incentives, not mere ecological advantage, appears to be necessary, and there are now several schemes of reforestation where the forest department
plants the seedlings and looks after the plantation for three years. Thereafter, the area is handed over to the local people.

It has been said by critics that before the forming of the forest department, village communities looked after their wooded areas very well because they had a direct interest in the produce. After the forest department came into existence and particularly after the reserve forests were formed, the locals found that the area set aside for meeting their needs was only a fraction of the earlier area and this could not cope with their requirement. Hence over-exploitation led to degradation. On the other hand, the reserve forests were destroyed through the unprincipled alliance between industry, corrupt forest officials and smugglers.

BONA-FIDE NEEDS

Foresters defend themselves by pointing out that when the reserved forests were formed, they constituted only 25 to 30 per cent of the forest area and as much as 70 to 75 per cent of the forests were left for the common people to meet their bona-fide need. Trees, they say, were destroyed due to the great increase in population of human beings and cattle, grants and encroachments for agriculture, lack of protection facilities and shortage of investment for new planting.

Foresters also always have had problems with the revenue department, who are the real custodians of the land, other than that in the reserved forests. One curious anomaly is that the Conservator of Forests is permitted by law to grant privileges, but he cannot withdraw them even if he finds that they are being abused. The Revenue Commissioner on the other hand is permitted by law to withdraw the privileges but he is not empowered to grant them. These checks and balances of a bygone age now need to be undone.

One gets a feeling from listening to debates in state
assembles that the forest department is constantly pressed for augmenting revenue from their operations, and since there is no easy way to compute the value of their conservation activities, economics wins over ecology. The forest departments of the states insist that their working plans take the ecological needs of the region into account, that is, no exploitation of timber from sensitive areas, as for instance from the evergreen forests of Coorg.

FIREWOOD CRISIS

Apparently 60,000 acres along the ridges of the Western Ghats are excluded from working. In view of the firewood crisis however it is doubtful if there are any forests left today which are totally free from exploitation. It is well known that the forest department can meet only a fraction of the needs of the people. In North Canara, about 60 to 70,000 tonnes of firewood is sold - Rs. 80 per tonne. Considering market prices, there is a subsidy of Rs 150 per tonne. Hence in one district alone, the government has to provide a subsidy of over a crore rupees.

The total revenue earned by the forest department in Karnataka is Rs. 55 crore and in Maharashtra it is Rs 100 crore (The present figures may be a bit higher). It is claimed by the forest departments of both these states that the generation of revenue is not their major concern and that “the first duty of a forester is to maintain site quality.” Unfortunately various factors have prevented foresters from discharging their duties successfully.

It is urgently necessary to formulate a national policy in exotics. In India, eucalyptus and casuarinas are both fast growing species with the added advantage of being drought resistant and unpalatable to cattle. They are playing a major role in meeting the gap between the demand and supply of firewood. The accusation that eucalyptus is a heavy drawer of water is denied by the forest department. In any case, because of the controversy,
it is important for the government to specify under what conditions eucalyptus and casuarinas can be grown.

*Parthenium, eupatorium and the water hyacinth have done tremendous damage to our country. Other nations have made use of biological control to check the spread of these invaders, but we are still hesitating. Since physical uprooting of a plant like *parthenium* is impossible and since chemical means have serious dangers, we are left with no alternative but to try biological control, and action must be initiated urgently.*

Apart from the cutting down of trees for firewood, one depleting factor which needs to be looked into is the role of brick kilns which are fired by the cutting down of road side trees. Unfortunately tamarind and mango trees are the most favoured because of their capacity to retain the heat for a long time. Now that alternative technologies for making bricks are available which do not require any firing, it would be worthwhile for state governments to discourage traditional brick kilns and encouraging the use of soil block making machines whereby bricks can be manufactured purely by compaction.

One sq. km. of forest contains 50,000 to 20,000 cubic meters of water in their root system. Our cities should have large wooded areas surrounding urban settlements, because then the water table might remain high and this is obviously of immense advantage. Just a hectare of forest can hold 30 tonnes of dust and a 50 meter belt of forest reduces noise level by 20 to 30 decibels. Also a single hectare of woodland takes 3.7 metric tonnes of carbon dioxide out of the atmosphere and returns oxygen.

**FOREST DEPARTMENT**

*Finally, to return to the most important question which is: how to afforest degraded lands, and how to preserve the forests which still remain. One solution could be to divide the forest department into two distinct divisions - conservation and production. The former would*
be concerned only with the planting of indigenous species of trees in selected areas, such as the catchment areas of rivers, all hilly areas with a gradient of more than 30° lands along canal banks, areas around lakes and water tanks to prevent siltation woodlots in villages, and in all locations where permanent tree cover is necessary for ecological reasons. The production division would be concerned with the planting and harvesting of quick growing species, eucalyptus, casuarinas, acacia, auriculiformis, wattle and several others which have proved their capabilities under our conditions. Such a division of activities would prevent the forest department from the present schizophrenia caused by dual responsibilities of conservation and development.

Man continues to fight nature in the belief that one day he will bring it completely under his control; but history tells that civilisations of the Nile and the Euphrates River Valley, the Syrian and the Greek civilisations, and the Indus Valley Civilisation, all perished because they did not follow the rules of nature.

Unless we give up trying to exploit nature and begin to conserve its treasures, the end of mankind is certain.

Only trees can halt such violent and uncontrollable forces of nature as floods, storms and earth-quakes etc.

The environmental pollution is likely to kill about 180 lakh people during the period 2001-2020.
The theme for the eleventh World Food Day is Trees for Life. The message that the Food and Agricultural Organization wants to convey through this theme is the link between battling hunger and protecting environment. The FAO has stressed that without a healthy, productive environment, the world will not be able to feed its population a few years from now. While this might sound excessively Malthusian, in its pessimistic overtones, there is some merit in what the organisation says. The bulk of the population growth is in the developing world, where due to increasing pressure on land, there is systematic and accelerated degradation of the environment. This results in a whole chain of events like declining soil fertility, lower levels of productivity and output, loss of energy and raw material resources in addition to loss of biological diversity. This will increase the external dependence of the developing countries for food and perpetuate mass poverty in these countries.

The programmes that are likely to be launched by the FAO are wasteland development, social and agro-forestry and energy plantation programmes. Quite rightly, the world body has tried to wed employment generation to forestry programmes and related enterprises. There is now increasing realisation that without an associated income generation plan, stress on preserving environment is likely to be confined to sloganeering. This is where developed countries can do their bit. With large parts of the third world reeling under heavy external and internal debt, and the added strain of overstretched governmental resources.

This article appeared in The Economic Times of October 16, 1991. Copies of this were published by Bhagat Puran Singh and distributed free of cost for evoking public awareness.
spending, not enough resources are left to be devoted to such programmes. For example, as the FAO report points out, quite a few countries are willing to permit logging to produce timber for export, since it helps in improving their immediate balance of payments position. Given the perverse logical sequence of similar strategies, it is not surprising that environment gets a raw deal in most third world countries. This is not to say that the developed countries are environment-conscious. The millions of tonnes of industrial effluents and toxic waste that are dumped in the rivers and the seas is an indication of the insensitivity to environment that continues to persist in these countries. The difference is that while the developed world has the resources to control and even reverse degradation of this kind, the developing countries have little in this regard. FAO's themes for the World Food Day have had a visible impact on the policies of most countries of the world, with the 1983 theme of food security now being universally accepted aim of food policy. 'Trees for Life' is an equally important theme that deserves global support for a long time to come.

<table>
<thead>
<tr>
<th>The following could be the causes of climate change in the world</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Change in the amount of radiation from the sun.</td>
</tr>
<tr>
<td>2. The dust released into atmosphere by volcanoes, which blocks radiation from the sun.</td>
</tr>
<tr>
<td>3. Shift in the axis of rotation of the sun.</td>
</tr>
<tr>
<td>4. Change in the earth's orbit around the sun.</td>
</tr>
<tr>
<td>5. Changes in the minimum and maximum distances of earth from the sun while orbiting around it.</td>
</tr>
<tr>
<td>6. The process of mountain formation, that changes the wind direction.</td>
</tr>
<tr>
<td>7. Drifting of the tectonic plates of the earth.</td>
</tr>
<tr>
<td>8. Change in the land use, such as cutting down of forests, excessive industrialization of cities.</td>
</tr>
</tbody>
</table>
ENVIRONMENTALISTS TAP VEDIC WISDOM

MYTHS AND RITUAL PRESERVE NATURE

- Shanta Chatterji

"When we find that it is the attitudes of man that govern wants, needs, economies and empires, is the fashioning of these by the right ritual such an unnecessary thing?"

Substitute "habit" for "ritual" and you have spanned 5000 years in India.

At a time when nature conservation is at its lowest ebb, are we going to have academic discussions on whether to use the rational approach or the emotional approach to bring it about? This was the question, which produced 'Sanskar', an audiovisual presented by World Wildlife Fund, India on nature conservation as an ancient India tradition, sponsored by the National Museum of Natural History, Department of Environment, New Delhi.

Let us investigate. Is not ritual, or habit if you wish, the surest way of inculcating in massive population, a way of life which is environmentally rational for our own existence? Did our ancients not use this to great advantage through a technique of story-telling which is potent even today? Should we reject it or should we build on it? With our environment in a shambles, with forest cover dangerously nearing 10 percent, with 1.3 million hectares of trees disappearing every year and 30 years to go, which

This article was published in Times of India, December 18-19, 1985. As many as 30,000 copies of this article were published by Bhagat Puran Singh ji and distributed amongst public free of cost for evoking awareness.
is our quickest way of getting an active response from the public?

If we give them facts and figures, will they absorb them beyond a point? Having absorbed them, will they be moved to act on them? Experience shows that “statistics never moved souls.” And then, what percentage of the population will react? For the bulk of the population, while we go through the cycle of literacy, education, public awareness of social and economic issues, will the environment wait?

So what is the quickest way? What about stirring up our subconscious, the storehouse of myth and history which we gather in our childhood, the association we have with stories of Krishna and Rama, of living in harmony with nature, of protecting it, of cherishing it? And one by one, all the “westernized”, “elitest” concepts of ecology, the environment and the interdependence of all species come alive, in an idiom which is relevant and easily assimilated by most of traditional India – with a power that touch a level of consciousness which never forgets the lessons.

Why Krishna? What’s the secret of his popularity? He was never projected as a paragon of virtue. But he always keeps us amused. His frailties make him lovable. His romance is vicariously satisfying. And once you have identified yourself with him, you are ready for his wise counsel.

MOUNTAIN’S ROLE

“Worship Govardhan and not the god Indra, for the mountain gives you food for yourself and fodder for your cattle.” The people of Brindavan were converted immediately for he had caught their imagination. They moved from the over-grazed and denuded Brindavan to Govardhan.

And what greater impact than the dramatic content of the cosmic form of Krishna, as revealed to Arjun on the battlefield of Kurukshetra? What would the Gita be without this VIRAT ROOP, where the web of life, the unity
and interdependence of all species comes to life in a flash. The same energy that transforms itself from one to the other, echoing strains from Fritjof Capra, the nuclear physicist of today, who so lucidly draws parallels between ancient insights and the conclusions of quantum physics, that all matter is energy, that Shiva’s dance of creation is almost identical in its postures to the behaviour of the splitting of particles into energy in a nuclear bubble chamber. Only the image of Shiva remains longer in the mind than a diagram of lines going in different directions. “Clay models are immersed, but concepts stay behind.” If you take the trouble to investigate these concepts or even if you do not, they stay with you. And so the dancing Shiva is almost a symbol of India for the world.

What beautiful imagery when the forests were likened to Shiva’s locks which broke the force of the Ganga and let it descend gently on to the earth below. We know now the fury of floods and famine as the forests slowly disappear from the Himalayas, as the image of Shiva recedes from local minds.

How was nature conservation a way of life in India? We seem to have gone through a range of attitudes from wonder and worship in the Vedic period, to equality and communication in the Ramayana period, to devotion and closeness during the Krishna period, tinged with romance and poetry of which scented glades and ebullient animals and birds were always a part. There was no art without nature, no music without the live symbols of the seasons which gave content to it, the Koyal heralded spring, and the cranes followed the rains.

The Vedic period used the rational approach, through ritual. Only fallen branches were used for yagnas and religious fires. Only branches of trees, never the trunk, were cut for the pandal poles. Out of the twenty one stakes required, the central stake was from the Rajjudata tree, two were prescribed from the pitudara (deodar) tree, six from the bilwa (bal tree) six from the khadir (accacia
cat e ch u)  t re e, and t h e  remaining six from t h e  palasa tree (t h e  flame of t h e  forest). F ourteen species of t rees were specified for use in sacrifices and nine species were prohibited. What more even use of resource, according to their availability and renewing capacity, can today’s environmentalists ask for?

