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**SOCIETY AND ENVIRONMENTAL RESOURCES**

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LIVING organisms are highly ordered configurations of giant molecules. Thermodynamically speaking they are highly improbable systems that can preserve their order only by maintaining a constant flow of energy through their bodies. This energy enters the bodies of animals, including man, as energy of chemical bonds from the bodies of other plants and animals that they eat, and leaves as heat. The aerobic animals, again including man, need oxygen as well as water to organize this flow of energy through their metabolism. Further, this metabolism cannot tolerate certain molecules which will disrupt it. So the basic environmental resources needed by all animals, and man, are food, clean air and water.

Man's early ancestors depended basically on just these resources. They gathered fruit and leafy vegetables from the wild plants around them and hunted wild animals for meat. Their small populations, perhaps at densities of less than 1 per 100 sq. km carried on such a tropical existence for hundreds of thousands of years (Lee, R., and De Vore, I., 1968).

Then, some 4 lakh years ago, they discovered fire. This opened up for them an entirely new environmental resource, namely, grass seeds, for grass seeds can be digested by man only after cooking with fire. At the same time, man could now create grasslands out of forests by setting fire to and slowly eating into the edges of the forest. In fact, the huge savannas of East Africa with their teaming herds of antelopes and zebras are a resource largely moulded by man and his ancestors. The discovery of fire enabled man to further expand his population, as well as its range to colder latitudes (Harris, M., 1977).

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## DAWN OF AGRICULTURE

Man's ancestors, now very much the present species *Homo sapiens*, took a major step towards revolutionizing the environment of the earth, when, ten thousand years ago, they began to domesticate plants and animals. While the hunting-gathering people gathered what their families needed from day to day, the grain bins of farmers or the livestock of pastoralists represented resources which could sustain people for a long time. A farmer or a pastoralist could also produce a surplus over what his family could immediately consume. Human society quickly reorganized itself to take advantage of this situation through a division of labour. Some social groups like artisans provided a real service to farmers as in fashioning farm implements; others, such as the army, merely expropriated the agricultural surplus by force of arms. For the first time in human history, then, we had a group of people which did not relate directly to environmental resources. Moreover, power was now distributed in such a way that those that directly related to environmental resources were at the bottom, and those that were alienated from nature were at the top of society. In this situation are to be found the roots of the present-day environmental crisis.

This agricultural civilization spread slowly over the surface of the earth. Henceforth, two further environmental resources were of importance to this civilization, namely, fertile land for cultivation and fodder for their animals. This called for the clearance of forests, and the story of the burning of Khandava forest by Krishna and Arjuna in the *Mahabharata* reflects this struggle of the agricultural civilization against forests and their hunting-gathering inhabitants (Karve, 1, 1967).

But during this period, the agricultural civilization, and even its armed champions like Krishna and Arjuna, retained a relationship with, and dependence on, the wild plants and animals. This is reflected in another episode in the *Mahabharata* the *mriga-svapnabhava* — or fear of the dream of animals. The Pandavas dwelling in a forest used to hunt on a large scale for food and fun. One day the animals appeared in Dharmaraja's dream and pleaded that they were on the way to rapid extermination at the rate at which they were hunted, and begged the Pandavas to move to another forest and come back only after their populations had recovered. This the Pandavas did.

## INDUSTRIAL REVOLUTION

The agricultural civilization gradually expanded over the globe, replacing the old hunting-gathering ways of life until the middle ages. Around AD 1500 man learnt to tap fossil fuel and other

sources of energy with far greater efficiency than before and launched on the industrial revolution in Europe. This put European civilization in a commanding position over the surface of the earth. This civilization then spread to large continents, till then lightly populated by hunter-gatherers and completely expropriated them. This civilization also established a hold over the resources of the old world populated by an agricultural people.

The industrial civilization thus found itself in control of immense resources compared to their populations, and with technologies highly efficient in tapping these resources. The response was a way of life based on a highly wasteful use of the environmental resources. Thus, for instance, when the white settlers first reached the American prairies, the land literally teemed with millions of buffaloes. They were an easy prey for the armed riders and within a few decades the white settlers hunted them to the point of extinction. At the height of this massacre, meat was so abundant that the hunters consumed only the tongue, leaving the rest of the carcass to rot (Roe, F. G., 1970). Unlike the Pandavas, they certainly had no fear of the dream of animals!

#### SQUANDERING RESOURCES

The march of European civilization continued unabated from the seventeenth to the nineteenth century, bringing in its wake a spate of extinction of animals, and large scale changes in the environment. In India, the Europeans almost exterminated the lion, till the Nawab of Junagarh protected the last twenty in his Gir forest; they also felled forests on a large scale for laying down railway lines. In Tasmania, they not only wiped out many animals, but literally hunted the native humans. In South Africa, they wiped out practically every large wild animal and drove out the natives. However, no doubts about this unprincipled march were raised, since new lands still remained to be colonized by the Europeans. This ended by the close of the nineteenth century, and the contradictions in European civilization began to surface. There followed two great wars and a depression. There were the dust bowls of the Mississippi and the poisoned great lakes of North America. Gradually the West began to re-examine what was going on.

One of the results of these crises was the dawning of an awareness that the resources of the earth are limited, and that man cannot continue to exploit thoughtlessly nature for all time without suffering the consequences. A whole variety of solutions has been thought of to solve these problems. In the interests of saving biological diversity, they include the National Parks and the Endangered Species Act. In the interests of pollution control, they in-

clude clean air and water acts. They also include Environmental Impact Assessments and so on. All these measures are very significant signposts of progress; but they entirely fail to touch the primary cause of the global environmental crisis, namely, the incredibly wasteful use of the resources of the earth (Ehrlich, P. R., 1980).

