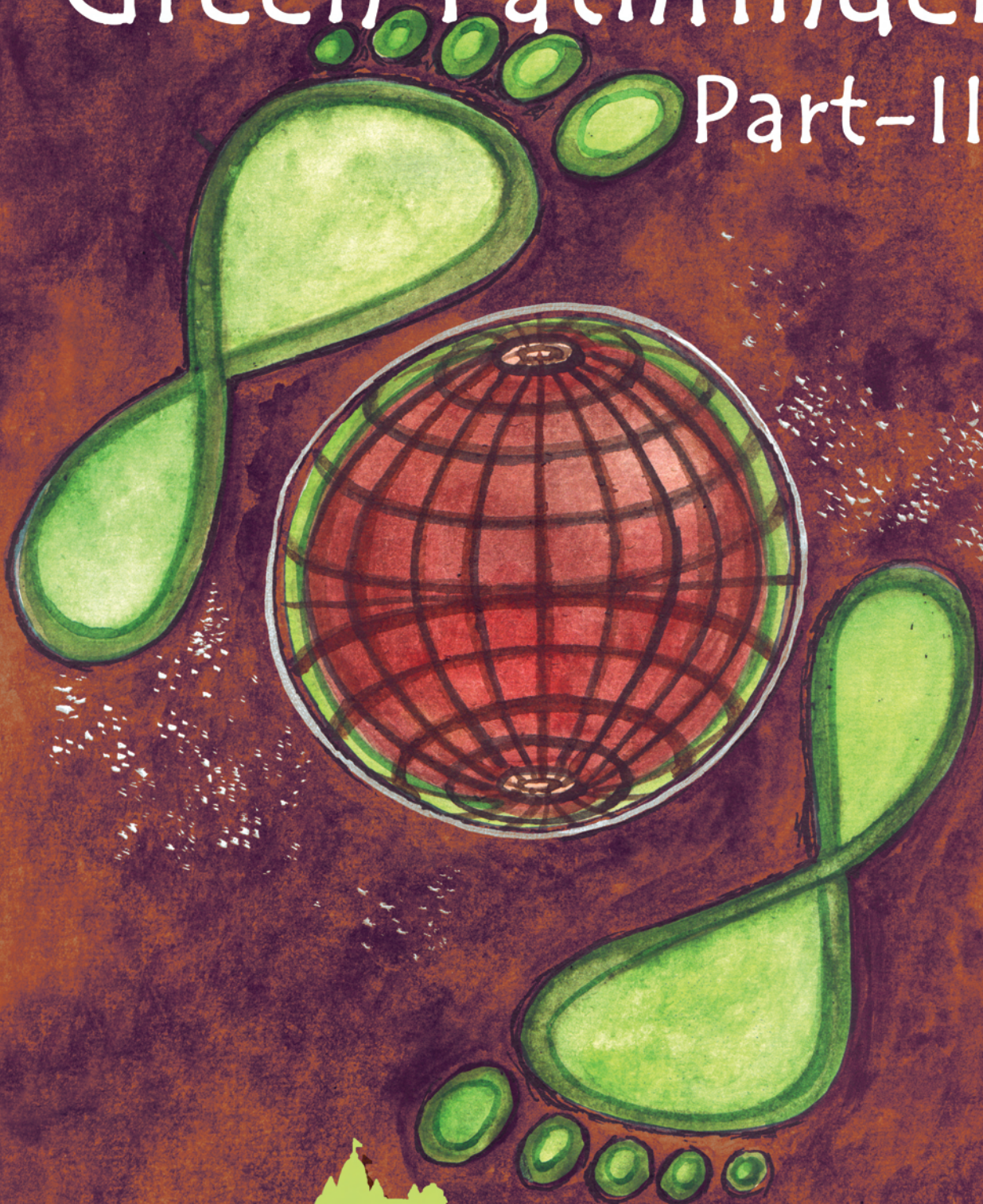


Green Pathfinders

Part-II



Vivekananda Kendra Patrika

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GREEN PATHFINDERS

Part II

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9. The Hindu-Survey of the Environment 2007
10. Guardian News Papers Ltd. 2008
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12. New York Times News Services
13. C.I.I. Sources, New Delhi

14. The Gandhi Peace Foundation, New Delhi, 'The Chipko movement' 1978
15. APF/WWF sources
16. C.P.R. Environment Education Centre, Chennai 18 Biodiversity (2005)
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GREEN PATHFINDERS PART-II

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Green Path Finders-Part II

Prelude

In the last issue we saw the philosophy and emergence of green technologies. From the life and works of J.C.Kumarappa, to the way green technology is using effective micro organisms. In a peep into the future of sustainable technologies we also have seen how nano-technology can help sustainability. From water management to sanitary technology it has been a green odyssey linking past, present and future. Specific fields have been studied in-depth in that issue. In the case of water management we have seen how cost-effective technology and community action go hand in hand to revive traditional sustainable water management systems and also deal with the problems the modern degradation has created. We have also seen how these local technologies and collective actions are actually related to global ecological problems including the energy crisis and global warming. We also saw how solar energy and wind energy can be harnessed to provide clean green energy.

In this Kendra Patrika which is actually a continuation of the previous one, we are going to see how grassroots activism is slowly changing the planet for the better locally and how these local efforts are cascading into a mighty force changing the mindset of people at large. We also see how there are regions which are being protected by the state or preserved by nature to become intensely high bio-diversity sanctuaries. We also see how there are principles and worldviews and belief system help mould our perceptions of nature and from that perception how our activities and technologies evolve and determine the way we react with nature. Ultimately we are beginning to realize the wisdom of the old tribes that what we do to the web of life, we do to ourselves. For ultimately, we are all one and united in the great circle of life.

Section IV is an introduction to the way the individuals, communities and grassroots organizations are involved in bringing the change that is needed to save humanity from the impending ecological doom. The change that is being shown in this section is a change that is not percolating from above through state power but through the activism and wisdom of the local populace and communities and also individuals. Chipko Movement to Ralegaon Siddhi, Bishnois of Rajasthan to

Anthony's Wonder Garden in Tamil Nadu the readers are taken on a tour of how Individuals, communities and institutions are building from bottoms up a sustainable living.

Section-V deals with the green sanctuaries that are present all over the planet, where efforts are being made to conserve species and also natural bio-diversity hot spots. Emphasis is given to Biosphere reserves and natural bio-diversity hot spots like Gulf of Mannar, Western Ghats and Sundarbans in India. Their importance with relation to Indian wildlife conservation, ecological stability and also their significance in global environmental conservation has been brought out.

Section VI is an important component of this compilation. Here the heart of the problems is being touched. Bio-diversity – its loss as well as its preservation is linked inevitably with the worldview that humanity nurtures. The idea of monocultures of the mind, genes and matter has wrecked the fabric of bio-diversity that has been responsible for the evolutionary advent and sustenance of man. When humanity loses the ability for diversity from its own consciousness then it affects the very pattern that holds the life breath of humanity and its doom is inevitable. Lynn White Junior's famous article that appeared in the prestigious magazine Science talks about the historical roots of our present ecological crisis. The section further shows how linguistic diversity is also fast eroding. The section shows how the mindset of the humanity is changing today for the better after allowing it go berserk towards self-annihilation in the path of eco-destruction. The focus on Sustainable development has even ushered us in an era of green-careers.

Together both the issues convey a single message. That is the message of changing our lifestyles from that of a predatory consumerist culture to one of holistic symbiotic culture. The book looks at this transition at various levels – from that of technology, community action, grassroots activism, government policies, biological reality as well as basic values and worldviews. Ultimately what is it all about? Why do we need green technologies? Why do we need to conserve animals and plant lives from them going to extinction? In the words of Swami Vivekananda:

Why should I love everyone? Because they and I are one...There is this oneness this solidarity of the whole universe. From the lowest worm that crawls under our feet to the highest being that ever lived - all have various bodies but one soul. (The Complete Works: Vol-2, Practical Vedanta and other lectures: The Way to Blessedness)

SECTION - IV

Greening The Grass Roots



The only job for the boxes is to create the space for the “out of the box” thinkers and doers.

Green Foot - Prints Greening The Grass Roots

SECTION - IV

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Greening the grass roots

Prelude

Krish Phidol: We talk so much about people's involvement in Development. But every passing year sees more and more disciplines and fields coming under government control, government inspired – ideas. The Government is itching to take the ultimate responsibility for the all-round growth of the society.

Annapurna Duval: Don't talk rubbish. The less the Government pokes its nose in my affairs, the better. In our village, all the

us, the women. Many of the ponds, lakes, irrigation canals were being desilted by the village-men until just one generation ago. The work of desilting of water-bodies was linked to our Mariamman temple festival. All the men-folk participated in the work with Bhaya Bhakti (Fear and Devotion). Now the government has entered the scene, it collects the water-tax, but all our ponds are silted up. Last summer my cows did not have even drinking water.

Jnani Noval: There have been interesting discussions on the role of Governments in the society. Swami Vivekananda, has observed that people should learn to restrain themselves, without the imposition of external rule. His concept of Satya Yuga's ideal state, envisages self-government by the people. The Greek philosophers led by Plato said that the best government rules the least, meaning that the people by voluntary and collective efforts should run their public



The less the Government pokes its nose in my affairs, the better.

grass-lands, pastures were maintained by

affairs. Marx expected the state to wither away once his ideal society is established. All these saints and savants rather expected

the government to engage itself constantly in promoting voluntary effort in the society and gradually reduce its own role. But nobody wants the government to die! There are specific domains like defence, policing, railway, shipping, finance, major projects that involve much funding and take long gestation-periods, projects that involve many provinces. They should definitely be controlled by the state. But where creativity, innovation, persuasion, education, value imbibition are involved, the government should leave more and more space to the people.

Krish Phidol: How did the governments all over the world get into this mess?

Jnani Noval: When monarchies fell all over the world, replaced by people's government of various hues, a new kind of public figures called 'Politicians' cropped up. These new rulers, drunk with new-found power, imagined themselves to be omniscient and started interfering in all walks of public life. Perhaps their general feeling of insecurity about their 'relevance' pushed them to overreach themselves and bring more and more aspects of the society's work under

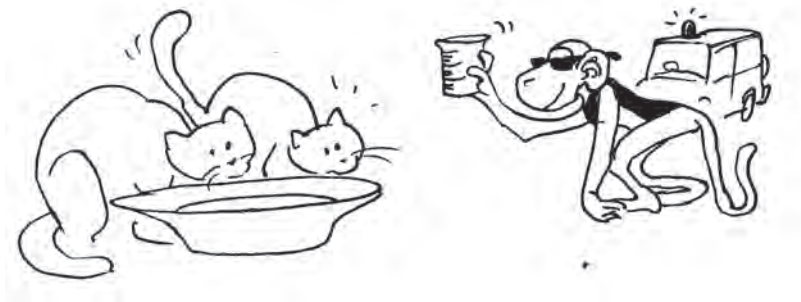
ety was born. The state took over the roles of families, schools, hotels, entertainment, employment, industries, farming and what not. Instead of a State's constitution evolving out of the capacities, customs, cultures, ambitions, history of achievements of the society, the frame-works became highly Utopian, unrealistic, unrelated to the grass-roots, failing to enthuse the citizens even into motions of adherence to the state laws. Such systems were bound to fail. In systems like Soviet Russia, a small percentage of voluntary and free producers accounted for 30% of the Nation's productivity at one stage. Only then, the governments everywhere woke up to the power of the innovative, humane, spontaneous and creative energies of their peoples. In some societies, as I said, the only good work was done where the state machinery did not poke its nose.

Krish Phidol: (Laughing) The only job for the boxes is to create the space for the "out of the box" thinkers and doers.

Annapurna Duval: But still in our country, the innate love for nature has led our people to take up some work for conservation of nature for example saving water-bodies, afforestation, pollution control and eco-awareness. But we should confess that the quantity achieved is small.

Jnani Noval: It is not the quantity. It is the spirit and the trend. And the quantity itself is not negligible. From the Chipko movement of the Himala-

yan people to the common people desilting



their control. The concept of Welfare soci-

their village water-bodies voluntarily, there is a heart-warming array of conservation activities throughout India. Every state in India has shown this spirit. Common home-



makers, enlightened leaders, heads of cooperative groups, ex-servicemen, scientists, community-level workers, who were able to carry their whole village with them, tribes, corporate bodies, you name it, it is there – have striven to pool the energies of unorganized people, for ecological conservation. That is true democracy in action. Of course the governments will provide the legal umbrella to cover to systematise and

to encourage such activities.

to encourage such activities.

Annapurna Duval: Yes and No. In my village the government officers blocked self-help efforts for desilting ponds, saying that, if funding agencies come to know of this possible-self-help, their funds will not be forth-coming. They with-held permission for desilting our ponds. On the contrary, in our neighboring village the forest officers actually involved the people in saving the tigers.

Jnani Noval: These systems do not always act in a predicable manner. There are good officers who involve the people and there are others who play by the book. But there is always space for well-meaning individuals and groups in cities, villages and large communities.

Krish Phidol: The future of our programmes for conserving of Nature, in fact the future of our democracies lies in such participatory efforts.

Jnani Noval: Yes. With the state machinery providing the skeletal services.



Chandi Prasad Bhatt

Dr.P.C.Maithani



Chandi Prasad Bhatt has emerged as a successful public leader in the Post-Gandhian era. He implements the thoughts of Mahatma Gandhi. He operates the power of governance with people's support. He mainstreams the untouchables and the women in the society. He stresses social equality and the importance of labour.

Chandi Prasad Bhatt was born on the 23rd June 1934 at Gopeshwar, a remote village in the Chamoli district of Uttarakhand state in the central Himalayas. He completed his education, helped his family and gradually came out of the confines of his family, to

devote his life to fight the various social evils such as alcoholism, untouchability and social injustice. These he did, by organizing the weaker sections of the society, especially women.

In 1956-57, he came in contact with the Sarvodaya ideology. Vinoba Bhave and Jayaprakash Narayan were his ideals to work for causes that were dear to him. In the early 60s, he started a village level labour cooperative, for protecting the laborers from exploitation. The villages would be made self-reliant. The young and the old, the skilled and the non-skilled, and the workers from all castes and creeds, work there together, eat together and draw equal wages.

The plight of the mountain people as a whole, became Chandi Prasad's concern. He often walked through the mountains and talked to the villagers about their problems. Shortage of farmlands, lack of job were the issues. The government policies regarding forests were oppressive. Large scale felling of trees was allowed to contractors.

In 1964, Chandi Prasad Bhatt established the Dasholi Gram Swarjya Mandal (DGSM)

along with his team-mates. Enhancing the skills of the workers and making use of the skills were aimed at. A series of village-industries were established based on local resources.

In 1974, the Alakhnanda floods devastated the area. Shri Bhatt and the DGSM assessed the effects of the floods and concluded that large scale felling of trees increases the frequency of the Natural Disasters in the region.

In that year, during the monsoon period, the Alakhnanda river water level rose by 60 feet, flooding hundreds of square miles. The waters swept away hundreds of houses. One entire village was swept away. The workers of DGSM organised a relief operation for mountain-villages marooned by the flood. Their close contact with the villages and their field observations revealed to the workers that the chief cause of the disaster was the commercial lumbering operations. When the trees on the mountain-

slopes were cut and cleared, rains washed away the top soil. This exposed the soil and the rock underneath to crumble and fall in landslides. Much of the soil from the moun-

tain slopes were deposited in the dams that could burst under pressure. At the same time, the bare slopes allowed much more rain to run directly into the river. The end result was floods.

The officials of the forest department were unaware of this effect of felling trees. They allotted trees to contractors. Contractors also bribed forest rangers to cut more trees than the number allotted. The forest department had a programme of replanting the cleared slopes but it was inadequate. So, bare slopes remained bare. The volunteers prepared reports of their findings and submitted them to the Government but to no avail. But the workers learnt the lesson



that the forest policy that denied them the fair use of forest resources was gradually destroying their mountain home.

In 1973, Forest department allotted forest cutting in the region to a Simon Company, which was resisted by Shri Bhatt. He declared, "Let them know we will not allow the felling of a single tree. When their men raise their axes, we will embrace the trees to protect them." Shri Bhatt stated that their aim is not to destroy the trees but to preserve them. When the men go to cut them, why don't we cling to the trees, and dare them to let their axes fall on our backs?" (Chipko means "hug," or "cling to"). This was beginning of Chipko movement. The people were at first stunned by the novelty of the idea. Then they began to shout their agreement. Yes, they would hug the trees! Despite this mass upraisal, the Forest department was bent upon executing the contract of forest-felling and the Simon Company went ahead with its plans. This led to more protests at various places including forests at Mandal and Phata. Finally, the government gave in. The Siomon Company's permit was cancelled. However, thereafter, the Forest Department announced an auction of almost 2,500 trees in the Reni forest—a forest overlooking the Alakhnanda River. The lessons of that river's previous flood had been completely ignored. Chandi Prasad quickly set out for the villages in the Reni area. He mobilized the people and reminded the villagers of the flood of 1970. He asked them if there wouldn't be more landslides and worse floods once the remaining forests on the mountain were cut down. Being a core Gandhian, he explained to the villagers that they could save the forests by hugging the trees. It was a continuous movement for months together with gatherings and rallies held throughout the Reni area to

prepare the people for what was to come. Even this did not deter the contractors from moving to the forest for felling trees. This led to direct confrontation in the forests; and the village women leader Gaura Devi pronounced. "This forest is like our mother. You will have to shoot me before you can cut it down." Finally Chandi Prasad was called to the state capital to meet the chief



minister. The chief minister agreed to set up a committee of experts to investigate the situation. When this was announced, the contractor withdrew his men from Reni to wait for the committee's decision. The committee took more than two years to finish its report—but its findings were even better

than the Chipko workers had at first hoped they might be. The committee said that the Reni forest was a “sensitive area,” and that no trees should be cut—not only in the Reni forest but also in a larger section of the Alakhnanda watershed, that included Reni. On the basis of the report, the government put a ten-year ban on all tree-felling in an area of over 450 square miles. The victory at Reni was followed by other successes. In 1977, the Chipko workers learned that forests were being auctioned in an area next to the one protected by the government ban. They asked the Forest Department to send representatives along with Chipko workers to inspect the region. They also warned the department that a Chipko campaign would be launched if the department failed to take account of what it found there. Following the investigation, another area of 100 square miles was added to the protected area.

Since 1975, the Chipko workers have not only been protecting forest slopes, but started restoring bare ones as well. Millions of trees had been planted through their efforts. Besides the local and immediate benefits, this reforestation programme has been helping them to determine what trees and planting techniques might work best in the region as a whole. The Chipko workers have also tried to develop methods of forest-farming, both to conserve the forests and to create employment. In all these efforts, they have paid special attention to involve the mountain villagers themselves in the care of the trees.

Chipko Movement has now spread its roots

in the entire Uttarakhand region and also it has shown a way for protecting the environment, to the world. On the larger front Chipko has transformed itself into a movement for basic right of a community to conserve, control and benefit from the resources of its own home.

In the past 4 decades, Chandi Prasad Bhatt has been actively working for rejuvenating the denuded slopes in the Upper Alakhnanda basin through eco-development camps involving the local community, and participation particularly of women and youth. Such camps provide decision makers and administrators also in order to evolve an environmental and developmental planning process tuned to the expressed needs of the specific area. This programme is organized as people’s programme and assessed by Indian Institute of Science, Bangalore, The Planning commission (Govt. of India) and various other experts. They concluded that the work by villagers under the leadership of Chandi Prasad Bhatt is much more successful than that of the forest department. Shri Bhatt travelled through the entire Himalayas, Indus to Ganga, Brahmaputra, Godavari and their tributaries, the Western Ghats and the Eastern Ghats for understanding the ecology and environment of the Himalayas and to study the people’s problems in various parts of the country, their socio-economic status etc. During his visit, he not only shared people’s programme and people’s knowledge but also actively participated in the people’s movements in various parts of the country and directed the people’s awareness and their struggle in a creative manner. The mission

is still continuing.

A few years back Govt. of India constituted a national level committee for making a 20 year action plan for forests under the chairmanship of Shri Bhatt. The committee put forward various suggestions like including forestry and environment as a subject in school level education, to ensure local people's participation in every activity of the forests, planting of village forests and public oriented forest policy laying down rules and regulations for Forest management. The Government is implementing most of the suggestions of the committee. Shri Bhatt was also member of National Forest Commission and National Remote Sensing Agency. Presently he is the Chairman of the Task force on High altitude medi-

nal plants, National Medicinal Plant Board (Govt. of India) and Vivekananda Hill-Agriculture Development and Research Center (ICAR). He is also Consultant of Rural Technology Action Group (Rutag), Office of the Principal Scientific Advisor, Govt. of India. He is a member of the committee on Study Group on Himalayan Glaciers constituted by Department of Science and Technology, Government of India. He is also member of the Governing body of VIKSAT, Ahmedabad.

In recognition of his work, he has been honored with many national and international awards and he has shared his experiences in renowned forums by delivering lectures. He received Padma Bhushan and the Ramon Magsaysay award in the year 1982.



The Chipko Movement

(Gleaned from the Writings of Sundarlal Bahuguna)

1. History of the Chipko Movement

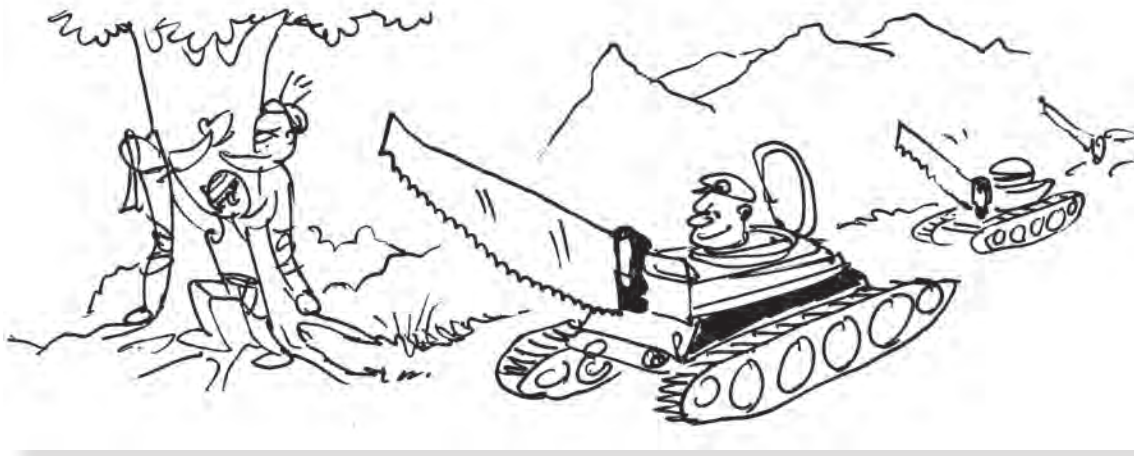
In 1930, the people of the Himalayan region of the State of Uttar Pradesh (now Uttarakhand) revolted against the commercialisation of the forests. The State rulers sent in the army to suppress the rebellion. 17 persons were shot dead, 80 were arrested.

The local people were inspired by the dead and established a memorial for them and took a pledge paving the way for the CHIPKO MOVEMENT – ‘Hug the tree’ movement.

Later, on one occasion, the Uttar Pradesh

Government sanctioned felling of 50 ashwood trees in a village in Chamoli District. In that village, the people have been refused permission to cut a single tree for making agricultural implements. The villagers decided not to allow anybody else to fell trees. That was the impact of Sarvodaya ideas on the local people.

Prior to this, to teach a lesson to the Government, the people used to destroy the forests. But this time they said, “we will hug the trees.” So the idea came. They demonstrated and the logging company people ran away from there.



There are 5000 to 7000 different species of bacteria in one gram of soil. The total living matter in an acre of soil ranges from 5000 to 20,000 pounds.

People went from village to village with this idea. In Indian History, in 1730, as many as 363 men and women offered themselves to the axe in a village (Kedaldi) near Jodhpur in Rajasthan to prevent trees from being cut. They belonged to the Bishnoi Community. The tradition among the Bishnoi's is that they would not allow anybody to fell trees or kill wild animals.

Now in Chamoli District, those who were against the movement came with police force or threatened the local people through goondas. They set fire to the houses of the Chipko activists.

Sometimes there were 100 armed policemen. The women went and hugged the trees. The policemen told the contractors "go and fell the trees."



But the labourers were not ready. Women raised slogans, "We have no quarrel with the police. Policemen are our brothers. We simply want to save our trees."

The Chipko movement had spread far. News about Chipko movement has spread

to 108 countries in the world. In Sweden, two of our activists protested against spraying of pesticides in the forests. Switzerland, Nairobi, France, Germany etc., have shown interest.

We preach on fresh food against tinned food in the West.

In India, we spread our message through songs, Bhagawat Katha – Religion is not dogma. Through Kathas, we try to educate the people. Padayatras are also conducted.

2. Landmarks in the Chipko Movement

1973 Founded by Chandiprasad Bhatt; stops tree felling by sports goods contractors in Chamoli District.

1974 Women prevent contractors from entering sensitive, fragile areas. Student leaders march for improving conditions of forest dwellers, for local industries, for saving trees.

Villagers save trees from being cut.

Chipko movement enters Kumaon region to arouse youth / to save trees.

1977 Landslides kill people and their animals. Tree auctions stopped by protestors.

Auctions postponed repeatedly. Chipko enters Tehri Garwal – trees hugged.

1977-78 Women struggle to save trees being cut by papermills.

- 1979 Sundarlal Bahuguna on hunger strike to save Badyargarh forests—Contractors withdraw.
- 1980 Women stop tree felling for horticultural purposes.
- 1981 Sundarlal Bahuguna demands ban on cutting trees above 1000 m. elevation in the Himalayas. Central Government's Committee puts a 15-year halt on tree cutting in the Himalayan region.
- 1984-85 Women from Gopeshwar save soil and protect their right for firewood by preventing even dead trees from being removed by outsiders.

Further comments

3. Radhakrishnan, General Secretary of the Gandhi Peace Foundation (1978):

In the Post-Gandhian era, the concept of Satyagraha has been given a new significance by Vinoba. In his view general Satyagraha could be offered by the people themselves relying on the own strength and organization and not by their representatives. This has given a new dimension to the non-violent struggle. Fortunately there are a few genuine examples which show in the promise and potential of Satyagraha even in cynical times. The unique struggle to save the Himalayan forests—the Chipko Andolan continues to grow from strength to strength. The fate of the movement is bound to have a decisive impact on the life of the people inhabiting this vast

region and even beyond its periphery. This should help to arouse popular interest on a National level in the cause of forest preservation.

4. Erik Eckholm – ecologist:

Nepal's largest and the most precious export is the 230 million tonnes of silt that its rivers annually carry to the sea. Erosion is no less severe in the Kumaon and Garhwal Himalaya.

5. B.G.Vergheese on "Chipko"

The Himalaya is geologically young and unstable and is subject to periodic seismic shocks that bring down crumbling slopes. But the vagaries of nature have been thoughtlessly aggravated by the ravages of man. As population densities have increased in the hills, as much as in the plains, the forests have been



felled and scoured for fuel and firewood or forest lands have been brought under cul-

Each year, 15 tons of dry soil per acre, pass through earthworms. Earthworms eat soil to get the organic materials in it. The rest passes through them.

tivation. As the rate of extraction has exceeded natural regenerative cycle or any afforestation that may have been attempted, the ecological balance has been upset and thereby started and then accelerated a vicious circle of greater depredation of less productive areas to sustain growing numbers in an increasingly adverse land-man ratio.

It is this Himalayan tragedy that Chipko seeks to arrest.

6. B.G.Varghese's introduction to: Anupam Mishra and Satyendra Tripathi's book "Chipko Movement".

Chipko assumed its present (1978) form over the past five years as a movement to encircle the trees in threatened forests in a human embrace to prevent them falling to the forester's axe. It has graduated from a protective movement to prevent forest auctions and fellings to a movement for the ecological and human rights of the hill people and for adherence to a conservation ethic. It is an extraordinary achievement in its own right that women, the most backward element in what are among the most backward (hill) district in UP (now Uttarakhand), have been raised to such a degree of social and political consciousness and mobilized to defend the forests in which they now perceive their heritage and future. Songs in praise of nature and its gifts and the role of trees and forests in the life of the people have become evocative ecological texts for popular education and mass communication. Here surely is a powerful tool for further organisation for

development and for adult education and functional literacy.

7. Anupam Mishra and Satyendra Tripathi (in their book):

In July 1977, the movement workers planted 4000 willow cuttings around Gauna lake 35 km from Gopeshwar, which had been the scene of devastating landslides in 1970. The willow is abundantly found in the Kashmir Valley, but recognition of its soil gripping capability and its quick growth by Chipko workers had brought it to Uttarakhand. Local species were also found and planted. The UP government banned for ten years tree-felling in the vast catchment areas of Alaknanda river and its tributaries.

The ban was imposed on an area of 1200 sq. kms. far beyond the Reni forest which had made it possible. Thus not only the 2451 trees of Reni were saved by the Chipko movement, but hundreds of thousands more that would have come under the axe in the course of "planned development". This vast but vulnerable catchment had finally won a respite from men at least for a decade.

The movement that had began three years earlier to save the Reni forest had achieved its goal. The apprehension of the illiterate villagers had been substantiated by the experts. The Himalayan forests had found their saviors.

(Extracts from "The Chipko Movement", Gandhi Peace Foundation, New Delhi, 1978.)

A Mother's love

Malini Shankar

Childless Thimakka found the perfect answer to her emotional void in the 280-odd saplings she planted and nurtured



Saalumarada Thimakka, of Hulikal village (near Kadoor, Magadi taluk, Bangalore rural district), has discovered a novel way of dealing with her inability to have a child—a fact that causes her much anguish. She realised early on that she was not destined for motherhood, and knew she must involve herself in growing something. So she threw herself with passion into planting avenue trees along the entire stretch of a road that was to connect her village to the neighbouring village.

Thimakka's passion was not backed by academic knowledge. Her circumstances denied her the chance of an education. With

no clue about the significance of the species she was planting, all she wanted to do was create life. At some point in her life, she married Chikkanna, who herded cattle, while she worked as a casual labourer. She cannot place the events of her life in terms of dates, nor can she count the years. Her guess is that she is a little over 75 years old now.

The lands given to landless labourers were lush green, thank to a large number of Ficus trees. Thimakka and her husband started grafting saplings from these trees. They grafted only 10 saplings in the first year, and planted them across a distance of four kilometers near the neighbouring village of Kadoor. In the second year, they planted 15 saplings, and the third year, 20. This pattern continued. Nourishing the saplings gave the couple much-needed emotional solace. Chikkanna tied two huge pails of water to either end of a bamboo pole, slung them across his shoulders, and carried them across a distance of four kilometers to water the saplings. Thimakka carried one pail of water on her waist and one on her head across the same distance. They used no manure to nourish the saplings. The saplings were planted only during the monsoons,

Earthworms are amazingly strong. They can easily shift stones 60 times their own weight!

and post-monsoons, the couple watered each sapling once or twice a week till the end of the following summer. By the onset of the next monsoons, says Thimakka, the saplings had invariably taken root. "I do not recall any sapling perishing. Perhaps a couple of them did not survive, but my husband was very particular that we replant those that had perished. In all, we planted about 284 trees. I should not take credit for more than what I have done," she says earnestly.