B efore a branch was cut, an invocation was chanted, a prior forgiveness obtained ‘Swadhit e  ma ma hinsa. Aushadhe trayasva enam’. (O knife, do not cause any harm, O Lord of the plant, protect him.)

If we were to ask Dr J. C. Bose, the modern originator of the theory that plants have life and emotions, he would have said that this was a method of hypnosis inducted in the plant, to ease its pain, to make it retreat and go numb before the axe struck any part of it. Check it out with the “Secret Life of Plants” by Peter Tompkins and Christopher Bird.

H U M B L E  P R A Y E R

W hatever effect it had on the plant, the humble prayer must have had its influences over the man who wielded the axe, to wield it judiciously.

Y ou then had the religious strictures to plant five species of sacred trees: banyan, peepal, um ber, the flame of the forest and mango. All species which the most ardent environmentalist would urge you to plant today for they retain the maximum water, protect the maximum soil, provide medicinal ingredients, attract birds and give fruit, not to speak of shade and oxygen. The only difference is: would you rather be told by your grandmother about them in a nice story, with tender love, when you are five-year-old and impressionable, or by your botany teacher in the 10th standard when your main interest is pop music and pretty girls?

E mperor Ashok spelt out the same rules in the 2nd century B.C., of planting banyan trees on roadsides and mango orchards in your back yard. But will anybody listen?
Symbolism has played an important role in the shaping of our psyches. Laxmi, the goddess of prosperity is always being given a leisurely bath by the cloud elephants of the four quarters. Why? Why elephants? Could it be that elephants living in high rainfall bamboo forests signify rain? And rain brings vegetation and prosperity? And what about Ganesh? The giver of knowledge (elephants are reputed to have a stupendous memory) and the remover of obstacles (also elephant-like)? Those who worship him, are they likely to massacre him?

Whatever the reasons, our gods and goddesses had in acquiring vehicles of animals and birds - Brahma on the swan, Vishnu on the serpent or Durga on the tiger - could it be that these species have remained protected until recently due to their strong associations with worship? Snakes do happen to be the best controllers of our rat population which destroys 20 per cent of our grain; and the tiger, we find, is the best indicator of a healthy eco-system needed for man's well-being? Here, the goddess Durga is in complete agreement with officials of project tiger. Save the tiger. In the Sunderbans, it is a joint effort.

But slowly the canvas in India began to change. Cultural imprints, carefully inculcated, began to be superimposed with other imprints. India was invaded, conquered. We, a pliable people, began to be influenced by the fashion of the day. Hunting became a sport and man called upon wildlife to give beyond his basic needs. They stopped being friends. They were on opposite sides of the fence.

New modes of transport, of agriculture, perhaps, brought more and more alienation from the living things around man and his interdependence on them. He had no need to be nice to them.

From animals as an object for sport to animals for exploitation was a short stop. Tigers and leopards hung as trophies or “hugged the supple shoulders of a memsahib.” Snakes became snake-skin bags and the trend continues. And one cocktail circle imitates avidly.
But the naag panchami is alive and picking a declared holiday where the snake is still worshipped by great numbers. Are there enough snakes to halt seriously our rats from going amuck? Even if you are only a “layman” and not an expert ecologist, whose side would you be on? The memsahib’s or the naag worshippers? The one who knows facts and figures about rat control or should know but ignores them? The rishi had all his facts and figures but used his imagination to use colour, shape and sound in the best psychological tradition to touch a level of consciousness which is deep enough to create a habit in people and to get their participation as the performers, the potential nature-protectors. For when you participate in a pooja, in a dance drama, in a song, where you have been the Hanuman, or you have been the Ram who took help from Jatayu, the eagle, you have unconsciously taken a pledge. You are not likely to kill them. And you go to prevent others from killing them. Thus are ecosystems saved.

Thirty-eight years after independence, we are still looking for a national identity. Perchance we shall find it, now that a new generation has arisen. Can we sieve through our Sanskars, our cultural imprints, and come up with a mix which is rational in content arid imaginative in its approach? If we are to grasp that identity and thereby unleash our energies, there is no other short cut. By imitation of other societies, we are likely to remain shadows of ourselves. By a judicious blend of centuries – old experience with the investigative technique, we might just about stop ourselves from throwing away the rice with the chaff.

RESTRAINED USE

In the churning of the ocean of our traditions and rituals what comes up strong and clear is the restrained use of natural resources we made and the quality of intellectual and artistic life we achieved. Whether this restraint was conscious or instinctive we have a wealth of everyday common habits, which happen to be environ-
mentally safe and less taxing.

We are predominantly vegetarian and therefore depend upon food with a shorter production cycle. Plant life regenerates faster than animal life, apart from the recent knowledge of 160 immunities in the body which are destroyed by non-vegetarian food.

We enjoy eating with our hands and do away with implements which require factories to manufacture scarce steel as raw material and high energy which is mainly based on oil, a fast depleting resource.

We have traditionally used no furniture to any great extent and preferred cushions, carpets and bolsters in a warm climate where the cool floor is the best means of cooling you down. The revival of this habit could have a substantial impact on saving our vanishing forests. Certainly we never used wood for wood-paneling our offices! And what would happen to our forests if every Indian used toilet paper? We use water which is a recyclable resource. Little drops of water make a mighty ocean, and so can the continuing of some of our sane habits as individuals.

Our investigative searchlight must fall not only on our own ancient and modern way of life but also on that of the industrially developed countries which we are trying hard to imitate. We seem to want to be like them, to improve our image in our own eyes. Will we have the courage to shed our complex? Will we be discerning enough not to invite acid rain and genetic defects, through over industrialization and nuclearization? Will we resist the cycle of creating a demand, then obsolescence, then another demand for products which are not crucial to our existence? Will our environment sustain the resource drain? Shall we ignore as obsolete Chanakya's counsel in the 4th century B.C. that "the stability of an empire depends on the stability of its environment?" Shall we wait for the idea to be injected to us through the West, like yoga has been put back in fashion here? Shall we look at the new trends in places like West Germany, a technologically
highly developed, well-organised country where the latest thing is the Green Party, with 27 seats in the Bundestag, their parliament? Say Fritjof Capra and Charlane Spretnak, “Green politics have appealed to so many West Germans because theirs is a densely populated, heavily industrialised nation where the limits to growth are visible at every turn, where the madness of nuclear deterrence has made them prime candidates for a thermo-nuclear holocaust and where the level of affluence allows ‘big picture’ election.”

CULTURAL IMPRINTS

There are signs that our sanskars, those invisible cultural imprints, are showing up, that we are not giving up all our safety valves. Whether by design or instinct, we are going in for those industries, like electronics, which use the least natural resources, to afforestation schemes which are the quickest way to encourage dispersed employment and are also environmentally the most productive. We are taking steps, ever so small, to keep the ground under our feet and water in our wells, to use the sun for renewable energy, to recycle waste. Eventually, one hopes we shall use more and more biotechnology for pest control and bio-gas for fertilizer so that we eliminate the risk of toxic chemicals and our dependence on oil-based industries.

The outward symbols of this rethinking and resurgence of our sanskars are simple, like little lights being set afloat in a lotus pond. The five religious trees, the ecologically most important ones, being planted to commemorate an inauguration, like the cleaning of the Ganga and above all, like the Chipko movement, which echoes the sacrifice of 363 Bishnois in Rajasthan 300 years ago, when they clung to their trees and lost their lives with them. The first one to give up her life to the maharaja’s men was a young bride, Amrita Taru.

That song is the beacon light which till this day marks the Bishnoi villages in Rajasthan as “the high spots of greenery in the bleak desert.” The black buck, an endan-
gered species in India thrives in this area because it is still worshipped. The message is direct. Man, woman and child each plant that one tree which can change the face of the country. The secret lies in the seed. “When I dig, let it be to sow” - that tiny potent force, which can stop mountains from rolling down, and stop waters in their tracks.

If scientific temper is the in thing, let us evaluate each one of our everyday habits against the touchstone of environmental good sense and then decide to keep them or not. Also, let us apply that same touchstone to our changing habits, acquired from other cultures, which are probably quite relevant there but not here.

We rue India for changing slowly, but there is an advantage. We have the option not to be caught in the side effects of processes and products the world has tried and rejected. Shall we give up our strengths and take their weaknesses?

A civilization which lives on very little from nature is the civilization which lasts the longest.

• World population doubled during the period 1950-1990 from 250 Crore to 500 crore. Increase in the demand of wood accelerated felling of trees in the tropical rain forests.

• The rate of population growth needs to be brought down. The developed countries should transfer information and technology to the developing countries to help them in their economic development.
Ancient Indian tradition has always treated nature and the tree with veneration. The tree's cool canopy of leaves was a most welcome shelter from the blazing sun. A long caravan could rest for a while in the shade. A weary traveller, a monarch with a mighty army, a simple teacher and his students - all regarded the tree as a benevolent protector.

No wonder then, that trees and creepers were personified and showered with great affection. Devotees looked after the plants and trees by watering them and tending to them; and it was believed that trees in turn abundantly returned human love. They scattered flowers like tear drops at the great grief of Sita when she was abandoned in the forest with much reluctance by her loving consort Ram.

Even today on specific days some trees like the pipul, neem, banyan, shami and tulsi are worshipped with offerings of milk, water, incense sticks, camphor, flowers, coconuts, fruits and sweets.

Trees have been so loved, particularly by the women, that they are thought of almost as companions. Sometimes offerings of bangles have been made to trees for the boon of a long life for the husbands. Sometimes, clothes have been offered to trees, especially to the tulsi plant for blessings to curtail the fierce summer heat and offer protection from the biting winter cold. Fasts have also been observed to propitiate trees and creepers. This is manifest in the popular banyan-Savitri worship and the tulsi worship.

In ancient Indian belief even sex was attributed to
trees. Poetry and literary works spoke eloquently about the mating of trees and creepers, a wedding of beloved ones.

Lamenting for his lover, who lies in this lap, with her eyes closed in death, Aja exhorts her to awaken and witness the fruits of her desire - the marriage of the mango and the liana. And the poet compares red palasa flowers, curved like the crescent moon, to nail-marks imprinted by a lover. (Kumārasambhava, III, 29).

In a land with such concepts it is not surprising that the return of man's love by plants and trees was accepted as an almost absolute certainly. This explains the development of the concept of dohada - the power of a young damsel to make a plant bloom out of season. There are various methods of dohada, a theme as pleasantly handled in sculpture as in literature. Kalidasa in Mālavikagnimitra III, 12 says that there are two who are entitled to the privilege of receiving a gentle kick from a beautiful young woman: One is the ashoka tree that is late in blossoming and the other is an unfaithful lover - errant but repentant.

Stimulants for making a tree flower out of season are known as uddipanas. For example, the kuruva tree is brought to blossom by the embrace of a damsel. The bakhul needs the sprinkling of mouthfuls of wine. The kesara can be moved by just the mere loving glances of a damsel.

The harmonious existence of human life along with nature forms the basis of Indian religious thinking and culture. Thus, we are told of the trees on the banks of the river Nairanjara which extended their branches towards Gautama Buddha as he crossed the stream, thus allowing him to step easily on to the bank. An architrave from Sanchi shows the wisdom of animals who are worshipping the bodhi tree, the tree of wisdom. Interesting panels at Bharhut depict the traditions of tree worship whilst the Bodhigara itself is a survival of an earlier cult of tree worship.

Shiva, as the great teacher Dakshinamurti, is shown under a banyan, the most magnificent of trees surrounded
by the ancient seers who are his disciples. Vishnu, as teacher is Narayana with the badari tree spreading its shade over his head.

The Aranyak, one of the sacred Hindu writings, was to be studied in the fairest glade. The cool shade of the tree and sylvan surroundings were considered the perfect ambience for cultivating concentration, memory and philosophical speculation. Today when concern for the environment has become such a dominant issue it is worth reevaluating our traditional customs and beliefs. Selfishness, rapaciousness and increasing materialism are the root causes of environmental degradation. Perhaps this is why our forefathers in their wisdom had drawn up a series of maxims designed to protect nature.

For example, there was the belief, that cutting a tree laden with fruit would bring about incurable disease to the person who cut the tree. This belief was based on sound principles. In Indian folklore, a tree loaded with fruits must receive the same tender care as a pregnant woman. Destroying a tree in full bloom was a heinous crime and so came about the maxim that whosoever cut a tree in blossom would be plagued with bad health.

