

Shifting Cultivation and Deforestation : A Socio-Eco System Nexus

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ABSTRACT This paper discusses the environment-society nexus including both biological and socio-cultural factors. The impact of human activity on the environment, the environmental issues pertaining to development, deforestation and environmental degradation and the consequences of deforestation have been some of the major concerns of the paper. In this context the issue of shifting cultivation has been discussed not only as a cause of deforestation but also as a specific type of agricultural practice that has social cultural and economic consequences on certain categories of people. The paper also suggests remedial measures to handle the problem of shifting cultivation and the resultant deforestation which was not seen in isolation but as a complex process between social and ecological system. The two prolonged strategy which is suggested here is : firstly to wean the tribals from the practice of shifting cultivation and secondly, to undertake afforestation on a large scale. However any attempt to wean the tribals from the age old practice of shifting cultivation should take both biological as well as the human components in to consideration.

The evolution of man's adaptation, use and occasional (now frequent) misuse of natural environment, and the evolution of his thinking process is an interesting study, but the former seems to always have preceded the later by a considerable pace. Environment devastated by the action of man and by vagaries of climate paint a gloomy picture of the future of man, his environment and the consequent survival.

Man is struggling to survive in today's world because of lack of understanding of nature and through his wrong actions doing more damage to himself the environment and the fellow humans. But unfortunately what seems to go unnoticed is the mutual dependence of man and his environment. Population explosion, environmental pollution, desertification of soils, the uncontrollable and violent natural forces (together with the excessive human urge* to reproduce) are hastening up the process of

deterioration of human conditions on earth. This brings us to the question of environment-society relationship.

ENVIRONMENT - SOCIETY NEXUS

The fact that the life of a given society depends very much on the environment is generally accepted. But what is disturbing is the conceptual unidirectionality of environment- society relationship. Possibly because the impact of society on environment is indirect and hence cannot be perceived directly. Consequently many cultures tend to blame nature for most of the misfortunes of mankind. This tendency is so strong that often, we find that the causal paths are turned upside down and the effects are taken as causes and vice-versa. The responsibility is thus allocated to the wrong actors.

Usually conflicts between man and nature are presented as an ecological problem on the one hand and as a socio-economic problem on the other, and often approached as if both

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components are autonomous. But it should be realised that they are only two components of a complete situation which may be better described with reference to the internal interactions within an all embracing system. Here, we should try to understand a phenomenon where causes and effects, interactions and inversions, linear chains and feed backs are mixed in the integrated complex whole. For example, the soil of a certain region, the atmosphere above it and the human settlements located and working on it cannot be considered in isolation. They cannot be studied independently of each other. They constitute a totality of a single system. To sum up, a phenomenon can be viewed as a whole constituting four components, namely (1) A physical component (2) A physio- biological component (soil) (3) A man generated biological component and (4) A socio-economic component which roughly constitutes all human activity (The way man uses his land).

In other words, society and environment can be seen as a total system comprising two sub systems, ecological and sociological. The

growth, survival and transformation of these sub-systems are in turn governed by several factors which are often inter-related. Now let us try to define such a system, which in its broad sense can be diagrammatically represented as below :

As can be seen from the figure, a socio-eco system is a single entity which is characterised by a number of components having among them a definite set of internal relations that defines its structure and that is in relation with other systems through exchange of matter, energy, ideas, etc. The impact or influence that each of these sub-systems exert on the other can be understood only by the study of the processes involved but not the description of states because basic to any impact study is the study of dynamics and not statics. Hence, it is important to examine the factors that are responsible for changes in these sub- systems. For example, the problem of deforestation is not a simple process. It is influenced by several factors. Firstly, it is the insatiable greed of the city man who is exploiting the nature for commercial purposes unlike the tribal whose