However, her brave efforts would have gone unnoticed if some villagers in Kudoor had not wanted to fell a few of these trees. Alert citizens of Kudoor got Thimakka to lodge a complaint with the police to prevent the tree felling at all costs. The attention she received brought Thimakka's labour of love to the government's notices. She was bestowed with awards and recognition.

Certificates of honour from institutions adorn the mortar walls of her humble hut in Hulikal. A list of some of them: National Citizens' Award 1995; Indira Priyadarshini Vrikshamitra Award 1997; Veerachakra Prashasthi Award 1997; honour certificate



of the women and child welfare department, government of Karnataka; and a certificate of appreciation from the Indian Institute of Wood Science and Technology, Bangalore.

At a time when the vanamahotsava and afforestation programmes have become ludicrous, Thimakka's grit and contribution are truly remarkable. Thimakka's instincts are evidently good. She planted trees rich in biodiversity. Today, she is invited for virtually every tree planting initiative in the state. She spread her native knowledge with gusto, and recommends evergreen trees for arid zones: *Ficus mysorensis*, *Ficus bengalensis*, *Ficus religiosa*, *Pongamia pinnata*, *Mangifera indica*, *Zizuphus jujube*, *Tamarindus indica* etc.

Thimakka today craves for a regular income to tide her through days of frailty, old age and blindness. It is not a lot to ask for. But who's listening?

** Extracts from the Article 15/7/2002



The Message of Ralegaon Siddhi

Dr.Ramesh Awasthi and Dasharat K.Panmand



Four decades of development planning in India have resulted only in widening the rich-poor gulf and the urban-rural chasm. Rural areas are neglected and at their cost, urban areas flourish.

Transport, scientific advancement, industrial growth and income growth, are all designed to benefit the urban and the rich. Poverty, drought and unemployment stare in the face of the rural poor, who often migrate to the urban areas, adding to the social and economic problems of the country.

The village Ralegaon Siddhi in the Ahmed Nagar district of Maharashtra was one of the worst victims of such process. In 1975 Anna Hazare, a local resident, started guiding the villagers there, to take up their own developmental work and the result today is that a planning model has evolved in front of the rural people all over India. Students, development workers and researchers study the developmental processes in Ralegaon Siddhi, making it a special place of pilgrimage.

Anna Hazare was a 1965-war-veteran. He was the lonely survivor of a platoon. He was inspired by Swami Vivekananda's teachings to find out the meaning of human life, through service to fellow men.

Anna Hazare, with no special skill in developmental work, mobilised the village youth through his selfless leadership and moral appeal. Mobilization of local people and absence of any significant financial or managerial input from funding agencies are the twin peaks of Ralegaon's success story. Local labour as shramdan and local ingenuity in adopting and implementing development schemes have done the trick.

Reconstruction of the moral fabric of the village, emotional unity achieved by renovation of the village temple, mobilization of youth by a campaign against alcoholism, the guiding principle of growth with equity, eradication of social discrimination and special attention to the lower income groups constitute the important facets of Ralegaon's success story.

Social development towards an egalitarian society has preceded as well as accompanied economic development here. The village people gave priority to integration of Harijan and other "lower" castes into the community, making the integrated village see a stake in the development programmes. The fruits would be distributed equitably.

Shramdan helped dig wells, construct check-dams, plant trees, build a hostel, etc. One adult from every household contributed labour for the project. The result was that the government grants were utilised with 130% effectiveness, plugging all leakages found elsewhere. The surplus generated by development schemes was distributed according to a village code--50% for the beneficiaries, 25% for loan repayment, and 25% for village reserve capital.

In the fields of public health, safe drinking water supply, soak-pits, gobar gas plants, smokeless ovens, public latrines, urinals, nutritional food, etc. held sway. No new technologies or fanfare could be seen here. Simple and systematic, natural growth was alone seen here.

Individual morality and moral reconstruc-



tion of the society derived from religion are essential for socio-economic reconstruction of villages, feels Anna Hazare. Regular prayers, bhajans, hymns, religious songs and talks, and ban on (a) smoking b) non-vegetarian food and (c) film songs, have helped the society rebuild its moral strength. Improvement of the lot of women, and better integration of the family have come about.

The economic growth has been 24% per year, annual per capita income rose from Rs.270 in 1975 to Rs.2257 in 1986. Govern-

ment subsidies, bank loans and villagers' contribution make up a capital of Rs.500 per person per year. Donations are not accepted.

Ralegaon Siddhi model is a self-help model. The bureaucracy too, instead of seeking to make money out of government grants to the village, cooperated to make it a model village. Inspiration replaced corruption as the motivation. Of course, Anna Hazare could bring pressure from above to stave off corrupt practices at local levels.

Surrounding villages send their people to

see Ralegaon. The concept of self-help inspires all. Anna Hazare would visit neighbouring villagers and talk to them about Ralegaon. The nearby villages are picking up the message for practice. Panchayat members of nearby and far away villages want to replicate the Ralegaon experiment in their domain. Ralegaon also trains people from other villages. A hostel has come up for this purpose.

Motivated leadership, self-help, and social integration remain the core of the message of Ralegaon.

Strange Guys-these conservationists!

Six people have won the Goldman Environmental prize for 2008. The prize is Rs.60 lakh each:

1. A polio-affected musician from Mozambique, Africa who used his music to get clean water and better sanitation for his country's poor people.
2. A Russian woman who fought with the Government to save the oldest lake of her area from Nuclear wastes.
3. A Belgian campaigner who raised 90 m dollars to create the country's first national park in the densely populated industrial wasteland. He convinced the corporates that environmental care is development.
4. A Puerto Rico lady who persuaded the US Environment Authorities to fine the polluters to fund her Marshland Reserve for Aquatic Birds.
5. A Mexican who battles to save the land from soil erosion.
6. Two Ecuadorians who fought an oil giant corporation to pay and clean up an oil spill in their country's river.



(Reuters)

The farmers in the Oaxaca valley in Mexico use organic debris ejected from the fungus gardens of *atta* ants. This is a natural fertilizer extremely rich in nutrients. 25

Chipko of the South

Akila Dinakar

Inspired by tree-man sunderlal Bahuguna, Pandurang Hegde chose to follow his steps in Karnataka. That was the birth of Appiko, which means 'to embrace' in Kannada. "Our philosophy in just three words is Ullisu – to save, Belesu – to regenerate and Balasu – to use rationally," explains Mr.Hegde.



His activism to save trees, which expanded into bio-diversity conservation began with his two month internship with the Chipko movemet in 1979 as part of his Post-Graduate thesis in the Delhi School of Social Work. He walked the Chipko way over hills and dales for 3,400kms between Kashmir and Kohima on the trans-Himalayan Chipko Foot March with Bahuguna spreading the message to protect trees in August 1983.

"I wanted to come back home and do a similar thing in the Western Ghats," he narrat-

ed. Not a bit of the initial passion for his work has left him 20 years after his campaign. His training in walking helped him to walk along the Kali River from the mouth at Karwar to its source at Diggi, spreading the Chipko, because a series of dams were planned. People from Sirsi in the Western Ghats joined issue against clean felling of trees and monoculture of tea, eucalyptus and acacia-so he wanted to oppose monoculture and felling of forests. Appiko was not confined to just Uttara Kannada District but spread to Coorg, Dakshina Kannada, Shimoga and Chikmagalur. "We asked for a total ban on felling live trees in the natural forest regions in Karnataka," he said. In 2003 there was a walk for the Kali Bachao Andolan. Along the 184kms stretch, there were six dams and the seventh was being planned. Besides a nuclear power plant, Appiko was fighting against the pollution caused by a paper mill on the river banks. Appiko has found its place in school textbooks and is now lending a helping hand to environmental activism in the neighbouring States of Tamil Nadu and Andhra Pradesh. Appiko has worked in Campaigns to save the Eastern Ghats, Nilgiris, Palani Hills, Wynad and also other states in the North.

* Extract from Article

Steps To Involve Anamalais Tribals In Promoting Agri Biodiversity

By V.S.Palaniappan

Officials of the Indira Gandhi Wildlife Sanctuary (958 Sq.Km area) are taking steps to involve tribals in promoting agricultural biodiversity in the Anamalais. The Wildlife Warden of the sanctuary, V.Ganesan, said ragi, 'varagu', samai, pani varagu, thenai and kudiraivalai and cumbu which formed a major part of the staple in the past, were now becoming uncommon.

These millets could withstand severe drought. All traditional varieties of millets were free from pests and diseases and had good nutritional value.

Pseudo cereals such as amaranth (*Amaranthus frumentaceus*) were rich in dietary fibre, protein, calcium and iron. These lesser known crops grown in tribal and hilly areas should be popularized so as to enrich the diet in the era of fast foods.

Hence, the Forest Department was taking steps to promote cultivation of these crops by involving tribals, providing them with agricultural inputs. The Department also contributed for these inputs, besides funds

from the DRDA.

The Anaimalais was declared a sanctuary and the national park was part in-situ gene bank for many wild genes of crops – rice, numeric, ginger, pepper, banana, mango and amla. In addition, there were traditional varieties of food crops raised as sub-



sistence agriculture, and indigenous varieties were conserved by the tribals.

The Anaimalais, rich in biodiversity, was also famous for anthropological diversity. The indigenous people belong to six social groups including Malasar, Malai Malasar,

It takes on average 41,000 litres of water to produce 1 kg of beef, as opposed to 5000 litres to create 1 kg of rice.

Kadar, Muduvar, Eravallars and Pulayars (around 5,000) were living inside the sanctuary in 36 different settlements. They were traditionally hunters.

These people were doing 'shifting cultivation' in the past. Muduvars were expert agriculturists. Even today many of the communities grew traditional crop varieties under rainfed conditions without chemicals.

The lifestyle of the tribals was such that dependence on forests continued for their nutritional requirement, in addition to food production from traditional agriculture. Four to five species of wild yam continued to play a vital role in the diet of Malai Malasar and Kadars. In addition, honey formed the major portion. Seed amaranth flour, honey and ragi paste and sukkuti keerai were the staple among pulayars in the hills.

Two varieties of rice, two varieties of the-nai, three varieties of ragi, three varieties of seed amaranth, one variety each in Samai and Kudiravalai were under cultivation in inaccessible tribal areas.

These varieties were becoming rare in the plains. The department was taking steps to protect these traditional crop varieties with the support of the tribals. Their traditional knowledge and wisdom had to be documented fully and they had to be compensated for conserving the traditional varieties.

The Department was drawing up major plans to rope in the tribals, who would also help them with employment and earning opportunities.

* Extracts from the Article 06.06.2004.



Wild Life Population at IGWLS

Anamalai's is the home of many rare and endangered species of mammals and birds like elephant, Nilgiri Tahr, leopard, wild dog, gaur, Lion Tailed Macaques (LTMs), Great Pied Hornbills, Ceylon frog mouth, Malabar Great Black wood pecker.

The density of various animals per sq km and population in 958 sq km sanctuary area (given in brackets) are as follows: elephant 1.36 (1,303), Gaur 1.25 (1,198), Sambar 2.75 (2635), Chital 6.2 (5,940), Nilgiris Tahr 9.9 (9,495), Common Langur 14 (13,412), Malabar Giant Squirrel 4.2 (4,024).



Can rural poor contribute to knowledge economy?

Siddhartha Prakash

In 1996, a scientist working with local tribals in the forests of Kerala discovered the potential for a new herbal drug to enhance the immune system. Dr. Pushpangadan sought the prior informed consent of the Kani tribe before commercializing their medicinal knowledge. All royalties and profits from the herbal product called Jeevani were shared equally among the forest dwellers and researchers.

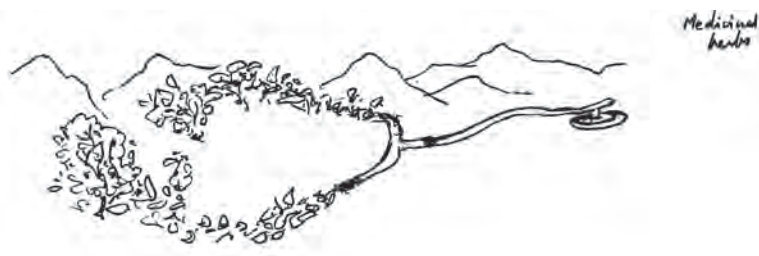
Thus begins the story of how an ancient culture began unleashing its entrepreneurial energy to transform the modern world. The Kani tribe benefit sharing model was the first of its kind and has subsequently been modeled in several countries in Africa and Latin America.

The Kani tribe model provides a small example of the enormous potential for growth in herbal products and medicines derived from the knowledge of rural communities. Today the sale of drugs based on traditional medicines generates over \$ 50 billion a

year. It has been estimated that by consulting indigenous peoples, bio-prospectors can increase the success ratio in trials from one in 10,000 samples to one in two.

Intangible assets

What does this mean for India? Tapping into the local knowledge of tribal communities can provide an effective means of lifting them out of poverty and generating income. Secondly, the country's vast reserve of intangible assets, if effectively harnessed,



can help India achieve the millennium development goals.

Indigenous knowledge (IK), also referred to as 'traditional' or 'local' knowledge, represents the intangible assets (intellectual capital) of local communities, and is a potentially cost-effective and sustainable re-

source in the development process.

Farming technologies

The World Bank funded Uttar Pradesh Sodic Land Reclamation Project provides another example to illustrate the potential in agriculture for IK to help alleviate poverty and empower rural India. The project is a farmer-driven effort to improve soil fertility and reduce the incidence of brown plant hoppers that destroy 40-50 percent of paddy and wheat.

Applying their own knowledge and experiences, farmers reclaimed over 68,000 hectares of sodic land belonging to 247,000 families. They spread gypsum, built bunds, leached the soil, started multi-cropping and green manuring and crop rotation, used compost and ploughed the land. Farmers controlled brown plant hoppers with neem extract, rice husk and green manure. After five years, wheat and paddy yields and incomes had risen by 60 per cent.

India's rich tradition of Ayurveda, Siddha and Unani practices can contribute to improving the nation's ailing healthcare system. Given that India has one of the largest

number of HIV/AIDS infected people in the world, traditional medicines can help save lives.

India has embarked on an exciting knowledge journey led by an army of knowledge workers who run the back offices of the world. But knowledge extends beyond the realms of information technology. It thrives among India's farmers, healers, artisans and rural communities who know best how to make optimal use of their limited resources to ensure their survival.

The time has come to provide due value, recognition and rewards to harness the creative capabilities of local grassroots innovators. The National Innovation Foundation is a step in the right direction.

The Foundation has established an enabling environment to support local innovations in health, agriculture and natural resource management. India's future lies in its dynamic culture of innovation, experimentation and creativity at all levels of society.

(The writer is an economist and has worked in Africa and Asia for the World Bank and the WTO)



Bringing life back to earth

G.Nammalvar

G.Srinivasan

“We have polluted the earth and environment with chemicals. Now it is time to repay what we have taken from the mother earth by resorting to natural farming,” says G.Nammalvar, an agriculture scientist, who has been campaigning for natural farming. His message has already reached farmers of Erode and Dharmapuri. They have adopted natural farming techniques. Now he is concentrating on the Cauvery delta districts, where he plans to take up a padayatra from Poompuhar to the Grand Anaicut to create an awareness of the importance of natural farming.

“In the name of green revolution aimed at ensuring more food production, we have polluted the soil. The name, pesticide, is a misnomer. It should have been ‘biocide’, as it not only kills the pests, but also mingles with crop and poisons consumers. As a result, we now have fruits that contain poison as they have been grown with pesticides. Even mother’s milk, experts say, can contain the effects of fertiliser. In such a situation, only natural farming can serve us,” asserts Nammalvar.

Born at Ilankadu near Thirukattupalli in Thanjavur district, Mr.Nammalvar studied

at the Sri Sivasamy Iyer Higher Secondary School at Thirukattupalli. Later, he went in for B.Sc. Agriculture in the Annamalai University in 1963. He worked as a scientist at the Regional Research Centre, Kovilpatti. His experience in maintaining 158 farm acres there taught him several things about chemical farming and extension activities.



He realized that what was being taught to farmers was wrong. He took up an assignment for the R.P.Dominique Pire Foundation (named after Dominique Pire, a Belgian, who won the Nobel peace prize in 1957). Ten years of experience in the project made him realize that farmers remained poor while traders became rich. Vinoba Bave’s view on education led him to believe that without proper education, the lot of

There are as many as 100 million species on Earth, of which only 1.7 million have been identified. Humans are but one of those species.

farmers could not be improved, and he decided to launch a campaign.

A four-week training in “Renewable agriculture for sustainable environment”, held in 1995, provided him with the base for his action plan. He took the message of natural farming to farmers in Erode and Dharmapuri. He also evolved some techniques. First is preparing compost, especially vermin-compost. “It is unfortunate that we killed all earth worms, and are producing them now. Earth worm is often described as a friend of farmer, as it ploughs the soil by going up and down.” Besides providing employment to farm labourers, vermin-compost improves moisture retention. The second is green manuring, which can be done with 20 plants, including cereals, pulses, oilseeds and spices. After growing them for 45 days, they should be ploughed and mixed with soil. It provides major nutrients to the soil. The third is the integrated pest management. “Cultivate without chemicals—both pesticides and fertilisers” is the motto. Pests can be eliminated by allowing good insects to take on the bad ones, and bio-fertilisers can replace chemical fertilisers.

He also advocates the use of “Amirtha Karaisal”. Over 10,000 farmers in Maharashtra have been using this mixture. It is prepared with one kg of cow dung, one

litre of cow urine and 50 grams of jaggery mixed and fermented for 24 hours. It should be sprayed with ten litres of water. It acts as both pesticide and fungicide. Another bio-friendly solution is ‘Panchagavyam’, which has become popular in the Erode and Dharmapuri areas, and is catching up in the delta districts too. It is prepared with five kg of cow dung, three litres of cow urine, two litres of milk, two litres of sugarcane juice, 800 grams of jaggery and 100 grams of yeast. This will also serve as fungicide and pesticide.

Another of his theory is “Law of Return”. That is, taking what we need and giving back other unwanted things. For example after harvesting the sugarcane crop, the waste such as leaves should be put back in the field, for being mulched. In coconut groves, all coconut products, including the pith and cover, should be put back into the soil and made a bio-fertiliser.

Mr.Nammalvar was also a member of the Indian team, led by Dr.Vandana Siva, which went to Munich in Germany in 2000 to argue India’s case before the European Patent Office over the patent right claimed by a U.S. firm on neem extracts. The office canceled the right claimed by the U.S. firm.

* Extracts1/6/2003



Anthonymsamy's Wonder Garden

R.S.N

"The carcass of dead cattle or jackal is to be skinned. The flesh is to be soaked in sugar crystal solution. Irrigate your fruit trees with this mixture. You will find your tree-branches breaking down under the weight of their fruits." Vriksha Ayurveda verse number 129.

Today Anthonymsamy's fame has spread across Tamil Nadu. It is very difficult to meet him. He is busy giving training in camps organised by the Spices Board, and the Horticultural Department.

Anthonymsamy talks to you in his witty Tirunelveli rural Tamil. He burnt his fingers, listening to the Counsel of Agriculture Department. He tried a goatarie, a grape-orchard, and lost his way in the 'modern agriculture' using chemical fertilizers. He ran into debt running into lakhs of rupees. He was saved by natural farming of Amalaka, (Mynobalan) and Lemon. His produce fetch excellent prices in the market. He also cultivates traditional rice varieties like Jeeraka Chamba and Arcot Kichli. His orchards earned for him millions and saved him from the debt trap. The Green Revolution pushed him into the debt-burden he rues. His is a non-weeding farming technique.

He believes in Green Mulching (interring the greens into the soil) and dry mulching (burying the dry leaves into the soil). The rains drive the organic matter deep into the soil towards the roots of the lemon trees. He believes that grass can act as micro-filter.

The soil in his farm is very light, full of organic matter, a good 15% lighter than other soils. Mulching does the trick.

Anthonymsamy is a multifaceted farmer. He produces hi-brid seeds too and supplies them to Indian Council of Agro-Research. He also cultivates banana, coconut, millets, vegetables including tomato and lady's finger. His lemon trees are of the quick yielding variety. He grafts high yielding modern varieties of fruit trees on the bases of traditional and even wild varieties and achieves incredible amounts



W.D.B. Even a hectare of land in Barmer, Jaisalmer and Bikemer in Rajasthan (rain fall less than 100 mm p.a.) could theoretically yield one million litres of water if harvested.

of yields. He sells the grafted saplings too to others. The wild-modern cross-breeds are disease-resistant.

Anthonymsamy points out to the Western Ghats as his Guru. "I am a student of Na-

ture" he claims. 'I continue to learn from Nature' he concludes. His bumper crops of disease-resistant, very sweet, natural fruits vouchsafe for the truth of his statement.

(Translated from Tamil Dinamani 17/8/2004)

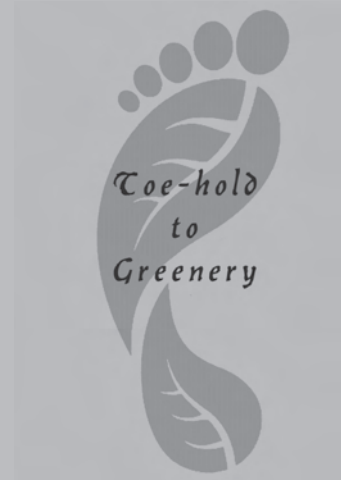


V.ANTHONYSAMY OF PULIANGUDI

Sri Anthonymsamy also cultivated onion, using a concoction of waste fish ensilage and Panchagavyam, as fertilizers and pesticides. He also used a liquor of local leaves, Nochi, Erukku, Arali, Sothukathazai and Pungan as a very useful pesticide – spray. He uses aloe vera and garlic as fungicides. The result was healthy, tasty, large bulbs of onions which could withstand drought conditions. He made a profit of Rs.35,000 per hectare.

Sri Anthonymsamy applies equally effective organic farming practices for sugarcane cultivation. A green manure Daincha was cultivated and ploughed into the soil as manure-base. Application of Panchagavya, yielded 125 tonnes of juicy, thick sugarcanes. Instead of selling the same to the sugar factory, which would have sacrificed all precious mineral-salts from the sugar, Anthonymsamy manufactured his own jaggery, boosting his net-profit. Taste and good health were extra bonuses for his profitable operation.

(Translated from Dinamani)



The Bishnois of Rajasthan

The Born conservators

The Bishnoi community of Rajasthan is well known for its conservation practices.

There are around two million Bishnois in Rajasthan. They are mostly agriculturists but a number of them have taken to business and politics and are powerful politically and economically.



According to legend, the founder of the Bishnoi sect, Jambheshwar Maharaj attracted many Jat followers in the 15th century, promising them they would not have to migrate in years of drought if they followed 29 principles. He proposed the idea of resource optimization, including restriction in cutting and lopping of the khejri tree, rearing camels and cattle and conserving all forms of life. The Khejri, Chinkara and

blackbuck are revered.

The Bishnois have been taught from the childhood that the environment comes first. One life is a small sacrifice while protecting a tree! Modern education too has helped the Bishnois. Earlier generation followed the rules because they were sacrosanct. With education, they make more sense. Protecting the environment allows you to use resources more systematically and efficiently.



W.D.B. There are 1.5 million tanks dotting Rajasthan's 66,000 villages. The state's numerous forts and palaces still boast of rain-water harvesting facilities.

Harsh conditions have made Bishnois good conservators. During 1981, floods devastated agricultural crops in Rewar village. Other communities migrated. But Bishnois moved in with their resource-conservation strategy. They could withstand the ravages of floods which left the well-water unfit for use. The Bishnois functioned more effectively during adverse circumstances.

lution of institutions and practices geared to resume conservation. This helps them secure a foothold in less than optimal conditions.

The khejri is leguminous. It restores nitrogen and micronutrients to the soil. Blackbucks and chinkaras provide the manure. That is why the Bishnois adore them.

What distinguishes the Bishnois is the evo-

**Extracts from the Article 31.7.2000)



A Bio Village

M.J.Prabu

Meekeri calls itself an organic-Bio Village. It is situated 16 km from Udhagamandalam in Tamil Nadu. Under the Hill-Area-Development-programme, Meekeri has been adopted as a Bio-Village with technical know-how from the Institute of Commercial Horticulture (I.C.H) and Tamil Nadu Agriculture University (TNAU). After training the farmers, in organic farming, ICH & TNAU started supplying them Panchagavya, Dasagavya, Biodynamic compost, Vermi compost, Cow pat pit. Azospyrillum, Phosphobacteria, and Bio-control agents such as Trichoderma Viride. Field demonstrations were conducted. Production went up. Costs came down. The Organic Farmers' Association which, was satisfied with the authenticity of the Organic products of Meekeri, makes advance payments for buying them.

The Organic Farmers' Association has 10,000 farmer-members from all over the country. It has 200 outlets to market its branded vegetables "POISON-FREE FOOD". Organic Farming is low budget, risk-free farming say Meekeri Villagers.

(The Hindu)



A True Friend Of Trees

P.Isakki

Shri N.S.A.Velu Mudaliar of Pulian-gudi town, Tirunelveli district, Tamil Nadu has been awarded the prestigious “INDIRA PRIYADARSHINI VRIKSHA MITRA NATIONAL Award. He is 73 years old but keeps himself busy planting trees. He has created a mini-forest on the slopes of the Western Ghats, planting 2500 saplings of Teak wood, Neem, Tamarind and Acacia in a six-acre barren land.

He acquired a barren, rocky and rubble-strewn patch of land in 1986. He divided the land into 100 feet x 100 feet plots and built 3 foot high earthen boundaries around each plot to conserve the run off water from the scanty rains. He had to carry silt from nearby ponds to make his land arable. A seepage pond was dug nearby to collect the rain water. He never allowed a drop of water from his land to go waste.

In the dry seasons, he had to carry water up the slope to keep the saplings alive. In four years it was a mini—forest tempting wild animals to find their new home there.

Deers, hill-goats and wild boars along with their avian friends inhabit his forest. The deers multiply to prove that they are at



home here.

Wearing his honours lightly, Velu Mudaliar slogs on in his dearly loved forest.

(Translated from Dinamani Tamil 6/7/2002).



Don't waste your "Wastes"!

About 550 litres of human urine, and 50 kg of faeces contain 5.6 kg of Nitrogen, 0.4 kg of Phosphorous and 1 kg of Potassium, enough fertilizers to produce 200-250 kg of Food-grain annually!

Her Nature Is To Be Environment-Friendly

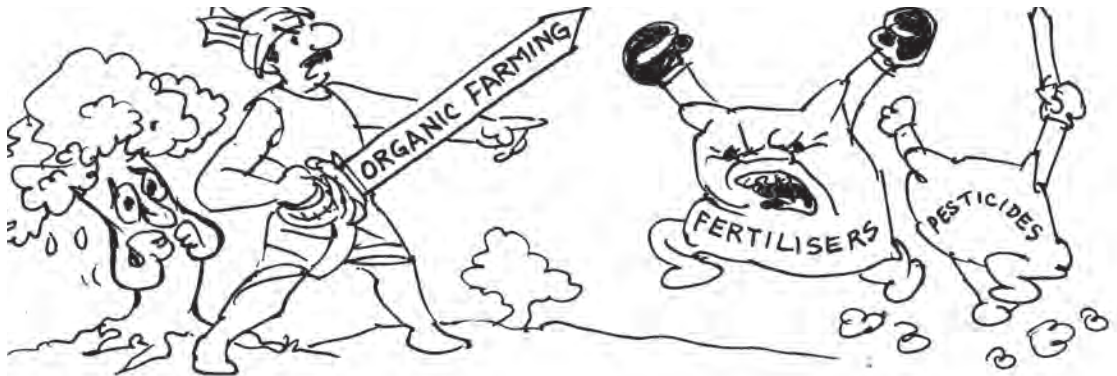
Prathibha Parameswaran

She has always been passionate about nature and the environment. She has been a member of the Coimbatore Environmentalists Club for a decade and coordinator of Nature Clubs in 100 schools in the area.

An associate member at the Salim Ali Centre for Ornithology and Natural History, she is also an avid birdwatcher.

She began to document her interaction with the trainers until she became one herself in 2002.

Though initially she devoted a few hours during week days and entire weekends to learning all about organic farming, her interest in the subject soon prompted her to resign her job as a teacher at PSGG Kanya Gurukulam Higher Secondary School in Coimbatore and apply herself to interact-



Her concern for nature prompted her to learn more about environment-friendly ways of agriculture and soon she was associated with some of the leading trainers of organic farming in Tamil Nadu.

ing with farmers in rural areas and creating an awareness of organic farming among them.

She is also the author of several books on the environment and organic farming such

as 'Pasumai Niraintha Ninaivugalai,' 'Kandanthu Vanda Padayil Kaladi Chuvadukkal,' 'Soil Management' and 'Why Organic Farming Is The Need of the Hour'.

The Executive Director of the Tamil Nadu Organic Farming Trust, M.Revathi talked to Prathibha Parameswaran.

Even while at school, Ms.Revathi had shown a deep interest in studying and observing the environment.

Besides teaching her students what was in the curriculum, she engaged them in myriad activities and environmental projects encouraging them to become sensitive towards the environment.

I found that the cause of their death was due to the consumption of pesticides."

Wanting to know more about the kinds of pesticides used by farmers, she along with some like-minded students surveyed nearby farms in Coimbatore.

She observed that most pesticides left a residue on the plants, which were present even after cooking. But what was the alternative?

She skimmed through various journals and magazines associated with farming and came across organic farming techniques, which eco-scientists such as M.Nammazhvar were trying to popularize during that period.



"Initially I too was skeptical about the idea, but I visited about 25 organic farms with my students and even tried the method in five acres of land that I own. The results convinced me," she confesses.

A major breakthrough in her life, however was her association with the Salim Ali Centre.

"At one point of time, we started getting a lot of dead bird samples, which we sent to the lab for study. I was quite shocked when

Her association with organic farming trainers opened new avenues to explore. She speaks with conviction when she says, "Why do so many farmers kill themselves if artificial fertilizers and manures could retain soil nutrition? My observation has been that even if the land is badly damaged,

The W.D.B.: Trees and other green plants absorb the atmospheric carbon dioxide by a process called photosynthesis. The plants manufacture their food through photosynthesis. They use Co₂ and release Oxygen.

we can make it fertile through organic manures.”

Organic farming is the latest field explored in biotechnology, which effectively uses microbes to increase soil fertility, she says.

She deems organic farming to be the only sustainable method, which could make farmers self-reliant.

“In Sivagangai and Ramanathapuram, thousands of farmers have switched over to organic farming.”

Now, she is dedicated to motivating others to join the trust to become trainers.

The trust has more than 100 training centres across the State, but a larger number of trainers must be roped in to widen the network.

“The next three to five years will see a drastic revolution in terms of farmers returning to organic farming techniques,” she says, with confidence.

In recognition of her works in various areas, Yuvashakthi, a non-governmental organization conferred the Young Environmentalist Award upon her.

She acted as the project coordinator of the team of students who won the national award for the best project at the National

Children’s Science Congress in 2004.

She received the Best Environmentalist Award in 2004, instituted by Vivasaya Ulagam, a magazine.

The Salim Ali Centre also recognized her as the Best Coordinator in 2004.

Talk about the many honours she has received and she is quick to point out that her husband, R.T.Swamy, formerly an officer at the Aviation Department of the Indian Navy, who quit his job to help her, gave her constant support.

“We live on the honorariums and rewards for the articles I get published in different magazines. Financially, it might be a bad phase now, but the movement will gain momentum in a few years time and then it might not be so difficult.”