Caring for trees and plants reflected the tenderness of the human heart, the tolerance of mutual coexistence. The west today has suddenly woken up to the fact that music and even talking to plants is beneficial to their growth. This knowledge was, however, known to our forefathers and for centuries women have treated the trees tenderly, singing songs and venerating them.

Decorative and fragrant trees and blossom have played an important part in rituals and customs. These include the Cedar, Deodar, Chinar, Kadamb, Gulmohur, Champa, Rose, Lotus, Marigold and Jasmine. Mango leaves have been extensively used for auspicious occasions like marriage ceremonies and the naming of a new born baby. Garlands of Mango leaves are often tied to the entrance door of a house to ward off evil and bring good luck.
DESERIFICATION:
THREAT IN HIMALAYAS REAL

The lush green Himalayan region may be denuded of forests by 2031 AD and its white belt transformed into a desert unless the present rate of deforestation and the increase in the human and cattle population in the lower regions are not checked immediately, a study says, report UNI.

Dr. K.S. Valdiya, head of the department of Geology, of Kumaon University has in an article titled “The Crumbling Himalayas” pointed out that the signs of desertification were already apparent.

Lantana shrubs brought from Australia are rapidly replacing the indigenous flora in southern Kumaon, and plants such as cacti capable of surviving prolonged spells of drought, have taken hold of the naked slopes in many valleys such as the Kosi and Gaula in Kumaon.

The exponential rate of depletion of forests was 5.8 percent per annum. The cattle population was growing at the rate of 0.18 percent annually and the net rate of depletion of grass stock was five percent, says Mr. Valdiya in the article, published in the latest issue of “Science Age” brought out by the Nehru Centre here.

The progressive dwindling of the discharge of springs and seepages would eventually culminate in a drastic reduction in the discharge of the Himalayan rivers.

Already in the tributaries of major rivers, the difference in the volume of water flowing during dry and rainy seasons was as great as 1000 times. Too little water during the dry season and too much during the rains is a common feature of desert terrain.

Almost two-thirds of the lesser Himalayan area has been deprived of forest-cover on account of the pressure of population. As a result, the area of land under

This article appeared in the economic Times, April 7, 1986.
cultivation is increasing at the rate of 1.5 percent a year - all this at the cost of the forest, Mr. Valdiya says.

At higher altitudes, extensive damage to the ecosystem has resulted through the loss of protective vegetal cover and gully erosion of soft soil by the trampling hoofs of grazing cattle and the waterlogging of farmed debris deposits.

However, the biggest factor responsible for damaging the stability of the hillsides and promoting erosion was the making of "Unimaginatively planned and cruelly executed roads".

The construction of one km long road generates 40,000 to 80,000 cubic metres of debris. The total debris produced annually is estimated at more than 25 million cubic metres.

Road construction activities not only drastically increase the incidence of landslides but also stimulate erosion in the channels of rivers and streams.

Studies in the valleys of the Bhagirathi, the Alaknanda and the Sonkosi have shown that landslides triggered by road construction add to the bed load of the rivers. They also cause curents to deviate, leading to the undercutting of opposite banks and their eventual collapse, as can be seen along the pilgrim routes to Badrinath-Gangotri.

The river bed of the Tarai was rising at the rate of 15 to 30 centimeters a year. A similar situation existed northwest of Kotabagh in Nainital district, where the dabka river was transporting enormous quantities of eroded material every year.

Rivers have also contributed to soil erosion. It is estimated that the Karnali river in West Nepal alone carries to the plains 75 million cubic metres of sediments every year. The Sedi is eroding away at the rate of 1950 tonnes a sq km of its catchment area annually.

The Kosi in East Nepal is removing the soil of its catchment area at the rate of far more than 1 a year. All the rivers of Nepal together annually transport more than 240 million cubic metres of debris to the adjacent plains.

The situation is equally serious in Kumaon, Garhwal and Himachal Pradesh.
THE LAST CALL OF THE WILD

– Thor Heyerdahl

For generations man has struggled against the wilds to create a world where only he decides whether animals and plants survive or are wiped out. We accepted as self-evident that any changes in our environment brought about by science and technology must be an improvement over the primitive world of our ancestors. Until recently we were so sure of ourselves that we used the word "progress" to describe everything we did to separate ourselves from nature.

But now thinking people all over the world have begun to feel that we are going too far, and that we should try to save some of the world's original life before it is too late. The founding of the world wildlife fund was one result of this growing awareness. There are thousands of people like myself who support the fund because it has already done so much to preserve animal life and unspoiled areas.

Why should we take care of the natural environment? Isn't it sentimental to preserve wilderness in a world whose aims are civilization and technology? Isn't the future welfare state an urban society with no weeds or pests, with only selected plants in parks and gardens and with wild animals reassuringly displayed as caged curiosities? Are civilization and nature compatible as we approach the year 2000?

The answer is that the two cannot be separated. The same sciences which in their early stages led us away from nature are now showing us the miracle of creation in which man, himself an incomplete part of an indivisible whole, like the top shoot of a tree, is totally dependent on the rest down to the deepest roots.
Our whole ecosystem was so ingeniously built up that every little organism had its function to make the whole gigantic system work. The earth under our feet was once as desolate as a moon landscape. Only sterile gases surrounded our planet before life first arose in the ocean. Then the tiny, almost invisible, marine plankton began to produce oxygen by photosynthesis. The oxygen rose above the water and mixed with the sterile gases, gradually creating the atmosphere essential for all breathing creatures. Today even apparently superfluous creatures, such as ants, mice, worms and other inedible “pests” still produce things we need, directly or indirectly, or remove something that must be eliminated or transformed so that the conditions necessary for life can endure. And there is an unwritten natural law in the system whereby one species helps to keep another in check.

But man has broken the laws of this ecosystem, in spite of the fact that he is a part of it and depends on it. We have driven other species to the brink of extinction or wiped them out completely and have increased our numbers so much that two thousands million people now suffer from starvation or malnutrition. And a rapidly increasing pollution is following in the wake of our population explosion.

DESTROYING NATURE

Mankind is multiplying like yeast in wine. Yeast flourishes in grape juice, where it consumes glucose, produces alcohol, and reproduces so unrestrictedly that in the end the alcohol it secretes will kill all life in the wine, including the yeast itself. The by-products which four thousands million people today release into the environment— insecticide, herbicide, cleaning fluid, hair spray, engine exhaust, factory smoke, liquid industrial waste, etc. - spread everywhere and threaten remaining animal life far more than hunting and fishing. DDT has long been found in the meat of Antarctic penguins and in the brains of Arctic polar bears.
Fish eating whales, which could be protected by a catch quota system like Norway's, may be threatened by poisoning of the plankton. Millions poisoned planktonic organisms are eaten by the fish whales consume. They also pass up the food chain in increasing concentrations to man, who sits on top of the ecosystem's pyramid, and who must pay the penalty for the damage he has done to the foundation.

In all these matters the world wildlife fund encourages scientific studies, followed by intervention of the authorities where possible. The remedial tasks we face are multifarious and there will be even more as time goes on. To begin with we must create protected areas, natural reserves where the local ecosystem can be built up again and then maintain itself. But it is just as important to make and enforce laws. In areas outside nature reserves where the natural balance is already disturbed, there we must complete the system ourselves, for instance, by artificial increase of stocks by improving the conditions for survival or by taking over the control which predators once exerted.

Our planet is small. A spaceship can circle it in an hour and in a few weeks one can drift across the oceans on a bundle of rushes. When we did this on a ill, we took up clots of oil from the flushing of tankers, not once but on 43 of the 57 days of our voyage from Africa to America. The oceans are deep, but life is concentrated near the surface and the poisons pouring into the sea from sewers and rivers all over the world are found mostly in the surface layers.

Civilization is advancing in all parts of the world and the process cannot be stopped. But today more than ever before we must distinguish between genuine progress and camouflaged deterioration. If civilization is to survive, and with it modern man, civilization and nature must go hand in hand.

HUMANITY POSES THREAT TO EARTH

Human activities are increasingly sapping the earth’s resources, posing a direct threat to the planet, a U.S. environmental group warned in a new report released here today.

“Since 1950, world population has doubled, food production has nearly tripled, and fossil fuel use has more than quadrupled”, said Mr. Lester Brown, president of the Washington based “Worldwatch Institute” and director of the new study.

The impact of this growth in population and consumption has been severe, particularly upon the atmosphere, tropical rainforests and the earth’s topsoils, Mr. Brown said.

These and other changes in the global environment “are taking society by surprise,” said Mr. Brown, and will take a devastating and costly toll upon future generations if they continue unchecked.

The Worldwatch study, called “the state of the world, 1987” is the fourth annual report released by the Institute on the world’s environment.

While scientists have been predicting profound ecological change as a result of human pressures for many years, last year for the first time they actually confirmed some of these changes taking place, said Mr. Ted Wolff, a Worldwatch associate. “We’re beginning to see the consequences of problems that have been hypothetical for some time,” Mr. Wolff said.

In particular, the Worldwatch report warns that destruction of the ozone layer of the earth’s atmosphere, caused by uncontrolled emissions of carbon dioxide and

This news item date-lined Washington, appeared in the Times of India, February 15, 1987. Its contents are relevant today also.
other gases, is increasing ultra-violet radiation levels and causing a long-term increase in the earth's average temperature.

The cost of adjusting agricultural systems to this so-called "greenhouse effect" may run into hundreds of billions of dollars in investments in new irrigation and drainage systems, Mr. Brown added. Equally grave a threat is posed by the destruction of innumerable species due to forest and other habitat damage, the Worldwatch warned.

The group's report cites an October 1986 international conference of biologists which found that "continued degradation of natural habitats could bring a wave of extinction comparable to that which wiped out the dinosaurs and half of all other extant species some 65 million years ago."

Widespread "deforestation" has already proven costly for Third World populations that rely on firewood for fuel, Mr. Brown said. And widespread erosion of the earth's topsoil is also costing billions of dollars in greatly reduced crop yields throughout the Third World, according to the report.

But at present, said Mr. Wolff: "Very few structures exist to address global environment problems" effectively.

"What will be apparent with some of the problems is that it will require a revitalization of the United Nations agencies" which deal with such issues, like the U.N. Environmental Programme, Mr. Wolff said. At the same time "A handful of countries hold the key to some of the major adjustments facing humanity," Mr. Brown said.

Mr. Brown pointed in particular to the U.S., the Soviet Union and China, which together account for half of global emissions of carbon dioxide from fossil fuels.

"A vigorous effort to curb fossil fuel use by these three countries could go a long way toward slowing the global Carbon Dioxide buildup and the projected change in climate," he said.
I think practically all environmental degradation in the East is due to consumption in the West. Consumption has many facets. First, the excessive and wasteful use of resources by the West—resources they do not have and consequently extract forcibly, using the new colonial weapons of the International Monetary Fund, the World Bank and aid to tie us up permanently in debt, and thereby make us more amenable to exporting our primary and irreplaceable assets.

Second, in order to keep their own industries going, inefficient, outdated and harmful machinery and chemicals are forcibly dumped on the East.

Most important, however, is the constant brainwashing to the effect that ideal living, prosperity, means the Western way of life—more of everything, bigger, faster, more waste-generating. This generates imitation and raises consumption levels of people and countries who cannot afford it. It also destroys a biomass-based economy without replacing it with anything better.

The generation and distribution of electricity is one example. India has bought the Western models of huge thermal plants and dams (and now nuclear plants) outright—and 90 percent of the machinery in both comes from the West itself. These thermal plants work at less than 50 percent of their capacity and the centralized distribution system—poles and wires—cannot stand the weather or the inefficient maintenance over thousands of miles.

For instance, 1600 dams provide only 2.5 percent of the country's power, and the damage they cause by flooding the areas around them in the monsoon, runs into thou-
 sands of crores of rupees.

They do not provide irrigation as only a few have canals and even those do not get the water released into them. They cause malaria (70 percent of our health budget goes into malaria combating pesticides - again sold to us by the West).

Less than ten percent of our villages are electrified because the system does not work. But that does not prevent the West from selling, or giving us 'aid', new power plants that will naturally need new machinery after a few years, which can then be sold at double the normal price. The World Bank announced a $1.1 billion environment fund recently with low rates of interest for environmentally sound projects. Top of the list was retrofitting thermal plants, or, in other words, money to buy more machinery.

Seventy percent of our water is polluted. A large part of that is due to pesticides that have been sold to us by countries who have banned their use for themselves.

Look at the diversion of land for export crops to help pay our international debt - a debt incurred by oil and the above-mentioned machinery. In a country where the staples cannot be given to our own people, the best land goes into tea, coffee, sugarcane, tobacco and spices. All of which use a heavy concentrate of pesticides and enormous amounts of water and all of which are sold on the international market at prices fixed by the West that are lower today than they were in 1980!