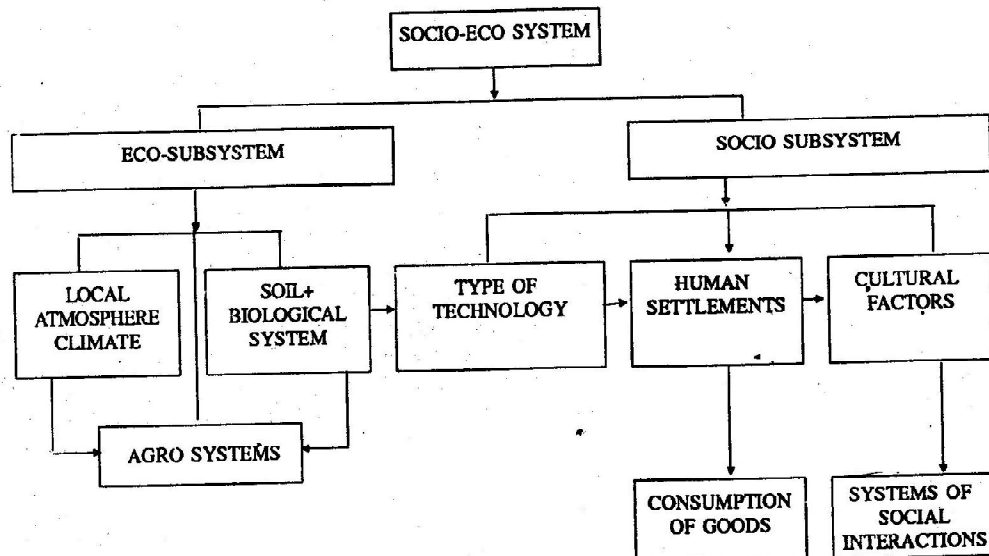


Fig. 1. Model depicting socio-eco system

actions are conditioned by his struggle for survival. Secondly, it is also the result of certain long term activities such as those arising from changes in cultural patterns induced by demographic changes. Lastly, the nature and causes under which deforestation takes place varies from developed to developing countries which gives rise to different problems necessitating different strategies of intervention.

ENVIRONMENT AND DEVELOPMENT

Essential environmental processes are those that are governed, supported and strongly moderated by eco-systems and are essential for food production, health and other aspects of human survival and sustainable development. The maintenance of such processes and systems is vital for all societies regardless of their stage of development.

Environment-economy linkage is delicate and critical for development, especially for a developing country like India, where ecological balance and economic growth are more directly linked. While economic growth or development essentially involves the exploitation of the environment, all eco-systems do not allow exploitation to the same degree, because, some of these systems are fragile, where linkages among components are critical because of their low carrying capacity. These can be called marginal eco-systems. The marginal eco-systems should be exploited keeping in view the institutional and social linkages. Under such circumstances part of the problem lies with cultural adaptation to technological change (for example, weaning tribals from the practice of shifting cultivation).

Environment is seen to be constantly degraded because of the simultaneous prevalence of poverty and problems caused by activities aimed at economic development. The presence of these paradoxical problems makes it extremely difficult to solve some of the major environmental problems (Glaeser and Vyasulu, 1979). Further, it is to be realised

that environmental quality cannot be maintained when action aimed at subsistence itself is the cause of degradation as in the case of shifting cultivation.

In a sharply stratified society such as ours, there are inherent compulsions towards, the deterioration of the environment where the rich destroy the environment indirectly through resource wasteful like styles and directly through exploitation of nature for profit (for example, paper, plywood and textile industry). Whereas the poor are often forced to fall back upon nature for their very survival thereby using up resources in an unsustainable fashion. As we shall see deforestation and shifting cultivation is one such process.

Deforestation and Environmental Degradation

The rate at which deforestation is going on in the third world countries, it is estimated that there will be virtually no forest left in 60 years, if serious measures of counter action are not taken. The present rate of afforestation is less than 10% of that necessary to supply the minimum needs of these countries by the year 2000 A. D. (Spears, 1978 : 15). Coming to the subcontinent, India is losing forests at an alarming rate. Available satellite data shows that 1.3 million hectares of forest is lost every year (CSE, 1985 : 49). This is estimated from the landsat imagery maps in terms of closed forests (Undergraded forests) and open forests, and data indicates that closed forests are getting degraded and are vanishing rapidly (NRSA, 1984). Further, 75 million hectares of land is said to be under the control of the Forest Department which is represented as forest in official documents. But it is estimated that less than half (30 million hectares) of this land is actually under the tree cover and even these areas are poorly stocked. Much of this land has been sequestered for different purposes such as agriculture, road building and river valley projects. The net result has been considerable

disturbance in the ecological balance leading to the increased incidence of floods, silting up of dams, drying up of perennial sources of water, etc.

It is alarming to note that large tracks of forest land continues to be cleared for crop cultivation, pastures, plantation and industrial development. Of the total forest area that is officially recorded as deforested for different purposes between 1951-52 and 1977-76, as much as 60.6% was for agricultural purposes (Swaminathan, 1980: 20). In contrast, in urban areas the decline of flora in 41 urban centres is attributed to fire wood extraction, because fire wood accounts for 94% of the total wood extraction in India (Bowender et al., 1985 : 7).

Deforestation - Effects

Deforestation can have a range of devastating consequences both for the society and for the individual. At the societal level these consequences relate to the effects of soil erosion, flooding, climate mal-effects, spread of deserts, drying up of previously perennial streams, increased frequency of land slides in the hill areas, the rapid siltation of rivers and reservoirs and so on (Echholm, 1976 ; Digernes, 1979).

