Ind. Jn. of Agri. Econ.
Vol. 55, No. 3, July-Sept. 2000

SUBJECT II

FORESTRY AND RELATED ISSUES

Research Issues in Forestry in India*

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INTRODUCTION

Twenty three per cent of India's geographical area equivalent to 76.5 million hectare (mha) has been declared as forests, which is now mostly under government control. According to the Forest Survey of India (FSI, 1998), 48 per cent area notified as forests had in 1997 a crown density of more than 40 per cent, 34 per cent between 10 and 40 per cent, and the rest 18 per cent has less than 10 per cent or no tree cover at all. The Forest Survey of India estimated current productivity for the entire forests at 0.7 cum (cubic metres) of wood per hectare per year, which includes both recorded and unrecorded removals from forests. These levels are dramatically lower than the potential, which has been estimated at 2 cum per ha per year. Achieving this potential, which is about three times the current productivity, would bring considerable improvement in the economic and environmental well-being of India's land and people.

Forests are not spread evenly in India, but are concentrated more in the poorer regions in India of low agricultural productivity and poor soils with heavy tribal concentration. India's forests have generally speaking not been uninhabited wilderness. Even in the remote forests people have either been living traditionally or were brought by the Forest Department in the colonial period and settled there to ensure the availability of labour. Today, there are about 100 million forest dwellers in the country living in and around forest lands and another 275 million[1] for whom forests have continued to be an important source of their livelihood and means of survival (Lynch, 1992).

Changes in forest policy and management over time in India can best be understood in terms of the competing claims and relative influence of the various interest groups and stakeholders. Within an overall structure of state ownership and control, two groups seem to have had a major impact over the last hundred years: foresters and industrialists (Guha, 1994). For almost a century and until 1988, forest management strategies were decided almost exclusively by the foresters and were

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Views expressed are personal and do not bind the organisation for which the author belongs or has worked in the past.

markedly biased in favour of commercial and industrial exploitation, with little attention paid to sustainability or to social justice.

However, in the last decade and a half, as the forestry debate has intensified both locally and in the media, the State has increasingly responded to the claims of forest dwellers voiced by the activists and NGOs. Their call for a decentralised and participatory system of forest management has finally been accepted, at least in theory, through the programme of joint forest management or JFM. This has attracted considerable donor support in the last ten years, although the policy instruments of improving the effectiveness of communities in local management are still not very well understood. This paper discusses the evolution of the current forest policy and the unresolved issues in its design and implementation, and raises some research questions.

Forest Policy Before 1988

As recently as fifty years ago, India possessed extensive natural forests. Since then human and animal populations have expanded rapidly as has the industrial sector, placing immense pressures on the forest. The British viewed forests as crown lands, limiting private property rights only to continuously cultivated lands. Uncultivated land remote from habitation was declared by the government as forests and managed under the new forest regulations for timber production. This orientation did not change even after Independence, as the Forest Policy, 1952 declared that village communities should in no event be permitted to use forests at the cost of 'national interest', which was identified with defence, communications and vital industries.

The next policy declaration contained in the report of the National Commission on Agriculture (NCA) in 1976 too put its stamp of approval on this commercial approach in the following terms (Government of India, 1976, p. 32):

> "Production of industrial wood would have to be the *raison d'être* for the existence of forests. There should be a change over from the conservation-oriented forestry to more dynamic programme of production forestry. The future production programme should concentrate on clear felling of valuable mixed forests, mixed quality forest and inaccessible hard wood forests and planting these areas with suitable fast growing species yielding higher returns per unit area."

In tune with the above recommendation the states stepped up the programme of industrial forestry. For instance, in the Sixth Five Year Plan (1980-85) of Madhya Pradesh, the central Indian state with highest area under forests, stated:

> "To produce 25 m cum of industrial wood it would be necessary to subject 5.5 mha of production forest lands to the intensive management, that is to clear-felling and planting.... with the massive plantation programme being launched in the state, there would be extensive monocrops of teak in the forests.... we

should clear-fell and plant roughly one lakh hectares annually if we want production of industrial wood to keep pace with demand in future."