The most amazing land use is for fodder and flowers. Every seventh kilogram of meat eaten in Europe is made from fodder grown in the East. So, our people who do not even have the staple foods, grow fodder for animals so that people in the West can eat meat, or grow vast quantities of hybridized roses and lilies to adorn Western homes. And what happens to the money we earn? It goes to pay the debt we owe to the West for buying outdated and leftover machinery.

Consumption in the West needs to have sanctions put
on it: it must not only be cut down, it must be rationalized. The eastern countries are told their poverty and environmental degradation were due to their population. Pollution is not caused by the number of people living but what they do while living. One child in the West consumes as much as 125 eastern children do. Each Western citizen consumes 300 kg of paper as compared to five kg in the East. Carbon dioxide comes from the developed market economies due to the burning of fuels.

Rationalization must take place. Is it essential to truck fruits from Italy to Sweden every day? Is it necessary to have a second car? Is it necessary to use rayon or disposable diapers? Is it necessary to use a non-renewable resource like oil in such wasteful ways that the price goes up and the Third World’s burden of debt increases even further, limiting their development options?

Is it necessary to use a large part of our metals in making arms and then forcing Eastern countries to buy them? Is it necessary to produce such hazardous chemicals that Western governments refuse to accept them in their dumping sites, and instead, fly this poison by night ships under the Panamanian Flag to dump it secretly in Third World countries?

Is it necessary to force India or Thailand to buy foreign cigarette brands? Is it necessary to make Brazil cut down its forests to ranch cattle so that the USA can have cheap beef? Was it necessary to sell us CFC (Chloro-Fluoro Carbons) technology ten years after the West had discovered that it was destroying the ozone layer?

The greatest harm done to the environment by the West is through the spread of an ideology on growth which has taken firm roots among our Third World elite. The axioms of this ideology are simple: more growth is good; less growth is worrying; negative growth is disastrous. The relationship between growth and welfare is ignored. Are the goods produced valuable? Are they beneficial? Have they been distributed to all?

How can we tackle the consumption problem? West-
ern governments should have to regulate what they give or sell to the East. Individuals in the West and companies should cut down on wasteful buying and production of items that are not necessary (Fabric Softeners? What a scam!)

At the same time, politicians in the East - for they, more than their counterparts in the West, control the patterns of development in their countries - should be held accountable for all the wasteful and suspicious buying they do from the West (Wasteland helicopters, for one)

Multinational companies who open factories in the East should be monitored strictly for their safety procedures. Hundreds of units in India spew poison into the waters daily. Of course, Union Carbide is a case in point, making a chemical in India that they were not allowed to make in their own country and then making it in the most careless way possible.

The UNEP (United Nations Environment Programme) should be strengthened. At the moment, it exists from conference to conference and does practically no concrete work. But it has the power of the UN. It should be given sanction - making powers. If UN members can impose sanctions on Iraq and South Africa, environmental pollution and wasteful consumption are no less an act of war and a violation of the human rights of the East.

The UNEP could act as a monitor for restraining environmentally inefficient machinery and harmful chemicals from being passed on forcibly to the East. Where it is established that a developing country has been coerced into consumption, the debt should be written off. It could be the channel to pass on the latest technologies that are suitable for Eastern land, water and weather conditions. It could also enforce the 'polluter pays' principle, which would in time have its effect on western governments and companies. It could come up with solutions that sustain life, not destroy it.

The East is ready to listen. Is the West?
CATASTROPHES: ROUTINE IN EARTH HISTORY

Sixty-five million years ago, the earth was blighted by an awesome catastrophe which precipitated the sudden extinction of the dinosaurs, and more than half the plants and animals existing at the time. However, this was not the only momentous event to shape our planet's evolution, and worldwide researchers from a multitude of different scientific disciplines, ranging from paleontology to astrophysics, have been uncovering further evidence of episodes of mass extinction throughout the earth's history.

These new findings, now being debated at a conference in Gottingen, Germany, have been collated as part of the recently concluded international research project entitled "Global Biological Events in Earth History" by the International Paleontological Society (IPS). The project was launched to discover reasons for these mass extinctions, or bio-events, as they are called by scientists.

DINOSAURS' EXTINCTION:

The most recently publicized event coincided with the total extinction of the dinosaurs, which occurred during the transition between the Mesozoic and the early Cenozoic eras, at the boundary to the Tertiary period.

For several years scientists had been mystified at the inability of strong and highly developed animals to survive during this period. Today it is generally accepted that the dinosaur's demise originated in space, in the form of a meteorite, which collided with the earth some 65 million years ago, unleashing an explosive force several times more powerful than the world's combined nuclear arsenal in the aftermath of the impact, the atmosphere became
warmer and choked with dust, pouring poisonous rains upon earth and leading finally to a "nuclear winter."

For Professor Otto Heinrich Walliser, from the Institute and Museum for Geology and Paleontology at the University of Gottingen, who directed and initiated the international research project, this now generally proven theory is one of their most significant findings and is based in no small measure on the work of US scientists - the Berkeley geologist Walter Alvarez and the nuclear chemist Frank Asaro - who have spent several years carefully collating evidence to substantiate the controversial meteorite theory.

This development encouraged several scientists to conclude that extra-terrestrial bodies may have been responsible for other events which have influenced the earth’s evolution. However, these claims still have yet to be proven, given the sufficient number of terrestrial phenomena to explain such events, e.g. the Ice Age, global warming and changing patterns in the oceanic currents.

Generally mass extinction was caused by a combination of existing factors, which had almost imperceptibly been changing the ecosystem before suddenly culminating in a catastrophe. One such example is the Kellwasser event, named after small valley in the Harz mountains of Germany.

**KELLWASSER EVENT:**

Heralded by temperature fluctuations and glaciation, the Kellwasser event occurred some 365 million years ago when the drift of the lithospheric plates caused the continents and ocean links to shift, changing the chemical composition and the current patterns of the world’s ocean. Cold, oxygen-rich layers of ocean forced their way up to replace the warmer, life sustaining surface waters. The resulting deterioration in habitat spelled extinction for more than half the planet’s animal groups and ecosystems.

To confirm these theories, Dr. Eberhard Schindler at
the University of Gottingen conducted geochemical analysis of the rock samples from the Kellwasser sediment, by examining each stratum of the rock for signs of life. He was able to retrace the course of events and compile a list of extinct and surviving species. Over half the life forms, mainly microorganisms existing at the time, could no longer be found at the upper, dark boundary layer of the younger, lighter-coloured lime-stone, e.g. the vertical reefs mostly made of coral, whose demise resulted in the loss of a highly developed biotope.

**BIOLOGICAL DEVELOPMENT:**

The results of the research seem to indicate that these “episodes of mass extinction are more common than previously assumed,” explained Professor Walliser. As such, it is wrong to interpret such periodic extinction as total catastrophes since they are followed by periods of accelerated biological development, in which totally new life forms evolve or existing ones make rapid advances. However, it was not always the fittest who survived and Mr. Alvarez believes that “luck also plays a role”. As a highly specialized life form, particularly vulnerable to changes in habitats, fortune obviously smiled on mammals, 65 million years ago, for only after the extinction of the predominant dinosaurs, were they able to flourish and influence life on the planet.

**RECOVERY PHASE:**

A further theory of Professor Walliser’s is predicated on the premise that if these phases have proven the rule rather than the exception throughout evolution, then “a substantial part of this time has been used in recovering from such episodes.” And this recovery phase is now to be examined in a five-year International follow-up project entitled Biotic Recovery from Mass Extinction Events.
THE ECOLOGICAL IMPERATIVES

- V. Eshwar Anand

The twentieth anniversary of world earth day will be observed throughout the world on April 22. The significance of this year's event is that the day would also mark the beginning of the “Decade for Environment.”

As in the past, seminars, conferences and cultural programme will be organized in various parts of the world to help promote global solidarity on the issue of protection of the environment. This year, India's nationwide programme is being organized at Pune where many environmental groups will hold the Earth Day Eco Fair.

A question that arises in this context is whether all this would really help create the necessary awareness among the people to protect the environment. For after three billion years of pre-biological evolution and 15,000 years of human history, we have come to the crossroads on the planet earth. While science and technology have certainly transformed the lives of many people and have brought blessings to a large section of the world, they have also deeply eaten into the vitals of the environment, caused disharmony to the ecological system and disturbed the ecological balance.

Besieged by the pressures of relentlessly increasing demands, India's ecosystem is suffering unprecedented onslaughts. Despite afforestation and other measures, the already scant wood cover is reportedly shrinking at the rate of over a million hectares a year. The Himalayas are said to be gradually slipping into the bay of Bengal with an increasingly polluted Ganga carrying down 1.5 billions tons of soil annually. The Western Ghats are beset with problems similar to those which have brought the sub-
Himalayan region to the verge of ecological collapse.

Unfortunately, forests as far afield as Andhra Pradesh, Karnataka and Orissa are vanishing to meet the insatiable fuelwood needs of Bombay, Calcutta and Delhi. Irresponsible mining and quarrying methods have irreparably ravaged vast tracts of once fertile land.

Kerala is a typical example that illustrates, more sharply than most other states, how disastrous can the ecological consequences be because of a combination of policies skewed by misperception of development imperatives and resource use options. Owing to the government raised plantations, illegal conversion into farmlands and submersion by irrigation and power projects, the nine lakh hectares of forest, which the state had when it came into being in 1956, today stands abridged by more than half. Large tracts of forests lost on these counts were of the most deciduous, semi-evergreen and evergreen categories which have an important place in the ecosystem.

True, plantations are an essential part of any forest conservation endeavor as they serve the domestic or industrial needs and thus help reduce the pressure on the natural forests. But if they are to be promoted at the cost of the tropical rain-forests or raised by mono-cultural practices (with all their questionable features) they will certainly become counter-productive. According to an estimate of the National remote sensing agency, Kerala has lost 14.34 percent of its evergreen forests.

Meanwhile, public resentment is brewing against the various projects launched in the country. For instance, the Tehri Dam, the Narmada Valley Development Project, which includes Gujarat’s Sardar Sarovar Project and the Narmada Sagar Project in Madhya Pradesh, were all designed to boost power output but which are also expected to take a heavy toll in terms of eco-environmental damage.

Consider the Tehri Dam Project. Whatever may be the
merits of the project and even if the problem of displacement and even submergence of over 4.750 acres of fertile land are overcome, the risks of dam failure due to earthquake, reservoir-induced seismicity, destructive flash floods and possibility of very high siltation rate and consequent low life-span of the reservoir, would still remain.

The same is the case with the Kaiga nuclear project in Karnataka. It is feared that the project will bring incalculable damage to the rich rain forests in the North Kanara district, introduce harmful changes in upstream areas and adversely affect the fisheries and quality of water. It is indeed an irony that even though international financial institutions like the World Bank have recently decided not to fund development projects involving the production and disposal of hazardous or toxic wastes so as to prevent the world from becoming a "wasteland", the Government of India is going ahead with the Kaiga and Narora nuclear projects.

Despite the successes of the environment movements, its bane in India is that it is by and large location specific. In the absence of a broad-based national movement, as in the west, ecologists are not able to exert adequate pressure on the government to undo the wrong and promote the cause of conservation. Various agencies do organize seminars from time to time. But in reality, they mostly deal with generalities and tend to confer a hot house atmosphere on environmentalism which is seen more as an exclusive elitist preserve.

The need of the hour is a structural mechanism at the village and block levels to promote and ensure the sustainable management of natural resources by local residents. For this the village panchayats should be trained in developmental ecology and among them one should be a woman, since traditionally women have considerable conservation skills.

At the block levels there should be block land-use
councils with representatives from farm families, landless labour, technical experts and representatives of government departments. They should be chaired by a working farmer or a woman and have a qualified person as a secretary.

Worthy of consideration in this context is Dr. M.S. Swaminathan's call for evolving a programme for employment guarantee for ecological security on the lines of the Employment Guarantee Scheme of Maharashtra but also including in its ambit, skilled workers. A properly structured scheme would help undertake long-term ecological rehabilitation programmes without interruption. Funds for these could come not only by the methods adopted by Maharashtra but also from the agencies, which polluted or degraded land. Young men and women in villages should be trained for providing the necessary ethnical support for such a programme.

Today, the people seem to have no choice at all. Mankind has finally been forced to remind itself that it cannot destroy nature without ultimately destroying itself.