Increased deforestation also adversely affect the availability of forest produce which is gathered by the tribal people for their own needs and often for sale as well. This includes not only fruit and fodder but also herbs and plants for local medicines (Hoskins, 1982) Resins (Guha, 1983) and certain kinds of flowers such as *Mahua*, which in India provides liquor and cattle feed (Chand and Begboruah, 1980 ; Narayan, 1952). It is estimated that in India 30 million people depend on minor forest produce for some part of their livelihood (Kulkarni, 1983 : 194) and because of deforestation they are getting increasingly marginalised.

It is estimated that 40% of the farmers of the third world live in valley lands and depend heavily for their irrigation water on the sponge effect of forests surrounding catchment areas (Myres, 1978 : 951). Further, the disappearance of forests result in release of rain water during wet season causing drought conditions in the dry season. For example, in the forested zones of Indonesia, Malaysia and Philippines the green revolution is observed to be losing its momentum because the farmers can no longer find regular supplies of irrigation water for multiple rice farming (Myres, 1978 : 951).

Deforestation has also been noted to lower the water table making it much more difficult and time consuming for women to obtain water especially during dry season. This is noted for instance in Senegal (Hoskins, 1982), in India (Bahuguna, 1984) and in Nepal (Dogra, 1984).

Deforestation : Shifting Cultivation

Some authors maintain that one of the significant causes of deforestation, not only in India but also in other parts of Asia, is shifting cultivation (Novak and Polycarpow, 1969 : 21-22).

It needs to be emphasized here that shifting cultivation should be understood not simply as a cause of deforestation but also as a specific type of agricultural practice that has social, cultural and economic consequences on certain categories of people. The hill areas where shifting cultivation is practised have become the most typical example of what is believed to be the devastating effect on a territory of a combination of low technology adaptation, population pressure and ignorance of ecological damage. Now an increasing number of ecologists and social scientists are becoming aware of the role of socio-economic and cultural factors in the processes leading to a deterioration of the environment.

Shifting cultivation in India is practised by 26 million tribals who constitute 8.7 per cent of the total population. It should be noted that economy of the tribe is a projection of tribal

society and shifting cultivation is a spontaneous response to the eco-system in which it is placed. Its functions of production and distribution are governed by the bonds of kinship. Production is based on the exploitation of the resources locally and easily available, with a crude technology largely for consumption.

By the very nature of their habitat and ecology the tribals depend heavily on forests for their survival, livelihood, occupation and employment. The concept of ecology carried with it, the notion of relationship between a biological entity, in this case a tribe with an external environment, the forest. The mode of environmental exploitation has pervasive effect on all other aspects of culture and the socio-cultural milieu emerges as an interlocking system in which cause and effect are inter related in a manner that when one element is significantly altered it has direct or indirect repercussions on other parts of the system.

Here the destruction is because of the internal contradictions which pre-exist in the (socio-eco-system) shifting cultivation system which had developed at different levels. These contradictions between the production system and the natural environment developed over the years in an irreversible manner, give way, once the old response mechanisms are broken, for instance, reduction in length of fallow period, the time for which a forest is left to regenerate. The dissolution of traditional social structures over the years made it impossible to reproduce the former association between the eco-systems and society. The rapid degradation of the eco-system was mainly due to advancement of the practice of fallow land. In fact over the years the length of fallow period, the number of years a deforested land is left for regeneration has come down to 2-3 years from 30-40 years some decades ago (Radha-krishna Rao, 1988 : 15)

As Gambarotta (1981) rightly pointed out "This behaviour of the peasantry (tribal) is by no means irrational but results from the fact that confined to a marginal role in society,

the conservation of the environment does not enter into its economic calculation which is centered on the dilemma of survival. It is the marginalisation of the peasantry by the social system and not the behaviour of the peasantry itself which appears as the ultimate cause of destruction of the environment".

So far we have seen how low technology coupled with several extraneous factors had led to the destruction of forests. The remedy to these problems requires a two pronged approach.

1. To wean the tribals from the practice of shifting cultivation without endangering their traditional social structure.
2. To undertake afforestation to a level where the desirable minimum forest cover (30-33 per cent) is restored.

The first approach is to wean the tribals from shifting cultivation. There are several hurdles in achieving this. The government instead of trying to understand the problems of tribals and providing suitable assistance it has in its own bureaucratic style and innovative manner simply reduced the area under shifting cultivation by declaring most forest land as reserved (Ironically reserved for the use of paper, plywood and textile industry). This reduction in available forest land for agriculture forced the tribals to resort to smaller cultivation fallow cycle leading to the acceleration of damage to the forests (Saha, 1970).

