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Deforestation and Forest Land Use Theory, Facts and Policy Implications

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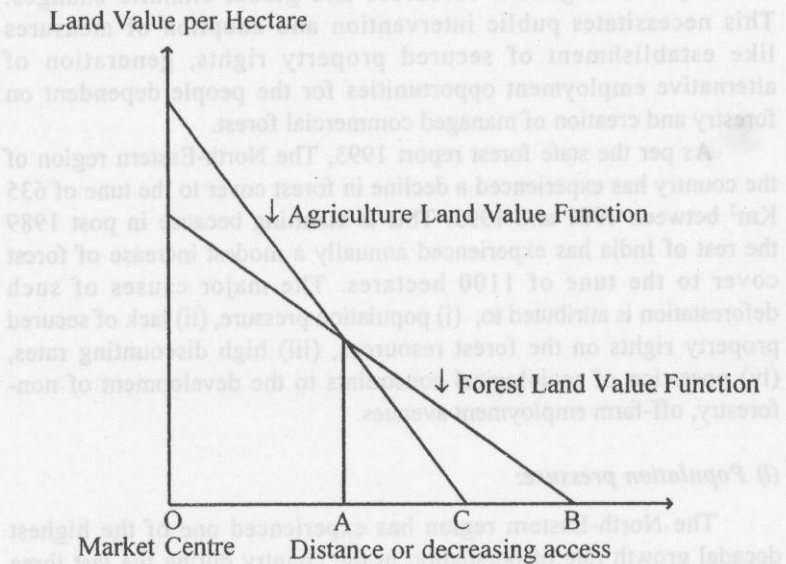
Deforestation and its effects on market and non-market values of forest resources are the concern of the world now. Forest as resources have market values (e.g. timber, leaves, fuel-woods, medicinal plants etc.) and also non-market values (e.g. bio-diversity, erosion control and global climate control). Hence, any discussion on forest resources management essentially implies management of problems arising out of deforestation and forest land conversion.

Population pressure, shifting cultivation, government policies encouraging commercial agriculture, private domestic fuelwood needs and commercial timber exploitation are some of the main causes of deforestation these days. To develop a meaningful public policy of managing and controlling deforestation, we need to be well acquainted with the problem of deforestation, not in an abstract sense as is often done but in an analytical sense. This exercise is done (fig 5.1) with the help of a simple model developed by Hide Ital..(1996).

In figure 5.1, the vertical axis represents the value of the land and the horizontal axis represents the distance from the market. The functions show present resource values. The agricultural value function shows the net discounted value of land for agricultural production and the natural forest value function shows the net discounted value for the standing forest resource. Agriculture is the preferred economic activity up to point A and thereafter forestry is the preferred economic activity. From O-A, the entire land is used for agricultural production and it

has well-defined property rights. Beyond A up to point B, the entire land is used for forestry. Forestry remains economically viable until its present value becomes zero at point B. Generally the entire forest land beyond A up to B is an open access resource because the costs of establishing and protecting permanent property rights to the land are more than the present value of the products harvested. Similarly forest land beyond point B is also an open access resource and is not presently the effective forestry zone because the present value of the products is less than the costs of access and harvesting on it. However, with the increase in the costs of forest products and reduction in the costs of access and harvesting in future (because of improved technology, roads and communications etc.), the area of this uneconomic forestry zone gets reduced as more and more land at the margin of this residual natural forests enters in to the effective forestry zone.

Figure 5.1. The Relationship Between Land Use and Market Access.



Note: Point A is the point at which agricultural land value equals forest land value; point B is the point at which present forest land value equals zero; area beyond point B represents residual natural forests of no economic value.

The point that emerges from this simple model is that market forces, (i) set a limit to deforestation in the effective forestry zone i.e. A-B, (ii) because of the existence of a vast uneconomic natural forestry

zone (beyond B), it becomes increasing difficult to establish secure property rights on forest lands in the effective forestry zone, (iii) three categories of forests are sustainable: commercial plantation, household tree plantings and the uneconomic residual natural forest. The region of current forestry will always be subjected to open-access extraction because the cost of securing permanent property rights is greater than the value of the resources harvested. If forest are treated as private goods, then deforestation in this region becomes unavoidable and economically efficient since to make it sustainable forestry, the expenses are to be too high which many of the developing countries can not afford, at present.

However forest in this effective forestry zone and non-economic forestry zone are not private goods. They are public goods having externalities. The social cost of deforestation exceeds its private cost. It includes the private cost plus environmental cost in terms of soil erosion, loss of genetic resources and global climatic changes. This necessitates public intervention and adoption of measures like establishment of secured property rights, generation of alternative employment opportunities for the people dependent on forestry and creation of managed commercial forest.