Soil is the most important among things that sustain human life. It is from the soil that we get things like food and clothing that sustain our life; but while doing so, we should ensure that we maintain the soil in a healthy state so that it continues to sustain our life for the times to come. We cannot afford to neglect this. If we do neglect this, we cannot escape punishment from mother-nature. The history of the world is full of the records of terrible famines, during which men died like insects.
DO TREES CAUSE RAIN?

- Lavkumar Khacher

To what extent is tree-cover linked with rain-fall? Meteorological scientists categorically state that trees cannot affect rain-fall unless the tree cover is over a very extensive area.

Viewing the entire question from a planetary scale, they point out that much of the rain results from huge air mass movements involving oceanic air, continental air and polar air to create atmospheric turbulence. Heating of a central core as over an oceanic tropical island will generate violent cyclonic storms; mountain ranges deflect air currents both upwards and along their flanks to produce significant changes in air temperature and resultant precipitation. Trees are too small a factor to produce rain in quantity, on the scale these atmospheric disturbances generate.

At the macro level, trees are inconsequential but they do influence and modify the climate. All this suggests neglect is not to afforestation, the point is that we must not allow ourselves to be panicked into acceptance of poor quality plantations at the expense of sound forestry practices. The answer lies somewhere in between the two extremes.

Forests are the result of thousands of years of adaptation to climate and other physical influences.
operating in a particular region. A forest is the product of
the climatic system, but it in turn exerts subtle but very
perceptible influences on the climate. Howsoever small
these influences may be, their cumulative effect over ages
can be staggering. This is what ecology is all about.

When the monsoon front is progressing up the Ganga
plain in serried ranks of nimbus from the Bay of Bengal,
the presence of trees, or their absence, on the plains below
have no significance. Equally true, a wide depression,
which forms over Orissa and moves westward across
Madhya Pradesh, needs no forests to cause widespread
rain. A violent cyclone slamming onto the Tamil Nadu
Coast, or sweeping up from the Arabian Sea across Gujarat
produces violent rain and the presence or absence of trees
are inconsequential.

Cutting down all forests from the Kerala hills will not
reduce the heavy relief rainfall produced on the Western
Ghats since the massive clouds piling up against the
mountains are the result of moisture-laden sea winds
being forced to rise by the physical barriers. Trees or not, Keralawill get heavy rain, as will Bengal and Assam.

No amount of tree planting in Rajasthan will make it
a heavy rainfall area; massive afforestation programmes
will not alter the fact that Ladakh, like adjacent Tibet lies
in the rainshadows of the Himalayas and is an arid zone.
 Pune will continue to have moderate monsoon compared
to Bombay.

The basic patterns have been established and can
change only if there are shifts on a planetary scale which,
let me hasten to add, would be cataclysmic. But, where
precipitation is caused at the contact level of the
atmosphere with the ground – and a considerable
amount does occur at this level – plants play a very
significant role.

There should be no doubt about the role plants play
in increasing precipitation, just as there is none about the
importance of plants in checking surface water run-off,
thereby encouraging greater percolation into the soil. Vegetation considerably reduces soil erosion - streams and rivers tend to flow clear long after the rains.

During the height of the southwest monsoon, when the winds from the sea start blowing continuously, they are surface winds and a considerable amount of low clouds pass over, depositing an almost continual rain from light drizzle to fairly heavy showers. Whenever there have been heavier falls during premonsoon thunder-storms, the ground is already wet and cool, and those localities invariably experience wetter conditions on account of these persistent drizzles. Just as cold, wet ground can increase condensation from the air, a cluster of trees induces more rain to be deposited from the passing low clouds; in addition, a surprising quantity of moisture condenses onto the leaves. Watching low clouds passing over open grass-covered hills, one cannot fail to notice the heavier drizzles in dramatic contrast to nearby, over-grazed pastures over which the same clouds pass but without releasing much rain. Trees effectively impede the flow of surface wind, creating small turbulences, which noticeably produce heavier clouds. Over several days, the additional rain is certainly not negligible.

Watching the progression of warm moisture - laden air up a mountain slope too can be educative. Forests on a slope slow the clouds rising up the mountain's flanks, and clouds hugging forested slopes is a familiar sight. Such clouds deposit a surprisingly large quantity of rain, as I know by personal experience. In the Darjeeling area, we have almost, laboratory situations to observe the effect on rising mists up bare slopes next to those covered by forest. On the same slope water will be briskly pattering on leaves and racing down roadside gutters, while across a fence, though the mist would be present little water is deposited.

It does not need much intelligence to agree that forest cover is so important on mountain slopes that a national consensus is needed for a strict policy of ensuring that
every mountain and hill forest is completely clothed in vegetation - if not dense forests, well tended grasslands. The plains dwellers should grudgingly agree to compensate the people living in the hills in a manner that the latter are induced to conserve their forests.

If indeed, the people of this subcontinent are to become integrated, the wealthy farmers and industrialists of Kheda in Gujarat must realize that the welfare of the adivasis of the nearby panchmahals can guarantee their own prosperity. Similarly, the wealthy and assertive Punjabi and Haryanavi farmers must appreciate that money must be provided to improve the lot of the people of Himachal Pradesh and Garhwal, if they are to protect mountain forests assiduously. Developing such broader understanding alone can make the general populace of Tamilnadu start taking greater interest in their Government's policies towards the Nilgiri and Palni hills from where their life giving water originates.

Apart from providing an assured flow of water, a concern for our forests will bring us together as a nation. Forests must become India's magnificent obsession.

(Courtesy: CEE-NFS)

---

- Forests trap rain water and release it gradually into the rivers; this prevents floods. The disappearance of forests can put great strain on the water cycle.
- Ice over the mountains of the Larsen Bay in Antarctica, covering 3250 square kilometers, has already melted as a result of rising temperatures.
- According to an estimate of the United Nations Food and Agriculture Organisation (UNFAO), in the developed world about 200 million hectares of forests have perished between 1980-1995.
THE FROG'S REVENGE

An old saying in India has it that if you play around with nature, nature will play around with you. For long, this was dismissed as one of the myriad folk sayings to which not much attention need be paid. That of course, was in the days when there were not too many shortages and too much pollution and the resultant calamities had not become a cause for disquiet.

But science has now discovered that nature imposes an inexorable balance and that disturbing such regimen is fraught with peril. An example has to do with China where there was a government-sponsored programme to rid the country of sparrows which were considered pests that destroyed food grain crops. Hundreds of thousands of sparrows were destroyed by enthusiastic young volunteers who were led to believe that they were doing a commendable job for their motherland.

The results were disastrous. Insects which were the staple diet of the sparrows, multiplied manifold, playing havoc with crops.

A similar situation has been developing in India with the great emphasis on the export of frog legs, considered an exotic delicacy in the western countries. There are two aspects to the problem: humanitarian and ecological. Thousands of Indian bullfrogs are caught by lantern light at night. Their rear legs are sliced off by crude blades and they are left to suffer agony before they die. For the land of the Buddha and Mahavira that is nothing to be proud of.

The ecological aspect is even more frightening. Frogs eat up a lot of insects that are harmful to crops. With the decimation of the frog population, there is a natural
increase in the number of pests, for which pesticides have
to be imported in greater quantity with scarce foreign
exchange.

Pesticides in fields destroy all kinds of insects, some
of which are favourable to man. In addition, they also
destroy tadpoles, thus further reducing the availability of
full-grown frogs.

The chain goes on even further. Snakes survive on
frogs, and when frogs are threatened, snakes are also
threatened. When the number of snakes dwindle, rodents
thrive. Today, in the areas where frogs are caught for
export, rats eat up increasing percentages of grain
production.

So far, there has been a deliberate neglect of the
dangers of overkilling of frogs because of the export angle.
Marine product exporters have seen to it that no move is
made against the killing of frogs. But the export of frog legs
fetches India a meagre sum of Rs. 8 crore a year, which is
chicken feed for a country of India's magnitude. In any case,
at the rate the frog population is being decimated, the
export can only decline in the days to come.

There is another danger to agriculture itself with the
reduction in the number of frogs. When more pesticides
have to be used, the chemicals therein add to the toxicity
of the land, adding a lot of poisons to the food chain. The
lowly frog might yet have its revenge.

Ozone layer is the concentration of ozone (O₃) gas particles
in the atmosphere. This layer lies about 10-50 kilometers
above the earth's surface in the stratosphere. Its maximum
concentration is at about 25 kms above sea level. Scientists
have recently measured the thickness of this layer above the
South Pole and found a large hole in it.
MAKE YOUR LIFE BETTER
- K.P. Bhagtiar

All over the world governments are trying their utmost to bring the marvels of science and technology into the lives of the people. The life of the common man is not only becoming easy but also comfortable and full of entertainment. But while many welcome improvements have come in the past 50 years, worries have also increased and today, even small children live in fear of global annihilation. Social cohesion has been greatly weakened and many people conclude that material progress has come at the cost of character and virtue.

There is a Crisis of Values:
Sexual and social discrimination persist.
The cohesion and strength of the family is waning.
Respect for parents, teachers, civil and legal authorities is at low ebb.
Families, schools, neighbourhoods and markets are beset with violence and vandalism.
Religion and love for one's native land and language, which should enrich life, are being turned into negative factors and put to destructive purposes.
Youth complete their studies without acquiring useful skills or a sense of direction and in consequence they become vulnerable to the temptation of many social evils.
We are thoughtlessly destroying animal and plant life, polluting the environment - thus digging our own grave.

Over the past 50 years we have improved transportation, communication, medical treatment, agricultural productivity and a host of other things. Can we not improve ourselves? We had better tried, and quickly. It's time to work on the human personality and aim for excellence.

This article appeared in the Tribune, February 2, 1987.
Personal ity must be taken to mean the physical, intellectual, emotional, psychological and spiritual aspects of the individual. These aspects are directly related to the five basic human values: right conduct, truth, peace, love and non-violence. Intellect gives birth to thought and from thought we come to truth. Truth put into action is right conduct and right conduct is the key to emotional stability or peace, from emotional stability or peace proceeds love and compassion, and this makes possible non-violence.

In love, we discover the power of the soul; it is a kind of energy which we are emitting and receiving all the time. This soul - force is the mightiest force; a fact fully realized by the great spiritual teachers such as Guru Nanak Dev, Buddha, Jesus Christ, Mohammed, Ramakrishna Paramhansa, Vivekananda, Gandhi and many others - indeed by all those great men and women who won the hearts of the people with love.

Jesus did not carry a fat wallet, Guru Nanak Dev did not wear beautiful clothes but still the people adored them. Why? Because they were enriched with the wealth and beauty of love and they lavished it on all who came to them. Love springs from truth, it is power of right conduct and results in peace. Love is a power and children, beasts and even plants respond to the slightest dose of it.

It is a power with countless practical uses; it overcomes fear; creates and sharpens understanding; makes life at once simple, joyous and meaningful; teaches giving and forgiving to replace getting and forgetting; inspires respect for parents which goes on to include family, neighbours, and finally mankind.

Getting back to the imperative need to improve the human personality, it goes without saying that maximum effort must be made to see that children are started right.

In teaching our children we are gurus with the small "g" but there is also Guru, capital "G", the lamp of love which can rekindle thousands of lamps. If mankind is not to grow worse even as the material world grows better, we will have to pay close attention to the human lamp and its light.
A WALK IN THE WOODS

-Sunderlal Bahuguna

Himalaya has been my field of activity since last 46 years. I had been looking for an opportunity to visit the places we saw during the Kashmir-Kohima foot march which concluded on Feb. 2 1983. After my recent tours of Bodhghat, Bastar and Gandmardan, Orissa, where the natural forests are being sacrificed for development, I started on a three week tour from Pathankot to Pithoragarh, covering Jammu & Kashmir, Himachal Pradesh and the hill districts of UP.

Though Pathankot is in Punjab, still the prosperity of this foothill town depends upon the hills. It is the centre of timber trade, as well as the victim of the spreading desert on account of deforestation in the hills. The main objective of my tour was to meet people, listen to their views on environment and share with them my experiences of the Chipko movement. I met people from all walks of life - the toiling masses, students and teachers, administrators and politicians, scientists and laymen. My observations are based on whatever I listened with my ears and saw with my eyes during this journey of 2,500 kms.

During our foot march through Chenab valley in Doda district of J & K, we had seen large number of dead and snow - damaged trees. The whole valley presented the ghastly scenes of being a graveyard of trees. As old trees have exhausted now, green trees even on steep slopes have been marked for felling by the Forest Corporation, which is virtually operating through an ex-contractor, fuctioning as a labour contractor.