She has also embarked on a project to bring out Thai Manne Vanakkam, a magazine, through the trust.

As a woman working at the grass-root levels, she says she has encountered lesser obstacles than praise for her work.

“I find it easier to approach women and talk to them about issues such as the presence of pesticides in breast milk. Being a woman trainer is an added advantage,” she says.

* Extracts from the Article 27/2/2005



Cattle-Based Integrated Intensive Farming System

Cattle-based integrated intensive farming system (IIFS) is ideal for small farmers. It is not only eco-friendly, but also much more economical for farmers to raise animals in an integrated farm, according to Mr.P.Gomathinayagam, a pioneer in organic farming in the Pulian-gudi village in Tirunelveli district of Tamil Nadu.

“We have twelve cross-bred milch cows and a stud bull in stall-fed conditions. We make our own concentrate feed by mixing rice bran, green gram pod shells, black gram husks, powdered pearl millet (Cumbu in Tamil) and groundnut oil cake in the right proportions to meet the energy needs of the animals. The cost of the feed works out to Rs.7 per kg, and each milking animal is fed about two kg of the mixture in addition to liberal quantities of rice straw and green fodder,” he explains.

The fodder and the straw and all the ingredients of the concentrate feed are grown in the farm, and cattle relish them well. Besides this feed, the animals are given 400 ml of lime water (calcium rich solution of slaked lime) in order to increase the calcium content in the milk.

“All our animals are periodically vaccinated, and kept in good health by providing regular veterinary care. We lay particular emphasis on the efficient collection of dung and urine.

We have two 3-metre-cube biogas plants, which provide continuous fuel supply to the kitchen.

The slurry from the biogas plant is used in making bio-active inputs such as Panchagavya, vermin-compost and Amirtha Karaisal, which are critical for successful organic farming,” points out

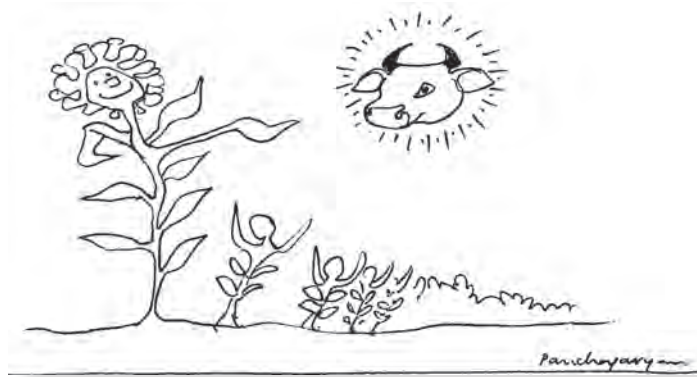


Mr.Gomathinayagam.

“The animals, on an average, yield 50 litres of milk a day, and we sell the milk locally at Rs.12 per litre.

The dairy farm is central to our organic farming as the animals help in efficient recycling of the organic and crop residues

from the farm. Our organic farm provides adequate quantities of high quality, poison-free straw to our animals, and in return the cows provide the much-needed energy for our kitchen and key inputs for making enriched organic manure.



The urine is mixed with the dung for feeding the biogas plants,” say Mr.G.Jeeva and Mr.G.Nallathambi, the two progressive-minded sons of Mr.Gomathinayagam, who

are actively involved in the integrated farming.

The integrated approach makes farming economically rewarding and intellectually gratifying, according to the sons. They also cultivate traditional varieties of rice or fruit trees instead of exotic.

The nutrient-recycling and the preparation of cow-dung and cow-urine- based plant growth promoters such as Panchagavya

and Amirtha Karaisal have proved to be profitable and environmentally sound.

“By feeding the animals with organic rice straw and other crop residues without any insecticides, we are able to keep them healthy, and they yield milk of high quality,” explain the brothers.

* Extracts



Dear Mother Earth

An inveterate fighter for organic farming, Gomathi Nayagam has won prizes for his writings. Students, scientists, organic farmers members of non-government organizations and reporters, come to see his farm and learn from his example. Even ordinary individuals return inspired to do something for Dear Mother Earth.



SECTION - V

End - Angered



*India's Treasure of
Bio-Diversity*

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End - Angered

Prelude

Krish Phidol: What are you pundits doing to preserve the variety of birds and animals many of which help me in breeding better cattle, poultry or milch animals? In pollinating my fields and helping me in general?

Jnani Noval: The issue is much larger. The Bio-diversity, the variety of living beings was for long a neglected field. Now scientists and farmers are waking up. Governments, bodies of scientists, farmers, forest communities and other stake-holders are pooling their resources to preserve, individual living-beings, species, environments and habitats. Knowledge of inter-dependence of man, plants and animals is dawning slowly on our decision makers. And at last, the importance of local people in conservation efforts is being realized more and more, by the administrators. From outside, it seems Governments, fund providers and scientists are seized of the problem. They are laying down the rules, they provide technical and financial help to conserve nature.

Annapurna Duval: Can we help?

Jnani Noval: You can help! Women, rural people, farmers, forest tribes and people living in areas near conservation-sites have a lot to contribute. The government

officials and scientists have conceded that earlier attempts to conserve life forms and sanctuaries failed because the local people were not involved.

Krish Phidol: Tell us how we can help!

Jnani Noval: The local people should not be considered a nuisance. They have the accumulated wisdom, the traditional wisdom, the knowledge of local areas. They instinctively relate to the season, the species, the land and build themselves into nature's schemes. They may not be able to talk in seminars, or read research papers but they have the wisdom gained by repeated exposure to field conditions, added up through generations. **Scientists can also learn from them.**

Annapurna Duval: What is there on the ground, as solid achievements born of this new-found awareness?

Jnani Noval: Protected areas, wild life refuges, sanctuaries and bio-reserves both marine and inland, have come up, in many



parts of the country.

The lion, rhino and many other animal populations have actually gone up. The officials claim, disputably, an increase in the tiger population too! Their habitats, are given the status of Nationally Protected Areas. Various endangered species have been identified, and the intensities of dangers



have been measured. Priorities are decided. Conservation bodies involve academics, politicians, field-scientists, area-specialists and the local people. Area-wise, category-wise, animal specific, protection measures have been taken up. Conservation has to be done, accommodating the local livelihood compulsions, tourist interests, other economic considerations, such as collection of forest products or fishing. Dangers such as poaching, the bone and skin trade, and the lures of selling endangered animal parts/products for medicines are being tackled, with the help of enactment of and proper implementation of conservation laws. Innovative methods of weaning people away from deforesting the area have been designed and are being implemented.

Krish Phidol: The problems are as complicated as life itself.

Jnani Noval: In spite of our sketchy designs, laws with sieve-like loopholes and their poor implementation, India has succeeded in remaining as one of the Mega Biodiversity Regions of the world. With much better knowledge and purposeful administrations and more funds, many developed countries have failed in saving their wild life species.

India is winning in spite of constraints.

Annapurna Duval: India has an image of a nature-loving country and preservation of variety comes naturally to us.

Jnani Noval: When the culture itself is getting eroded all the consequent

advantages will be also lost!

Annapurna Duval: And when Nature suffers, mankind also suffers! When my daughter goes away from my village, she forgets the folk songs, village jokes, rural slang and household arts.

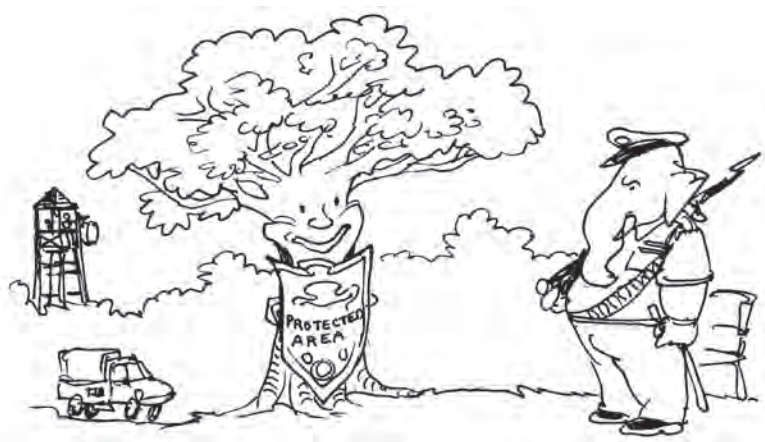
Jnani Noval: The same thing happens when birds/animals have their environment destroyed or degraded. Their songs are forgotten, their calls and cries lose their diversity, they become less cooperative and more quarrelsome. Their reproduction cycles get upset.

Annapurna Duval: The sooner man realizes that the degradation of the environment degrades him too, affecting his livelihood skills, communication skills, ease and enjoyment, work efficiency, the sooner will he try to go back to nature.

Nationally Protected Areas

There is an ever growing awareness of the need to protect valuable scientific reserves, monuments, national parks of international significance, wild life sanctuaries, landscapes and seascapes and the like.

at least 1000 hectares that fall into one of the above mentioned categories. The Latin America and the Sub-Saharan region contained over 1400 thousand sq. km of protected areas forming over 6 per cent of land area, next only to the high income group.



The high income countries protected nearly 3300 thousand sq. km in 1999, working out to nearly 11 per cent of total land area according to the statistics put out by the World Development Indicators, 2001. Nationally protected areas are incidentally of

protected area was double that of Mexico.

A study shows that Ecuador had the highest percentage of protected area to the land area followed by Venezuela in 1999. India had close to 5 percent of protected area.

Among individual countries, the U.S. had a large protected area of more than 1200 thousand sq. km in 1999 and this is the largest for any single country. The African countries too have fairly large protected areas. Namibia, Botswana, Congo Democratic, Ecuador and Tanzania all have more than 100 thousand sq. km of protected area. India's pro-

The Living Planet Index (LPI) and the vanishing wildlife

The WWF's Living Planet Index, which tracks the fortunes of nearly 4000 populations of 1,477 vertebrate species from 1970 to 2005, showed an overall decline of 27 per cent. Over-fishing and hunting, along with farming, pollution and urban expansion, were blamed.

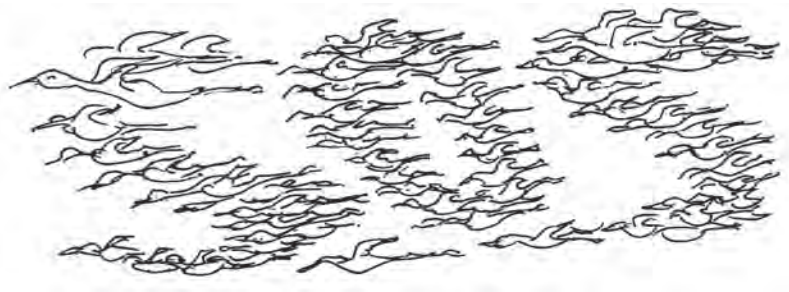
WWF Director General James Leape warned: "Reduced biodiversity means millions of people face a future where food supplies are more vulnerable to pests and disease and where water is in irregular or short supply. No one can escape the impact of biodiversity loss because reduced global diversity translates quite clearly into fewer new medicines, greater vulnerability to natural disasters and greater effects from global warming."

The marine LPI showed a 28-per cent decline with a dramatic drop between 1995 and 2005. The overall freshwater LPI fell by 29 per cent between 1970 and 2003. Swordfish numbers plummeted by 28 per cent in the decade from 1995. Ocean

birds suffered a 30 per cent decline since the mid 1990s.

"Biodiversity underpins the health of the planet and has a direct impact on all our lives so it is alarming that despite an increased awareness of environmental issues we continue to see a downward trend," said Colin Butfield of WWF-UK.

The conservation charity warned that a failure to halt biodiversity loss would have negative impacts for humans. In the next 30 years, climate change is expected to become a significant threat to species. The declines come at a time when humans are



consuming ever more natural resources, and are now using 25 per cent more than the planet can replace, it said.

The WWF urged governments to take action to reduce the rate of biodiversity loss by 2010, employing cross-Ministry protection plans. They should set up financial incentives to support the establishment of protection zones, it said.

“The fact that human activities have caused more rapid changes in biodiversity in the last 50 years than at any other time in human history should concern us all,” said Britain’s Biodiversity Minister Joan Ruddock.

(AFP/WWF Sources)



WHAT IS A TREE WORTH?

A fifty-year old tree produces Rs.2.5 lakhs worth of Oxygen in its life time. It yields 50 tonnes of timber. It saves us Rs.5 lakhs by preventing air-pollution. Preventing soil erosion and increasing soil-fertility, a tree saves us Rs.2.5 lakhs. The tree also perpetuates itself through its seeds. Water re-cycling activities of a tree, and moisture control in the atmosphere, make a tree worth another 3 lakhs. The protein supply by a fruit tree could be worth Rs.20,000/-. In all a tree in its life time saves us/yields for us Rs.15.70 lakh worth goods and services. In 2008 prices, this could be worth Rs.20 lakhs.

(Dinamani 9-8-2004)

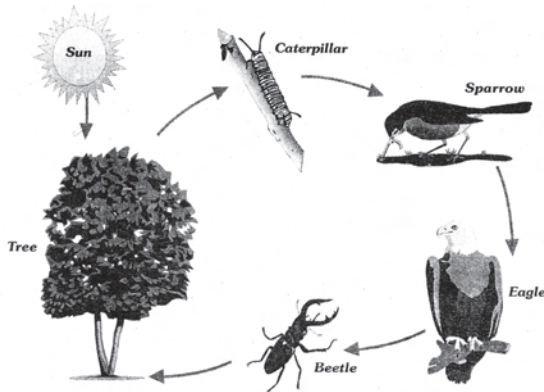


Measures to conserve its rich biodiversity have not been sufficient. Despite many laws in place (Wildlife Protection Act, 1972, Forest (Conservation Act), 1980, Biological Diversity Act, 2002), the report admits that there is lack of effective enforcement of the laws to protect biodiversity

Why is Biodiversity Necessary?

The food chain

The building blocks of plants, animals and humans are identical, and are made up of



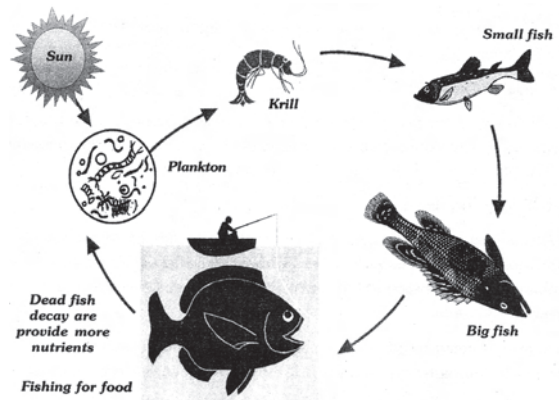
The chain that links consumers to producers is called the food chain or web of life. every living creature is found on a food chain. There are several food chains and depending on the environment, it can be complex or simple.

All life on earth is interdependent and man is only a strand in this delicate web of relationships.

Food chains in water

Consider a very short and simple food chain in water. Green algae are eaten by water fleas, which are in turn eaten by hydras. An example of a slightly longer chain

the four elements, namely, carbon, oxygen, nitrogen and hydrogen. These elements are available in the environment-in air, water and soil. However, only green plants can absorb nitrogen from the soil through their roots, and use sunlight and water by a process called photosynthesis to produce energy. They are known as producers. Animals and humans get their food only by consuming plants or other animals. Therefore they are known as consumers.



is, plankton-krill-small fish-predator fish-seal-man.

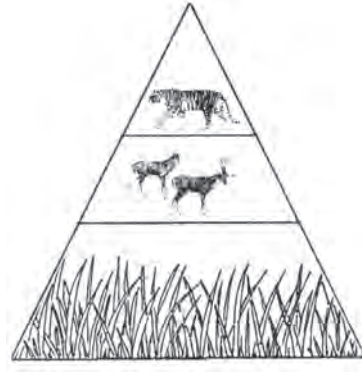
Food chains on land

Caterpillars feed on green leaves and are eaten by small birds like the sparrow. Carnivorous birds like the eagle hunt the sparrows. When the eagle dies, its remains are returned by other insects like the sexton beetle to the soil, where they become nutrients for the tree.

Green grass is eaten by grazing animals like the deer, bison, zebra and cattle. These are in turn eaten by carnivores like the lion, tiger, leopard and man. Grasshoppers eat grass and are themselves eaten by frogs. Snakes eat frogs and rodents.

Fig trees are pollinated by tiny insects called fig wasps. The female wasp enters a fig flower to lay her eggs and dies. In the process she brings in fig pollen which fertilizes the flower to produce the fig fruit. The eggs develop in the flower to larvae which feed on the fruit and become adult wasps that mate within the flower. The female wasp-whose life span is only two days-then leaves that flower covered with the pollen in search of a fig in flower. Thus both fig trees in fruit and in flower should be present throughout the year. Fruit eating mammals hence have figs throughout the year and help in the dispersal of its seed just as they disperse seeds of other fruits. Therefore other plants are also dependent on the fig wasp which initiates the pollination process.

All food chains are fragile. If a link in the chain is broken, it sets off a series of reactions.



If snakes are destroyed the population of rats and moles would increase dramatically and they would devour crops and grains at an alarming rate.

The use of pesticides destroys insects, but this also starves the birds. The predator birds dependent on small birds and rats for their food then reduce in number and the rat population will go unchecked.

If the predator animals are hunted down, the grazing animals multiply in large numbers and will eat up all the green grass, leaving the land barren and unproductive.

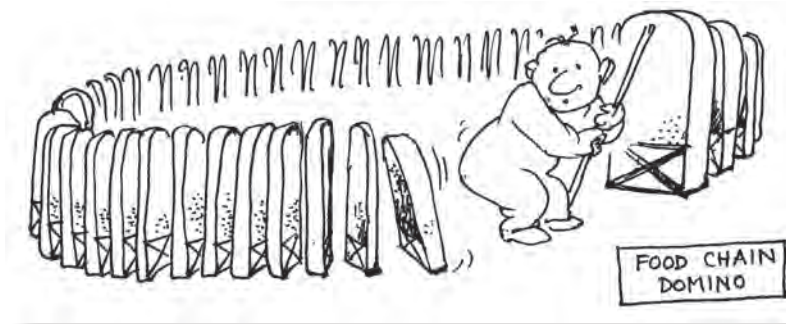
In contrast, if the predators were in excess of the grazing animals they would overrun the land and man, himself short of food, will become their prey.

When the ocean currents become unusually cold, plankton do not survive and this ultimately leads to the death of seals-the

Much of India's forestland has been given away for industrial and infrastructural activities. Since the enactment of the Forest(Conservation) Act, 1980, about 15,000 projects involving 1.14 million hectares of forest have got official clearance

staple food of the Eskimos.

“So long as this earth is full of nature (wild plants and animals), the human race is going to flourish”



Charakasamhita (4th – 5th A.D.)

The seriousness of the problem is multiplied enormously when the plants become extinct, as they form the base of the

ecological pyramid constituting the “primary producer” of the food chain upon which depend all other species, the better will be equipped to manage ourselves.

An important conclusion that can be drawn on studying the food chain is that the amount of green plants in any environment should be much more than the animals or insects that feed on them and they in turn should be in excess of the predator species. This is the origin of the famous Chinese saying that “only one tiger can live on a hill”. In the ecological pyramid only one consumer is shown at the apex while the broad base is filled with the green plants.

The greater the diversity of wild species, the greater is the opportunity for the production of new varieties. Almost all crops and livestock on which we depend for food production are hybrids – the result of cross breeding – originally from wild species. Compared to their wild ancestors, hybrid species are vulnerable to an epidemic or any abnormal climatic variation, which may completely wipe them out. Without their wild ancestors, it might not be possible to replace them.

Thus the importance of each and every creature in the web of life is evident. Tampering with the food chain only produces negative results, leading to the destruction of species. This shows why biodiversity and all its components are essential to maintain the balance of nature. Man is only a strand in the delicate web of relationship in the global ecosystem. Every time a species becomes extinct, the strand is broken and man himself moves closer to his doom.

The greater the variety of wild life we conserve, the more will we be able to learn from it.

(Extracted from the Book: Biodiversity C.P.R. Environment Education Centre, Chennai 600 018. (2005)



Conservation of Biodiversity

1. Why Biodiversity Conservation?

- a) Biodiversity Conservation leads conservation of ecological diversity. Continuity of food chains is preserved.
 - b) The genetic diversity of plants and animals is preserved.
 - c) Sustainable utilization of life support systems on earth is assured.
 - d) It provides vast knowledge of potential use to scientists.
 - e) A reservoir of wild animals and plants is preserved. The species can be introduced elsewhere if needed.
 - f) Recreation and Tourism are served.
 - g) Conservation is an insurance policy for the future.
- b) A Global Environmental Facility has been established by the World Bank and the UNDP for funding conservation programmes (1980).
 - c) A global biodiversity strategy has been set in place (1982). Bodies such as World Resources Institute, World Conservation Union, UNEP, 40 NGOs and Government agencies are involved.
 - d) On the sidelines of Rio (1982) a convention of Biodiversity was held, involving 150 countries. The conservation pro-

for forest-clearing in Brazil has helped in preservation of forests.

2. What is the world doing to preserve Biodiversity?

- a) The world is making policy amendments regarding land tenure, rural development, family planning, subsidies for pesticides and subsidies for fuel energy. For example removal of subsidies

would be aided legally, financially and technologically. Priorities would be



Over 40 per cent of India's forests faces different levels of degradation. The plan blames domestic demand for timber, fuel-wood and grazing for the crisis. About 80 per cent of the forest area faces heavy grazing while fire affects 50 per cent of the forest cover

fixed. Both conservation and uses will be attended to.

- e) A programme of action for Biodiversity conservation for the 21st century was designed.

3. What is ex-situ Conservation?

Conservation of Biodiversity outside the naturally occurring areas is called ex-situ conservation. Animals and plants are reared in Zoological or Botanical parks and are introduced into former habitats or new areas. For example the Gangetic gharial has been reintroduced in the rivers of UP, MP, and Rajasthan where it has become extinct. Seed banks, botanical gardens, horticultural gardens and recreational gardens are important in ex situ conservation.

4. What is in situ conservation?

Conserving animals and plants in their natural habitats is called in situ conservation a)

National Parks b) Sanctuaries c) Biosphere Reserves d) Nature Reserves e) Reserved and Protected forests e) Preservation plots and f) Reserved forests—are established for this purpose.

5. What is agrobiodiveristy Conservation?

With the introduction of hybrid cotton, tobacco, sugarcane, sunflower, soyabean etc., some farmers became victims of monoculture, in their greed for money. Many indigenous varieties were lost. The hybrid varieties become more susceptible to disease and pests. Traditional wild varieties are to be conserved for future use in the event of any epidemic which could completely wipe out the hybrids. Every farmer, gardener and cultivator should help the institutions for helping in preservation of Biodiversity in agriculture, dairy, fisheries etc.

(Biodiversity Op. Cit)



Wildlife Refuges

(Conservation sites of India)

1. Introduction:

Conservation of wild-life has been a tradition, strengthened by Indian Laws :

1. The elephant preservation act (1879)
2. The Indian fisheries act (1897)
3. Wild birds and Wild Animals protection act (1912)
4. The Indian Forest Act (192)
5. Bengal Rhinoceros Act (1932)
6. National Park Act (1936)
7. Bombay Wild Animals/Birds Act (1951)
8. The Wildlife Act (Protection) (1972)
9. The Forest Conservation Act (1980)
10. Wildlife Protection Act (Amendment-1991) and
11. The Conservation of Forest/Natural Ecosystems Act (1994) have been enacted for this purpose. In addition, the Cruelty Against Animals Act (1960) also helps in this purpose.

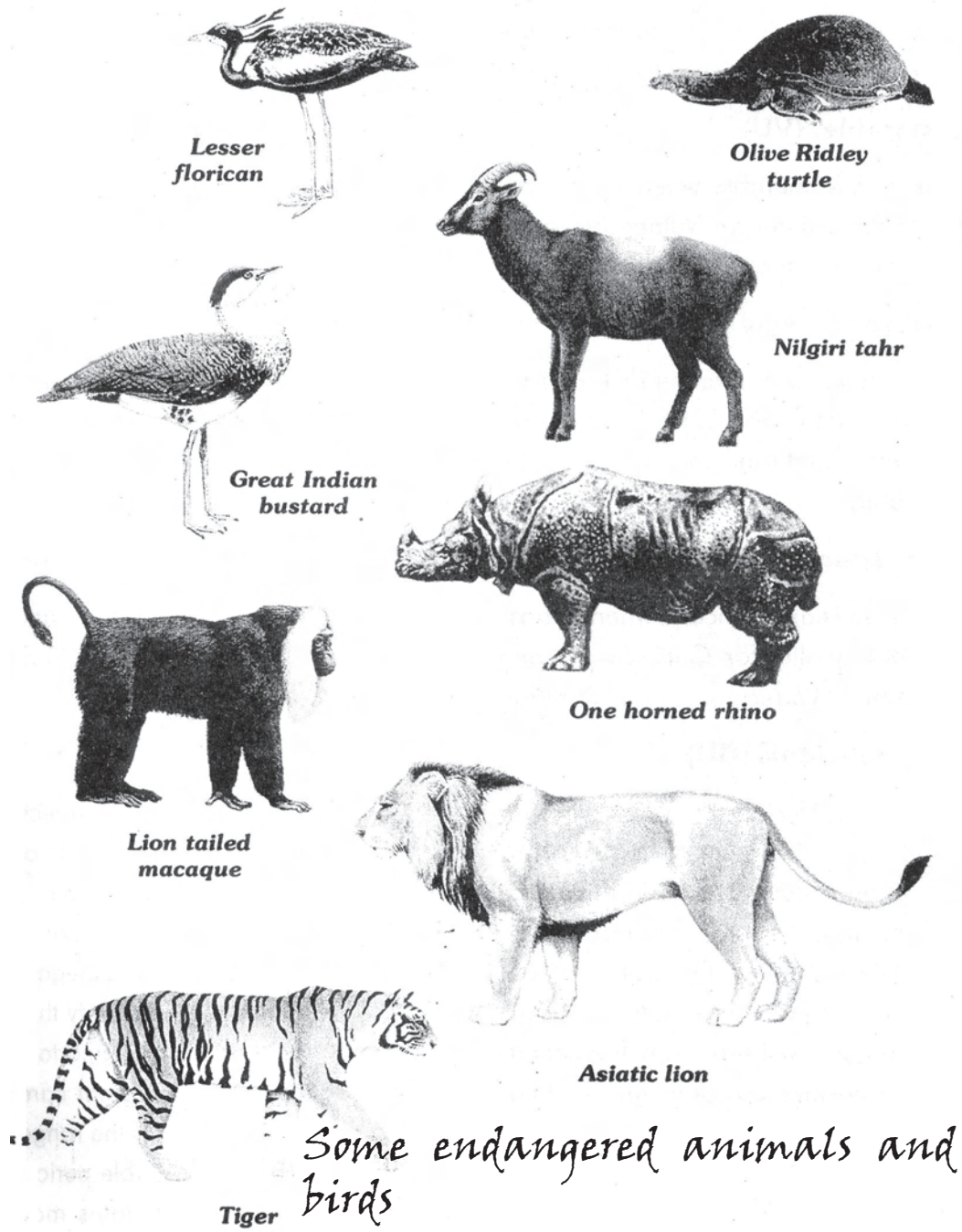
2. Wildlife Sanctuaries (WLS)

India has established 709 WLS covering an area of 133960.47 sq km or nearly 4% of India's total area. Except for the two sanctuaries of more than 5000 sq km, most

are less than 10 sq km in area. Of these, Andhra Pradesh has 22 WLS over an area of 12660 sq km. Other states are 2) Arunachal 11 (7606 sq km) 3. Assam (150 (883 sq km) 4. Bihar (12) (3000 sq km) 5. Chhatisgarh 10 (3419 sq km) 6. Goa (6) (650 sq km) 7. Gujarat 21 (16422 sq km) 8. Haryana (8) (280 sq km) 9. Himachal (32) (5770 sq km) 10. Jammu Kashmir (15) (10312 sq km) 11. Jharkhand (10) (1863) 12. Karnataka (21) (3888 sq km) 13. Kerala (12) (2143 sq km) 14. Madhya Pradesh (25) (7158 sq km) 15. Maharashtra (35) (14376 sq km) Manipur (3) (393 sq km) 17. Meghalaya (3) (34 sq km) 18. Mizoram (4) (771 sq km) 19. Nagaland (3) (20 sq km) 20. Orissa (10) (6969 sq km) 21. Punjab (10) (317 sq km) 22. Rajasthan (24) (5713 sq km) 23. Sikkim (5) (265 sq km)



India now has just 12 varieties of food, which provide 80 per cent of the food energy. Changing lifestyles have affected variety, taste and nutritional value of food



National Parks of India



24. Tamil Nadu (19) (2540 sq km) 25. Tripura (4) (604 sq km) 26. Uttar Pradesh (23) (5222 sq km) 27. Uttaranchal (6) (2395 sq km) 28. West Bengal (15) (1203 sq km) 29. Other Small States/UTs-(10) (510 sq km).

3. National Parks

There are 92 NPs and 74 more NPs are proposed to cover a total area of 15.67 million hectares. Majority of the NPs have an area of 100-500 sq kms and there are seven parks with an area each of more than 5000 sq km.

4. Biosphere Reserves: (BSR)

India's 13 BSR include one Marine BSR. (See separate article on BSRs)

5. Botanical Gardens

These are ex situ conservation of plant species at Regional or National level. They are 78 in number.

6. Zoological Parks (ZP)

Rare and threatened animals are conserved ex-situ in ZPs. 109 ZPs serve this purpose. 53 deer parks, 13 safari parks, 7 snake parks, 26 breeding and education centres and 7 aquariums work for specific species. 307.84 (Biodiversity Op. Cit)

Agricultural biodiversity has been declining in India with more number of crops being commercially cultivated. Number of varieties grown under different agricultural systems has also fallen. Over 300,000 samples of indigenous plants kept in the National Gene Bank have gone out of cultivation

Biosphere Reserves of India

The World now had 425 Biosphere Reserves (BSRS) in 95 countries. Indias BSRS are as follows:

1. Agasthiamalai BSR:



In Kerala is spread over 1701 sq km and includes Neyyar, Peppara and Shendumey wildlife sanctuaries (WLS). The Agasthyavanam special division is also included in it. This is likely to be extended to Kanya-

kumari and Tirunelveli districts of Tamil Nadu, the Mundanthurai Tiger Reserve and Kalakkadu WLS. Thorns, moist desiduous and semi evergreen are the forest types. It is rich in plant and animal diversity with many endemic plant and animal species unique to the Peninsula. 35 plants are endangered or threatened. Forests occur at heights less than 300 m to 2800 m (Ag-



asthyakudam). 2000 plant species, 30 new plants (discovered) 100 endemic plants, 50 rare plants mark this BSR. Rudraksha Tree, Black plums, Gaub tree, wild dhaman are the endemic plants. Snakeroot, Cardiospermum, Tapervine, Serpentinewood, Laurel leaf greenbrier are the typical plants.

The Endemic fauna include Lion-tailed Macaque Slender Loris, Great pied hornbills etc. The tigers here are endangered and conserved at great cost. Hydal and irrigation projects, plantations with their cultivation of exotic plants, tourism threaten this BSR.