### INDIA'S CULTURAL HERITAGE

In contrast to the Western attitude of aggression against nature, Indian culture has to this day retained an element of seeking harmony with nature. After all, our traditional morning prayers begin with asking forgiveness of mother earth for stepping on her:

समुद्रवसने पृथ्वी पर्वत स्तन मङ्गले ।

विष्णुमूर्ति नमस्तुभ्यम् पावस्पर्शम् क्षमस्व मे ॥

India in fact has retained many traditions of nature conservation, ranging from sacred groves and sacred lakes, sacred trees and animals, to closed seasons for hunting and restrictions on stages that may be hunted. The banyan and peepal trees that provide the only shade over much of our countryside, and the rhesus monkeys that have played such an important role in modern biomedical research are all a legacy of this culture. And this philosophic tradition continues in Mahatma Gandhi's perceptive words that the earth can supply the needs of all, but cannot meet the greed of the few.

Of course, one cannot categorically state that Indian society practiced an ethic of balance with nature, or that it did not indulge in a wasteful use of resources. Episodes like the *Khandavavana-dahana* during which Krishna and Arjuna not only burnt the great forest, but killed every creature inhabiting it show that our ancestors could also be great aggressors against nature. Tales of sacrifice of thousands of beasts at Yagnyas and the ostentation of our princes also bear witness to an extravagant waste of resources. Nonetheless, through all this, our society did retain a veneration for nature, and retained many practices which put a brake on the way we exploited it. Moreover, there simply did not exist the kind of demand on the resources of the earth in the pre-industrial civilization that the industrial civilization brought to bear on it.

### COMMERCIALIZATION

British colonial rule radically changed the way in which our resources were being used. Prior to the British, there was little pressure on forests for commercial timber as such. But when the British consolidated their hold after the 1857 War of Independence, they set about vigorously with the business of tapping India's resources. India became a supplier of cheap raw material and a

market for finished goods. An extensive network of railway lines was laid down to facilitate this flow (Dutt, R., 1960). The railways needed enormous quantities of timber for sleepers, and the British wanted these essentially free of cost. So the Government took over as reserved forests huge tracts of land till then held as communal land by villagers. This reservation was resisted, the resistance even leading to massacres as at Tiladi in Tehri-Garhwal in 1930. However, the resistance was overcome, and the forests were reserved without payment of any compensation to the original owners of the land.

With Government ownership of forests established, no segment of society retained a real interest in the long-term preservation of the forests. The villagers could now derive greater profit by cutting down the forest and putting the land under plough, rather than earn occasional low wages as forest labourers. The timber contractors and consumers of forest produce are only interested in short term profits. And with frequent transfers, general lack of accountability and political pressures, the bureaucracy has little stake in preservation of the forest either.

In consequence, while the forests are in theory managed on a sustained yield basis, they have been rapidly decimated everywhere. For instance, our estimates of bamboo resources in Karnataka show that while the annual increment to the stock is about 1.35 lakh tonnes, the annual harvest is over 1.6 lakh tonnes, the bulk of it going to the paper mills. Thus the capital of bamboo stocks is being eaten into year by year and is rapidly vanishing. To make matters worse, the paper mills harvest bamboos wholesale without proper regard to silvicultural regulations (Gadgil, M., and Prasad, S. N., 1978).

The paper mills however are not worried because they can switch to alternative resources such as sugarcane bagasse without loss of profit by hiking up paper prices. But the consequence for the people and the environment has been disastrous. Bamboo is the basic raw material for rural housing construction and the only source of livelihood for a large community of basketweavers. And these people, unlike the mills, have no alternative to bamboo. Furthermore, with bamboo gone, its place in the forest is taken by the pernicious weed *Eupatorium*, with most unfortunate ecological consequences.

#### DUAL SOCIETY

While the enormous consumption of bamboo by paper mills without due care has led to its decimation, the mills have been receiving bamboo at Rs. 100, or at most Rs. 280 per tonne. At the

same time, the poor basket-weaver today has to pay between Rs. 1000 to Rs. 4000 for a tonne of bamboo. This unbelievable state of affairs highlights the way in which our nation's environmental resources are being destroyed.

For Indian society today is a dual society. There is an enormous mass of the rural poor who do not earn enough even to buy sufficient food for themselves. They therefore depend entirely on free environmental resources for many of their basic needs: fuel for cooking, bamboo and other wood for constructing huts, fodder for their animals and so on. When bamboos disappear, they get no more bamboo shoots with which to feed themselves, or bamboo leaves for their cattle, nor can they get any other construction material for their huts. But the other society, the affluent 10 per cent, are far removed from such direct dependence on the environment. For them paper is important, no matter what happens to bamboo. For them commercial profit is critical, no matter what happens to the people. So more and more paper mills are put up even if there is less and less raw material for them to process. If the bamboos of the Western Ghats are finished we open up Mizoram. When that is finished we go to the Andamans.

#### PEOPLE'S INVOLVEMENT

The need then is for those in power to realize the critical role environmental resources play in the well being of the masses of our country. If the path of economic development chosen by us is not to lead further and further into the impoverishment of the masses of our population, we must be careful of the way we treat the resources of our environment. A heartening sign that this perspective will slowly be brought into our planning is the grassroots movements of the people themselves; the Chipko movement in the Himalayas, the fishermen's agitation against marine pollution in Goa, the save the soil campaign against a poorly conceived irrigation programme in Hoshangabad. This gives us hope that we will eventually turn to environmentally sound, and therefore genuinely sustainable and people-oriented, development.

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