The revenue from the State forests has gone up from Rs. 40 lakh to 40 crore - hundred times - within the last
forty years. The department has plans to extract 15 million ft. of timber from the forests. In order to achieve this target the enthusiastic marketing officers did not even spare the trees over steep slopes, which were protecting the villagers from landslides. O.P. Thakur, convenor of the Chipko Information Centre in Doda, cited the example of his own village in Bhadrwah Tehsil. We could see heaps of sleepers ready to be transported on roadside from Doda Pul to Bhadrwah.

Though there has been some restraint on green fellings in H.P. but the demand for apple packing cases is so high that everywhere on roadside logs could be seen. The number of dead and dying trees must be very high as heaps of sleepers were seen at Bhati in Kangra district and different collection centres of forest department. In some areas, forest corporation is unable to remove dead trees whereas green felling for apple eases continues. In Trimuthi block of Pandersa Range of Mandi division, about 1,700 green trees have been marked on very steep slopes.

In U.P. while the State government swears by conservation and the officers over and the over again declare that the forests are not being managed to earn revenue, heaps of sleepers near Thadujar and other places on the banks of Tons tell the sad tale of organized plunder of forests by the State Forest Corporation and its contractors. I had seen similar heaps during my trip in December Jamuna and Tons valleys, where a century ago existed masses of pine trees, are now grave yards. Plunder of forests is a common feature in the catchments of Bhagirathi, Alaknanda, Pindar, Ramganga and Kosi. We saw Nepali sawyers, who had completed the working of chir-forests, were going towards bamsu deodar forest in Tons. Similarly in Bachhuawan, the last village of Chamoli, there were huge moutains of Chirpine logs ready to be transported to the paper mills. The roadside between Berinag and Thal in Pithoragarh and near Dwarhat, presented a similar scene.

The villagers everywhere, complained that they were
denied free timber or timber on concessional rate - the concessions they have been receiving for the last 100 years - to build or repair their houses. The conservator of forests, Tehri circle of UP, confirmed that the quantum of free grant timber was reduced by 60 percent. Bhag Singh Makhloga, pramukh of the block development committee, said that “28 out of 65 gram sabhas of his block never got free timber and the remaining 37 did not get any for the last three years.” The trees are felled, but instead of going to the needy these go to timber smugglers, who have a flourishing business.

The Prime Minister's remark that the fence was eating up the crop was being repeated by people everywhere in the context of illicit felling of trees. Out of four cases registered with the police for illicit tree felling two - Ghonti, in Tehri Garhwal and Berinag in Pithorgarh - were against the State's own Forest Corporation. The other two cases were in Porola in Uttarkashi and Gairsain in Chamoli. The police took cognizance only when the District Magistrates were approached. The forest officers objected to the entry of revenue police into the forest to detect the theft under the plea that they have enough powers to impose the fine. This is a cheap method to conceal the crime and share the booty. The market value of a truck-load of sleepers at Raiwala of Dehradun is Rs. 40,000, whereas the maximum fine will not go beyond Rs. 25,000. In all the four cases, however, no forest officer detected the theft. In one case when village women complained about illicit felling of trees by the forest corporation workers, the Range Officer visited the village accompanied by armed guards to terrorize the women. In Tona Division, where illicit felling of hornbeam (Chamkilarik), a costly industrial wood, by the grant of which Forest Ministers of Himalayan States and UP used to favour their favourites, was reported, but no action was taken.

From Jammu to Pithoragarh, the number of dead and dying chir-pines is increasing. In Jammu, ten percent trees
are dying every year. Forest Research Institute, Dehradun, has declared the prevalent method of resin tapping as unscientific and recommended the new-rill method. The directive of Centre has fallen on the greedy States, who are bent upon killing the goose, which lays the golden eggs. Mr. Rego, Inspector-General of Forests, had assured me that as per instructions from the Centre, the old method will be abandoned. But what I saw in Jammu and H.P. was the same chisel and a different one - called Joshi or Siva chisel - in UP (not rill method), I was stunned.

One of the objectives of my tour was to meet the hill women, who are the worst victims of ecological crisis in the Himalayas. They have to walk a long distance to collect firewood and fodder. The crisis is deepening as the shrinking forests are being burdened with the increasing firewood demand for the expanding cities. The Government fuel depot in Srinagar sells firewood at the rate of Rs. 4.25 a maund - ladies in the neighbouring villages sweep dried poplar leaves to be burnt in the Kangris. Two thousand truck-loads of charcoal were sent from the Shivalik foothills of Jammu to the valley. A number of charcoal kilns may be seen on both sides of the road between Kathua and Lakhapur. Camels, trucks and even porters were busy in transporting wood to feed them.

In Himachal Pradesh, chir felling in Shivalik forests near Kotla and the Oak forests near Bhuntar for charcoal was in progress. Everywhere from Jammu to Tanakpur, we could see bundles of firewood on roadside to be taken to the bazaars.

The firewood requirement of Doda, a district headquarter town of J & K, is met by wood extracted from already disappearing forests as far as 10 to 12 kms. From all sides of this town, donkeys and mules can be seen with fuel-wood loads coming to the town. But this is not enough. Practically every family has an illegal electric connection from the street pole for heaters. When I asked why so? The answer was, “It is cheaper. You have to pay only Rs. 10 a
month to the Electricity Board lineman."

In spite of the Forest Department's policy of commercial exploitation of Himalayan forests and monoculture, the forest officers everywhere have been kind enough to show me their plantation, specially in degraded areas near the habitats. In Jammu and Kashmir, a Rs. 300 million World Bank Social Forestry Project is encouraging poplars in hills and eucalyptus in the plains. The slogan is "Plant trees: Grow money." During previous years, 80 percent plantations were of these trees. Now there has been some change, but the percentage of survival is too low. In Birchala near Doda, where 37,500 saplings were planted, only 2 to 3 percent have survived.

The choice of poplars and eucalyptus is mainly for their capacity to survive, but the greed to earn more has induced farmers to plant these in irrigated fields. I have seen one such plantation in a wheat field in Hamirpur—a border village near Chamb-Joriyana. Even in Army camps, where these trees obstruct the signals, these have been planted. All road side plantations in H.P. are of poplar. I was told it was for beautification. The higher hills grow birch cheery, the best ornamental tree, flowering during winter and having beautiful leaves during the summer.

Wherefrom does the inspiration for fast growing commercial trees come? The riddle was solved, when I quietly listened to the agent of a company, who had come to see the director of Forests in Jammu. The company was raising 80 million saplings for the Madhya Pradesh Government the cost of per plant will come to Rs. 2.07 as compared to Rs. 5.62—the Government cost. The idea of this new venture came from USAID director and the technical support from WIMCO. WIMCO and other multinationals are interested in growing feed for their machines; not food, fodder or fuel? The fast-growing commercial species, besides consuming too much of soil fertility and moisture will reduce free, independent and self-
sufficient highlanders into the labourers of these companies.

Unfortunately in the afforestation programmes all over the Himalayas, priority is being given to the commercial species. I have seen pine, even exotic pine, being planted in areas, where deodar was growing - Champawal area of Pithoragarh.

Contrary to the official plantations, whose low survival rate was the main topic of criticism everywhere, we could see several successful people's plantations. People believe in regeneration by protection and plantation of local food, fodder, fuel, fertilizer and fibre species. Besides many community oak forests, the glaring examples of successful community plantations may be seen in Komala area of the Chamba district (HP).

Why this distrust among the hill people for government plantation programmes? This was explained to me by Jia Lal, a resident of Ramgarh in Doda. Near his small teashop was displayed social forestry signboard saying: “There is greenery due to trees.” “There is money, Health and Prosperity” (Podon se hariyali hai, Paisa, sehat, kushali hai) Jia Lal said, “This is all true, but only for the contractors and the foresters. The planting programme gives them money, health and prosperity, and nothing to the people. They are not taken into confidence. Every year, new saplings are planted and the old disappear.” The same were the comments of Bhag Singh Makhloga and others about South Bhagirathi World Bank Watershed Project plantation programme: “Why to dig new pits every year, when old plants do not survive?”

When I asked people “can we stop the destruction?” They replied in the affirmative. A deputation of concerned people had met J & K Governor Jagmohan in the first week of March with the demand to stop felling of green trees for commercial purposes and give rest to pines wounded from resin-tapping. Similar demands were put forward by a group of scientists and social activists before the Chief
Minister of Himachal Pradesh.

In U.P. the hill people wonder why the Centre's directive to stop all green felling right up to the foothills of Shivaliks has not been implemented. It was suggested to meet the local demand of construction timber and firewood from dead, dying, diseased and over-mature trees. The wounded pines need immediate rest for healing. Continuance of resin-tapping in already wounded trees will mean further devastation.

'Kato aur kamao' (fell trees and earn money) was the slogan of timber mafia in Himachal Pradesh. The mafia includes corrupt politicians, officers and contractors, and their organization was so strong that they virtually rule over certain important pockets. They have now been smashed, but there are still some white collared people engaged in illegal timber trade, specially in Chail and Solan areas. Creation of a special enforcement cell has gone a long way to check it. In UP hills, specially in Hamuna, along Tons Chakrata and Tehri division, which are adjacent to HP, the Himachal pattern of illicit timber trade is flourishing. There is need to set up a special machinery to detect these cases and punish the offenders including the officials.

Proper land use planning is the ultimate solution of the problem of Himalayan forests. Should the land area of this fragile mountain system be exploited for growing soil-depleter commercial species, uncontrolled grazing, reckless mining and agriculture on steep slope; or should a scientific land use plan giving top priority to the natural regeneration of mixed forests, plantation of food, fodder, fuel, fertilizer and fibre trees capable of soil and water conservation and making people self-sufficient in their basic needs be implemented? This is the challenge of the Himalayas which is to be taken as seriously as the national defence. Will our policy makers, administrators and the leaders of public from all walks of life accept it?
WITHER GOOD EARTH?

- Maneka Gandhi

Today is earth day. Today demonstrations have been organized by the global greenhouse network all over the world to protest against the use of chlorofluorocarbons (CFCs). India is one of the few countries not taking. The Greenhouse Crisis Foundation Washington had asked me to organise the demonstrations in India. I could not find anyone who considered the issue important enough to protest about. At the most they wanted seminars by the knowledgeable for the knowledgeable.

In the last 15,000 years the temperature of this planet has varied by 3.6 degrees. In the last 50 years of industrialization, it has risen considerably and its projected rise in the next 50 years (most of us will still be alive then and our children certainly will be) is 4.9 degrees. Apart from the heating of the air, we are also polluting it beyond retrieval. This heating up, caused by carbon dioxide, chloro-fluorocarbons and other air pollutants is called the greenhouse effect. One hundred years ago the level of carbon dioxide was 275 parts per million. Today it is 350. In 40 years from now it is projected as 450 PPM. Carbon dioxide is 50 per cent responsible for the increase in the earth's temperature. CFCs contribute 20 per cent.

World attention has been focussed on the CFCs— and rightly so. If the ozone layer, which is destroyed by CFCs is damaged, we lose the filter protection against the aggressive rays of the sun and the food chain that starts with plankton in the sea and EFDs with us humans is destroyed. When this layer is destroyed— and 5 per cent is already gone— and everyone is sick, a majority with

This article appeared in the Indian Express, April 22, 1989.
Cancer, and hungry, it will be irrelevant for governments to talk of housing, unemployment and democracy.

CFCs are used in coolants, such as air-conditioning and styrofoam packaging, in cosmetic aerosol sprays as propellants, food processing, electronic items, vaccines and pharmaceuticals. Our get-rich-quick industrialisation has led to an increase in our dependence on these life destroying chemicals. And destroy life they will—not in the remote future but within 20 years. Already it is projected that the 1990s will have 80 million new cases of skin cancer. An international protocol has been signed by most countries to reduce and then stop the CFCs. India has refused to sign it. Indeed, our government has licensed new CFC plants. The network wanted the protest outside navin fluorine industries in Gujarat—a major producer.

India cannot afford to treat itself separate from the world. Dr. Mayur of the urban environment institute, Bombay, lists statistics of 50,000 cases of lung disease in Bombay alone caused by ozone depletion. Delhi, Bombay, Calcutta, Mexico, Los Angeles and Bangkok have the distinction of being the most polluted cities in the world—places that desperately need oxygen.

We in India are playing our part towards bringing about a catastrophe as soon as possible. We are cutting our trees rapidly, bringing in smoky factories indiscriminately—often with no safeguards, increasing vehicular traffic by lakhs every year and refusing to check emissions from this traffic, planning our cities so that no space for breathing is left, building power plants by the dozen, increasing our dependence on air-conditioners as our own bad planning increases the heat in the city.