2. The Dihang-Dibang BSR



Covering an area of 5111 sq km in the state of Arunachal Pradesh, this is the last stronghold for many Himalayan species. Subtropical, broad leaved, subtropical-pine, temperate broad-leaved, temperate conifer, subalpine woody shrub, alpine meadow, bamboo brakes and grass-

land. It is a BIO DIVERSITY HOT SPOT OF THE WORLD. 1500 flowering plants including the rare orchid Vanda, 50 species of Rhododendron, are found here. Saprophytes like Indian pipe, parasites like Epipogium occur here. "Primitive" families such as charles raffill, Ribbon wood, are worth mentioning. The Rare and Endangered species are Rough Tree Fern and Indian Gold Thread. The Endemic flora are Cyathea (tree fern) Begonia, Lady's slipper orchid.

The endemic fauna include, Red Panda, Himalayan black bear, Green pit viper, and Takin.

45 species of moths, butterflies and insects, 195 species of birds including the globally threatened pale-capped Pigeon are located in this area. Purple Cochoa, Nepal Cutia, and pale blue fly catcher are found here. The Wedged Billed Wrenbabler, one of the rarest members of the Laughing thrush and babbler family has been found in the Dibang Valley. 3 new species have also been reported.



The faunal wealth includes, leopard, snow-leopard, golden-cat, jungle-cat, marbled-cat and leopard cat. The critically endangered musk deer is found in the thick forests. Gaur, serow, Himalayan black bear, sloth bear, Indian wild dog, red fox, deer, Assamese macaque, otter, squirrel and civet

add to the biodiversity of this Reserve. This reserve is facing the threat of poachers and collectors of medicinal plants.

3. Dibru Saikhova BSR

Spread over an area of 765 sq km in the state of Assam, the Dibru-Saikhava BSR



hosts Sarpagandhi, Benteak, and the orchid Livistona as its endemic flora. The endemic fauna are white-winged wood duck, Hollock-gibbon and wild-baffalo. The wild-life sanctuary and National Park named after Dibru-

Saikhowa are located within the BSR. The bio-geographical properties of both the Indian region and the Malayan sub-region are found here. Semi-evergreen, deciduous, littoral, and swamp forest types are seen here. Patches of wet-evergreen forest are also there. The entire reserve is a flat terrain in the flood plain south of Brahmaputra. A large number of perennial and seasonal channels cut across the area of the BSR.

The flora of the BSR include, Indian willow, Blume Javanese bishop wood, Honda Para tree,



Nearly 140 native breeds of farm livestock are facing survival threat. Low genetic diversity in natural conditions has affected the evolutionary development of indigenous wild species

Red-silk Cotton tree, Landia, Indian Seaside oak, Taungpienne, Indian rose chestnut, Sissoo, and Ficus. The orchid varieties commonly found are Blume saccolabium blumei Luidley, and Rattlesnake-tail orchid. A variety of grasses such as Giant Reed, Flute Reed, Japanese blood grass, and Saccharum sp. The medicinal plants, serpentine wood, Chaulmoogra tree, Conessi tree, Spiral ginger, Winged yarn and Air Potato Vine are the threatened species.



screw pine, blume areca, Buddha's Coconut, Morning glory, Beaf wood, Nipapalm, White sins, Makok fem, Lagarto Caspi. Indian black bery, Rudhraksha, Sea Mohwa, Red Mangrove, Large leaved orange mangrove, Tagal man-

36 species of mammals including 12 coming under the schedule of protected animals populate the area. The famous Royal Bengal Tiger, leopard, clouded leopard, jungle cat, sloth bear, golden jackal, dole, small Indian Civet, small Asian Mongoose, other, Malayan giant squirrel, Palla's squirrel, giant flying squirrel, Gangetic dolphin, Asian elephant, barking deer are some of them. A large variety of turtles, fish and lizards populate the area because its nearness to the Brahmaputra. Also recorded are 350 resident and migratory birds-pelicans, grebe, stork, duck, pochards, florican, hornbill and babblers.

grove, bamboo and canes also occur here. The characteristic Tree Fern, and the beautiful ornamental orchid, Phalanopsis are confined to the Southern most island.



The endemic fauna, crab-eating Macaque, Nicobar Megapode, Giant robber Crab, Nicobar Serpent eagle live along with the saltwater crocodile, Giant leather-back Turtle, Malayan box turtle, Nicobar Tree shrew and reticulated python, Andaman wild boar, palm civet, fruit bat, Nicobar pigeon, white bellied sea-eagle, Nicobar serpent eagle, water Monitor lizard also live here.

The Annual floods in the river, Grazing and siltation threaten this BSR.

4. The Great Nicobar BSR

This isolated BSR in the state of Andaman and Nicobar islands, extends over an area of 885 sqm. The endemic flora, Screw Pine, Nipapalm, Ceylon iron wood etc. growing in Virgin lush evergreen dense tropical forests are kept absolutely undisturbed. Five species of Ficus, two species of Gall nut,

The threats to this BSR include hunting by protected tribals and poaching.

5. Gulf of Mannar BSR (GOM)

Extending over an area of 10,500 sq km. in

the State of Tamil Nadu, the GOM is the only Marine BSR in India and therefore is unique. The BSR includes The Gulf, the adjoining



coastal area and the islands dotting the Gulf. The BSR includes the Marine National Park. The

endemic flora, Morning glory, Jatropha and Halophila grass thrive alongwith 160 species of Algae. 30 of these Algae are edible seaweeds. Sea grasses flourish here, supporting the sea-mammals (dugong). The islands grow mangroves, that include the 1. Red, 2. Black 3. Large-leaved orange and 4. Tagal varieties. The GOM supports 46 endemic plant species.

Beautiful coral reefs harboring a wide of variety marine vegetation and animals are characteristic of this GOM. Edible



bivalves, sea anemones and sea cow (Dugong dugon) occur in this reserve. The invertebrates include 280 varieties of sponges, 92 species of corals, 22 species of sea fans, 160 species of polychoates, 35 species of prawns, 17 species of crabs, 7 lobster species, and 103 species of echinoderms.

Threats 1. Illegal coral mining for cement

industries killing 65% the coral reefs 2. Indiscriminate collection of sea-grass.

6. Khanchendzonga BSR

The Khanchendzonga BSR located in the State of Sikkim extends over an area of 2619 sq kms. The Khanchendzonga National Park on the North, and reserve forests in the South and the West, are included in this BSR.



It is a high altitude reserve with the Peak Khanchendzonga within the Reserve. Lofty, picturesque and beautiful peaks (5825 m. and above) Glaciers, high altitude lakes, mark this Very-high-altitude eco system.

The forests are 1. Subtropical broad leaved hill forests 2. Temperate broad-leaved forests 3. Himalayan Wet temperate forests 4. Mixed conifers forest, 5. Sub-alpine forest and 6. Dry alpine forest. The temperate forests house phalat, shrub leave oak. Ghoge Champ, and cinnamon. The mixed coniferous forests are formed by fir, East Himalayan fir, Maple, spruce, Juniper and Rhododendron.

Primrose, Rhododendron, bottled gentian and stagger weed form the common



About 90 per cent of India's traditional herbs are being traded, India's share in the global complementary medicine market valued at us \$62 billion is only 0.3 per cent, out of which 70 per cent comes from the export of raw materials

plants of the Alpine forest here. Medicinal plants, Aconite, Kutki, Spikenard, Rhubarb and Ginseng are being harvested. The endemic plants are 1. Anemone 2. Uvaria 3. Sikkim Rhododendron 4. Sikkim Mahonia.

The alpine and the plateau regions are home to rare and endangered species of animals. The snow leopard is at the apex of the biopyramid. Himalayan red Panda, muskdeer nayan, the Tibetan Sheep, bharal, the blue sheep, Himalayan Tahr, marcopolo sheep, marmots etc. are important faunal species. A wide variety of snow-cocks, pigeons and eagles are the important bird varieties. Of these, Monal Pheasant and Snow partridge are endemic to this area.

The main threat to conservation arises from Landslides, loss of soil and the resulting in restrictions to Migration.

7. Manas BSR

Assam's second BSR is located at Manas, a 2837 sq km stretch named after Manasa (Durga Devi). The humid climate is conducive to Biodiversity. tropical, humid, Bengal Rain forests of the Indo-Malayan realm is represented here. Manas is a UNESCO approved World Heritage Site. The two major Biomes 1. The grass-



land biome (Savannah and Teri) and 2. The forest biome (Bengal rain forests) host a total of 543 plant species. They include 30

pteridophytes and gymnosperms and 139 monocots and 37 dicots. The Endemic flora are Catechu tree, Sissoo and white Siris.

The faunal wealth is marked by 61 mammal species, birds (327 species), reptiles (two species), amphibians (7 species) and fishes (54 species). The rare animals Hispid hare, pigmy hog, golden langur are seen here. Of course Manas has won fame for its Rhinos, tigers, elephants, wild buffaloes, wild sambars, boars, Swamp deers and hog deers. During winter, Manas is visited by migratory birds aplenty. River chat, fork tails, Cormorants and ducks like Ruddy Shell. Regular woodland birds, Indian Hornbill, and Pied Hornbill are also found here.

The smallest and rarest wild suid Pygmy hog exists only in Manas and nowhere else in the world. The Assam roofed Turtle, the least known of the species is found in Manas. The IUCN has listed it for conservation. The pygmy hog, Golden langur, Assam roofed Turtle are the endemic species of fauna.



The Bodos depend upon these forests for fodder, timber, firewood, thatch, wild vegetables, fruits and fish.

This BSR is threatened by soil erosion, weed infestation and trans-border management.

8. Nandadevi BSR

The Himalayan Zone of Biogeographic zonation has its BSR representation in the Nandadevi BSR of Uttarakhand. This includes the Nandadevi National Park and



the Valley of flowers National Park. It is a World Heritage Site (1991). The Nandadevi peak and the major portion of Chamoli district are included in the Reserve. The forest here supplies the local people all their fuel, fodder, timber, leaf-litter for organic manure and many medicinal plants.

1. Temperate Forest 2. Sub-alpine forest 3. Alpine land form the forest types here. The 800 types of plants recorded here include 1. Silver weed 2. Fairy Candelabra 3. Fairy Primrose 4. Salep orchid and 5. Rhododendron-Satsuki azalea, all endemic species.

The rich fauna as surveyed by the Z.S.I. show mammals (18 species) and birds (200 species). Seven mammals and 8 birds are endangered. Snow Leopard, Black bear, Brown bear,



Musk deer, Himalayan Tahr are the endangered mammals. Monal pheasant, koklas pheasant, western tragopan, snow cock, golden eagle, steppe eagle, black eagle and bearded vulture are the endangered birds.

Poverty, remoteness, small size of the holdings and illiteracy are the main problems. Agriculture and sheep rearing are the main occupations. The Bhutas here had a flourishing barter system with Tibetans, thus mastering trans-Himalayan trade (prior to 1962).

Collection of endangered medicinal plants, forest fires, poaching, influx of pilgrims add to the threats.

9. The Nilgiri BSR

Spread over the southern states of Kerala, Karnataka and Tamil Nadu, the Nilgiri (BSR) has an area of 5520 sq km. Wide



ranges of ecosystems and species diversity made this the first BSR in the country. The Malabar rain forests are the main forest type. The Mudumalai WLS (wild life sanctuary) Wyanaad WLS, Bandipur NP, Nagarhole NP, Mukurthi NP and the Silent Valley are the protected areas within the reserve.

1. Thorn scrub forest 2. Dry-deciduous forest 3. Moist deciduous forest 4. Wet evergreen forest, 5. Montane forest 6. Shoals,

Grasslands, rivers, wetlands and coastal and marine ecosystems are under threat causing widespread damage in support system for various species

grass lands, marshes and swamps are found within the BSR. Woody climbers are also found here.

The very rich floral diversity is exhibited in 3300 species of flowering plants (132 endemic to this BSR). The genus *Baeolepis* is exclusively endemic to the Nilgiris. The plants Carolina allspice, Dogbanes, False thorn are entirely restricted to the Nilgiri BSR. Orchids (175 species) are rich in variety here. Eight species are endemic to Nilgiri BSR. The endangered species are Vanda, Lily leaved twayblade, Medusa's head orchid, October ladies tresses, and Chi-tou wind orchid.

The rich varieties of trees support a thriving timber trade,



sandal, Indian Rosewood, jackfruit, jamun, ironwood, rhododendron and hill-gooseberry, are the important ones. Orchids are many in types. The unique Kurinji shrub that produces a blue flower reportedly once in 12 years lends the name to the mountains here. Black pepper and numerous herbs are of economic importance.

The faunal wealth is equally diverse. 100 species of mammals, 350 species of birds, 80 species of reptiles and amphibians, 300 species of butterflies, many invertebrates endemic to the area live here. Fresh water fish (Pearl danio) (3 species) are restricted to this reserve. The Nilgiri gaur, Indian el-

ephant and Marten are found here.

Tribal groups such as Todas, Kotas, Irullas, Kurumbas, Paniyas, Adiyans, Edanadan-chettis. Cholanaicken (hunters and fisherman) Allar, Malayan etc. are native to this reserve. They are mostly agriculturists.

The threats to the reserve come from human interference, development projects, hydro electric power projects, agriculture, horticulture, intensive tree felling, monoculture grazing, forest fires, construction activity and unplanned tourism. They all have brought substantial changes to the ecology.

10. The Nokrek BSR

This small but precious reserve (80 sq km) is situated in the Western part of Meghalaya. The Nokrek NP is the core zone. Many perennial streams and rivers originate here.

The area including the entire ridge of Tura Range is very important. It is rich in floral and faunal diversity and water wealth and river systems. Abundant natural occurrence of citrus indica and other citrus species makes this a special area. This constitutes an important genepool for future hybridization programmes for evolving disease resisting citrus plants.



Tropical (1000 m and above) and subtropical types of vegetation (below 1000 m height) are found here. The types are 1. Evergreen 2. Semi evergreen and 3. Moist deciduous.



Bamboo thickets, grasses and riverine forests also are found. Grand rasamala, white meranti, Bamboo, Lali and Chempaka and the wild lemon are the endemic varieties.

Such a rich Biome deserves to be studied and surveyed better. The endemic, endangered fauna include hoolock gibbon, binturong, stump-tailed macaque, pig-tailed macaque Himalayan black bear, tiger, leopard, elephant, Giant flying squirrel etc. The jhum cultivation to which the local 40,000 Garo people resort, results, in soil erosion and loss of the top soil.

11. Pachmarhi BSR

Lying in the state of Madhya Pradesh (Southern part), this BSR includes three wildlife conservation units viz 1. Bori WL Sanctuary 2. Pachmarhi WLS and 3. Satpura NP. Some sort of conservation effort has been going on here right from 1862. Teak and sal dominate the timber species. Thalophytes (30 species), Bryophyte (83 species) pteridophytes (71 species) Gymnosperms (7 species 633 genera) are reported. Pachamarhi plateau is a boatnist's paradise. Patalkot, a small Tribal hamlet inside the reserve is an anthropologist's paradise. There

are rare and endemic plant species which are considered to be a 'gene bank' of rare species of this locality. 48 species out of 71 pteridophytes are ferns. Several rare angiosperm, plants, whisk Fern, Sandbar willow, stalked adder's tongue fern, and Tree Fern are found here. Rare and endemic bamboo clumps also have been reported.



The faunal varieties include mammals (950 species) birds (254 species) and reptiles (30 species). The steep vertical scarps are

home to numerous raptors such as honey buzzard, serpent eagle and black eagle. The birds in the reserve include, red jungle fowl, Malabar pied hornbill, M. Whistling thrush and paradise fly catcher. Geckos and skinks are the reptiles. Rhesus monkey, Indian giant squirrel and flying squirrels are endemic.

Cave shelters of great archaeological interest, rock paintings several thousand years old and the Mahadeo Shiva temple at Pachmarhi are other great attractions.

Endemic flora: Sal tree, Selaginella fern, Palimorpha bamboo. Endemic fauna: Barasinga, wild buffalo, Red jungle fowl.



The threats to this BSR come from collec-

tion of rare endemic medicinal plants, proliferation of lantana and poaching.

12. Similipal BSR

This BSR situated in the western part of Orissa (4374 sq km) is a rich watershed with many perennial rivers. Tropical semi-



ever green, tropical deciduous (moist) hill forest, grassland and savannah. This reserve is an interesting link between South India and Sub-Himalaya North East India. This reserve has 7% of the flowering plants, 8% of the Orchids, 7%

of the reptiles, 20% of the birds and 11% of the mammals reported so far from India. Coix grass is the endemic flora. Among the others, 1170 flowering plants Orchids (94 species, plustura endemic) are found. Eight species are endangered, 8 are vulnerable, and 34 are rare. Myrobalan, Sissoo, Champak, Sal tree, India butter tree are the important plant trees.



On the faunal side, amphibians (12 species) reptiles (29

species) birds (260 species) and mammals (42 species) are found here. Elephant, Tiger, leopard, fishing cat, four horned antelope, rudy mongoose, red-breasted falconets and grey-headed-fishing eagle are important. Slender-billed scimitar babbler is endemic.

Four of the villages are in the core area. 61, in the buffer and 1200 in the transitional area. 73.44% of the population out of the 4.5 lakhs of people are Tribals.

The threats are from the high dependency of the people on the forest for their livelihood, forest fires, fire-wood colletion, poaching and the annual tribal poaching festival called Akhand Sikhar.

13. The Sundarbans BSR

Situated in the state of West Bengal, the Sundarbans BSR (9630 sq km) is the largest contiguous mangrove area in the world. It is a World Heritage Site. It is the only mangrove reserve in the world inhabited by Tigers. This BSR includes



1. The Royal Bengal Tiger Reserve 2. Sundarban National Park 3. The three WLS a) Sajne Khali b) Lothian island and c) Holiday island.

The flora consist of Tropical humid forest and mangroves. Mangrove species such as

Avicennia alba, *Bruguiera gymnorhiza*, *Ceriops tagel*, and *Rhizophora apiculata* are the major species. Tropical evergreen forest, agro eco systems, silviculture, pisciculture and prawn culture are the major habitats of the Reserve.

Sundari, Passur and Nypa are the endemic flora.



The flora recorded here include algae (120 species) mangroves (25 species) Angiosperms (124 species). The rare and endangered species are 1. *Acanthe molle* 2) Nipah palm 3. Mangrove apple 4. Crabapple mangrove 5. Nilar ixora manila 6.

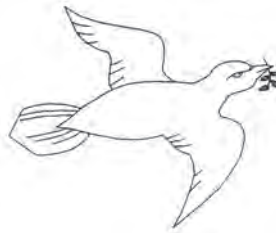
Cannonball mangrove 7. Sundari 8. Tagal M and Sandy M.

The faunal diversity is exhibited through birds (163 species) mammals (40 species) reptiles (56 species) fish (165 species) prawn (8 species) crabs (67 species) and molluss (23 species).

The most important animals are 1. Tiger (*Panthera tigris tigris*) 2. Saltwater Crocodile 3. Fishing Cat 4. Indian Leopard Cat 5. Yellow monitor 6. Olive Ridley sea turtle 7. Hawksbill sea turtle and 8. Green sea turtle.

The threats to the shrinking mangrove reserve come from 1. people living within the biosphere 2. exploitation of forest based resources 3. excess fishing 4. aquaculture practices 5. harvesting of timber and firewood.

(Biodiversity Op. Cit)



With just 180 left across the world, the gharial (*Gavialis gangeticus*), a riverine species, is in the critically endangered category of the Red List of the International Union for the Conservation of Nature and Natural Resources (IUCN)

Some Special Projects to save Threatened Species

1. Project Tiger:

The GOI started the Project Tiger in 1973. Now there are 27 reserves distributed over 15 states in different habitat types. The tiger



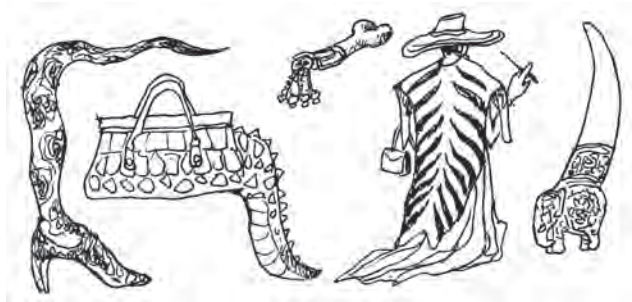
reserves have succeeded in preserving anything between 2000-4000 Tigers in their Natural habitats. This project is viewed by the world as a rare success. This project has also served as a means of preserving biotypes of sizeable magnitude (Map) WB and WWF have helped India in this venture.

2. Crocodile Breeding Project

Orissa started this project in 1975. Several other states have followed suit. UNDP helps the programme. Three endangered crocodile species 1. *Garialis gangeticus* 2. *Crocodylus palustris* 3. The salt water crocodile *Crocodylus porosus* are to be the main species to be protected.

3. Lesser Cats Project

In 1976 the lesser cats project was started with the view of protecting four species 1. *Felis bengalensis* Kerr 2. *Felis marmorta* Martin 3. *Felis lemruinki* Vigors Horsfield and 4. *Felis Viverrina* Bennet. These species are found in Sikkim and the Northern part of West Bengal.



4. The Brow-antlered deer Project:

In Manipur this project was launched in 1981. The Brow-antlered-deer (Cervus eldi eldi) is on the verge of extinction. The 35 sq km habitat is the park and the sanctuary which has helped the deer population increase from 18 to 250.

5. Project Elephant (1991):

Project elephant working from (Map) eleven centres is trying to project the Asiatic elephant, an endangered species. The dangers come from poachers. There is the problem also of ivory seller.

6. Project Rhino (1987):

The Kaziranga Wild-life Sanctuary in As-

sam is famous for its one-horned Rhinos. This project tries to save the Rhinos. The project area of (430 sq km) hosts a number of Rhinos. Ex-situ conservation is also being tried.

7. Himalayan Muskdeer Project (1981):

This project was forced to resort to captive breeding and ex-situ breeding to save musk deers from extinction. The results are good.

8. The Hangul Project (1970)

The Kashmir stag (Cervus elaphus hanglu) is facing extinction in its own habitat in Kashmir. As a result of this project the number of the stages has gone up to 500.

The extent of threat to wild life in India			
Intensity of Threat		Number of Species	
1	Endangered	24	
2	Rare	45	
3	Vulnerable	49	
4	Extinct	4	
5	Data Deficient	52	
Class		Threatened	Extinct
1	Mammalia	53	2
2	Aves	69	2
3	Reptiles	23	--
4	Anphibia	3	--
5	Invertebrates	22	--
Total		170	4
(From Biodiversity Op Cit)			

The Gulf of Mannar

P.Daniel and P.Uma Maheswari

The Indian MAB Committee following the Unesco programme identified a network of 14 representative ecosystems to be designated as Biosphere Reserves. 12 Biosphere reserves have already been set up. The Gulf of Mannar, the first marine biosphere reserve in SE Asia was established on 18-2-1989. A biosphere reserve is intended to fulfil three basic objectives: “of conserving insitu of biodiversity of natural and semi-natural ecosystems and landscapes contributing to foster sustainable economic development of the human population, living within and around the biosphere reserve and providing facilities for long term ecological studies, environmental education and training, and research and monitoring related to local, national and global issues of conservation and sustainable development.”

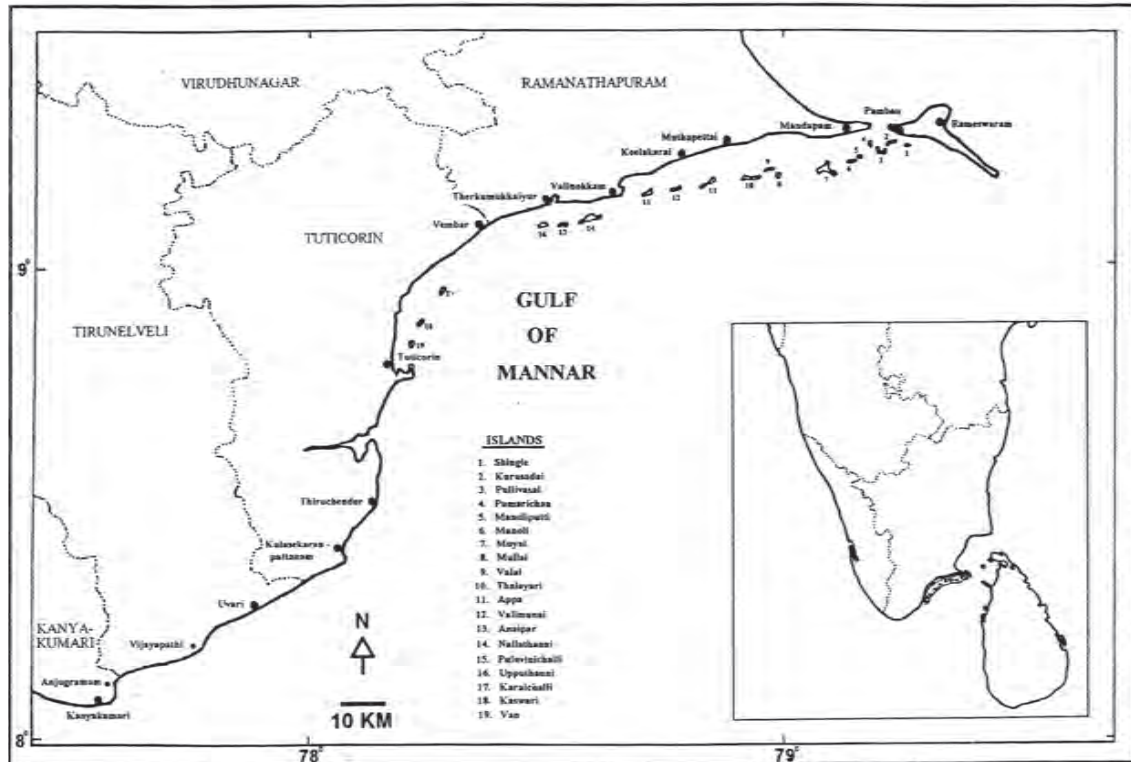
The practical work involves 1.identifying the components of biological diversity important for conservation and sustainable use 2.monitor through sampling and other techniques, the components of biodiversity identified, paying particular attention to those requiring urgent conservation measures, and those which offer the greatest potential for sustainable use etc.

The Gulf of Mannar Reserve with a variety of eco systems such as 1.coastal 2.mangrove inland and 3.marine, is a suitable site for such studies. A team of Botanical Survey of India experts have explored 19 existing islands as well as the mainland coast from Rameshwaram to Kanyakumari so that the flora of the islands can be related.

A study enumerated 764 species of angiosperms including cultivated ones, Endemic, rare, and otherwise interesting species were studied. Wild relatives of cultivated plants, wild edible plants, fodder plants and medicinal plants have been enumerated in the study. The threats to the biodiversity has been identified. Conservation measures have been suggested. Areas of further research have been suggested.

The functions and objectives of the ecosystem are associated together through a zonation system consisting of a core area, buffer area and transition area.

The core zone is a securely protected site for conserving biodiversity, monitoring minimally disturbed ecosystem, and undertaking non-destructive research and other



low impact uses such as eco-tourism and education.

A well-defined buffer zone is that which adjoins or surrounds the core zone and is used for cooperative activities, compatible with sound eco-practices, including environmental education, recreation and applied and basic research.

A flexible transition area or area of cooperation is the Utilization zone. This allows a variety of agricultural activities, settlements and other uses, in which, the local communities, management agencies, scientists, NGO's, cultural groups, economic

interests and other stakeholders work together to manage and develop sustainably the area's resources.

Such zonation has been demarcated in the Gulf of Mannar Biosphere Reserve in the form of Biosphere clusters.

Region 1 : Pamban (Rameshwaram) island to Keelakarai on the main land.

Region 2 : Keelakarai to Therukumukaiyur

Region 3 : Therukumukaiyur to Tuticorin

Region 4 : Tuticorin to Kanyakumari

The Gulf of Mannar Biosphere Reserve covers about 10,500 sq.kms (Indian part

of the Gulf). It includes 23 islands, the sea from Dhanushkoti to Kanyakumari in the districts of Kanyakumari, Tirunelveli and Tuticorin. The mainland coast runs for 350 km.

The Biosphere reserve is rich in Biore-sources and ecosystem diversity. These islands are considered a biologist's paradise. The variety of natural resources such as sea grasses, sea weeds, coral reefs, pearl banks, chank beds, mangroves and other island species, marine animals, birds etc. along with other non-renewable sources make this Biosphere Reserve an important region for conservation. Places of historical importance, religious importance, tourist places, small ports, a major post etc mark the area.

The mainland coastal vegetation can be differentiated into sandy seashore plants, inland woody scrub jungle, wetland, mangrove and sea grass vegetation. *Spinifex littoreus* (Ravanan meesai) in the Sandy seashores, *Casuarina* plantation at Dhanushkoti-Pamban area, palm and *Acacia* in the woody areas, shrubs, herbs, common trees are the other vegetation.

The low-lying salt-marsh habitat has *Aeluropus*. The mangroves are salt-tolerant species which serve the purpose of land-stabilising and land-building, preventing soil erosion, providing nutrients for the inhabitants and supplying forest produces for human use. In the Gulf of Mannar area, they have some diversity including *Avicennia marina* (Kanna). The sea-grasses are specialized marine angiosperms support-

ing a large number of marine organisms. Shellfish larvae, marine animals and sea cows, live off them.

In the Gulf of Mannar 46 endemic taxa have been identified including one subspecies.

There are reportedly 400 living organisms living in the coral reefs of Gulf of Mannar. The coral reefs are the hatching places for them. Apart from the sea-cows, the rare mammals, the GOM is also host to sea-



turtles, dolphins and sea-horses. Out of the 160 varieties of coral reefs in the world, 137 varieties are found in the GOM. Oysters, Corals, gargomids also thrive here.

Threats to Biodiversity

Human interference, natural calamities, such as gales, cyclones, storms and consequent floods affect the biodiversity of the GOM. Felling the trees for firewood, island-based fishing, use of dynamite for fishing, quarrying corals, exploitation of reefs, collection of seaweeds, establishing industries

along the coast all affect the habitat. Discharge of effluents, dumping fly-ash from coal-burning power stations, expansion of salt-pans, sand-quarrying, sea-water entering freshwater aquifers, targetting the palm trees for felling for fire wood, acacia for pulp making in paper industries, agriculture are all combining to threaten the Biodiversity of the area.

Conservation of existing biodiversity, discovering and rediscovering the rare species, pollution control from industries, are

of urgent need. Replanting of mangroves is suggested. Checking of human interference in the islands is urgent. Biotechnological propagation of rare species can be employed.

General awareness building among the local people will save this rare, rich and degraded area.

(Compiled from The Flora of the Gulf of Mannar, Botanical Survey of India, MOEF, Calcutta 2001.)



Loss of Linguistic Diverstiy

In the Gulf of Munnar, in southern India, there was a conservation effort a few years back to save the Dugong (sea-cow). Not knowing the local word for dugong, environmentalists translated sea-cow literally into the local language and handed out pamphlets that read “save the kadal pashu”. The locals thought this was an attempt to keep cows from falling into the sea.