As regards efforts made to meet tribal demands for fruit, medicinal herbs, etc., from forest lands, the same Plan document admitted, "no special programme were taken, which could directly contribute to the upliftment of the tribal economy. The programmes executed were essentially the forest development programmes which benefited the tribals only indirectly, ... (through) wage earning opportunities."

Thus the entire thrust of forestry during the first four decades after Independence was towards the production of a uniform industrial cropping system, created after clear-felling and ruthless cutting back of all growth, except of the species chosen for dominance. Three set of factors have been at work in shaping such policies. First, development until the mid-seventies was associated in the minds of planners with creating surplus from rural areas and its utilisation for value addition through industry. Hence output from forest lands was heavily subsidised to be used as raw material for industries. The impact of such policies on environment, on the existing natural forests or forest dwellers was not considered to be serious, as the resource was thought to be inexhaustible. Secondly, tribals and forest dwellers, with little voice or means to communicate were remote from decision-making, and politically their interests were not articulated. Thirdly, foresters were trained to raise trees for timber. Other intermediate and non-wood products were not valued, indicated by their usual description as 'minor products', leading to adoption of technologies that discouraged their production. The combination of these forces led to perpetuation of a timber and revenue-oriented policy that harmed both the environment and the people, but was argued to be meeting the goals of the nation-state.

The Social Forestry Phase 1975-90

The NCA recommended that peoples' basic subsistence needs should be met from non-forest lands in order to check the process of deforestation and save forests. This was then sought to be achieved through social forestry, a programme of fuelwood and fodder plantations on village and private lands. It is significant that social forestry was not tried on forest lands, except in small measures, as such lands were, as in the past, used for producing timber. Thus social forestry was seen as a programme that would release industrial forestry from social pressures. The core objective for forest lands remained the production of commercial timber. But in order to keep people out it was necessary to make them produce what they consumed free of charge using community and private lands to draw off the pressure on forests.

The programme of social forestry had two main components, planting trees on private lands, called farm forestry, and afforestation of village lands. In terms of sheer production of trees the programme of farm forestry had been immensely successful, especially in north-west India, Gujarat, and Karnataka, leading even to a glut of eucalyptus wood (Arnold and Stewart, 1991). However, two serious problems surfaced with this programme. Firstly, its geographical spread remained confined to a

few surplus regions only, and secondly, even in these regions the initial enthusiasm for farm forestry could not be sustained after 1990. The craze for planting eucalyptus, which was the main farm forestry species, declined as fast as it has risen during the 1980s (Saxena, 1994).

The sustainability of the social forestry component on village lands could not be ensured (Saxena, 1995) because, despite the rhetoric, the programme remained essentially a departmental one where local people were not involved; village councils merely transferred common lands to the Forest Department and played no role in the decision-making or choice of species. There was no continuity in the management and control of thousands of scattered pieces of planted village lands creating enormous problems of protection. Projects were designed around the ultimate felling of the planted trees, degradation often set in after the trees were harvested. The area available as village lands was also far less than anticipated at the project stage. Projects failed to define, establish and publicise the rights to the trees and the procedures for marketing and allocating benefits. The shares that would go to the individuals, village, panchayat and the Forest Department were not clearly laid down. Insecurity about benefits led to indifference on behalf of the people. Poor soil conditions and tenurial insecurity led to a low survival rate of plants, specially in deforested regions and hillsides prone to soil erosion, where trees were needed most (Barnes and Olivares, 1988).

Besides, market-oriented trees were planted which did little to improve consumption within the village. Fodder trees were generally ignored. Close spacing to accommodate more trees affected grass production. As projects did little to meet the demand of the poor for fuelwood and fodder, the pressure on forests continued unabated. Finally, as state funds got locked to meet the matching contributions required for external assistance for social forestry projects, forests got starved of funds, with several adverse effects. The neglect of forests hurt forest dwellers and tribals. It reduced timber supplies to the markets, resulting in price escalation, which further increased smuggling from forests.