What we need is a strict policy of energy conservation and preservation, combined with a plan that places tree plantation on a war footing, especially urban tree planting. And a strict family planning law that gives incentives like guaranteed education and jobs to one-child families and disincentives for larger ones. We need a good mass transit
system instead of individual cars. We need to buy or develop clean-burning fuel technologies. We need to discourage single occupancy vehicles. Local town councils have to draw up air-pollution reduction lists and patrol the two accordingly. Do we really need most of the stuff we produce? Do we realize what we are doing to the earth (limestone quarrying, for example, destroying portion of forest, Corel reefs and marine life). Cutting back on inessential exploitation of our natural resources will stop a large chunk of pollution. The government will have to re-evaluate its priorities to make them survival oriented.

The most inefficient item on this list of remedies is the planting of trees. Something that each citizen can do. Nana Chudasama has started a campaign as Bombay's sheriff. If you live in that city, get involved. Trees on parking lots, school-yards, traffic islands break up the asphalt heat islands that raise temperatures. Trees adsorb carbon dioxide. They act as the garbage collector of the air. as the city cools down with the increase of trees, our dependence on artificial coolants like air-conditioning is reduced. The cycle of heat and more heat is broken.

Today is earth day. Do your bit. Don't use an aerosol spray. Don't use your air-conditioners. Write to your government and ask them to join the protocol. Plant a tree. This is not a political issue - so don't let the politicians decide the length and quality of your life.

• Ozone layer acts as a shield to protect the animal and plant life on earth from the harmful effects of ultraviolet rays from the sun. The adverse effects that are likely to follow from the decreasing thickness of this layer are as follows:

• Increased possibility of skin cancer; the ultraviolet rays destroy the acid contained in the DNA.
OVER-EXPLOITATION OF
GROUND WATER

- H.S. Bhat

In recent times large scale pumping of ground water is resorted to in many of our cities and towns due to shortage of surface water supply. Many authorities including social organizations and even men in public life are voicing their concern about the risks of indefinitely continuing this exercise, particularly about the depletion or complete drying up of the underground resources due to insufficiency of recharge. But, there is yet another possible danger from over exploitation of ground water, that is the land subsidence which does not appear to have received much publicity in our country.

There are reports to show that in a number of cities in different parts of the world, land subsidence has taken place due to large scale extraction of groundwater. Among them may be mentioned Bangkok in Thailand, Venice, Milan and Pisa in Italy and Nagoya in Japan. In Bangkok, for example, a recent study indicates that excessive exploitation of ground water in the past 30 years has caused frightening land subsidence resulting in flooding and water logging problems and damage to buildings and other infrastructure. Wherever it was possible to cut down the pumping of groundwater, the subsidence has stopped and in some cases even rebound of surface has been noticed. Wherever it was not possible to completely ban groundwater pumping due to shortage of surface water supply, artificial recharge is contemplated as a supplemental remedial measure.

This article appeared in the Hindu of July 28, 1990.
No subsidence studies appear to have been done in our cities so far, except in coal mining areas. However, it appears there are some visible impacts of subsidence in Calcutta, such as tilting or settlement and cracking of some buildings, creation of water-logging problems in some areas etc. Unless systematic subsidence studies are conducted, nothing definitely could be concluded, and remedial measures taken. It is not known if such studies are done or contemplated in Calcutta. Similarly, in our big cities, like Bombay, Madras, Bangalore, Hyderabad etc., and in other cities and towns where there is large scale pumping of ground water, such studies are called for to avoid possible future hazards. Necessary know-how for carrying out subsidence studies is available in our country with the central mining research station, Dhanbad (Bihar), the Banaras Hindu University, Department of Mining, and perhaps a few other universities and institutions concerned with land subsidence in coal mines.

It is needless to emphasize the advantages of taking timely precautions in these matters, in the larger interest of protecting the community from further environmental disasters. It is hoped that the metropolitan authorities and others concerned would take note of the problem and initiate necessary timely action as the situation demands.

• Every year 16 lakh children die due to consumption of contaminated water and due to dirty surroundings. Majority of these children are under 5 years of age.
• One crore persons do not have clean drinking water.
• The infectious diseases kill double the number of people who die of cancer. These diseases are preventable.
NOT A CASE OF MISSING THE WOODS OR THE TREES

- Raman Nanda

Contractors in Manipur pay the state government crores of rupees annually as royalty for permission to fell teak trees though there are hardly any teak forests in the state!

Are the contractors then fools enough to pay royalty for non-existent teak? Quite to the contrary, they simply smuggle teak on a large-scale from Burma into the Indian Border State. The permits, in effect, provide legal cover for the transportation of teak logs from Manipur to the rest of India where teakwood commands a high price.

While Burma’s Kabaw valley on the Indian border, is being denuded of teak forests, the contractors are having a field day raking in the profits. The pockets of police, forest officers and also politicians are allegedly lined for letting a sizeable proportion of the smuggled wood through the checkpoints underpaying “royalty” and sometimes without paying it.

The state government, which collects a fair amount of

This article appeared in the Times of India, May 12, 1988.
revenue, looks the other way while the smuggling goes on. The tribals, who do the groundwork of transporting the teak logs from the Burmese to the Indian side, occasionally running the risk of being checked by the Burmese border forces, also make some money in the process.

The whole process has been so systematized over the past few years that tribal villages on the border have formed associations to conduct the “trade” and obtain better terms from the contractors who are supplied the logs. How lucrative the trade is, can be gauged from the fact that the contractors have reportedly built motorable roads through the rocky terrain of Manipur in Molcham area on the Indo-Burma border.

Burmese teak is being smuggled through Manipur from two areas—Moreh, which has relatively better road connections and Molcham.

Royalty receipts at Moreh alone are estimated at over Rs. one crore for the financial year 1987-88. For the first nine months, April, 1987, to December, 1987, the revenue receipts were over Rs. 85 lakh, according to forest officials at Moreh.

While the forest officials admit that there is “hardly any teak” in Indian forests around Tengnoupal forest division—huge teak logs are seen piled up on the roadsides.

Trucks carrying them freely moved around. “These long teak logs that you see around are obviously not from our forests,” officials say, adding that “teak trees in the Indian forests are shorter and even these had been cut down completely long ago. We are now going in for teak planting and these are not allowed to be felled.”

According to another Imphal-based forest official, “Forest rules stipulate that trees permitted for felling have to be given prior numbering and their girth and height are required to be measured for purposes of royalty assessment, which is linked to the volume of wood.” But,
as there are no teak trees on the Indian side, there is no question of the trees being given prior numbering.

Even for purposes of loyalty assessment on the smuggled logs, the contractors bribe the local forest staff and get the volume of wood grossly under-estimated.

The forest staff at the checkpoints on the way from the border collect Rs. 50 to Rs. 100 per truck, even when they have the “correct papers.” In some cases, the papers too are forged, forest officials said citing the example of the holding up of a couple of trucks recently at Mao where police suspected some forgery in the papers. There are over half a dozen forest department checkpoints between Moreh and Imphal.

The initial, and somewhat risky, work of getting the logs over to the Indian side is done by the tribals, mainly the Kuki tribe which inhabits the border area.

The tribals are permitted to move 40 km on either side of the border and also engage in the trade of basic necessities. There are also marriages between the members of this tribe on either side of the border.

The modus operandi for obtaining teak is that the contractors' employees contact the Kuki tribal on the Indian side who in turn, contact their tribesmen on the Burmese side. The teak trees, felled from the dense Kabaw valley, are brought over to the Indian border largely in carts, and, occasionally even the world war II vintage trucks.

On the Moreh-Molcham road along the border are about 18 villages, whose residents engage in teak smuggling. The chiefs of some of these villages, including T. Minou, Betuk Sargrang, Gampazo and Chhtengnopoul have formed associations of sorts to conduct the smuggling of teak, according to officials.

Over the years, the tribals have also realized that the contractors were making big money out of teak, and that they too could extract their relatively smaller share.
Officials point out that whereas earlier, if contractors wished to construct roads to go into the thick forests or close to the borders, the villagers used to offer free labour. Now, they charge the contractors for permission to construct a road near the village. Contractors, according to officials, constructed kuccha roads in Molcham area. (In laraolaimanal village in Manipur, the chief levied a fee of Rs. 250 on a small time contractor for permitting him the use of the village road for transporting wood. The chief of the village, around which the trees were being felled, had entered into an agreement with the contractor, permitting him to take the forest produce for a lumpsum payment of Rs. 500.

While all this is going on, no one has given a thought to the ecological destruction, which will result. Though the actually felling may not be in India, the Indians too will be affected by the environmental problems that this will create, according to some forest officials, who admit to their “helplessness” in putting an end to this deforestation.

mmm

- The chemical pollutants cause great harm to the health of a child growing in its mother’s womb. Mercury, tobacco and lead are causing the birth of many mentally retarded children. The immune system of such children gets severely weakened. Such children are subject to disorders of the heart, blood circulation and brain. They become prone to diseases. So the pregnant women should not work or live in polluted environment. The little children have also to be protected from contaminated food and polluted environment, so that they remain healthy and have resistance against disease. Therefore, minimize the use of chemicals in your life.
THE ISSUE

More and more people are taking up cycling and jogging for health reasons, but do they do themselves more harm than good by breathing in polluted air?

THE FACTS

There are lots of reasons for being cautious about hard exercises like running and cycling from a general health point of view—these can include anything from sprained muscles to heart attacks, and there are large question-marks about the long-term implications for backs and knees of running on hard surfaces. Anyone thinking of taking up running should get proper advice about equipment and, if they're over 30, probably get medical advice.

What we're concerned with is whether exercise which makes you breathe deeply and rapidly substantially increases risks of ill-health from breathing in the pollutants. The short answer is that no one really knows. There have been several studies in very polluted areas with conflicting results. Some have found that carbon dioxide in the lungs of runners (used as a measure of how much pollution has been breathed in) are no worse than in other people; others end up recommending people never to run in the city.

We do know that there are good reasons for being wary about the health effects from vehicle exhausts, and it seems reasonable to assume that someone doing exercises which increases breathing rate would take in
correspondingly greater amounts of pollution. But whether this is a significantly greater proportion overall, and whether it is more than compensated by the health-giving effects of exercise, is still an open question.

MINIMIZING RISK

If you are going to run or cycle, there are some fairly obvious precautions which can be taken to minimize any risks:

- Don’t run along busy roads, especially those where cars are likely to be idling and thus releasing more exhaust fumes;
- Don’t run in fog or mists which trap pollution;
- Try to run in the early morning or late evening, when there is less traffic about;
- Cyclists could try wearing a face mask, although this will only keep out some of the larger particles, like dust. A better bet for avoiding pollution is probably to find routes which avoid the busiest roads.

DIESEL ENGINES

THE ISSUE

Diesel engines, used in lorries, buses, taxis and cars, are major source of black smoke and a range of pollutants, and are probably more dangerous to human health than petrol (gasoline) engines.

THE FACTS

Diesel engines produce a different mix of pollutants to petrol-driven cars. They have a number of clear advantages. Diesel engines do not emit lead, and generally have a low pollutant emission—if they are properly maintained and tuned. Unfortunately, this often isn’t the case, whereupon emissions rise steeply and they become highly polluting.

Diesel engines are a major source of black smoke and can be responsible for up to 90 per cent of black smoke in
urban areas. They also produce more polycyclic aromatic hydrocarbons (PAHs) and sulphur dioxide than petrol cars, about the same amount of nitrogen oxide and less carbon monoxide.

Over the last few years, a number of studies have looked in detail at the health effects of diesel engines, although there have been few epidemiological studies looking specifically at the impact of diesel fumes on the population. The following general conclusions have been drawn.

**SMOKE**

Diesel smoke aggravates several diseases such as bronchitis, asthma and cardiovascular problems.

**CANCER**

Diesel engines can emit polycyclic aromatic hydrocarbons (PAHs) which are strongly suspected of causing cancer. This has been backed by animal studies using diesel emissions. One study using mice found that the mixture of PAHs from a diesel exhaust was highly active in initiating tumour. Studies on animals also suggest that diesel could add to the risk of cancers developing in those exposed to other carcinogens, such as cigarette smoke.

This has been borne out by studies of workers and others who have been exposed to high levels of diesel fumes, although in most cases sample numbers are too low to be statistically significant. There is still no conclusive proof, but there is good evidence that there could be a link between diesel pollution from vehicles and lung cancer.