Conservation Challenges

The misfortune that befell a colony of Asian open bill storks, South Asia's familiar resident birds, in Assam in late-2007 during their breeding cycle points to the need to incorporate climate change perspectives in conservation. Unseasonal rain in Arrearjhar tricked the birds into laying eggs; but since the season was unfavourable, there was mass mortality of hatchlings as they fell off their nests in the downpour. The response of the Forest department to this distressing development was commendably prompt and efficient. The few surviving birds were saved under a rapid action project that was forged in partnership with the Wildlife Trust of India. Nets placed under nesting trees to rescue falling birds and the active involvement of the local community helped rehabilitate the survivors. The open bill episode should serve as a cautionary signal that breeding, migration, and survival of individual species, including those that are now plentiful, could be at risk from extreme and unexpected weather events. Wet spells, storms, floods, and drought may increase in frequency and intensity; such changes, coupled with other effects of an overall rise in temperature (the 20th century witnessed an average rise of 0.74 degree Celsius over

the global mean) could affect many species. The situation demands proactive, interventional conservation strategies to protect biodiversity.

Preservation of viable habitats is vital for individual species, such as open bill storks, to help cope with tremendous pressures from climate change. As habitat characteristics change in response to climate, losing



or acquiring plants and animals, some species will attempt to migrate to new locations more suitable for survival. There is some evidence that this realization is dawning on governments and conservationists; they must now redouble their efforts to preserve key corridors that can host species and facilitate migratory shifts. In *Climate Change and Biodiversity*, a compilation of scientific articles, editors Thomas E. Lovejoy and Lee Hannah refer to habitat-altering human disturbance as a major factor that might reduce the room available for manoeuvring. Preventing the movement of species by

fragmenting habitat and altering the nature of landscapes to suit human needs can affect the fate of many, as they encounter the fallout from climate change. While plants and animals may possess the genetic traits to survive some climate change, conservation success will essentially depend on the availability of viable landscapes they can occupy. Conservation programmes therefore must accelerate efforts to provide sufficient space in nature—and stop the degradation of habitat.

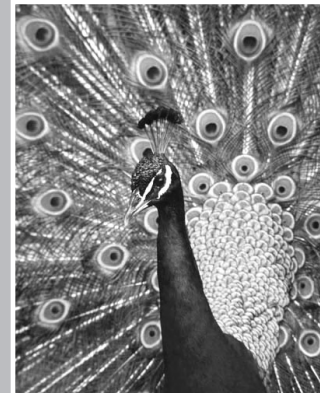
* Extracted from an editorial April 2008.



Their survival instinct is strong

It is not that all forest dwellers or those who make use of minor forest produce are anti-conservationist. The Saara Adivasis of Orissa are known to take measures to conserve forest wealth. The women of Deonjhari Nayagarh District, Orissa organised Maa Ghoda Dei Mahila Samiti protected their forest. They also helped in the regeneration of adjacent Pathar Gada forests.

The Gandha Mardhan hills of Orissa, rich in Biodiversity and medical plants, were saved by the local people. Biodiversity and forest conservation is a way of life of some of the Tribals like the Irulas of Tamil Nadu, a semi-nomadic tribe of hunter-gathers. Their very life depends upon forest conservation and they are sensitive to it. They take only what they want and help in replanting wave species to preserve the flora. While moving through the forests they help in dispersal of seeds.



D.B.N.Murthy

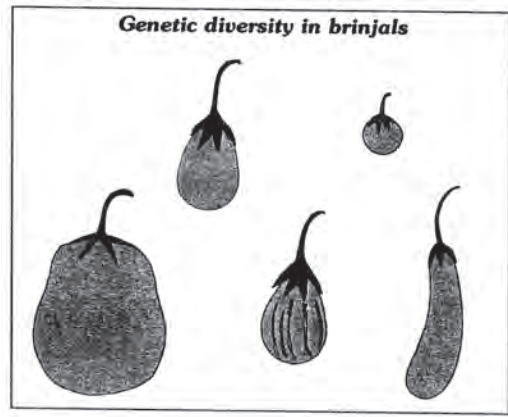
70 per cent of the country's land area has been surveyed and around 46,000 species of plants and 89,000 species of animals have been described. Nearly 50 per cent of the aquatic plants of the world are recorded in India

Biodiversity Losses

Biodiversity losses have reached critical levels and the dangers are equated with thermonuclear disasters in their severity. Environmental problems such as pollution, global warming, and ozone depletion can be overcome. But erosion of Biodiversity and extinction of species are irreversible losses. Species once lost from the earth cannot be brought back.

Biodiversity loss occurs when 1. The habitat is destroyed/degraded by development 2. A particular species is exploited for economic gain (tigers, rhinos) 3. A species is hunted for sports (tiger) or food (hilsa fish) 4. Extinctions of species may occur due to ecological substitutions (rice varieties) biological factors (insects/pests) and pathological causes. 5. Floods, earthquakes, landslides can also speed up loss of biological diversity 6. National competition between species, lack of pollination and diseases may shrink diversity. 7. Destruction of habitat by man for housing, agriculture, construction of dams, reservoirs, roads, railway tracks etc. will abridge diversity 8. Deforestation in tropical areas destroys Biodiversity 9. Industrial pollution kills species in air, land and water 10. Toxic chemicals, pesticides

are indiscriminately used destroying diversity 11. Genetic erosion arises from loss of conservation practices by rural and tribal people.



Even a loss of a single species is a tragedy because each form of life is a storehouse of irreplaceable genetic resources. Extinction is an irreversible process; when a species becomes extinct, it sets off a cascade.

Enclosed habitats such as islands are the worst affected, suffering mass extinctions, Man introduces predators, diseases and aggressive and weedy plants in these islands and snuffs out species.

Categories of threat

(Biodiversity Op. Cit)

The International Union of Conservation of Natural Resources (IUCN) has categorized

The Dimensions of the Threat*Species diversity*

The Balance of nature is upset when wild life population declines or when species become extinct. The disappearance of individual species triggers off change in the food chain. The delicate balance between producer and consumer, the dynamic equilibrium between the predator and the prey are upset. Insect pests multiply. Over-harvesting of Bull-frogs in Asia has allowed mosquitoes to thrive. Mosquitoes caused malarial upsurge in Asia in recent years.

Out of 350 species of mammals, 116 are greatly endangered. 2100 bird species and sub-species are endangered. Of the reptiles, tortoises, five species of monitor lizards, 3 species of crocodiles and turtles are in danger. Their flesh, skin, hide, shell, teeth, bones tempt the hunters to kill them.

the threats to species as 1. Extinct 2. Extinct in the Wild; surviving only in cultivation, in captivity, or as a naturalized populations well outside the past range 3. Critically endangered facing extremely high risk of extinction in the wild 4. Endangered 5. Vulnerable 6. Near Threatened 7. Least concern and 8, Data deficient 9. Not evaluated.

88 species of mammals, 74 species birds, 25 species of reptiles, 66 species of amphibians, 28 species of fish 2 species of molluscs, 21 species of other invertebrates, 246 species of plants, a total of 552 species are listed as Endangered by the IUCN (2000).

(Biodiversity Op. Cit)



The Western Ghats

A Mega-Plant Diversity region in the World

M.Raghuram

The area covering Dakshina Kannada, Udupi, Kodagu, Chikmagalur, Hassan and Shimoga districts in Karnataka is one of the top 12 mega-plant-diversity regions in the world. It is now being threatened by the deforestation activities and the Timber lobby.

The Western Ghats and the Eastern Himalayas are two of the 25 hot spots of plant diversity in the world. Several endemic species including medicinal herbs and plants have been thriving here.

The Western Ghats harbour scrub jungles, dry and moist deciduous forests, grass lands, sholas, and precious tropical evergreen and semi-evergreen forests.

Of the 17,000 flowering plant species in India, 4500 species are found here. They include endemic, rare and endangered species, scores of economically important ones, and wild relatives of cultivated plants. Experts say that the South-

ern segment of the Western ghats have the richest gene pool in the region.

Nearly 1500 species of plants are endemic species to the regions. Timber, firewood, fibres such as bamboo and rattan, food items such as edible fruits, nuts, spices, and condiments are found here. A number of extractive products including gums, resins, oleoresins, tans, dyes, essential oils, and medicines are also available from here.

Paddy, finger millet, pearly millet, sugarcane, pepper, turmeric, ginger and nutmeg,



find their wild relatives in the Western Ghats. These wild relatives played a vital role as gene resources is plant breeding

programmes. The wild species *Saccharum Spontaneum* was extensively used in breeding superior varieties of sugarcane.

The Western ghats are a treasure house of over 8000 ethnic and endemic varieties belonging to 386 botanical families. This accounted for one fourth of the world's medicinal plants (30,000) used in different medical systems.

All this is now dying because of 1) Shrinking forest cover 2) Indiscriminate timber extraction 3) Over-exploitation of bamboo 4)

Conversion of forests to alternative land-use 5) Invasion by plantation and plantation crops, 6) Multipurpose river valley projects 7) Human activity including: a) intentional burning of seasonally dry forests b) slash and burn cultivation c) wood gathering d) grazing e) growth of population inside the forests f) Mangalore-Bangalore HPCL Petroleum pipeline Kudremukh Ore Mining Project and finally 8) weakening of the 'Save Western Ghats' movement 9) Cracking up of the conservationists.

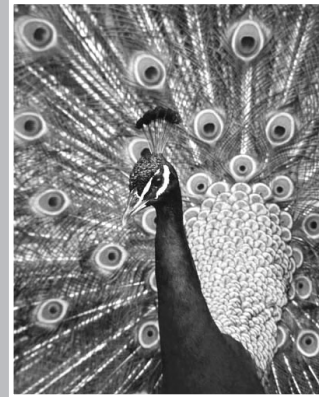
* Extracts from the Article



A TRULY SELF-LESS GREENING SERVICE

S.Tirunavukkarasu

Sri S.Nallasamy of Arachalur village near Erode town in Tamil Nadu is an ordinary man achieving extraordinary things. Single-handedly Nallasamy has cleared the bushes and undergrowths along the six-kilometre stretch of Lower Bhavani distributary canals. He has also saved the embankments from erosion by planting thousands of saplings of sturdy local varieties of trees, Poovarasu and udumbara. He had to struggle to save the trees from stray cattle, had to spend his personal money in the face of official apathy or want of munificence. The result now is a beautiful avenue, six kilometre long, protected embankments, free water flow and shady paths to walk by. S.Nallasamy has recorded his happy experiences of tree planting and greening the pathway in three inspiring books.



(Translated from Dinamani 25/12/2002).

We have made good progress in the wind and solar sectors. They have gained momentum. Production cycle in wind-energy has been indigenised, most components are manufactured in the country.

Kalakkad eco-development project

Syed Muthahar

KMTR is one of the 17 tiger reserves in the country covering an area of 895 Sq.Km. and the only one in the state of Tamil Nadu. Here the tiger population is said to be 30-35.

The eco-development project implemented by the World Bank at an outlay of Rs.11.82 crores in the Kalakkad-Mundnathurai Tiger Reserve (KMTR) in Tirunelveli district, has proved a big success and achieved reduction in resource dependency on reserve forests to a major extent, leading to habitat improvement and conservation. The project introduced in 1994 came to an end on December 31 2001, after two extensions.

As part of the Forestry Research Education and Extension Project in India assisted by the World Bank, conservation of biodiversity through improved park management and eco development was initiated in KMTR as a pilot project involving local people in conservation.

The project envisaged generation of valuable experience and information on causes, concerns and outcome of local people's involvement in conservation of biodiversity. The World Bank extended this five-year

project by another two years till 2001.

The objective was to establish committed grass roots level organisations concerned with conservation by educating, motivating and involving local people in the eco development villages, to reduce the dependency of the residents of the villages situated in the vicinity of the reserve forests by providing them alternative income generation activities.



According to R.Annamalai, Field Director, KMTR, village forest committees (VFCs) were formed in selected 132 hamlets with 30,000 members. These committees were

given adequate funds to help people pursue alternative income generation activities. A total of Rs.3.18 crores was disbursed to these committees in the last four years alone.

Besides for creating basic infrastructure, the funds were utilised for renovation of temples, drainages, water sources and construction of community halls and thrashing floors. Senior Social Development Specialist, World Bank, New Delhi, R.R.Mohan, said independent studies conducted in the past had proved that significant improvement on the ecology had been achieved.

Mr.Mohan said the active involvement of women in the activities of the VFCs was mainly responsible for bringing transformation in the minds of the people. The success of these groups could be understood from the fact that 63 types of

micro-enterprises had been created and the investment had now gone up to Rs.6.91 crores.

Besides improving the rural economy, this project had saved the innocent people from the clutches of the greedy moneylenders. As per an earlier study more than 3,200 headloaders felled 11.73 lakh trees annually from the forests.

Their number had now come down drastically, thanks to the provision of funds for their alternative employment, and 10.23 lakh trees had been saved from felling per annum. Cattle grazing inside the reserve forests had been eliminated.

Following the success of its experiment in KMTR, the World Bank had sanctioned eco development projects in seven other States.

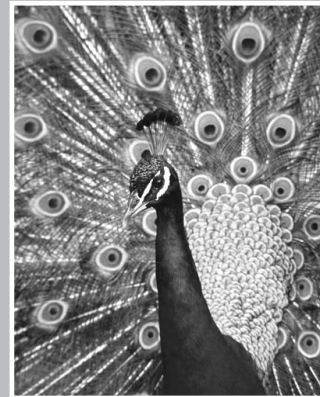
* Extracts from the Article 16/1/2002)

Protecting the Rivers - Almora women show the way

Aarti Dhar

The Kosi river in Almora district of Uttarakhand was dying. The flow of water in the river fell from 985 litres per second in 1992, to 85 litres per second in 2002. The river would dry up in 10 years. A magistrate ordered that all drawal of water for irrigation be stopped, leaving the scanty supply for drinking by urbanities.

But the local women rose to the occasion. Organised by Lakshmi Ashram, they restored the environment, planted trees, conducted awareness padayatras, greened the forests, raised the water levels. Civil society groups and institutions joined hands to conserve water, clean rivers and restore water flow in rivers.



Saving the tiger—The Problems and the Prospects

Dr.Rajesh Gopal, Director

1. Introduction:

The problem of field studies juxtaposed against computer-models:

The magnitude of conservation initiatives taken in a developing country like India by launching the holistic 'Project Tiger' has no parallel in the world. We must not forget the basic fact that with just 2 per cent of the global forest area, we cater to almost 16 per cent of world's human population and an equal percentage of global livestock. Project Tiger has been sensitive to this and hence has the 'core-buffer' strategy to address the concerns of wild animals as well as stakeholder people. No outsider or foreign agency will be in a position to appreciate this, leave alone research groups doling out fantastic computer-simulated models with seemingly unrealistic predictions, without understanding our conditions and village rhythm. Many such groups prophesied the extinction of tigers in our country by the year 2000!

2. The problem of Captive tigers and their safety:

There are affluent countries with more than 15,000 captive tigers in private collections

and one does not know their fate. Many such animals end up in organised hunts and the body parts cater to the thriving international illegal trade. Certain other tiger-range countries import and export live tigers and their future is also tentative. We have been voicing our concerns in this regard in international conventions. Thus the international organizations as well as scientific community might as well focus their attention on such issues and help a developing country like India in its conservation efforts, rather than finding fault over issues without proper ground truthing.

3. Pugmarks a useful parameter not the only parameter:

The official tiger estimation relating to 1997 was 3,508, while the figures stands at 3,642 during 2001-02. It is erroneous to, contend that pugmarks alone are taken into consideration for estimating the tiger population. On the contrary, pugmarks are one among a number of parameters such as stride, straddle, vocalization, scrapes, kill evidences, livestock depredation, local enquiry and the like, which are collected as per a standardized protocol for ascertaining the spatial presence of the tiger during the cen-

sus/estimation period. This is an exercise in 'time and space' in which such evidences, which highlight the presence of tigers, are collected in an organised manner and tallied to eliminate the duplicates. Further, this is also not an 'isolated event' occurring in a fixed periodicity, but is a complementing initiative to crosscheck the ongoing tiger monitoring data from patrolling units/beats in the Tiger Reserves. Thus the entire exercise amounts to almost mapping the tiger distribution in the country, and, unlike the sampling approach, does not involve extrapolation based on assumptions and restricted study. It goes without saying that pugmarks are the most prominent evidence one can ever see in any tiger habitat.

4. The sampling based approach; not suitable.

The camera does not trap everything: The sampling-based approaches as advocated by several workers, are really not suited since the distribution of tigers is not uniform, but rather skewed in a habitat. Any amount of stratification may not help here since the spatio-temporal use of habitat by tiger is governed by climate, availability of welfare factors, anti-predator strategy of prey animals, presence of livestock in fringe villages and territorial advertisements of conspecifics. These parameters can be taken into account only through a 'supervised', prior knowledge of the habitat based on field evidences like pugmarks and others, which can be readily collected in the field.

While no method can be claimed to be per-

fect, without a viable, field-friendly and cost-effective alternative, it is not wise to criticize the pugmark method.

The camera trap method, advocated by many scientists,



having a fancy for 'capture recapture' softwares, is most unsuitable and has its inherent drawbacks. Though a good method for non-territorial, small mammals, it has a serious statistical bias in the sense it is efficient only in estimating high density population. Most of the tiger population in Protected Area network or outside is low or moderate (less than 1 or 1 per 100 sq. km.). Only few areas have high density ranging from 2-5 per 100 sq. km. but even here, the skewed density distribution causes problem in statistical experimental designs. Therefore, to obtain a reliable estimate (coefficient of variation less than 10 per cent) at least 60 per cent of the tiger population needs to be 'captured' and 'recaptured' by cameras, which is impossible! The model does not provide for statistically working out the individual ID of tiger, nor it incorporates any error due to misidentification. It is relevant to add, experts in the Wildlife Institute of India have demonstrated the magnitude of misidentification from stripes of tiger on which the methodology is based. In addition, the camera trap method needs lot of experimental design from experts and the operative design is not 'generic' but 'site

specific', apart from not being cost-effective.

5. A broader context, a holistic approach:

It is true that habitat loss, fragmentation and illegal trade are causative factors for decline of tiger population in its range countries. India has responded to this situation by creating tiger reserves. Hunting of any wild animal is banned since the promulgation of our National Wildlife Legislation – the Wildlife Protection Act in 1972. In the present context we do not have large-scale hunting of wild animals which form prey of tiger as contended by Ullas Karanth. I wish to reiterate that habitat loss and the illegal international markets are more relevant in the present context. The natural landscape of tiger in many states having sizeable tiger population in our country has privileges like livestock grazing, and thus cattle also becomes important as a prey animal due to chance depredation by tigers, and high densities of natural prey animals may not occur in many places yet sustain tigers.

The success of conservation initiatives in a developing country like India depends on reduction of resources dependency of local people on forests through meaningful participatory eco-development and joint protection of forests, which are ongoing.

The Ministry of Environment and Forests is now in the process of developing a 'Tiger habitat and population evaluation system for the Indian sub-continent in the GIS domain. The objectives take care of the tiger sociology as well as the prevailing ground

situation. The habitat as well as status of tigers in the country is being assessed for developing site-specific census and monitoring protocols. The information collected and analysed in the GIS domain would be disseminated to Field Managers apart from conducting regional workshops and training to apprise the field staff in census, habitat monitoring, evaluation and field monitoring techniques. This exercise, using the state-of-the-art technology, would involve mapping satellite and field data collection, GIS modelling and validation. The 'tiger atlas' so generated would also serve as a benchmark and the evaluation system would be a monitoring tool to ensure that we keep the pulse of tiger population and its habitat for future generations to come. This state-of-the-art technology application to conservation should remove any doubt that may exist regarding our commitment to save tiger and its habitat.

6. The total biodiversity approach:

Lastly, the 'Project Tiger' Reserves thus designated, are not only to save the 'key stone' species 'Tiger', but to conserve the bio-diversity and essentially to conserve water, soil and replenish clear air for mankind. Therefore Project Tiger is not only about saving the tiger, but its scope expands to survival of our future generations by ensuring the life support system.

(Dr.Rajesh Gopal was the Director Project Tiger, MOEF GOI.)

Hope for wild tigers

Just how many wild tigers there are in India has been a contentious issue; it polarizes the debate on conservation strategies. The scepticism of the scientific community, which has not bought official claims of healthy tiger numbers, will be vindicated by a recent official report that says there may be only 1,300 to 1,500 left in India. This estimate, derived using better methodologies than in the past, contrasts with the figure of 3,642 tigers that Project Tiger believed existed five years ago. Yet this is not a time for gloom and mourning. Imperilled though they are, tigers can survive in India's reserves and even grow rapidly if informed and intelligent conservation takes place. So viable are some of the reserves in India and elsewhere in the subcontinent that the population of the big cat can potentially reach healthy numbers. Scientists Jai Ranganathan, Kai M.A.Chan, K.Ullas Karanth, and James L.David Smith report in *Biological Conservation* that 21 reserves, some of them forests contiguous with Nepal and Bhutan, can hold most of the tigers. The sub-continental population of tigers can grow to anything between 3,500 and 6,500.

Such optimism is based on the resilience of some tiger reserves in India and its neighbourhood in the face of a hostile matrix of

factors in the areas surrounding the reserves. Such evidence raises the hope that the majority of tigers can thrive in alluvial grassland, subtropical moist deciduous forest, tropical dry forest, and tropical moist deciduous forest. These rich natural sites are found primarily in the central Indian States, the terai region bordering Nepal, and in southern Bhutan. The primary conservation action required here and elsewhere is to preserve the prey base of the tiger; any changes proposed to land use in the surrounding region, such as exploitation for commerce and industry, must be given up without compromise. Poaching is a serious threat but prey depletion is at least an equal challenge to tiger survival and breeding opportunities in most reserves. Unlike tiger poaching, the hunting of prey such as deer, sambar, and wild pig remains mostly invisible and even tolerated; it contributes to a steady reduction in tiger numbers. George Schaller set the tone for evidence-based conservation in 1967 with his influential *The Deer and the Tiger*. A lot of research has been reported since, pointing to the need for habitat integrity and a healthy prey base for tigers to survive. The Tiger Conservation Authority and the Wildlife Crime Bureau have their task cut out.

* Extracts

70% of villages do not have access to commercial forms of energy. 25000-30000 villages are out of reach for grids. Solar PV with high subsidies is being tried for these villages, now providing only two lights.

Sundarbans

Joyashree Roy

The Sundarbans—a National Park, a World Heritage Site, a Biosphere reserve, is located on the Bay of Bengal. This is the largest contiguous area of mangrove forests in the world. It forms an integral part of the delta region at the mouth of the Ganga, the Brahmaputra and the Meghna and is shared by India (40%) and Bangladesh (60%). It provides vital ecological functions for the coastal South Asia Region.

The Sundarbans covers 10,000 sq km of forest and water. The Sundarbans—Forest Tiger Reserve (1600 sq. km.) falls in India. The Indian Sundarbans comprises 13 blocks in South.24 Parganas dt and 8 blocks in North.24 Parganas district. The total population of the area is 41 lakhs. (2001). The Sundarbans is protected by a 3500 km long embankment construction. Agriculture, Aquaculture with low productivity of shrimp, honey-collection, fisheries, all provide livelihood for the population.

survive in saline wetlands, where other plant-life cannot survive. The fallen leaves and branches from the mangroves provide nutrients for the marine environment and support immense varieties of sea-life in intricate food-webs. The shallow inter-tidel reaches of mangrove-wetlands offer refuge and nursery grounds for juvenile fish, crabs, shrimps and molluscs. Mangroves also are prime nesting and migratory sites



Mangrove trees have specially adapted aerial and salt-filtering roots and salt-extracting leaves. These help the trees to

for many bird species. Additionally, manatees, crab-eating-monkeys, fishing cats, monitor lizards, sea-turtles and mud-skip-

per-fish utilize the mangrove wetlands.

The mangrove area has declined from 420 hectares (1987) to 212 hectares (1997). The Tidal flats and the agricultural lands have declined along with the forests.

Mangroves act as an interface between land and sea and protect coastlines from erosion, storm damage and wave action. Mangroves provide global carbon sinks, maintain ecological functions to support biodiversity and sustain economic livelihoods.

(The Hindu Survey of the Environment-2007)



“Where indigenous people live, is where the greatest biological diversity, the diversity of nature, exists. Our complex systems are founded on the values which indigenous peoples have built.”

Namdapha National Park (Arunachal Pradesh)

Aparajita Datta

The Namdapha National Park in Eastern Arunachal, Changlang district is unique. High altitudinal range, diversity of habitats and forest types are unique and rare. These are the last remaining large tracts of low-land dipterocarp forests in India. They are the world's northern most rainforests. The region has heavy rainfall and has 1000 plant species, 100 mammals including 15 of global conservation importance, 400 bird species and lesser fauna which are poorly documented.

The area is contiguous with forested tracts in Myanmar. 90% of the area remains unexplored because of the steep terrain, high rainfall with no roads and few walkable trails. Hoolocks, langurs, macaques and diurnal tree squirrels are easily sighted here. Frogs, barking deers, flying squirrels are also recorded. Himalayan Palm civet, porcupines, wild dogs and rare tigers populate the area.

The areas of Jhum-cultivations are changing to wet rice cultivation. The rare and elusive clouded leopard is a tourist attraction. The pheasants, hornbills, monkeys, deer, wild pigs and gaur and tigers are facing the hunters and more poachers from the



Myanmar side.

Eight cat-species are known to occur in Namdapha. Of them, only four, clouded leopard, golden cat, marbled cat, and leopard cat have been recorded through camera-trapping. 14 other mammal species including Malayan Sun bear have been recorded.

Traditional taboo and modern awareness and no-hunting pledges have weaned the local Lisu tribe from killing the fauna/especially the tiger.

Laborious efforts are being made to involve the local communities in the conservation programmes for Namdapha area. (THSOE 2007)

Move to convert Kodai valley into 'kurinji' sanctuary

Though the 'kurinji' flower will bloom in 2006, hectic preparations are on to convert a massive valley, which has a large number of Kurinji plants between Coakers' walk and Vattakanal bordering on the Pambar river, into a kurinji flower sanctuary to protect and preserve this rare species in the Kodaikanal hills.

K.M.Mathew, Vice-President of the Palani Hills Conservation Council, said the 'kurinji' flower was a rare species in South India, growing only in Anamalai, the Nilgiris and the Palani hills in Tamil Nadu. It was not grown in any part of the world. Though there were about 50 varieties of the flowers, the blue-coloured variety alone would bloom once in 12 years.

The massive valley sprawling below the Coakers' walk, bordering up to Pambar Shola near the Pambar river on one side and up to Vattakanal on the side was identified for the proposed sanctuary.

To begin with, the existing plants in this valley would be protected till the flowering season in 2006. A fire prevention bund should be created below the valley to protect plants from forest fire or artificial fire.



Ten, exotic varieties of trees such as eucalyptus, casuarina and cherry in this valley should be removed meticulously.

The District Forest Officer, Nathan, said massive removal of exotic varieties of trees would cause soil erosion.

Mr.Mathew said soil erosion would be prevented with utmost care while removing

those trees. He also ruled out the threat to the proposed sanctuary in future as it was bordered by high ridge Coakers, Walk and the Pambar River. After the 2006 flowering season, seed collection would be intensified

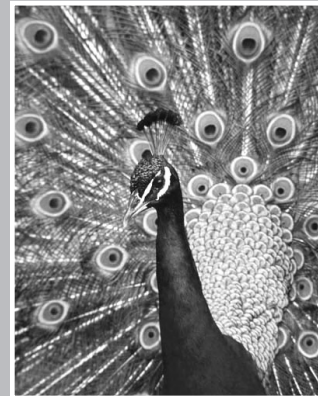
and replanting would also be taking place simultaneously to grow more plants in the Kodaikanal hills. Long storage of seeds would affect its vitality. This proposed 'kurinji' sanctuary in Kodai would become one of the world's conservation sites.

*Extracts from the Article 8/4/2004



The Tree Authority of Pune

As against the conventional image of civic bodies as a bunch of dry human beings, Pune city's Tree Authority is a lively group. They preserve trees, plant gardens, punish people who over-prune trees in their own home gardens. They rule that every tree cut should be replaced by 3 saplings. Their massive tree-plantation programme has a high survival rate. Greening Pune has also attracted new faunal wealth to the city-butterflies and birds. Fruit-trees are also planted. Marshy waste-land is converted into orchards. Their last census of trees showed Pune to have 46 lakhs of trees, more than their recommended density of 5 trees every 0.35 hectare of municipal area. Unusual green sense for a civic body of a mostly industrial city.



(DTE 31.3.2002)

Disappearing birds

The Sharp decline in the number of migratory birds reported by the U.N.Environment Programme is a worrying sign that these true citizens of the world may be losing out to developmental pressures. Several countries celebrated the unique phenomenon of bird migration on May 10 and 11 to raise awareness about the threats faced by birds. As an indicator of the state of biodiversity, birds are supremely important, although many aspects of their migratory travels between breeding and wintering grounds spanning different continents remain unexamined. A lot of work remains to be done, for instance, on the role of the earth's magnetic field, of light and visual indicators in bird migration.

What little we know shows that migration is truly extraordinary. The longest non-stop flight – 7,189 miles – is made by a wader species, the bar-tailed godwit, between Alaska and New Zealand; the Arctic tern makes a return trip between its northern grounds and Antarctica, covering about 24,000 miles. Not all countries that lie along the flyways of migratory birds, however, are sensitive to their needs. It is incredibly sad that of 522 migratory waterbird popu-

lations on the African-Eurasian flyways, an estimated 41 per cent have suffered decline due to factors such as habitat loss, climate change, and degradation of wetlands.

As a major host country, India has conservation obligations under international



conventions governing biodiversity and migratory species. Unfortunately, it has not been doing enough. Migratory birds, which were protected from hunters in the country through enlightened laws, have declined precipitously due to environmental factors. In what is the most famous national migratory site, the Keoladeo National Park in Bharatpur, the arrivals have dwindled from the thousands to just a handful, as people appropriate all water from the river that

feeds it. Not surprisingly, the critically endangered Siberian crane, a graceful, slow-breeder, was last sighted in India in the winter of 2002. Several hundred wetlands favoured by visiting birds are confirmed to be toxic with heavy metals and pesticide residues. Other habitat changes are affecting song-birds as much as waterbirds, and global warming may be accelerating the decline. Reversing the losses should be not

just a scientific goal but a national priority, and it can happen only with better understanding of migration. Liberal national funding of ornithological research, and permissions from the Ministry of Environment and Forests to ring and study birds in sufficient numbers are vital. This is an agenda to which India needs to commit itself.

* Extracts from the Article, Editorial May 2008

Saving the Tiger

The tiger is the largest of the cats. It is an embodiment of feline beauty, graceful movement and power. It is India's national animal. William Blake praises its fearful symmetry. Jim Corbett narrated the fear and the admiration tigers evoke. At the end of the 19th century there were 100,000 tigers world-wide, many living all over Asia. Today tigers are an endangered species with about 5 to 7 thousands of them left, mostly in India. The Bali subspecies died in 1937, the Caspian ended in 1950s and the Javan subspecies became extinct in 1972.



The South China tiger is on the brink of extinction. The Sumatran, the last of Indonesian Tigers is on the way out, says the World Wildlife Fund. The Indo-China and the Siberian subspecies are going. The Bengal Tigers 40,000 in number-early in 20th century have come down to 1827 in 1972. The project-tiger was started in 1973 by the Government of India. 27 reserves were established over 37,000 sq. kms. The census figure of 4000 based in pugmark count is disputed by experts.

The legendary Bengal tiger is threatened, by man, who poaches tigers, and competes with tigers for food, sambar, deer, gaur wild pig and other hoofed animals. But for man's interference, we would be having today 30,000 Bengal Tigers. Man should stop invading forests.