Transition from the outmoded system to improved agricultural practices should be a gradual process, as an interim measure improved method of *Jhum* cultivation (shifting cultivation) may be necessary. It may be mentioned here that there are certain other types of cultivation which are more or less akin to the shifting cultivation. They are Taungya cultivation, Dahia cultivation and Tahaila or Gora cultivation. The method of raising new crop of forest trees is generally known as Taungya cultivation. In principle it consists of clearing a piece of forest in more or less the fashion

under which shifting cultivation is practised. The agriculturist who undertakes the felling of a piece-of-rent-free-forest-land is allowed by the forest department for a couple or more years to raise agricultural crops on the condition that he plants young forest species in such a manner or in such a year of the lease as may be laid down by the Forest Department. Thus when the agriculturist vacates the land a young forest crop of trees remains in site. This corresponds more or less to agrosilviculture.

To understand the processes involved in the economy of tribes, the comprehension of nomadic behaviour is necessary which requires proper consideration of both the domestic groups which are the production and consumption units and the community groups to which they belong. Production patterns and levels are not determined by domestic requirements alone, but on the contrary it is the community which determines as to what would be considered as the needs of the group. In so far as belonging to a community represents a collective utilization of the means of production, here the community should be understood as a production unit.

So in order to protect and fulfil production needs of the community, alternative measures of production like horticulture may be suggested. Tribals can be taught how to cultivate fruits like orange, lemon, pineapple and also coffee and rubber etc., commercially. This will give the tribals regular income and also help in improving the existing forest cover.

The second approach to tackle the environmental degradation created by shifting cultivation is afforestation. There is no doubt that several afforestation programmes have been undertaken during the past decade with the aid of national and international agencies (Basu and Ghose, 1960 : 6) especially under the banner of social forestry. Yet, available studies evaluating these projects indicate that while farm forestry has had a limited degree of success in some parts of the third world, social

forestry in most cases was a failure. Because in many instances the schemes have been actually opposed by the people (Makhijani, 1979; Subramaniam, 1983).

An additional point of concern is that the state policies are leading on the one hand to the alienation and marginalisation of tribal and poor rural communities from access to forest produce and on the other hand to the spread of tree planting by paper and textile industries on a large scale. This is done even at the cost of destroying natural forests and diverting fertile land away from crop cultivation. In other words the thrust of social forestry originally envisaged as having a community orientation has been changed to suit the individual needs of rich farmers and the paper mills (Kondareddy, 1981; Guha, 1983).

While afforestation is necessary to improve the ecological balance, simple forestry like Eucalyptus will reduce employment (Bandhopadhyay, 1981). The species of trees that are planted is not guided by proper selection process. For example, in the case of Eucalyptus more of carbon dioxide (CO₂) is released during photosynthesis and it also draws more water from the soil resulting in lowering the water table.

The afforestation programmes are successful wherever there is peoples involvement (Bahuguna, 1984). A case in point is the experience of Ranchi Consortium for community forestry, and Youth Hostels Association of India's programme called clubs of Millions of trees. This can happen wherever cohesive village communities have retained control over their forest habitat. So in order to be successful afforestation should not negatively affect the human (social) component of ecology which is as important as the biological component.

SUMMARY AND CONCLUSION

The relationship between society and environment is interdependent, any attempt to simplify this relationship would result in

misinterpreting the components that constitute socio-eco system. While development necessarily involves the exploitation of nature all eco-systems do not allow exploitation to the same degree. Over exploitation results in degradation of environmental quality. One such exploitation is the excessive deforestation that is going on in the third world countries. The relative absence of corrective measures in this regard is causing alarm among ecologists and social scientists.

One of the main reasons for deforestation is shifting cultivation practiced by tribals. The effects of low technology adoption and population pressure is compounded by the ill conceived state policies like declaring most forest land as reserved. This resulted in reduction of the land available for cultivation and narrowing the fallow period accelerating environmental degradation and increasing the marginalisation of the tribal peasantry.

There are two ways to deal with the problem. Firstly, to wean the tribals from the practice of shifting cultivation and secondly, to undertake afforestation on a large scale. So far neither approaches received full attention. Further lop-sided priorities of the government like plantations for industrial purposes resulted in the failure of afforestation programmes. Afforestation did not receive peoples participation and also lead to the land alienation of tribals.

To sum up the problem of shifting cultivation and the resultant deforestation should be seen not in isolation but as a complex process between social and ecological system. Any move in the direction of weaning tribals from the age old practice should take in to consideration not only the biological component but also human component. Reliance on mere technological solution to the problem does not suffice. Because in reality the problem is rooted in the socio politics of poverty and structural inequalities. Finally, the success of weaning the tribals from shifting cultivation depends upon the provision and popularisation of al-

ternative measures like improved *jhum* cultivation and horticulture.

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