As per the state forest report 1993, The North-Eastern region of the country has experienced a decline in forest cover to the tune of 635 Km² between 1991 and 1993. This is alarming because in post 1989 the rest of India has experienced annually a modest increase of forest cover to the tune of 1100 hectares. The major causes of such deforestation is attributed to, (i) population pressure, (ii) lack of secured property rights on the forest resources, (iii) high discounting rates, (iv) operation of sociological constraints to the development of non-forestry, off-farm employment avenues.

(i) Population pressure:

The North-Eastern region has experienced one of the highest decadal growth rate of population in the country during the last three consecutive census periods i.e. 1971, 1981 & 1991 because of natural increments and immigrations. Such high growth rate of population has put pressure on the availability of the land. In terms of our model discussed in section i, the area of extensive agriculture with secured property rights increases as the agricultural land value function shifts to the right. The forest land value function may shift to the right too

but it does in a lesser scale than the former. Further, the area of uneconomic natural forest gets diminished as the forest land at the margin of this area of uneconomic natural forest (i.e. nearest to the right of B) enters into the effective forestry zone because of an increase in the value of forest resources and forest in this area being open access. Reduction in the Jhum cycle is also another offshoot of increase in population which ultimately causes more deforestation in the effective forestry zone (i.e. A-B). Population growth breaks down social norms and resource management systems, further contributing to deforestation and the later also increases population growth (Dasgupta and Maler, 1991). Thus, there exists a vicious circle between population growth and deforestation in the North-East.

(ii) Property rights

Many studies (Hanna and Munasinghe, 1995 a,b; Hanna, Folk and Maler, 1996; Persson and Munasinghe, 1995) have observed that deforestation is more when property rights are not defined than when they are well defined. When property rights are secured, the forest have a market. The squatters' marginal cost of deforestation is lower when property rights are undefined (open access) than when property rights are well defined. However, it becomes difficult to establish property rights in some or whole of the open access economic forestry zone because of the existence of a vast area of uneconomic natural forest in its vicinity.

(iii) High discounting

The people in the effective forestry zone in the North-East India discount the future at a high rate and this causes more deforestation. Open access or lack of well defined property rights on forest resources aggravates this problem.

(iv) Sociological constraints

Lastly, off-forestry and off-farm employment opportunities have not come up in the North-East states in a satisfactory manner because of the presence of a number of sociological constraints such as tribal value system with regard to risk taking, work culture etc. (Ray and Baishya;1998). As a result the direct pressure on land and forests has not been eased much.

Conclusion and policy implications

Our analysis shows that if forest are treated as private goods, the region of effective forestry will always be subject to open access extraction since the cost of securing well defined property rights plus the costs of access taken together, are greater than the value of the forest resources. However, forest happen to be public goods having externalities. Therefore, the social value of forestry in this effective forestry region in the North-East is greater than its costs of access and harvesting plus the costs of securing property rights. In the North-East region, the extent of this current resource extraction zone is quite large. Therefore it calls for effective public policy intervention in the form of establishing secure property rights and efficient management. This raises many questions such as, – what should be the form of secure property rights? Should it be individual ownership based, community ownership based or state ownership based? Who would pay for this extra cost of establishing secure property rights, etc., as the externalities of forest such as global warming and soil erosion are having national and global ramifications.

Coming to the second question first, we feel, the developed countries of the world and the world body should bear a portion of this additional cost as they are also the beneficiaries of reduced deforestation in this region. The nomenclature and mechanism of such cost sharing may be found out through discussions. Secondly, Government of India should also bear a significant portion of this cost, whatever may be the mechanism. Finally, North-East should bear the residual of the cost, making provision for it in its annual/plan budgets. So far as the first question is concerned it would be theoretically better to assign the ownership and management job to the state. But going by the experience of corruption and inefficiency in the forest department in the North-Eastern region, it would be in reality better to share the ownership and management of these forest (joint forestry management system) in this effective forestry zone between local level institutions like Panchayats and the state forest departments.

Secondly, the vicious circle between population growth and deforestation should be made virtuous. Provision of alternative sources of employment for the people in the non-forestry and non-farm sectors, encouragement of settled cultivation and establishment of organised credit and insurance markets for the rural households shall cause the high discount rates to reduce. This would ease the pressure on forest timber extraction and clearing the forest for shifting cultivation.

Thirdly, the Government in many of the North-Eastern states are main extractors of the timbers and other forest products from the region of current resource, extraction to generate revenues for undertaking administration and developmental works. Theoretically, resource extraction is undertaken till the marginal cost of access and extraction is made equal to the marginal revenue earned. But the question is: does this marginal cost is all inclusive? It seems doubtful. If it is made all inclusive, the profitability aspect of state forestry will have a all together different look. Alternative sources of revenue generation such as eco-tourism looks more attractive from cost and revenue angles. It has to be made operational.

Finally, creation of greater awareness among people about environmental values holds the final key to environmental issues like deforestation. The recent rise of temperature in a coastal state like Orissa and its accompanying human loss is an eye opener in this context. Environmental education, thus, should be a part of the syllabi of school, college and university curriculums in this region.

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