* Extracts From the Editorial 26/3/2004)

Larks are losing the ability to sing

(A study has found Dupont's lark, a relative of the skylark, is losing its singing range because numbers are falling.)

Graham Keeley

The poet Shelley, who immortalized the skylark, would have been saddened to know that threatened songbirds in Spain are losing their voice.

A study has found Dupont's lark, a relative of the skylark, is losing its singing range because numbers are falling. Biologists from the Donana National Park in Andalucia found that when male larks had fewer birds from which to learn new notes or ranges their repertoire, decreased. The number of notes a male uses is vital in attracting females.

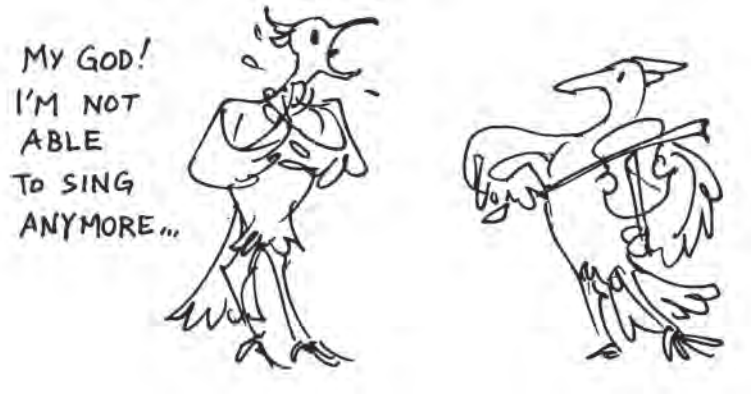
Dupont's lark, *Chersophilus duponti*, is found in Europe only in southern, central and north-east Spain and there are thought to be only 2,000 birds remaining as their natural habitat has been destroyed by man.

It is classified as threatened by the International Union for Conservation of Nature. In the study, published in the journal Public Library of Science, the Spanish

scientists recorded the singing range and number of notes of 330 male birds, mainly in the Ebro valley region in north-east Spain.

Using hidden microphones in places the birds usually inhabited, they taped mating calls. Paola Laiolo, who led the research team, said: "The female birds are attracted by the complexity and range of the male's song.

"We found that the lack of variation of notes or scales corresponded to the areas



where the population of larks was smallest. The birds which lacked tutors—or other

male birds to learn from—had the smallest range.”

Dupont’s lark has a range of 12 singing sequences or phrases. It is smaller than the skylark and its brown colour makes it hard to spot, so censuses are carried out by counting birds by their songs.

Dupont’s lark needs flat scrubland but in Spain much of this has been used for building development in Andalusia, Murcia,

Castilla la Mancha and Catalonia. It is also found in north Africa.

Shelley, writing of the Dupont’s lark’s distant cousin in his poem “To a Skylark,” in 1820, revels in the bird’s song:

“Like a star of Heaven / In the broad daylight / Thou art unseen, but yet I hear thy shrill delight.”

Guardian Newspapers Limited, 2008.



Birds on Song; Songs on Tapes

Snehal Patel and Mukesh Bhatt of Surat Nature club have produced for sale two audio-cassettes of bird songs; The voices of 117 birds have been recorded for listeners and bird lovers. Enthused by this adventure, one Surat-born American resident has donated high quality recording equipment for future production.

(Down to Earth 31.10.2002)



Koonthankulam Bird Sanctuary

(A Fact File)

P.Sudhakar

1. Area of the water bodies-total 129.33 hectares
2. The largest breeding water bird reserve in South India.
3. Attracts over 100,000 birds of 100 species or so.
4. Declared a sanctuary in 1994.
5. The village community has been protecting the birds and their chicks for the last 90 years.
6. 43 species of water birds both resident and migratory visit Koonthankulam every year.
7. The birds include large water varieties such as Painted stork, Flamingos etc.
8. The migratory birds include Bar-headed Goose, Pintail, Spotted Sand-piper, Green Sand Piper, Green Shank, Coot, White Stork-Coot, White Stork, Large Flamingo, Common Teal, Blue-winged Teal.
9. The resident birds include: Dabchick, Little Grebe, Spotted billed Pelican, Large Cormorant, Lesser Cormorant, Little Cormorant, Grey Heron, Purple Heron, Darter (Snake-bird) Large Egret, Pond Heron, Cattle Egret, Smaller or Medium Egret, Little Egret, Night Heron, Painted Stork, Openbill Stork, Small Kingfisher, White Ibis, Glossy Ibis, Spoonbill, Spotbill duck, Cotton Teal, Indian Moorhen, Pheasant-tailed Jacana, Bronze-winged Jacana, Brahminy Kite, White-breasted Waterhen, Black winged Stilt, Red-Wattled, Lapwing, Pied Kingfisher, White-breasted Kingfisher, and Indian Pied Wagtail.
10. The birds travel more than 100 km every day towards the Tamirabarani estuary at Punnaikaayal, close to the Gulf of Mannar to hunt for fish and return to feed their young ones.
11. Within the village 1023 nests of Painted Stork were spotted in 2005. In the lakes the Painted storks built 3000 nests. Pelicans built another 3000 nests.
12. Every year this village receives 10,000 tourists / bird watchers.

* Compiled



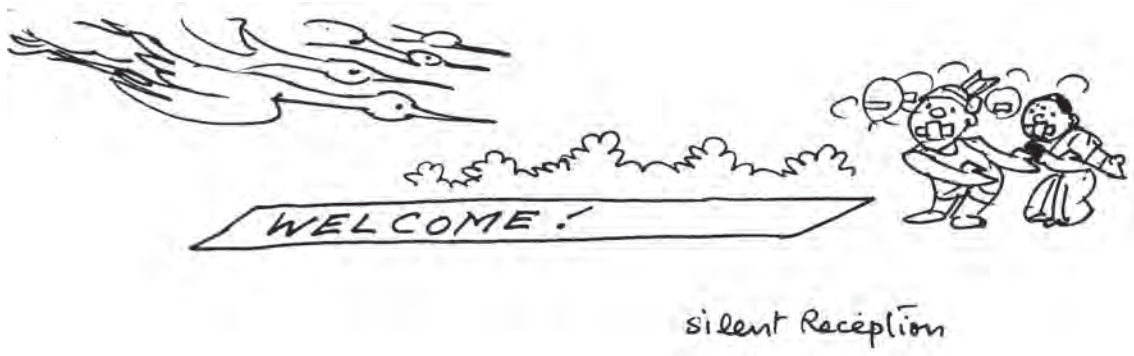
A Silent Reception For The Winged Guests

A.K.Perumal

Koonthankulam village of Nanguneri Taluk, Tirunelveli District, Tamil Nadu is no ordinary village. For its winged guests and visitors, the whole village practices 'mouna vrata' from January to August every year. No loud speakers for temple festivals, no fire works, even the boisterous folk-drums are sounded in a subdued manner. All this for giving a peaceful reception to the Siberian birds which visit this hamlet every year. Protected from urban towers of Babel, Koonthankulam has groves of Babool trees in the large lake

The southernmost bird Sanctuary of India, Koonthankulam ranks with Barakpur (Gujarat), Vedanthangal (Tamil Nadu), Kodikarai (Tamil Nadu) and Chilka lake (Orissa). Painted storks, Pelicans, Cormorants the three Siberian species of birds seek Koonthankulam. Also come the local black and white cranes. They all lay eggs and hatch them at the friendly haven of Koonthankulam.

The villagers think of the birds as daughters coming home for their confinement. The



near the Krishna temple. River Manimuthar feeds the lake. The rainy season finds the lake filled to the brim.

birds harbinger good rains and bumper crops for the faithful villagers. Red legged herons coming for nesting is an auspicious time; The chirping of birds wards away

diseases; Heat-related diseases will skip the village if the birds arrive; Signs of the people's faith are endless.

Ornithologists agree with the villagers. Ahead of the main migration, pilot birds from Gujarat and Siberia visit Koonthankulam on an initial survey. They instinctively know if it is a rainy year and if yes, the pilots stay on. It is the signal for the main flock to emigrate. If the pilot birds return away from Koonthankulam, a bad monsoon is predicted.

The nesting birds go as far as 50 km to the sea and ponds for their prey. The birdlings are fed by the scouting mothers. Not only the central grove, the trees on private lands and houses also host the birds. The villagers warn outsiders to keep away from the nests. For six long months the villagers put up with all inconvenience. "My tree hosts fifty birds. I do not allow others to climb on to my terrace, lest they disturb the birds. We sweep the terrace only after the birds depart"—claims a landlord. Another man would not let his children pick up noisy brawls.

The villagers do not encourage bird watch-



ers, sight seers or strangers to go near the lake. They recall how Moondradaippu, another village nearby, lost its winged guests because of too many noisy human visitors.

One visitor wrote in the complaint book: "We could not even approach the birds by boats." An illiterate elderly lady resorted. "Oh, if you let them in, they will meddle with the nests and decamp with the eggs. They would like to fondle the birds. Keep them away."

They do not want Koonthankulam to become another Moondradaippu.

(Translated from Tamil Dinamani 25/07/2003)

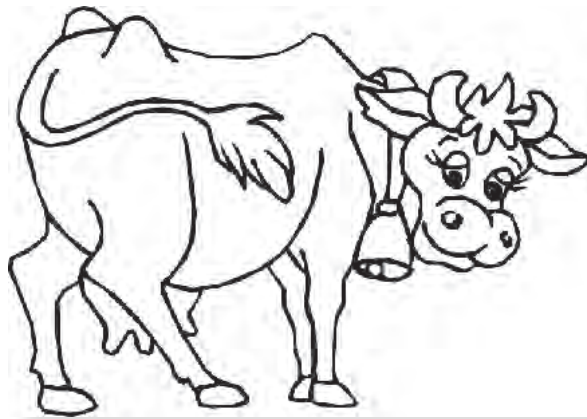


Incredible Indian Cow!

Viswanath. P

The situation around

The other day, during a workshop on “White Revolution in India” with specific reference to Gujarat experiment, I enquired about the availability of studies conducted so far in Gujarat on the environmental damage or de-forestation that took place because of the extensive grazing. The answer was in negative. After having lived in Gujarat



for over a year, I had observed keenly the desert like conditions in Sourashtra amid an overflowing cattle population.

Recent studies, Livestock’s Long Shadow cites cattle, especially when kept on enormous feedlots have been named as a con-

tributing factor in the rise in greenhouse gas emissions. A 400-page United Nations report from the Food and Agriculture Organisation (FAO) states that cattle farming is “responsible for 18% of greenhouse gases.” The production of cattle to feed and clothe humans stresses ecosystems around the world, and is assessed to be one of the top three environmental problems in the world on a local to global scale. The report, surveys the environmental damage caused by sheep, chickens, pigs and goats. But in almost every case, the world’s 1.5 billion cattle are cited as the greatest adverse impact with respect to climate change as well as species extinction. The report concludes that, unless changes are made, the massive damage reckoned to be due to livestock may more than double by 2050, as demand for meat increases. One of the cited changes suggests the intensification of the livestock industry, since intensification leads to less land for a given level of production. The report also mentions that grazing by cattle at low intensities can create favourable environment for native herbs, yet in world regions cattle are reducing biodiversity due to overgrazing driven by food demands by an expanding human population.

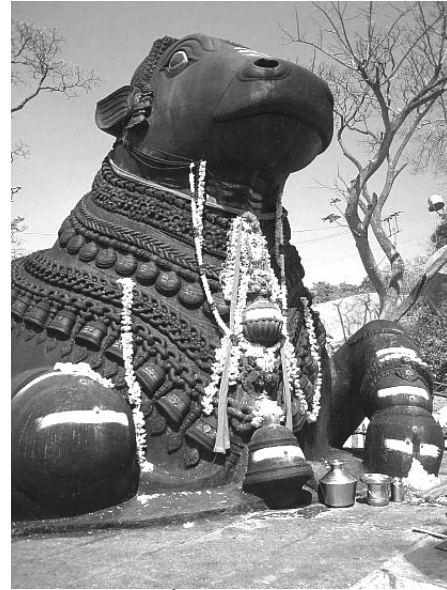
The beginning of the disaster in India “Protection of the cow means protection of the whole dumb creation of the God” said Mahatma Gandhi. This statement was taken literally by Planning Commission Members who spurred by the Milk Co-operative Movement in Gujarat chalked out the road map for up-scaling the programme by introducing foreign breeds. The milk production went up substantially but with that status of Indigenous cattle breed was neglected and they were now almost on the verge of extinction.

The ancient Indian wisdom

Cow in India is considered as Kamadhenu, the gratifier of all wishes. It is accorded a special status as it enriches both the material and spiritual spheres of humanity. It is like a loving mother who feeds us with her nectar-like milk. The cow is a life-companion to farmers, a healer and is a moving temple worthy of worship and veneration. A look; a touch; her mere presence purifies our body, mind and soul. Yet, what have we given it in return? Only disgrace, destruction and death! The Economics of modern dairying is totally based on milk, contrary to what Indian farmers thought in earlier times. They maintained cows for varied purposes like ploughing, transportation and even as pest-repellents.

With the onset of the mania of promoting exotic breeds, rural economy is in shambles. Bringing back the Indigenous cows is the only option in front of us. This becomes clear when we analyze the salient features of the Indian vis-à-vis the exotic breeds.

a) Maintenance

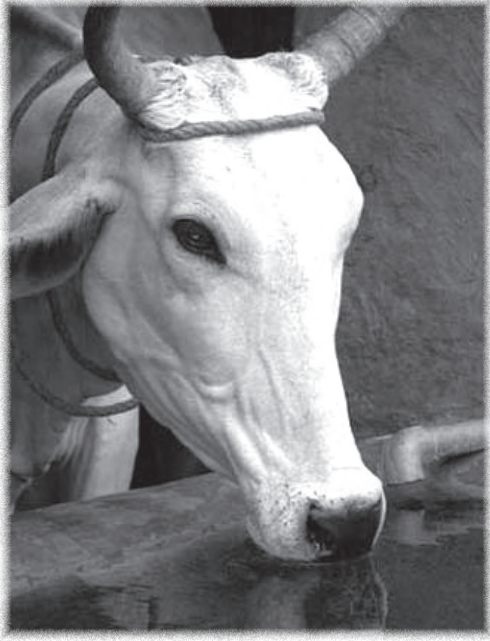


Ongole is one of world's oldest, tallest and sturdiest cattle breeds. Lord Shiva's bull Nandi (above) is an Ongole breed

Indigenous cows can be maintained very easily any where even under shades of the village trees! Some of the small breeds require almost a zero budget. Malenada Gidda, Vechur, Kasaragod and Baragur breeds can be maintained with just the kitchen waste. Locally available food, veterinary aid, low cost shed only need to be provided to the local breeds. For exotic breeds, modern facilities, almost a hospital - like atmosphere is the minimum requirement! Since these are developed only for milk and meat, they lose many of natural traits like bellowing, socialization and response to affection.

b) Skin

The cow's skin is the major organ which



helps in the body's thermo-regulation, water balance and protection. Indian climatic condition is so diverse that exotic breeds cannot adjust to these variations. Some of the special characteristics of Indigenous cows are:

- I. Skin area per animal is more – hump, dewlap, length of the ears, looseness of the skin. These factors help to increase the skin area. This facilitates greater sweating and better thermoregulation, in our tropical climate.
- II. Sebaceous Glands:- In India's local breeds, these glands are more in number, bigger in size and differ in shape.

These facilitate increased quantity of sweat. These glands secrete an oily liquid which coats the animal's skin and gives it a different odour. This oil secretion protects the animal's body from exposure to rain and attack by ectoparasites.

- III. The muscular layer under the skin of the local breeds so special that it twitches locally when a fly bites, making the fly move away.
- IV. The small hairs of local breeds keep skin clean and shiny.

These are the reasons why the Indigenous bullocks can work under the scorching sun. The local cows can graze in rainy forest areas with ease. But in exotic breed, the skin with fewer sebaceous glands, more hairs, and is suited to cold conditions. The mates of the exotic breeds are lethargic, and are not fit for hard work.

c) Tail

The length of the tail and the reach of its switches are long. The first bone in the series of tailbone is rudimentary so that it facilitates the tail to turn all around. The tail can keep away the flies. The long tail can reach the entire length of the body. In India in cowsheds the flies are more when compared to European countries. To protect the cow from the flies, this anatomical feature is helpful.

d) Hooves

The hooves are hard, sturdy, small and are

placed closely. This helps the bullocks to work in the field with ease. The soft hooves of exotic cows are prone to get fungal infections.

e) Chromosomes

The total number of chromosomes in *Bos Indicus* and *Bos taurus* are the same. The difference between the Y sex chromosome is significant. In *Bos Indicus* it is acrocentric and in *Bos Taurus* it is metacentric. The mixing up of these breed causes mismatching in Y chromosomes. This phenomenon is mainly seen in the 2nd or 3rd generation of the cross-bred animal. This mismatching is reflected in the by infertility of cows. This is the reason behind the major fertility problems in cross-bred cows.

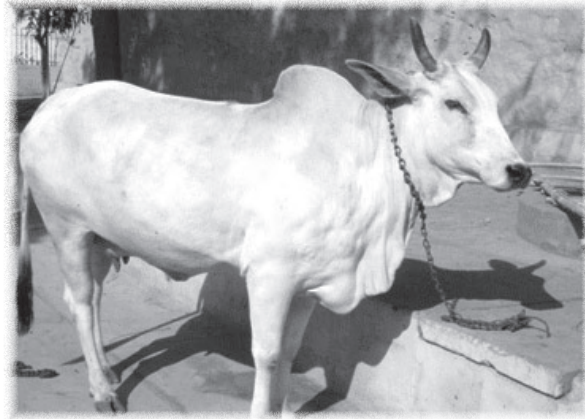
f) Resistance to Diseases

The Indigenous cows have great resistance to diseases, and this makes them easily maintainable in low input, low cost dairies. Since the diseases are rare, medicines required are fewer so that the cow milk is always of higher medical value. For the general diseases the locally available medicines are sufficient. Since this power comes to the cow by inheritance, the value of animal doesn't alter much, whether it is stall-fed or let out for grazing.

g) Basal Metabolic Rate

The activity inside the body-cells are gauged as Basal Metabolic Rate (BMR). In *Bos Indicus*, BMR is very low. That is why low qual-

ity food in minimum quantity will help the cow carry on. When good food is available the body condition comes to normal. If the



Cow - Thy Name Kindness

cows go down in a draught condition, this can retrieve by good food. In *Bos taurus*, the BMR is high. Best quality food in optimum quantity should be supplied throughout the life of the cow. When this routine is broken, the animals become sick and it never comes to normal.. Milk yield and fertility rate come down irreversibly.

h) Working ability

Indigenous bullocks have strong long bones, strong musculature. They possess the ability to adopt themselves to treat in summer. Their bodies can return water for long hours. They can work for long hours for ploughing in the field and can pull the cart for long distances, with little food and water. The hump gives extra support so that the cross bars of bullock cart does not slip back. Because of these factors in India the bulls are prized more than the cows.

The male calves are given full milk ration. Bos-taurus-bullocks cannot work in summer, and are sluggish. They are not suitable for agricultural or transportation work.

i) Milk yield

In India, we have very good milch cows yield - more than 15-20 litres per day. Gir, Sahiwal, Tharparkar, Rathi, Sindhi are the champion milk breeds. By systematic maintenance and breeding methods, many breeds can be upgraded for better milk yield. Local vaidyas claim that 1 litre of creamy milk is of good medicinal value from an indigenous cow is better than 10 litres of white watery milk of an exotic cow.

j) Panchagavya

Cows milk, curds, ghee, urine, dung when mixed together is called Panchagavya and is naturally available good medicine. This increases a human patients resistant power, rejuvenates the cells, reduces the needed dosage of antibiotics. Some patients have been cured of cancer with Panchagavya. It can also cure many other diseases. This is very good pest repellent and good manure. Dung can resist harmful radiations. This contains soil friendly microbes, essential for agriculture.

All these medicinal properties are seen only in Indigenous cows. Therefore it is high

time we took steps to protect and develop Indian Breed of cattle which can change the economy of the entire country for the better. The human population can also lead healthier life.

The Institutionalized intervention

Jagadguru Shankaracharya Shree Shree Raghaveshvara Bharathi Swamiji is the 36th pontiff of Shree Ramachandrapuramath. The Math was established over a thousand two hundred years ago at Gokarna by Adi Shankara, who annointed his disciple Shree Vidyananda as the first pontiff. The sacred idols of Shree Rama, Seetha, Lakshmana, Raja Rajeswari and the Chandramouleeshwara lingam which were wor-



shipped by Agasthya Muni and Varadamuni were entrusted to Shree Vidyananda by Adi Shankara for worship. The Math has a large following all-over India and abroad. The devotees belong to different communities. In addition to the main math at

Hosanagara, there are nine branch maths at Gokarna, Kekkar, Theerthahalli, Apparakonda, Peraje, Bhankuli, Chadurahalli, Bangalore and Sirsi in Karnataka..

The Swamiji's three cardinal statements

1. **To the farmers** – We will buy your cows, do not sell them to be slaughtered.
2. **To the general public** – save a cow from death by giving it jeeva dana – no other act can be nobler than this.
3. **To industrialists** – Establish cow centered industries and ensure maximum utilization of cow urine and dung, which will bring protection to cows and prosperity to farmers. It will protect your environment too.

Pained at the total neglect of the indigenous cow, Jagadguru Shankaracharya Shree Shree Raghaveshvara Bharathi Swamiji, the pontiff, launched the project KAMA-DUGHA for the conservation and rejuvenation of Desi cattle which are fast dwindling in numbers. It is a unique movement to save, protect and propagate the native Indian breeds of cattle through awareness-education and positive action. Following are the measures undertaken to achieve the goal.

- a) Out of the 33 surviving breeds, the Math has procured specimens of 27 rare Indian breeds of cattle and rears them in eco-friendly goshalas. Amruthadhara goshala at Hosanagara, attracts visitors from different parts of the world.

b) The Math runs goshalas at many places in Karnataka, Buja Kudlu in Kerala and at Kolad in Maharashtra.

c) Scientific research and development work on different aspects of cattle breeding, rearing and utilisation of cow products is undertaken by the Math.

d) The Math takes the responsibilities for distribution of cows of native breed to nearby farmers.

e) The Math guides the manufacture and marketing of medicinal arka (cow-urine-distillate) and products for day-to-day use such as soaps, shampoos, dhoopa and tooth powder extracted out of cow by-products.

f) The Math has established Gavya Chikithsa Kendras and Ayurvedic and nature-cure centres which provide treatment to ailments like cancer and arthritis for human beings.

g) The Math conducted Goyatra in November 2005 to create awareness among the farmers and the general public about the importance of preserving the native varieties of Indian cattle. It covered a distance of 5830 km and traversed through the state of Karnataka and Kerala.

h) The Math's Gou Samsaths are mobile parliaments to spread the knowledge on Indian breed of cattle. Experts clarify doubts through question and answer sessions on cattle rearing and on preparing cattle products. It also serves an

- education through entertainment.
- i) The Math promotes Goubanks which use cow as currency and lend them to people keeping in mind the welfare of the cattle and rearers.
 - j) The Math's Gavya dairy buys cow urine and dung and provides means of income generation through cattle rearing.

i) Amruthdhara Goushalas:

Plans are afoot for establishing eco-friendly Amruthadhara goushalas (cattle homes)



Relaxed Cow

through-out the length and breadth of the country to provide shelter and care to Desi Cattle. 13 such goushalas are already functioning in Karnataka.

ii) Indian Breed Cattles At The Math

- a) Karnataka-Malenad gidida, Amrithamahal, Hallikaru, Khilari, Javari, Krishnatheera
- b) Maharastra – Deoni, Dangi, Goulav, Lalkandari

- c) Kerala –Vechur, Kasargod
- d) Tamilnadu – Kangayam, Ambalcheri, Baragur
- e) Andhrapradesh – Ongole
- f) North India – Gir, Tharparkar, Sahiwal, Sindhi, Kankrej, Rati, Hariana, Malvi, Nimari, Nagoori, Gangathri, Kenkatha, Ponwar, Kerighar

iii) Breeds saved from the Verge Of Extinction and brought to Healthy Existence

a) Project Krishna Theera

Krishnatheera is a pedigree which used to be found in abundance in regions of Krishna river. But today only around twenty to thirty cattle are surviving. Efforts are being made to procure the available cattle. Work has commenced on the propagation of the breed at the Hosanagara goushala.

b) Project Malenad Gidda

This small sized cattle, once found in abundance in the hilly regions of Karnataka is most suitable for small farmers. The urine and dung of this breed are extensively used in medicinal preparations. Propagation and research work are carried out Muliya and Kairasangala goushalas.

c) Project Kasaragod

Kasaragod, a highly adaptable breed of Kerala is moving fast towards extinction. Propagation and research work are being carried out at Bajakudlu goushala.

iv) Amrutha Sathva

This project aims at bringing about qualitative change in the lives of people through the adoption of organic farming. Under the guidance of the Maths, a large number of farmers have adopted organic paddy-cultivation in Sagara, Shimoga, district of DK and Kasaragod. The project encourages the native cattle based agriculture and promotes cottage industries.

v) Vanajeevana Yajna

This project aims at turning our earth green. More than one crore saplings have been planted so far under this scheme. Rare plants and trees of native origin are protected from extinction. The Math prevents the exploitation of natural resources like forests, rocks, mountains, rivers, sandbanks, etc. of the area, through its education and protest movements.

vi) Gou Sanjeevini

A popular mass movement launched recently by the Swamiji to save Desi cows from the jaws of death by buying them from the people who sell them to be slaughtered. The Math accepts the responsibility of keeping such cows for life.

viii) Awareness Campaigns

a. Bharathiya Gouyathra A successful awareness campaign on the native breed cattle which traversed South In-

dia covering more than 6000 Kms.in 80 days.This historical yathra was witnessed by nearly one crore of people.

- b. Datta Shankar Gouyathra, a cattle bridge between North and South. The Math distributed nearly 1000 Kankrej cows in Karnataka and Kerala. The Kankrey cows were brought from Rajasthan.
- c. Bharathiya Gou bank ; gives desi cows to people on the condition that they will not sell them, cross-breed or adopt any artificial insemination methods. The bank accepts cattle as deposits when farmers find it difficult to maintain them.
- d. Gousamsaths; debates to clarify the doubts of farmers and general public with regard to Desi cows. A six month long yathra was conducted for this purpose in Karnataka and Kerala.
- e. Vishva gou sammellana: A nine day world conference and festival on indigenous cattle breed was held from April 21 to 29,2007 at Hosanagara. It proclaimed to the world the greatness of the Desi cattle. Nearly 25 lakh people gathered for this programme.
- f. Kotineerajanja: Nearly 1 lakhs mothers and sisters did Neeranjana to live goumatha in evening of 18th Nov 2007 at Palace grounds, Bangalore.

GAVO VISWASYA MATHARAH

SECTION - VI

Green Miscellany



*The whole creation is moving
towards an Advaitic unity*

Green Miscellany

SECTION - VI

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Green Miscellany

Prelude

Jnani Noval: The purpose of human civilization appears to be to find the central point towards which all movements take place in history. We can fast-forward it. The whole creation is moving towards an Advaitic unity trying at the same time to preserve external variety. The purpose of human civilization is to preserve variety and help human beings to find out, to recognize, individually and collectively the underlying unity. The chances of mankind hitting the bull's eye are more if the variety is more.

Annapoorna Duval: Man should be taught to identify unity under a variety of circumstances. In our crèche, we teach the colour sense to the child by helping her to recognize red or blue in various objects, so that the child does not associate red colour with a single object. She should be able to recognize the colour in whatever object she sees.

Jnani Noval: Yes. That is the philosophy of Hindu National and Religious Culture too. In Veda chanting, a letter or a sound is to be recognized in whatever combination it occurs. When the European civilization, Mid-west religions or Marxism all of which appear to have a common world view try to inch towards external uniformity, truth is the casualty. We have included in this issue

a classic article by Lynn Townsend White Jr. tracing the historical roots of our Ecological crisis.

Annapoorna Duval: It is just common sense that you have to learn to live with the plants around you, the animals, insects, reptiles, that God has thrown around you, and the other human beings with whom your lot has been thrown. Does it require a big civilization to emphasize such simple knowledge which seems so obvious.



Jnani Noval: The erosion of our eco-values come about slowly, in imperceptible acceleration. Some civilizations failed to respect their woman. They forgot their Mother Goddesses. Man was imagined to be a Master of Nature, its owner, enjoyer, not a child of Nature. Two researchers Anne Bar-

ing and Jules Cashford writing on the Myth of the Goddess (in the West) aver: "We have concluded that for the last 4000 years, the feminine principle which manifests in the mythological history as 'the Goddess' and in cultural history as the values placed upon spontaneity, feeling, instinct and intuition, had been lost as valid expressions of the sanctity and unity of life. In the Judeo-Christian Mythology there is now, formally, no feminine dimension of the divine, since our particular culture is structured in the image of a masculine god, who is beyond creation, ordering it from without; he is not within creation as were the mother goddesses before him. This results inevitably in an imbalance of the masculine and feminine principles, which has fundamental implications for how we create our world and live in it."

Annapoorna Duval: In our village there are many mother Goddesses. The female deities abound. Even our Shiva is Ardhanareesvara, half male, half female. And most of the village temples are surrounded by sacred groves, trees, animals and birds or their images. Nature worship is a vital part of our religion.

Krish Phidol: But who is going to collect all this information about your sacred groves and present them to the public with proper generalizations? linkages?

Jnani Noval: There was a long era of ne-

glect of our Bio-resources. But in the last two-three decades, the situation in this front has improved. Proper documentation, stock-taking, audiovisual recording, and highlighting of environmental degradation are being done. Good, and technically sound films have been made, recording the scenes in the polluted areas. Scientists have written, warning people of the long-term and short-term implications of eco-degradation. The corporate sector also is rising up to meet its eco-responsibilities.

Annapoorna Duval: Education, instead of widening our capacity for perception, seems to make the learners cling on to narrow strips of perceived reality.

Jnani Noval: Yes. Much study has been done on the impact of this constriction in language, family relationships, interpersonal relations, capacity for expression etc. One tragic aspect is that even countries like



Yin-Yang
world.

India and New Guinea, which have large diversity of language-groups are finding their local dialects dying. Fewer and fewer

people speak them.

Annapurna Duval: English threatens to take their place in the curriculum.

Jnani Noval: Yes. Just like the loss of Biodiversity from which humanity is suffering, there is steep decline of the variety of tongues in which mankind speaks. The folk and rural tales, songs, art-forms are fading away, not being replaced by spontaneous new expressions.

Krish Phidol: There should be some way of making a profit and loss check on this front too. What is green – auditing?

Jnani Noval: The corporate sector is coming round to accept standards of eco-safety in their factories, re-treat their effluents and have shown a willingness to be examined and evaluated by independent agencies. This readiness has ushered in eco-audit at least in some industries.

Annapoorna Duval: In the long run, such



external controls are to be internalized and made into the culture of a home, an industry, a school or any work place.

Jnani Noval: That is why very specific cases of bringing awareness in a field, as well as broad - based mass education go hand in hand. At least some media men have taken up this dual responsibility on their shoulders.



The Historical Roots of Our Ecological Crisis

Lynn White, Jr.