**ASSESSMENT**

There seems to be good reason for concern about the emissions from diesel engines and for trying to avoid them as much as possible. This is especially true as the means for reducing emissions do exist and are already being employed in some places.
MINIMIZING RISK

There is not very much the individual can do except get out of town... However young children, the sick and the elderly are thought to be especially susceptible to some of the side effects of diesel fumes, so it might be worth trying to avoid the places where, for example, buses and taxis are idling in a narrow street and thus likely to build up large concentrations of diesel smoke. If you can see a lot of smoke coming from a diesel engine, then the chances are that quite a lot of other toxic pollutants are being emitted at the same time. What governments could do? The technology is available to meet the more stringent emission controls with only fairly minor modifications to the diesel engine.

(Extracted from “Good Health on a Polluted Planet” by Nigel Dudley (1995))

• If we maintain the same indifference towards nature, it will be impossible to escape natural calamities. We should therefore avoid unnatural things and develop a bond of love with the nature. We should do organic farming, increase the area of forest land. We should check our growing population. The use of air-conditioners should be minimized. If you preserve natural resources, the atmospheric heat will also start to reduce; the man will be able to take a breath of relief.
DESTRUCTION OF TROPICAL FORESTS
SPARE THOSE TREES
IF YOU WANT TO SURVIVE
- Robert Allen

The world's tropical rain forests are on their way to being dispatched to the rich countries in the cause of immediate export earnings for the poor. This short-sighted policy is threatening the very survival of our coming generations.

Man's technological ingenuity is often exaggerated, but when it is deployed against himself by the three donkey-men of the ecological apocalypse—greed, ignorance and (myopia—there) is indeed no more formidable weapon.

Today, this weapon is being wielded with devastating effect in the rain forests of the tropics. Government departments, civil engineers and lumbermen now have at their command vast machines that in no time at all can reduce forest giants to shavings.

A hectare of tropical forest—900 tonnes of living plants—can now be cleared in only two hours. In a fragment of time, we can reduce the richest, oldest plant community in the world to a sterile mockery of its former self. Anyone who survives the next ten years will witness the snuffing out of 50 million years of continuous evolution. To be child of our times is to be able to say: "I will outlive the jungle."

INTENSITY OF DESTRUCTION

At first glance, this seems impossible. There are said to be between seven and nine million square kilometers of tropical rain forest covering large tracts of Central
America, Amazon basin and the Guianas, West Africa and Zaire, Southeast Asia, New Guinea and the islands of Melanesia. Yet the intensity of destruction is high enough to cope even with this extent.

In Central America, two-thirds of the forest have disappeared already. In Colombia, it is being cleared at a rate of a million hectares a year. In Brazil, the rate is many times faster. By the end of this century, most authorities agree, all but a few carefully preserved samples of the world’s tropical rain forests will have been eliminated.

Tropical rain forests are the greatest, most enduring celebrations of life ever to have evolved on this planet. No other environment has so many species of plant and animal. A hectare of temperate woodland, for example, normally contains no more than 10 different species of tree 20 centimeters and upwards in diameter. By contrast, a hectare of tropical rain forest generally contains more than 100 species of large trees.

The profusion of plants and animals is remarkable. In the forests of Southeast Asia, there are estimated to be more than 25,000 species of flowering plants, and 49 percent of the general represented are found nowhere else. Of the 660 different species of bird known or presumed to breed in the Malay peninsula, 444 are restricted to the rain forest. Insects, amphibians and many other animals abound in equally impressive numbers.

**MAJOR HISTORICAL EVENT**

As Professor Paul Richards has pointed out, “The destruction in modern times of a forest that is millions of years old is a major event in the earth’s history. It is larger in scale than the clearing of the forests of temperate Eurasia and America, and it will be accomplished in a much shorter time.”

The tropical rain forests are succumbing chiefly to the combined pressures of forestry, food production, cash crops and settlements. These activities in themselves are
necessary and benign, but when pursued carelessly or in ignorance, they can be disastrous.

With the exception of recent alluvial and rich volcanic soils, tropical rain forest soils are generally very poor. That the forest flourishes in such highly uncompromising circumstances is due to its unparalleled thrift, and the speed and thoroughness with which the nutrients are recycled.

According to FAO, between five and ten million hectares of forest are being felled each year for agriculture alone. Often the felling is government organized. At times, this is for the very best of motives, even though the results are unfortunate and could be avoided. In West Malaysia, the lowland forests are being felled to provide land for the landless under large-scale cooperative settlement schemes designed to produce cash crops like rubber.

At other times, the motives are more obscure. A distorted version of nationalism apparently demands that remote uninhabited areas be dragged into the country's economy before they are needed, or before it is known how best to use them.

Badly run timber operations are degrading the forests as effectively as are expansionist agricultural and settlement schemes. In a forest section, only a few species may be considered of commercial value, and to get at them, 75 per cent of the surrounding canopy is destroyed.

Although some lumber companies behave responsibly, many exploit the forest for their own profits. Such companies, damaging seedlings and saplings, disrupt the mix of tree species, and expose soil to erosion over large areas.

In Indonesia, 27 million hectares are officially classified as denuded by uncontrolled cutting, and the country still has too few trained foresters to supervise the enormous expansion of timber production, relying almost entirely on the good faith of the companies.
Japanese have been offering investments of US $80 million to $500 million to log the Amazon rain forests. It is very difficult for hardpressed, ambitious governments to resist such beguiling inducements, even though the result will be the destruction of a resource which, carefully used, could have lasted indefinitely.

Ignorance—of the richness of tropical rain forests, of their fragility, and of what precisely to do about either quality—was once some excuse for this short-sightedness, but from 1975 onwards it can no longer be.

International efforts to increase our knowledge of tropical rain forests and to make available what is already known to all who work in them, have been stepped up. UNESCO is compiling a world tropical rain forest inventory, and issuing guidelines for conservation.

**TRANSFORMING FORESTS EFFICIENTLY**

Before undertaking the transformation of tropical forests, every consideration should be given to exploiting more efficiently areas already altered.

The large areas that have already been cleared of forest, either for lumber or for agriculture and then abandoned, could and should be used for plantation forestry. This would relieve much of the pressure on the remaining areas of undisturbed forest, which often could be used most profitably as store houses of genetic diversity, as laboratories and as centres of recreation.

The world already derives considerable benefits from tropical forest plants: food from Brazil nuts, cashew nuts, passion fruit, papaya and avocados; beverages like cocoa and coffee; drugs such as curate, vital to safe and painless surgery; and invaluable materials such as rubber, chicle (from which chewing gum is made) and, of course, many fine woods.

**SCRATCHED THE SURFACE**

Yet we have barely scratched the surface. We still
know very little of the nutritional, medicinal, chemical and mechanical properties of the bewildering variety of tropical forest plants.

Biologically, tropical rain forests are the centres of the world. Much of the earth's contemporary flora and fauna originated in the humid tropics. For millions of years, tropical rain forests have been genetic factories from which plants and animals, capable of adapting to more difficult environments have gone forth to populate the subtropical and temperate regions.

Conserving substantial areas of tropical rain forest, as they are, is potentially as rewarding a form of development as agriculture, forestry or mining. Areas protected for their genetic diversity or scientific importance should be surrounded by buffer zones, which may be used for a variety of economic purposes – tourism and selective logging, for example – as long as they do not disturb the core area.

The short-term economic needs of countries containing tropical forests should not and do not have to be satisfied at the expense of their future prosperity. In many cases, the industrial countries ought to compensate any country conserving large areas of tropical rain forest, since such conservation represents an investment of benefit, not only to the country concerned, but to the entire world.

These great forests—the parents of the planet's vegetation—are the children of plants that no longer exist. The magnificent progress from bare rock high to forest cannot be repeated. We are perilously close to the point where what goes now is gone forever. Yet we know enough about the wise use of tropical rain forests for such a fate to be unnecessary as it would be tragic.

*Courtesy: Development Forum*
SYMBIOSIS BETWEEN
THE EARTH AND HUMANKIND

For thousands of years, human beings have been engaged in creative transformation of the wilderness and of humanized environments, but the process has been greatly accelerated and intensified since the 19th century. One of the psychological effects of the Industrial Revolution was to encourage the belief that any kind of change was justified if it was economically profitable—even if it caused a degradation of human life and of environmental quality. During recent decades, however, there have been signs of reversal in this psychological attitude.

In 1933, the city of Chicago held a World's Fair to celebrate its hundredth anniversary. The general theme of the fair was that the increase in wealth and in the standard of living during the "Century of Progress" had been brought about by scientific technology. The guidebook to the exhibits had a section entitled "Science discovers, Industry applies, Man conforms," and the text proclaimed "Individuals, groups, entire races of men fall into step with ... science and technology." There could not be a more explicit statement of the then prevailing belief that the
real measure of progress is industrial development, regardless of consequences.

Scientific technology is even more creative in 1976 than it was in 1933. Yet, no one would dare state today that humankind must conform to, or fall in step with, scientific or technological dictates. The present view is rather that industry must conform to human nature and be managed within strict ecological constraints. The desire for technological innovation and for industrial expansion is now checked by an equally strong concern for the long-range consequences of human interventions into nature.

Every part of the world can boast of humanized lands that have remained fertile and attractive for immense periods of time. From China to Holland, from Japan to Italy, from Java to Sweden, civilizations have been built on a variety of ecosystems that have been profoundly altered by human intervention. Many of these artificial ecosystems have proved successful even in regions not highly favoured by nature. In Greece, for example, a large olive grove in a valley near the Delphi site has been under continuous cultivation for several thousand years; many rice paddies of tropical Asia also have been successful for millennia. Israel, which was once the land of milk and honey, then became largely desertic after Roman times, has once more achieved agricultural prosperity as a result of skillful ecological management, including irrigation and reforestation.

The most interesting aspects of these approaches to the development of arid regions is not their technical boldness but a vision of the future in which a transient form of natural wealth—oil—would be converted into agricultural, industrial and social creations of lasting value. Whatever the financial resources available for these projects, however, the ultimate success of any venture will depend on the creation of artificial ecosystems designed within the constraints of local environmental conditions.

A century ago, wood was the fuel used to heat most
homes, as well as to fire steam engines and even locomotives. In our times, fossil fuels and nuclear fuels have almost completely displaced wood for such uses and several other sources of energy are under consideration. It is not impossible, however, that trees and other plants will again become important sources of energy; they may also come to compete with petroleum and coal as a source of raw materials for the chemical industries. The potenti-
alities of these uses can be surmised from the magnitude of the role played by the vegetation of natural areas—wilderness—in the economy of the earth.

One of the objectionable aspects of vegetation as a source of energy and chemicals is that it is more diffusely distributed and more difficult to transport than coal or petroleum. This will probably require that the biomass be handled in fairly small industrial units, a limitation that has some advantages. One of them is that it may favour social decentralization. Another is that decentralization will facilitate the return to the land of the waste products from plant materials, which can then serve as plant nutrients.

Granted that the techniques for production of energy and chemicals by photosynthesis are still in a primitive stage, the ecological prospects are sufficiently encouraging to justify a vast programme of research in fields pertaining to the production and utilization of plant materials, such as photosynthesis; plant physiology; plant genetics; including the production of new species; ecological different plant species; and development of techniques for the fermentation of plant materials to produce methane and for their hydrogenation to produce combustible liquids. While the new technologies that could thus be developed are not urgently needed in the United States, they might be of immediate practical importance in some countries that have abundant vegetation but lack other resources. Furthermore, the production of energy and materials by photosynthesis points the way to long-range global solutions based on biological techniques, compatible with the
ecological health of the planet.

The earth is to be seen neither as an ecosystem to be preserved unchanged, nor as a quarry to be exploited for selfish and short-range economic reasons, but as a garden to be cultivated for the development of its own potentialities of the human adventure. The goal at this relationship is not the maintenance of the status quo, but the emergence of new phenomena and new values. Millennia of experience show that by entering into a symbiotic relationship with nature, humankind can invent and generate futures not predictable from the deterministic order of things, and thus can engage in a continuous process of creation.

(Courtesy: USA Commercial News letter Vol. 11, No 1, January 1978)

Countrymen! Beware of noise pollution produced by the machinery, trucks, buses and motorcars and their blaring horns. This noise is injurious to health; produces eye diseases and even causes deafness. Doctors say that among causes of mental disease, loud noise is one of the deadliest; it gives rise to eye disease, stomach disorders, lack of sleep and insomnia. The sound of vehicle horns is making the lives of people miserable, especially of those living in cities and towns or near busy highways. This loud noise is causing great distress to children and old people living near roadsides. They are disturbed and miserable. Pedestrians and cyclists going on the roads of cities and towns should remain clear of the buses that overtake them, so that they don't have to use their horns. Bus passengers should ensure that the driver does not drive fast while passing through crowded roads of a city or town. Do not travel by buses; they are the dealers of death, killing people everywhere; travel by tongas and rickshaws instead.