A conversation with Aldous Huxley not infrequently put one at the receiving end of an unforgettable monologue. About a year before his lamented death he was discoursing on a favourite topic: Man's unnatural treatment of nature and its sad results. To illustrate his point he told how, during the previous summer, he had returned to a little valley in England where he had spent many happy months as a child. Once it had been composed of delightful grassy glades; now

it was becoming overgrown with unsightly brush because the rabbits that formerly kept such growth under control had largely succumbed to a disease, myxomatosis, that was deliberately introduced by the local farmers to reduce the rabbits' destruction of crops. Being something of a Philistine, I could be silent no longer, even in the interests of great rhetoric. I interrupted to point out that the rabbit itself had been brought as a domestic animal to England in 1176, presumably to improve the protein diet of the peasantry.

All forms of life modify their contexts. The most spectacular and benign instance is doubtless the coral polyp. By serving its own ends, it has created a vast undersea world favourable to thousands of other kinds of animals and plants. Ever since man became a numerous species he has affected his environment notably. The hypothesis that his fire-drive method of hunting created the world's great grasslands and helped to exterminate the monster mammals of the Pleistocene from much of the globe is plausible, if not proved. For 6 millennia at least, the banks of the lower Nile have been a human artifact rather than the swampy African jungle which nature, apart from

man, would have made it. The Aswan Dam,

The extinction of the European aurochs as late as 1627 would seem as late as 1627 would seem to have been a simple case of overenthusiastic hunting. On more intricate matters it often is impossible to find solid information. For a thousand years or more the Frisians and Hollanders have been pushing back the North Sea, and the process is culminating in our own time in the reclamation of the Zuider Zee. What, if any, species of animals, birds, fish, shore life, or plants have died out in the process? In their epic combat with Neptune have the Netherlanders overlooked

Bio-diversity a jig-saw puzzle



flooding 5000 square miles, is only the latest stage in a long process. In many regions terracing or irrigation, overgrazing, the cutting of forests by Romans to build ships to fight Carthaginians or by Crusaders to solve the logistics problems of their expeditions, have profoundly changed some ecologies. Observation that the French landscape falls into two basic types, the open fields of the north and the bocage of the south and the west, inspired Marc Bloch to undertake his classic study of medieval agricultural methods. Quite unintentionally, changes in human ways often affect nonhuman nature. It has been noted, for example, that the advent of the automobile eliminated huge flocks of sparrows that once fed on the horse manure littering every street.

The history of ecologic change is still so rudimentary that we know little about what really happened, or what the results were.

ecological values in such a way that the quality of human life in the Netherlands has suffered? I cannot discover that the questions have ever been asked, much less answered.

People, then, have often been a dynamic element in their own environment, but in the present state of historical scholarship we usually do not know exactly when, where, or with what effects man-induced changes came. As we enter the last third of the 20th century, however, concern for the problem of ecologic backlash is mounting feverishly. Natural science, conceived as the effort to understand the nature of things, had flourished in several eras and among several peoples. Similarly there had been an age-old accumulation of technological skills, sometimes growing rapidly, sometimes slowly. But it was not until about four generations ago that Western

Europe and North America arranged a marriage between science and technology, a union of the theoretical and the empirical approaches to our natural environment. The emergence in widespread practice of the Baconian creed that scientific knowledge means technological power over nature can scarcely be dated before about 1850, save in the chemical industries, where it is anticipated in the 18th century. Its acceptance as a normal pattern of action may mark the greatest event in human history since the invention of agriculture, and perhaps in nonhuman terrestrial history as well.

Almost at once the new situation forced the crystallization of the novel concept of ecology; indeed, the word ecology first appeared in the English language in 1873. Today, less than a century later, the impact of our race upon the environment has so increased in force that it has changed in essence. When the first cannons were fired, in the early 14th century, they affected ecology by sending workers scrambling to the forests and mountains for more potash, sulphur, iron ore, and charcoal, with some resulting erosion and deforestation. Hydrogen bombs are of a different order; a war fought with them might alter the genetics of all life on this planet. By 1285 London had a smog problem arising from the burning of soft coal, but our present combustion of fossil fuels threatens to change the chemistry of the globe's atmosphere as a whole, with consequences which we are only beginning to guess. With the population explosion, the carcinoma of planless urbanism, the now geological

deposits of sewage and garbage, surely no creature other than man has ever managed to foul its nest in such short order.

There are many calls to action, but specific proposals, however worthy as individual items, seem too partial, palliative, negative: The simplest solution to any suspect change is, of course, to stop it, or better yet, to revert to a romanticized past: make those ugly gasoline stations look like Anne Hathaway's cottage or (in the Far West) like ghost-town saloons. The "wilderness area" mentality invariably advocates deep-freezing an ecology, whether San Gimignano or the High Sierra, as it was before the first Kleenex was dropped. But neither atavism nor prettification will cope with the ecologic crisis of our time.

What shall we do? No one yet knows. Unless we think about fundamentals, our specific measures may produce new backlashes more serious than those they are designed to remedy.

As a beginning we should try to clarify our thinking by looking, in some historical depth, at the presuppositions that underlie modern technology and science. Science was traditionally aristocratic, speculative, intellectual in intent; technology was lower-class, empirical, action-oriented. The quite sudden fusion of these two, towards the middle of the 19th century, is surely related to the slightly prior and contemporary democratic revolutions which, by reducing social barriers, tended to assert a functional unity of brain and hand. Our ecologic crisis is the product of an emerging, entirely novel,

democratic culture. The issue is whether a democratized world can survive its own implications. Presumably we cannot unless we rethink our axioms.

The Western Traditions of Technology and Science

One thing is so certain that it seems stupid to verbalize it: both modern technology and modern science are distinctively Occidental. Our technology has absorbed elements from all over the world, notably from China; yet everywhere today, whether in Japan or in Nigeria, successful technology is Western. Our science is the heir to all the sciences of the past, especially perhaps to the work of the great Islamic scientists of the Middle Ages, who so often outdid the ancient Greeks in skill and perspicacity: al-Razi in medicine, for example; or ibn-al-Haytham in optics; or Omar Khayyam in mathematics. Indeed, not a few works of such geniuses seem to have vanished in the original Arabic and to survive only in medieval Latin translations that helped to lay the foundations for later Western developments. Today, around the globe, all significant science is Western in style and method, whatever the pigmentation or language of the scientists.

A second pair of facts is less well recognized because they result from quite recent historical scholarship. The leadership of the West, both in technology and in science, is far older than the so-called Scientific Revolution of the 17th century or the so-called Industrial Revolution of the 18th century. These terms are in fact outmoded

and obscure the true nature of what they try to describe—significant stages in two long and separate developments. By A.D.1000 at the latest—and perhaps, feebly, as much as 200 years earlier—the West began to apply water power to industrial processes other than milling grain. This was followed in the late 12th century by the harnessing of wind power. From simple beginnings, but with remarkable consistency of style, the West rapidly expanded its skills in the development of power machinery, labour-saving devices, and automation. Those who doubt should contemplate that most monumental achievement in the history of automation: the weight-driven mechanical clock, which appeared in two forms in the early 14th century. Not in craftsmanship but in basic technological capacity, the Latin West of the later Middle Ages far outstripped its elaborate, sophisticated, and aesthetically magnificent sister cultures, Byzantium and Islam. In 1444 a great Greek ecclesiastic, Bessarion, who had gone to Italy, wrote a letter to a prince in Greece. He is amazed by the superiority of Western ships, arms, textiles, glass. But above all he is astonished by the spectacle of waterwheels sawing timbers and pumping the bellows of blast furnaces. Clearly, he had seen nothing of the sort in the Near East.

By the end of the 15th century the technological superiority of Europe was such that its small, mutually hostile nations could spill out over all the rest of the world, conquering, looting, and colonizing. The symbol of this technological superiority is the fact that Portugal, one of the weakest states of the Occident, was able to become,

The National Forest Policy of India aims at providing environmental stability and ecological balance including atmospheric equilibrium, which are vital for the sustenance of all life-forms, human, animal and plants.

and to remain for a century, mistress of the East Indies. And we must remember that the technology of Vasco da Gama and Albuquerque was built by pure empiricism, drawing remarkably little support or inspiration from science.

In the present-day vernacular understanding, modern science is supposed to have begun in 1543, when both Copernicus and Vesalius published their great works. It is no derogation of their accomplishments, however, to point out that such structures as the *Fabrica* and the *De revolutionibus* do not appear overnight. The distinctive Western tradition of science, in fact, began in the late 11th century with a massive movement of translation of Arabic and Greek scientific works into Latin. A few notable books—Theophrastus, for example—escaped the West's avid new appetite for science, but within less than 200 years effectively the entire corpus of Greek and Muslim science was available in Latin, and was being eagerly read and criticized in the new European universities. Out of criticism arose new observation, speculation, and increasing distrust of ancient authorities. By the late 13th century Europe had seized global scientific leadership from the faltering hands of Islam. It would be as absurd to deny the profound originality of Newton, Galileo, or Copernicus as to deny that of the 14th century scholastic scientists like Buridan or Oresme on whose work they built. Before the 11th century, science scarcely existed in the Latin West, even in Roman times. From the 11th century onward, the scientific sector of Occidental culture has increased

in a steady crescendo.

Since both our technological and our scientific movements got their start, acquired their character, and achieved world dominance in the Middle Ages, it would seem that we cannot understand their nature or their present impact upon ecology without examining fundamental medieval assumptions and developments.

Medieval View of Man and Nature

Until recently, agriculture has been the chief occupation even in "advanced" societies; hence, any change in methods of tillage has much importance. Early plows, drawn by two oxen, did not normally turn the sod but merely scratched it. Thus, cross-plowing was needed and fields tended to be squarish. In the fairly light soils and semiarid climates of the Near East and Mediterranean, this worked well. But such a plow was inappropriate to the wet climate and often sticky soils of northern Europe. By the latter part of the 7th century after Christ, however, following obscure beginnings, certain northern peasants were using an entirely new kind of plow, equipped with a vertical knife to cut the line of the furrow, a horizontal share to slice under the sod, and a moldboard to turn it over. The friction of this plow with the soil was so great that it normally required not two but eight oxen. It attacked the land with such violence that cross-plowing was not needed, and fields tended to be shaped in long strips.

In the days of the scratch-plow, fields were distributed generally in units capable of

supporting a single family. Subsistence farming was the presupposition. But no peasant owned eight oxen: to use the new and more efficient plow, peasants pooled their oxen to form large plow-teams, originally receiving (it would appear) plowed strips in proportion to their contribution. Thus, distribution of land was based no longer on the needs of a family but, rather, on the capacity of a power machine to till the earth. Man's relation to the soil was profoundly changed. Formerly man had been part of nature; now he was the exploiter of nature. Nowhere else in the world did farmers develop any analogous agricultural implement. Is it coincidence that modern technology, with its ruthlessness toward nature, has so largely been produced by descendants of these peasants of northern Europe?

This same exploitive attitude appears slightly before A.D. 830 in Western illustrated calendars. In older calendars the months were shown as passive personifications. The new Frankish calendars, which set the style for the Middle Ages, are very different: they show men coercing the world around them—plowing, harvesting, chopping trees, butchering pigs. Man and nature are two things, and man is master.

These novelties seem to be in harmony with larger intellectual patterns. What people do about their ecology depends on what they think about themselves in relation to things around them. Human ecology is deeply conditioned by beliefs about our nature and destiny—that is, by religion. To Western eyes this is very evident in, say, India or

Ceylon. It is equally true of ourselves and of our medieval ancestors.

The victory of Christianity over paganism was the greatest psychic revolution in the history of our culture. It has become fashionable today to say that, for better or worse, we live in the “post-Christian age.” Certainly the forms of our thinking and language have largely ceased to be Christian, but to my eye the substance often remains amazingly akin to that of the past. Our daily habits of action, for example, are dominated by an implicit faith in perpetual progress which was unknown either to Greco-Roman antiquity or to the Orient. It is rooted in, and is indefensible apart from, Judeo-Christian theology. The fact that Communists share it merely helps to show what can be demonstrated on many other grounds: that Marxism, like Islam, is a Judeo-Christian heresy. We continue today to live, as we have lived for about 1700 years, very largely in a context of Christian axioms.

What did Christianity tell people about their relations with the environment? While many of the world's mythologies provide stories of creation, Greco-Roman mythology was singularly incoherent in this respect. Like Aristotle, the intellectuals of the ancient West denied that the visible world had a beginning. Indeed, the idea of a beginning was impossible in the framework of their cyclical notion of time. In sharp contrast, Christianity inherited from Judaism not only a concept of time as nonrepetitive and linear but also a striking story of creation. By gradual stages a loving and all-powerful

God had created light and darkness, the heavenly bodies, the earth and all its plants, animals, birds, and fishes. Finally, God had created Adam and, as an afterthought, Eve to keep man from being lonely. Man named all the animals, thus establishing his dominance over them. God planned all of this explicitly for man's benefit and rule: no item in the physical creation had any purpose save to serve man's purposes. And, although man's body is made of clay, he is not simply part of nature: he is made in God's image.

Especially in its Western form, Christianity is the most anthropocentric religion the world has seen. As early as the 2nd century both Tertullian and Saint Irenaeus of Lyons were insisting that when God shaped Adam he was foreshadowing the image of the incarnate Christ, the Second Adam. Man shares, in great measure, God's transcendence of nature. Christianity, in absolute contrast to ancient paganism and Asia's religions (except, perhaps, Zoroastrianism), not only established a dualism of man and nature but also insisted that it is God's will that man exploit nature for his proper ends.

At the level of the common people this worked out in an interesting way. In Antiquity every tree, every spring, every stream, every hill had its own genius loci, its guardian spirit. These spirits were accessible to men, but were very unlike men; centaurs, fauns, and mermaids show their ambivalence. Before one cut a tree, mined a mountain, or dammed a brook, it was important to placate the spirit in

charge of that particular situation, and to keep it placated. By destroying pagan animism, Christianity made it possible to exploit nature in a mood of indifference to the feelings of natural objects.

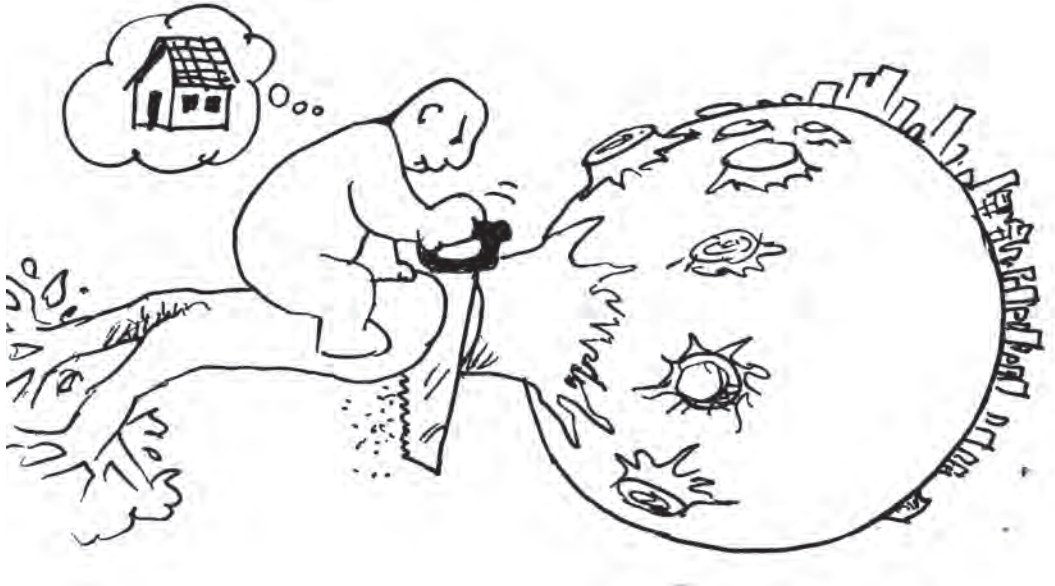
It is often said that for animism the Church substituted the cult of saints. True; but the cult of saints is functionally quite different from animism. The saint is not in natural objects; he may have special shrines, but his citizenship is in heaven. Moreover, a saint is entirely a man; he can be approached in human terms. In addition to saints, Christianity of course also had angels and demons inherited from Judaism and perhaps, at one remove, from Zoroastrianism. But these were all as mobile as the saints themselves. The spirits in natural objects, which formerly had protected nature from man, evaporated. Man's effective monopoly on spirit in this world was confirmed, and the old inhibitions to the exploitation of nature crumbled.

When one speaks in such sweeping terms, a note of caution is in order. Christianity is a complex faith, and its consequences differ in differing contexts. What I have said may well apply to the medieval West, where in fact technology made spectacular advances. But the Greek East, a highly civilized realm of equal Christian devotion, seems to have produced no marked technological innovation after the late 7th century, when Greek fire was invented.

The key to the contrast may perhaps be found in a difference in the tonality of piety and thought which students of comparative

theology find between the Greek and the Latin Churches. The Greeks believed that sin was intellectual blindness, and that salvation was found in illumination, orthodoxy—that is, clear thinking. The Latins, on the other hand, felt that sin was moral evil, and that salvation was to be found in right conduct. Eastern theology has been intellectualist. Western theology has been voluntarist. The Greek saint contemplates; the Western saint acts. The implications of Christianity

nature also must reveal the divine mentality. The religious study of nature for the better understanding of God was known as natural theology. In the early Church, and always in the Greek East, nature was conceived primarily as a symbolic system through which God speaks to men: the ant is a sermon to sluggards; rising flames are the symbol of the soul's aspiration. The view of nature was essentially artistic rather than scientific. While Byzantium



for the conquest of nature would emerge more easily in the Western atmosphere.

The Christian dogma of creation, which is found in the first clause of all the creeds, has another meaning for our comprehension of today's ecologic crisis. By revelation, God had given man the Bible, the Book of Scripture. But since God had made nature,

preserved and copied great numbers of ancient Greek scientific texts, science as we conceive it could scarcely flourish in such an ambience.

However, in the Latin West by the early 13th century natural theology was following a very different bent. It was ceasing to be the decoding of the physical symbols of

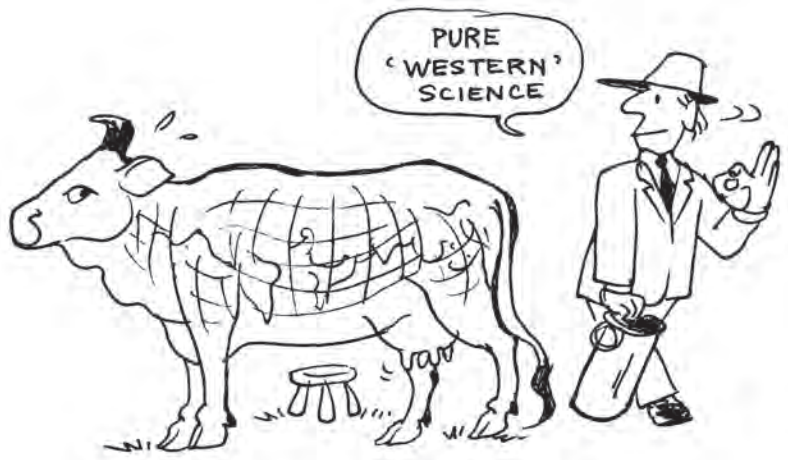
God's communication with man and was becoming the effort to understand God's mind by discovering how his creation operates. The rainbow was no longer simply a symbol of hope first sent to Noah after the Deluge: Robert Grosseteste, Friar Roger Bacon, and Theodoric of Freiberg produced startlingly sophisticated work on the optics of the rainbow, but they did it as a venture in religious understanding. From the 13th century onward, up to and including Leibnitz and Newton, every major scientist, in effect, explained his motivations in religious terms. Indeed, if Galileo had not been so expert an amateur theologian he would have got into far less trouble; the professionals resented his intrusion. And Newton seems to have regarded himself more as a theologian than as a scientist. It was not until the late 18th century that the hypothesis of God became unnecessary to many scientists.

It is often hard for the historian to judge, when men explain why they are doing what they want to do, whether they are offering real reasons or merely culturally acceptable reasons. The consistency with which scientists during the long formative centuries of Western science said that the task and the reward of the scientist was "to think God's thoughts after him" leads one to believe that this was their real motivation. If so, then modern Western science was

cast in a matrix of Christian theology. The dynamism of religious devotion shaped by the Judeo-Christian dogma of creation, gave it impetus.

An Alternative Christian View

We would seem to be headed towards conclusions unpalatable to many Christians. Since both science and technology are blessed words in our contemporary vocabulary, some may be happy at the notions, first, that viewed historically, modern science is an extrapolation of natural theology and, second, that modern



technology is at least partly to be explained as an Occidental, voluntarist realization of the Christian dogma of man's transcendence of, and rightful master over, nature. But, as we now recognize, somewhat over a century ago science and technology—hitherto quite separate activities—joined to give mankind powers which, to judge by many of the ecologic effects, are out of control. If so, Christianity bears a huge burden of guilt.

I personally doubt that disastrous ecologic backlash can be avoided simply by applying to our problems more science and more technology. Our science and technology have grown out of Christian attitudes toward man's relation to nature which are almost universally held not only by Christians and neo-Christians but also by those who fondly regard themselves as post-Christians. Despite Copernicus, all the cosmos rotates around our little globe. Despite Darwin, we are not, in our hearts, parts of the natural process. We are superior to nature, contemptuous of it, willing to use it for our slightest whim. The

newly elected Governor of California, like myself a churchman but less troubled than I, spoke for the Christian tradition when he said (as is alleged), 'when you've seen one redwood tree, you've seen them all. "To a Christian a tree can be no more than a physical fact. The whole concept of the sacred grove is alien to Christianity and to the ethos of the West. For nearly 2 millennia Christian missionaries have been chopping down sacred groves, which are idolatrous because they assume spirit in nature.

What we do about ecology depends on

our ideas of the man-nature relationship. More science and more technology are not going to get us out of the present ecologic crisis until we find a new religion, or rethink our old one. The beatniks, who

More science and more technology are not going to get us out of the present ecologic crisis



are the basic revolutionaries of our time, show a sound instinct in their affinity for Zen Buddhism, which conceives of the man-nature relationship as very nearly the mirror image of the Christian view. Zen, however, is as deeply conditioned by Asian history as Christianity is by the experience of the West, and I am dubious of its viability among us.

Possibly we should ponder the greatest radical in Christian history since Christ: Saint Francis of Assisi. The prime miracle of Saint Francis is the fact that he did not

end at the stake, as many of his left-wing followers did. He was so clearly heretical that a General of the Franciscan Order, Saint Bonaventura, a great and perceptive Christian, tried to suppress the early accounts of Franciscanism. The key to an understanding of Francis is his belief in the virtue of humility—not merely for the individual but for man as a species. Francis



the lazy, flames a sign of the thrust of the soul toward union with God; now they are Brother Ant and Sister Fire, praising the Creator in their own ways as Brother Man does in his.

Later commentators have said that Francis preached to the birds as a rebuke to men who would not listen. The records do not read so: he urged the little birds to praise God, and in spiritual ecstasy they flapped their wings and chirped rejoicing. Legends of saints, especially the Irish saints, had long told of their dealings with animals but always, I believe, to show their human dominance over creatures. With Francis, it

is different. The land around Gubbio in the Apennines was ravaged by a fierce wolf. Saint Francis, says the legend, talked to the wolf and persuaded him of the error of his ways. The wolf repented, died in the odor of sanctity, and was buried in consecrated ground.

What Sir Steven Ruciman calls “the Franciscan doctrine of the animal soul” was quickly stamped out. Quite possibly it was in part inspired, consciously or unconsciously, by the belief in reincarnation held by the Cathar heretics who at that time teemed in Italy and southern France, and who presumably had got it originally from India. It is significant that at just the same moment, about 1200, traces of metempsychosis are found also in western Judaism, in the Provençal Cabbala. But Francis held neither to transmigration of souls nor to pantheism. His view of nature and of man rested on a unique sort of pan-psychism of all things animate and inanimate, designed for the glorification of their transcendent Creator, who, in the ultimate gesture of cosmic humility, assumed flesh, lay helpless in a manger, and hung dying on a scaffold.

I am not suggesting that many contemporary Americans who are concerned about our ecologic crisis will be either able or willing to counsel with wolves or exhort birds. However, the present increasing disruption of the global environment is the product of a dynamic technology and science which were originating in the Western medieval world against which Saint Francis was rebelling in so original a way. Their growth cannot be understood historically apart from

distinctive attitudes toward nature which are deeply grounded in Christian dogma. The fact that most people do not think of these attitudes as Christian is irrelevant. No new set of basic values has been accepted in our society to displace those of Christianity. Hence we shall continue to have a worsening ecologic crisis until we reject the Christian axiom that nature has no reason for existence save to serve man.

The greatest spiritual revolutionary in Western history, Saint Francis, proposed what he thought was an alternative Christian view of nature and man's relation to it; he tried to substitute the idea of the equality of all creatures, including man, for the idea of man's limitless rule of creation. He failed.

Both our present science and our present technology are so tinctured with orthodox Christian arrogance toward nature that no solution for our ecologic crisis can be expected from them alone. Since the roots of our trouble are so largely religious, the remedy must also be essentially religious, whether we call it that or not. We must rethink and refeel our nature and destiny. The profoundly religious, but heretical, sense of the primitive Franciscans for the spiritual autonomy of all parts of nature may point a direction. I propose Francis as a patron saint for ecologists.

Science, Vol 155 (Number 3767), March 10, 1967, pp 1203-1207



An interview with God

(Make A Better Human Environment)

I dreamed I had an interview with god.
“So, you would like to interview me?”
God asked.

“If you have time,” I said.

God smiled. “My time is eternity...What questions do you have in mind for me?”

“What surprises you the most about humankind?”

God answered, “that they get bored with childhood, that they rush to grow up, and then long to be children again. That they lose their health to make money, and then lose their money to restore their health. That by thinking anxiously about the future, they forget the present, such that they live in neither the present nor the future. That they live as if they would

never die, and die as though they had never lived.”

God’s hand took mine...and we were silent for a while.

And then I asked, “as a parent, what are some of life’s lessons you want your children to learn?”

God replied, “to learn that they cannot make anyone love them. All they can do is let themselves be loved. To learn that it is not



good to compare themselves to others. To learn to forgive by practising forgiveness.

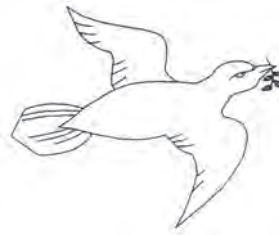
To learn that it only takes a few seconds to open profound wounds in those they love, and it can take many years to heal them. To learn that a rich person is not one who has the most, but is one who needs the least. To learn that there are people who love them dearly, but simply do not yet know how to express or show their feelings. To learn that two people can look at the same thing, and see it differently. To learn that it is not enough that they forgive one another, but

they must also forgive themselves.”

“Thank you for your time,” I said humbly. “Is there anything else you would like your children to know?”

God smiled, and said, “just know that I am here...always.”

From: Matruvani, February 2002 issue.



Oxford project: why mankind believes in God

University of Oxford researchers will spend nearly 2 million in a three-year programme to determine why mankind embraces God.

The grant to the Ian Ramsey Centre for Science and Religion will bring anthropologists, theologians, philosophers and other academics together to study whether belief in a divine being is a basic part of mankind's make-up.

“There are a lot of issues,” said Roger Trigg, acting director of the centre.



(Associated Press).

Tales of human folly

(Green film festival chronicles man's role in degrading the environment)

Nanditha Krishna

I recently served on the jury of Vatavaran 2003, an environmental film festival held at Delhi. Out of 154 entries, the nomination committee had selected 70, which I sat and watched in wide-eyed wonder and horror. Wonder at the passion and commitment that I saw in the fascinating creations of so many young filmmakers. And horror at the tales of vandalism and neglect. Each film narrates a story of awe and tragedy: I thought I would share some of these with my readers, for it is unlikely that these documentaries will ever see a popular theatre.

The special theme of the festival was "Water", in keeping with the International Year of Fresh Water. The winning film was *Unquiet flows the Chaliyar* by Sanjay Mohan, the chronicle of a dying river in Kerala that was once the lifeline of the communities that lived alongside. The toxic fumes and effluents let out by Grasim Industries Ltd. have resulted in death, cancer and cerebro-vascular diseases. The ecology of the river and the forests of Nilambur and Wynad have been destroyed. One man – K A Rahman – fought and died for the river. The pollution is so bad that stretchers are kept ready at bus terminals to rush villagers to medical help. Yet the pollution continues, unabated,

with no government action, although everyone knows what is happening.

Sanjay Kak's prize-winning *Words on Water*, narrates the story of the Save Narmada campaign. As we travel down the river with the filmmaker, we witness the helplessness



Sanjay Kak's film words on water

of the common people as they struggle to save their lifestyles from the juggernaut called development, which has the powerful ranged against the powerless, to the detriment of the latter. Another prizewinner was *Waterworks India*, about four men from Ladakh, Rajasthan and Tamil Nadu

and a water manager from Kerala who keep alive traditional water management practices. We need more such documentation, as traditional practices disappear.

In the category of Conservation of Natural Resources, Shekhar Dattatri's *The Ridley's*

Shekhar Dattatri - film on Turtles



Last Stand won the prize for documenting a million year old saga—the arrival of the Olive Ridley turtles on the eastern beaches, their laying of eggs that incubate for 45 days and then hatch at night, after which the turtles go back to the sea. But, in recent years, 75,000 of them have been killed by mechanized fishing boats and their gill nets, which trap the Ridelys who struggle and die, as they are unable to escape.



The film follows these ancient animals and the indiscriminate rape of the seas, a tragedy as large numbers of dead turtles are thrown into the water. Mike Pandey's *Kalpavriksha*, which came second in this cate-

gory, traces the evolution and discovery of medicinal plants that are inherent in tribal wisdom. These plants are disappearing as forests are cleared in the name of development.

The prizewinner in the Wildlife Conservation category was Syeed Fayaz's *A Brush with Death*, about the cruelty inflicted on a popular friend of the farmer, the common mongoose, which hunts snakes, rats and mice. It is a friendly little animal, which lives in open fields, scrub jungle and urban areas. I have often found badly little mongoose eyes watching me with great curiosity in my garden at Chennai. The mongoose is trapped by madaris to stage bloody snake and mongoose fights, which are banned by law but continue unabated.

It is also caught to make paintbrushes, a particularly gruesome death, for the hairs are pulled off when the animal is still alive. The filmmaker follows the entire process and the illegal trade in mongoose hairbrushes. The mongoose population has fallen sufficiently to place it under Schedule IV of the Wildlife Protection Act, yet we continue to buy mongoose hairbrushes for our children.

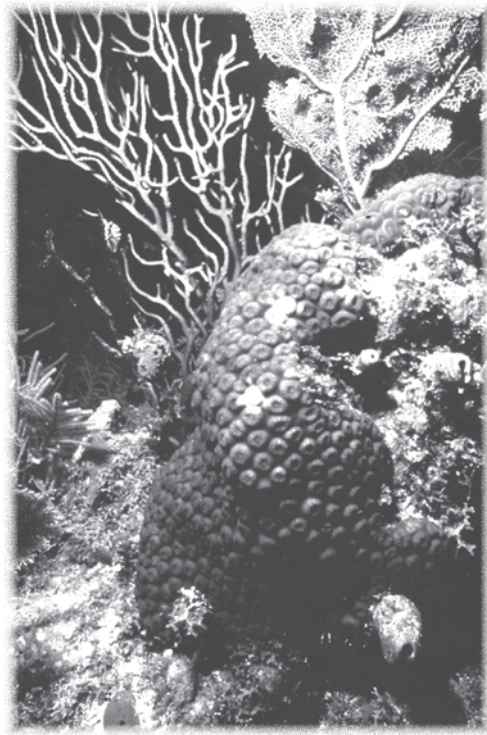
The other prize winner in this category was Gautam Pandey's *Timeless Traveler – The Horseshoe Crab*, about a unique animal that has lived on earth for over 500 million years. It is a fascinating ancient species

that, interestingly, is found only on eastern coasts. Its importance lies in its evolutionary role, with extraordinary properties contained in its blood that can even stop the growth of cancer and reverse diabetes. However, the animal now faces extinction due to over-collection. Its survival is essential for human survival.

Special mention was made of *Nagarhole – Tales from an Indian Jungle*, where Shekhar Dattatri covers a year in forest, from the arrival of the monsoon, when the forest gets rejuvenated, to the hot summer months when the water sources dry up and forest fires threaten survival. Human interference in forest habitats—illegal encroachments, deliberate forest fires and coffee plantations along elephant migratory paths—threaten the survival of the wildlife. Another habitat film was *Sahyadris-Mountains of the Monsoon* by Sandesh V Kadur, which follows the wildlife of the hills; Rutting Nilgiri Tahr, the endangered lion-tailed macaque, the elephants and other animals as they await the monsoon.

A new category was a film produced by children. While most of them were too adult to qualify, *Birds through my window* by Rudransh Mathur was an obvious production by a young boy with a hand-held camera. He documented the birds and their nests as they flew around his house one summer holiday. He installed bird's trays and put food on them, filming the birds that came to feed. The film is a revelation to jaded city slickers about how one can find a world of enchantment if only one looks hard enough.

The Best of Festival Award went to Mitali Dutt Sarkar, who has made what is probably India's first underwater film. The film documents the fascinating world of the coral reefs of the Lakshadweep Islands and the inter-dependence of various forms of sea life as they scramble to share the limited resources. In 1998, global warming and El Nino resulted in the rise of the water temperature by just a few degrees bleaching the corals and destroying the reefs. Nature is slowly regenerating the reefs, but it will be years before they return to their former glory.



I have read of quarrelling juries, but this

one worked with total consensus. Maybe it was the poignancy of the subjects that made us feel humble. Or maybe it was the wisdom of the Chairperson, Adoor Gopalakrishnan, who made us see the best and reject the worst. It is sad that in the most important category—Best Television Series – not even one was found fit to receive an award. If cinema theatres are too expensive for screening wildlife documentaries, television seems ideally suited in cost of outreach. Yet, not a single channel could send in worthy films. What a pity.

The one common thread in all the films was how human interference is resulting in havoc, destruction and death, on land and

underwater, in remote forests or in cities. We are the only species that has shown no respect for nature or natural resources. We have driven animals to extinction; we are destroying habitats; we are making rivers of life—into rivers of death; we are raising temperature levels that are destroying life under the oceans. Our actions are suicidal; We must realise that human greed will finally destroy human beings, for all life is interconnected. I only wish the messages of these young filmmakers touch a few hearts somewhere, and we learn to respect nature and her beautiful creations.

From: The New Sunday Express, December 7, 2003.

Films on climate change

The United Nations Environment Programme, the Worldwide Fund for Nature and the Television Trust for environment have made four 30 mts. films on climate change, one each on (1) The Science, (2) The Politics, (3) The impacts and (4) The future. The films trace the history of global warming from 1827 when the theory of global warming surfaced for the first time to 2000 when the Hague climate conference was held.

The film on The Science shows how in 1958 enormous jumps in CO₂ levels were recognized. In 1980 panic buttons were pressed.

The film on Politics shows the governments'

response to climate change. U.S. the biggest polluter with 4% of world's population contributes 25% of its pollution and refuses to join the climate control programme.

The film on The impact documents (1) The depletion of salmon fisheries in the North Pacific (2) The pest ravaged spruce forest of Alaska, (3) The vanishing glaciers (4) Storms, floods, sea level rises, (5) Health effects including smog induced Asthma, and highland malaria.

The section on The future; recommends solar, wind and wave-powered energy generation, and in the process rekindles faith in mankind's ability to overcome problems.

Souparno Bannerjee

A shooter with a different weapon

Robin Bannerjee, a medical doctor served at the hospitals of Assam Branch of Indian Tea Association. He was known for his love of wildlife photography, his museum collections and his love of children. Appropriately a part of his property has been gifted to Vivekananda Kendra, Golaghat Assam for running a school. His body lies entombed in the shadow of the museum he created.

He made a number of wildlife-photographs and movies, travelling across the world. Many of them won international awards. Many of them were shot in the wild areas of Africa.

A product of Shantiniketan, Dr. Banerjee could paint what he could not film. His house museum shows 19 award-winning photographs. He said that WWF award-winning photograph of a eagle feeding its chick was shot after a seven-hour-watch, during that period, he was lying on his back on a bed of sharp edged rocks!

Dr. Robin Banerjee made in all 32 documentaries, all on wildlife. Six of them are waiting to be edited.

It is his first visit to Kaziranga Rhino National Park that settled for him his life's love. He decided to settle down at Golaghat. His film Kaziranga was aired on Berlin TV in 1961. For the first time Kaziranga was exposed to an international audience.

Uncle Robin, a Padmashri, World renowned Photographer, decorated by Royalties and Presidents, World-level-institutions, car-



ried his honours with ease. He lived to ripe old 95 years and left as his monument his wonderful collection of dolls, paintings, artefacts, photographs and films arranged tastefully in his beautifully gardened estate.

Loss of Linguistic Diversity

From time Immemorial, language has served to bind humans in shared kinship and yet divided people in terms of race and nationality, status, and privilege. The 20th Century, particularly the period after the Second World War, created the technology for all manner of change. Air travel became routine, and world-wide broadcasting and instant communication with any part of the globe commonplace. New trade links sprang up between nations and contributed to make the world a smaller place. The effect of this new globalised environment has been to make English the world's lingua franca in many spheres of activity. English dominates international trade, finance, diplomacy and science. Tourism and the entertainment industry have extended its reach and the Internet has made it even more pervasive. English today is, way and ahead, the most popular, the most required foreign language. But this could be just the beginning. "We will experience some decades of rapid, and perhaps dis-orienting change, after which a new linguistic world order will emerge," predicts an article published in a recent issue of the journal Science.

The writer of this interesting article, David

Graddol, goes on to predict that English will "play a crucial role in shaping the new world linguistic order, but its major impact will be in creating new generations of bilingual and multilingual speakers across the world." Although English will be spoken by more people than ever before, the proportion of its native speakers (relative to native speakers of the world's languages) will actually decline by 2050. Chinese will remain unchallenged as the world's largest



language in terms of native speakers, with Hindi and Urdu ranking second and third. Arabic speakers will overtake native Eng-

lish speakers. Bengali, Tamil and Malay are among the world's most rapidly growing languages. The bad news is that 90 per cent of the 6,000 existing languages may become extinct in the coming century. Over half of



these languages are already endangered; in fact, 96 per cent of them are spoken by just four per cent of the world's population, according to UNESCO. The speakers of the vast majority of these languages – 90 per cent of them have zero presence of the Internet—are indigenous communities. It is reported that on average one language disappears every two weeks. Nature's secrets, locked away in the songs, stories, art and handicrafts of indigenous people, may be lost forever as a result of growing globali-

sation, warns the United Nations Environment Programme.

India is one of the hotspots of linguistic diversity in the globe. It is home not only to several languages that will rise to positions of dominance in the hierarchy of world languages in the coming decades, but also to many that seem doomed to extinction if no action is taken. The 1991 census counted 114 languages, sub-divided into 216 mother tongues. However, the 18 languages in the Eighth Schedule of the Constitution and their 85 mother tongues accounted for more than 96 per cent of the population. The census does not give information on mother tongues with fewer than 10,000 speakers, many of them spoken by tribal people. These could be the ones most at risk of disappearing, say experts. India has to face up to a difficult challenge. The demand for English as a passport to the world and a better life will doubtless continue and grow. But the country also needs to foster education in the mother tongues, including those spoken by relatively small numbers of people. Being multilingual and yet retaining strong ties with one's mother tongue will both be essential skills in the even more globalised world of tomorrow.

*Extracts from the Article



Doomsday Clock Moves Forward 2 Minutes

The Bulletin of the Atomic Scientists (BAS) has moved the minute hand of the Doomsday Clock from seven to five minutes to midnight, reflecting global failures to solve the problems posed by nuclear weapons and the climate crisis.



The BAS announced the Clock change at an unprecedented joint news conference

held at the American Association for the Advancement of Science in Washington, D.C. and the Royal Society in London. In a statement supporting the decision to move the hand of the Doomsday Clock, the BAS Board focused on two major sources of catastrophe: the perils of 27,000 nuclear weapons, with 2,000 of them ready to launch within minutes; and the destruction of human habitats from climate change.

The Doomsday Clock was created in 1947 by the BAS. It is the 18th time the Doomsday Clock has been adjusted in 60 years, and the first time it has been adjusted since February 2002, following the 9/11 incident.

By moving the hand of the Clock closer to midnight – the figurative end of civilization – the BAS Board of Directors is drawing attention to the increasing dangers from the spread of nuclear weapons in a world of violent conflicts, and to the catastrophic consequences brought about by climate changes.



The success achieved so far in Tiger protection is due to voluntary shifting of human population, intensified patrolling and flushing out of poachers.

Some of the Main Principles of Sustainability

1. All life forms are interconnected, interdependent.
2. The earth has limits.
3. The environment must be protected and restored.
4. Nature works. Therefore it is necessary to understand and widely apply ecological principles (i.e. the need for diversity, maximizing symbiotic connections, closing the energy and waste disposal loop)
5. Justice and equitable access to essential resources is an inalienable right of all.
6. Wherever possible, power and responsibility for that which directly affects them should be devolved to individuals/local communities.
7. Act locally, think globally.
8. The long view is more important than the short-term.
9. Quality is more important than quantity
10. As within, so without: it is important to cultivate a life-enhancing inner perspective.

There are two main requirements for putting these into effect:

1. Information. More readily available today than ever before. However some essential information for living a sustainable lifestyle is either still missing or distorted.
2. Motivation. Information does not necessarily lead to action. Individuals, societies change through a combination of factors including coercion, conscience, peer pressure and idealism. The most fundamental and permanent change occurs when an individual adopts a new perspective through deep identification.

To put it another way; change happens when it fulfils a basic need. That need, for many people, is a sense of individual identity and purpose. You cannot act sustainably if you are angry, in turmoil or despair, because of the principle of interconnectedness: you will communicate those things and thus become part of the problem.

“The first step in the ecological journey is to fall in love with the beauty of the planet.”



The pursuit of green-collar jobs

In a world that attempts to move towards a low-carbon economy

Efforts to cut greenhouse gas emissions and tackle climate change have created a new market, generating new opportunities, dubbed green jobs. According to a report by the United Nations Environment Programme, over the coming decades, millions of green jobs would be created in sectors such as energy, transport, construction, agriculture, forestry and industries

Energy

Moving away from fossil fuels would see a job reduction in oil, gas and coal industries.



The emerging renewable energy sector would compensate this and create millions more jobs. By 2030:

- 2.1 million jobs would be created in-wind energy sector
- 6.3 million jobs in solar power
- 12 million jobs in biofuel-related agriculture and industry
- By 2025, India will create 900,000 jobs in biomass gasification alone

Transportation

A shift towards sustainable transport would mean greater reliance on public transports like trains, trams and buses:

- Bus rapid transit systems would become a major employer offering substantial jobs in retrofitting diesel buses and in managing CNG or hybrid buses. In New Delhi, the introduction of 6,100 CNG buses by 2009 would create 18,000 jobs

Buildings and construction

Buildings have the capacity to reduce projected emissions by 29 per cent by 2020. As the next decade sees a transition to

energy-efficient buildings:

- 111 million people, in construction, would use new building technology
- Construction of green buildings, by retrofitting, and using efficient home appliances, would generate up to 3.5 million jobs in Europe and the US by 2030. The potential is higher in developing countries

Agriculture and forestry

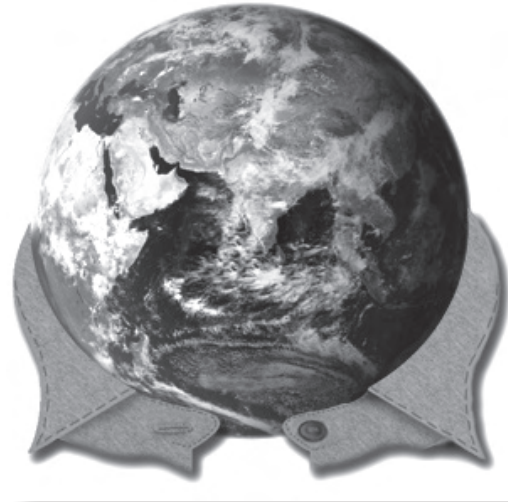
Emissions from agriculture could rise by 30 per cent between 2005 and 2020. Hence, there is a need to focus on organic farming, small farms and local food supply. These are potential sources of green jobs:

- Small farms and local food supply can promote local employment
- But this seems unlikely. With growing demand on global food production, small farmers would lose out to large retailers and capital-intensive producers. This would create rural unemployment
- Since deforestation contributes to 18 per cent of all GHG emissions, planting trees and sustainable forestry would create jobs, mostly in developing and poor countries

Basic industries

It is difficult to reduce the carbon footprint of heavy industries like steel, aluminium, cement and paper. Since recycling helps save energy and reduce pollution, recycling industries would grow rapidly offering new jobs

Employment exchanges



- Renewables such as wind, solar, biofuels, geothermal, small hydel dams, fuel cells
- Technologies such as integrated gasification, carbon sequestration, generation of combined heat and power
- Improved pollution-control technologies such as scrubbers, tailpipe technologies
- New vehicles such as fuel-efficient, electric, hybrid and fuel-cell
- Change in commuting behaviour such as car sharing, biking and walking
- Frequent use of public transit system
- Change in settlement pattern to reduce distance from home and workplace
- Energy-efficient appliances, solar panels

- Steps such as soil conservation, water-efficiency, halting deforestation, reforestation and sustainable forestry
- Organic farming, agroforestry
- Reducing farm-to-market distance
- Recycling and re-manufacturing Caution
- Most green jobs in developing countries would include agriculture and recycling. Many of these new jobs would offer low wage, contractual and insecure employment and exposure to hazardous materials
- Very few green jobs would be created for the most vulnerable: the 1.3 billion-working poor (43 per cent of the global-workforce) in the world with earnings of US \$2 per person a day or for the 500 million youth who would be seeking work over the next 10 years

Source : Towards decent work in a sustainable, low carbon world - a report by United Nations Environment Programme.



Green ADS.

Japan's corporate sector has promoted Green Advertising which:

1. Explicitly or implicitly addresses the relationship between a product or service and the environment.
2. Draws a link with an eco-friendly life style by highlighting a product/service
3. Presents a corporate image of environmentally responsible organisation.



What is a green-collar job?

Emine Saner



“We need to make sure that we start jump-starting the jobs in this country again, I want to put money into clean-energy jobs, green-collar jobs.” He would create 150,000 green-collar jobs a year, they were “central to my energy plan.” These are the words of American Presidents and Presidential hopefuls.

Green collars have joined the employment wardrobe of blue collars, white collars, and pink collars and refer to manual-labour jobs in the new ecological economy, from mending bicycles to cladding buildings in solar panels. As much as a quarter of the U.S. workforce could have a “green” job by 2030, says the American Solar Energy Society.

“The potential for job creation is vastly underestimated,” says Dave Timms, economics campaigner for Friends of the Earth.

On the surface, green-collar jobs look like a good things—as well as the environmental benefits, they would provide new employment, especially for manufacturing workers whose jobs have been outsourced – but Pat Thomas, editor of the Ecologist, is unsure. “Many progressive economists feel that a sustainable society won’t be able to provide full employment because in a world where we don’t produce more than we need, there is less to buy and there are fewer services required,” she says.

Guardian Newspapers Limited, 2008.

Green Jobs

Employment Potential of Sal leaves is enormous. It generates 2.5 million jobs in Orissa alone. It has high capacity for employment. India has several Sal forests. It can generate another 2.5 million jobs in Orissa alone. But the hurdle is that forest laws restrict plucking of leaves, which are used for making disposable cups and leaf-plates. Consumers spend Rs.2100 crores on Sal leaf products. The trade is un-organized.

Bamboo generates 10 million job at present. Silk farming employs 8 million people at present. Even this existing capacity can absorb another 3 m people. It is spread over 26 states. At present the silk worms are less productive. The technology is poor.

Vivekananda Kendra - A Call To The Youth

Sri. A. Balakrishnan
Vice-President

VIVEKANANDA KENDRA, KANYAKUMARI

VIVEKANANDA ROCK MEMORIAL and future.

Swami Vivekananda, with intense love in his heart for motherland undertook wanderings all over India. He came to Kanyakumari and sat on 25th, 26th and 27th December 1892 on the mid-sea rock meditating on India's past, present

and future. It was on this rock that he discovered the mission for glorious India and later shook the world by India's spirituality. On this sanctified place Sri Eknathji Ranade, with the participation of millions of people of India constructed the Vivekananda Rock Memorial, which symbolizes the glorious



mission of India as seen by Swami Vivekananda in his meditation. Eknathji was chosen by Sri Guruji Golwalkar to take up this challenging task. He could complete this massive monument with the help of his co-workers from Rashtriya Swayamsevak Sangh, the blessings of Swami Ranganathananda and all other monks of Ramakrishna Math and great sanyasis like Swami Chinmayananda, Swami Chidananda, Swami Chidbhavananda, Paramacharya Sri Chandrashekharendra Saraswati of Kanchi Kamakoti peetham, leaders like Dr Radhakrishnan, Lal Bahadur Shastri, S K Patil, Atalbehari Vajpeyi, Annadurai, M C Chagla, etc and many others from all over the country.

As the Vivekananda Rock Memorial was taking shape, Shri Eknathji Ranade also envisaged a living Memorial for Swami Vivekananda. The result was the conception and formation of the Vivekananda Kendra as a spiritually oriented service mission, which reflected Swami Vivekananda's vision of glorious India in action. The Kendra – a cadre based organization - is an eternal call for those youth who aspire to dedicate their life to serve the nation. Vivekananda Kendra is a call to those youth who want to lead a meaningful, different life in the service of the society.

Vivekananda Kendra aims at national reconstruction through 'Man Making.' The Kendra has evolved a system of moulding Karyakartas – dedicated workers – by screening selected youth and training them as Karyakartas with dedication and skill to undertake the great task of national regen-

eration. The Karyakartas are of four categories. Jeenavrati Karyakarta - the young men and women who join Kendra for life, Sevavrati Karyakarta - who join Kendra for a specific period of time, Vanaprasthi Karyakarta - who join Kendra after their retirement and Sthanik Karyakarta – the local people who commit their specific time everyday for the work of Kendra.

Today around 200 Jeevan Vrati, Vanaprasthi and Sewavrati Karyakartas are rendering service through 225 branch centres situated all over India.

YOGA: THE CORE OF VIVEKANANDA KENDRA

Taking Yoga as its core, to attract, contact and involve people belonging to various strata of society in the work of national regeneration Kendra has a unique method of regular activities for children, youth and all others. These are:

1. Yoga Varga – Daily classes for practice of Yoga to lead the Yoga Way of Life
2. Samskar Varga – Weekly classes for children for developing confidence and learning to work in teams
3. Swadhyay Varga – Weekly classes for knowing the purpose of life and for acquiring knowledge about our culture, country and current affairs so as to be able to contribute for nation-building.

Number of camps like Yoga Shibir, Spiritual Retreat, Personality Development Shibir, Youth Camps and training camps for the teachers and Karyakartas are also or-

ganised at Kanyakumari and other places.

Vivekananda Kendra works to create the awareness for the need of organized work for the regeneration of nation. Such awareness is reflected in its ever-growing activities. To cater to the needs of specific areas in the country and fields of work many service projects as mentioned below are also taken up.

KENDRA'S SERVICE PROJECTS EDUCATION

In the field of education, Kendra is running 61 regular schools affiliated to CBSE, out of these 29 are in Arunachal Pradesh, 16 are in Assam, 1 in Nagaland, 9 in Andaman Islands, 2 in Tamil Nadu and 1 in Karnataka. In all these schools, besides other subjects, English, Hindi, Sanskrit and the local languages are given prime importance. Regular cultural classes are conducted in all the schools in order to give value based education to the children. Total number of students studying in Vivekananda Kendra Vidyalayas as on today is approximately 30,000.

Kendra runs around 220 Balwadis (Nursery schools) to take care of the nutrition, health and hygiene along with development of the personality of the tiny-tots.

Kendra is also running 4 Vocational Training Centres for women, out of which 2 are located in Arunachal Pradesh, 1 in Assam and 1 in Karnataka.

In the field of education a unique initia-

tive of Kendra is Anandalaya. Anandalayas are run for the school going rural children to improve their academic as well as also to help to develop confidence. Gradually Anandalaya become the focal point of positive change for the whole village. Today Kendra is running Anandalayas in Arunachal Pradesh, Assam and Orissa.

WORK IN THE RURAL AREAS FOR GRAM VIKAS

Kendra works in the villages of Assam, Arunachal Pradesh and Orissa, in the rural areas of 5 Southern district of Tamilnadu, in rural areas of Nashik in Maharashtra and rural areas near Bangalore in Karnataka. This Rural development work is for the all round development of men, women and children of these economically backward areas. As part of these Rural Development Programmes, Kendra runs Balwadis, weekly Samskar Vargas, cultural competitions are organized for encouraging the rural talents. Medical centers and mobile medical vans take care of the health aspects. For the interior areas the youth are trained as Swasthya –Rakshkas who take care of the health and also guide the patients to seek medical help in the initial stages of diseases. The rural youth is guided through one day camps, written examinations etc to face the challenges of life. Deepapooja, Shivapooja, Mahila Jagaran Shibirs, training in tailoring, weaving food preservation are the activities to focus on the rural women, to bring them together to learn about health and hygiene and upbringing of children etc. Besides number of Youth Camps and Personality Development Camps are

organized as a regular feature for the rural youths.

NATURAL RESOURCE DEVELOPMENT PROGRAM

Under this project, 4 types of activities are undertaken by Kendra:

1. Water shed management
2. Rural Housing
3. Indigenous Medicines
4. Farming.

Technological Resource Centre set up at Kanyakumari trains the workers, village officers, Panchayat members and NGOs under these four activities. Gramodaya Darshan Park an exhibition on the above four topics is also established in Vivekanandapuram campus.

ARUNJYOTI

Arunjyoti - A programme for the multi-dimensional development of the Arunachali society is a part of the Rural Development Project organized by the Vivekananda Kendra in Arunachal Pradesh. Through this programme Kendra works to organize the Arunachali people and awaken their dormant spirit. Programs are organised in different forums namely - Yuva Manch, Mahila Manch, Swasthya Seva Manch, Sanskritik Manch and Anoupacharik Shiksha Manch.

VK MEDICAL RESEARCH FOUNDATION

Vivekananda Kendra Medical Research Foundation is running a hospital in the Nu-

maligarh Refinery Township complex. This 40 bedded well equipped hospital not only caters to the needs of the 4000 members of staff and family of the refinery, but also attends to peoples of 13 surrounding villages. Another hospital is being started at Bina in Madhya Pradesh in the township complex of Bharat Oman Refineries Ltd.

VIVEKANANDA KENDRA INTERNATIONAL

In order to take Swami Vivekananda's message abroad and also engage in civilisational and religious dialogues, Kendra has set up Vivekananda Kendra International. This was inaugurated by the then Prime Minister of India Shri. Atal Behari Vajpayee on 23rd May 2003. A befitting suitable building is completed on a plot allotted by the Government of India at Chanakyapuri. Regular monthly lectures with dignitaries on specific subjects are regular feature at present.

VIVEKANANDA KENDRA INSTITUTE OF CULTURE - GUWAHATI, ASSAM

The Vivekananda Kendra Institute of Culture, Guwahati, Assam is established with the purpose of focusing and promoting the cultural continuity of the North Eastern communities with each other and also with rest of India. Also to focus on how development takes through cultural norms VKIC is conducting various seminars, study circles and research works in all the seven states of North East Region. Some of the seminar

papers have been published in the form of books and CDs and are available for general public who are interested to know the colorful, cultural life of North East.

KENDRA PUBLICATIONS

As part of the it's various activities Kendra has been bringing out number of books and periodicals based on India's cultural ethos. During the year Kendra has published its second edition of the book "India's Contribution to World Thought and Culture" which was released by the Vice-President Sri Bhairon Singh Shekhawat on 22nd February 2004. The biggest biography of Swami Vivekananda "Comprehensive Biography of Swami Vivekananda" authored by Prof. S. N. Dhar has already entered into third edition. Kendra has brought out books authored by Manaeeya P Parameswaranji, President Vivekananda Kendra – "Marx and Swami Vivekananda", "Heart Beats of Hindu Nation", "Gita and its Social Impact". Many books on various subjects in various languages have been brought out by Kendra.

Vivekananda Kendra's periodicals are

1. Yuva Bharati – English monthly;
 2. Vivekananda Kendra Patrika – English thematic half yearly;
 3. Kendra Bharati – Hindi monthly;
 4. Vivek Vani – Tamil monthly;
 5. Vivek Vichar – Marathi monthly;
 6. Jagriti – Assamese-English quarterly;
 7. Vivek Sudha – Gujarati quarterly.
 8. Vishwa Bhanu – Malayalam bimonthly
- All these periodicals are meant for the gen-

eral public and particularly for the youth.

Besides the above mentioned service activities, number of regular activities are organised in Vivekananda Kendra campus. There are four exhibition maintained by Kendra:

1. Arise ! Awake! – The exhibition depicting the vision, life and message of Swamiji.
2. Wandering Monk – Depicts Parivrajaka phase of Swamiji.
3. Gangotri – An Exhibition highlighting Manaeeya Eknathji's life and the Kendra work.
4. Bharat Gramodaya Darshan Park –The pictorial and live demonstration in ideal management of water, housing, health and Vivekanandapuram Campus also provides accommodation for one thousand people at a time visiting Kanyakumari at a considerably lower tariff. Visitors can stay here in a "Home away from home" atmosphere amidst serene surroundings close to the sea.

CAMPS AT VIVEKANANDAPURAM, KANYAKUMARI

For the people all over the country following residential camps are conducted in the serene atmosphere of Vivekanandapuram

- Yoga Shiksha Shibir – for 15 days – In English and Hindi
- Spiritual Retreat – for 7 days – In English and Hindi
- Acharya Prashikshan Shibir – for 25 days – In English

LIVING WITH A PURPOSE

“They alone live who live for others the rest are more dead than alive” Said Swami Vivekananda. How true! Today when the modern science tells us that existence interrelated, interconnected and interdependent. For living meaningful life, we have to contribute and work for the good of the society.

Vivekananda Kendra invites all contribute their time, energy and money for the actualizing the dream of Swami Vivekananda of vibrant Bharat working for good of humanity.

- Sri. A. Balakrishnan
Vice-President
Vivekananda Kendra, Kanyakumari

Donations to Vivekananda Kendra are entitled to Income Tax Exemption under Section 80-G of Income Tax Act.

The amount can be paid by Cash or Cheque / Money Order / Demand Draft / Demand Draft in favour of Vivekananda Kendra payable at State bank of India, Vivekanandapuram Branch, Vivekanandapuram, Kanyakumari or by directly depositing in our State Bank of India Core Banking Account Number 11305877361(Bank Code No:03780).

For further details, contact:

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Inauguration of Vivekananda International Foundation

A grand ceremony which marked the inauguration of Vivekananda International Foundation was held in its premises at 4.30 pm on 1st December 09.



The revered Mata Amritanandamayi showering her benedictions on the Function was the main feature of the inauguration ceremony. Justice M.N Venkatachaliah, the former Chief Justice of India, delivered key-note address. Smt Vani Jairam, the famous classical singer was also present in

the inauguration ceremony.

The ceremony started with welcome by Shri Mukul Kanitkar, the Secretary of the Vivekananda International Foundation. It was followed by the melodious chanting of the holy invocations, by Smt Vani Jairam.

Shri Ajit Doval, the honorary Director of Vivekananda International Foundation gave a brief introduction of the Foundation and its objectives. He explained how the foundation would encourage young,

talented research scholars to probe the depths of research in various genre of topics which are very vital to the national interests and thereby streamline the scattered potential of the efficient human resources available in the nation, so as to elevate India to her right place in the world, as envisaged by Swami Vivekananda. This

will bring the intellectual community in consonance with the spirit of nationalism and will intensify it.

Mata Amritanandamayi in her speech rendered in Malayalam, which was simultaneously translated on wireless headphones in English and Hindi, touched upon a entire spectrum of topics, ranging from the lofty humanistic views of Swami Vivekananda to the problems being faced in the modern society. She explained how the impact of the materialistic civilization was effecting disastrous changes in the society by causing an attrition in our human values like compassion, love, cooperation and augmenting negative tendencies like selfishness, intolerance etc. She explained that although the modern generation is much better informed about the world, yet they are confused as they lack in the ability of judgment. She added that the best way of worshipping God was to exorcise all our hatred and prejudice and shower our love on all, regarding them as the tangible manifestations of the supreme spirit. She emphasized on rectifying the defective system of education as it was not in conformity with the ideals of Dharma which are imperative to enhance our hu-

manism and make this world a better place for our children. Lastly she emphasized on the intense patriotism of Swami Vivekananda and generously showered her bless-



From Left : Sri A.K.Doval, Hon'ble Justice M.N.Venkatachaliah, Revered Mata Amritanandamayi, Mananeeya P.Parmeswaranji, Smt Vani Jayaram

ings on the Foundation.

Mananeeya P Parmeswaranji, the President of Vivekananda Kendra, in his erudite style explained how nationalism which was being regarded as outdated by the modern generation, is one of the most pressing exigencies of the time and was the inseparable precursor to internationalism. He expounded how Swami Vivekananda, who was a real international icon, having shaken the world with his clarion speech at the Chicago, was imbued with boundless patriotism. He explained that in the modern, global context when bigotry has vitiated our visions, cre-

ating tendencies of conflict, mutual reconciliation through dialogue was the only panacea available to us. Hence for fructifying Swami Vivekananda's concept of worship of God being tantamount to worship of man, it was imperative to have dialogue between different communities, nations, ethnic and religious groups, for eliminating the mutual hatred and virulence looming large on their psyche.

Chief Justice Venkatachaliah in the keynote address in his scholarly style recapitulated the factors which led to the decline of spiritualism in India in the past and explained how the advent of Sri Ramakrishna and Swami Vivekananda were cosmic events which not only protected the Sana-

tana Dharma from getting extinct but also proved the veracity of the spiritual truths enshrined in our epics. He extolled Vivekananda Kendra as an organization endeavouring to implement the noble ideas of Swami Vivekananda, without exhibiting any bias against anybody.

The ceremony was attended by nearly 600 people. A large number of retired IAS, IPS, IFS officers along with top ranking officers of the armed forces like Air Chief Marshal (Retd) Krishnaswami, Air Chief Marshal (Retd) S P Tyagi, Admiral K K Nayyar, Admiral Raman Puri, Lt General Rawi Sawhaney, Lt General G.D Bakshi, Shri Kanwal Sibal, the former foreign secretary, Ambassador Rajiv Sikri, Ambassador T C A Rangachari and host of others were in the audience.