The 1988 Forest Policy

In a mixed economy, where both government and private sectors work, it is generally the government sector that looks after the infrastructural or welfare needs of the people, whereas market needs are met by the private sector. Thus, health, education, and roads, etc., which are non-commercial programmes come under the domain of the government, whereas the private sector has been primarily motivated by profit orientation. It was strange that in forestry this distribution of responsibility was not being followed, and the reverse was being attempted. Forest lands were to meet the commercial needs of the economy and farm lands were to produce 'fuelwood and fodder'. This conceptual weakness was perhaps one of the main reasons for the failure of the two programmes.

The correction came in 1988 with a new forest policy that is radically different from the two previous policies. According to this, forests are not to be commercially

exploited for industries, but they are to conserve soil and the environment, and meet the subsistence requirements of the local people. The policy gives higher priority to environmental stability than to earning revenue. Derivation of direct economic benefit from forests has been subordinated to the objective of ensuring environmental stability and maintenance of ecological balance. It discourages monocultures and prefers mixed forests. The focus has shifted from 'commerce', and 'investment' to ecology and satisfying minimum needs of the people, providing fuelwood and fodder, and strengthening the tribal-forest linkages. It declared that the domestic requirements of fuelwood, fodder, minor forest produce, and construction timber of the tribals should be the first charge on forest produce. It advises industry to establish direct relationship with the farmers who can grow the raw material if supported by the industry with inputs including credit, technical advice and transport services. As these linkages may take time, in the interim, it suggested that import of wood and wood products should be liberalised, but the practice of supply of forest produce to industry at concessional prices should cease.

Political Factors Behind Change

The striking policy reversal in 1988 suggests that there were no strong political constraints in effecting a radical shift in forest policies. This may surprise political economists and therefore requires an explanation. In a democratic country with 70 per cent rural population, rural interests cannot be ignored for long. A subsistence oriented forest policy does not hit the rural elite at all, it in fact reduces the control of the centralised bureaucracy, besides curtailing the outflow of forest products to industries. Hence such a policy should not attract political impediments, which are inherent in distributive programmes such as land reforms.

From the early 1970s the intellectuals and activists have also picked up the long-standing grievances of forest-dependent communities. Consequently, in the last two decades the working of the Forest Department has come under close and critical scrutiny. It has been demonstrated that state policies by promoting commercial forestry has contributed significantly to the decimation of biological diversity and to an increase in soil erosion and floods [Centre for Science and Environment (CSE), 1985; Gadgil and Guha, 1992 a, b].

The battles on behalf of the forest dwellers have not only been fought in the press on an intellectual plane, but have actually been carried out in the countryside. There have been both armed struggles and political movements to regain control over what they perceived to be their lands. Several heavily forested districts in Andhra Pradesh, Maharashtra and Madhya Pradesh are witnessing armed rebellion, called the Naxalite Movement directed against the State. One of the main demands of the Naxalites is better community control over forest resources. In Bihar, in 1978, local people protested in what is called the 'Tree War' against the replacement of natural forests by teak plantations (CSE, 1982). Even today the Jharkhand (meaning land of trees) movement calls for the creation of a separate state in the central region of India.

There have also been peaceful and non-political forest movements in the country. In many places during the 1970s people on their own initiative started protecting forests, of which CHIPKO is a well-known example. It started in 1973 when a local village group was denied access to forests for making agricultural implements, whereas the same coupe was allotted to a sports goods company. This favouritism provoked the villagers who prevented the company from felling trees by hugging them (Gadgil and Guha, 1992, p. 223). It spread throughout the hills in north India, forcing government to impose a ban in 1979 on all commercial felling in the hills above 1000 metres, which continues till date.

When different interest groups have claims on a resource, policy and politics do not always favour the same group. In the years preceding 1988, while many decisions were taken (Chambers *et al.,* 1989) to make forest policy acceptable to the environmentalists, the state government of Karnataka decided to lease out 30,000 ha of common lands in 1986 to a paper company on a lease rent of 12 per cent of the produce. When agitation and petitions to the government did not yield any result, a public interest writ petition was filed by several NGOs before the Supreme Court. The Government of India in this litigation decided to oppose the decision of the state government and side with the NGOs, with the result that the state government was forced to cancel the lease in 1991 (Hiremath *et al.*, 1994). This was celebrated as a big victory against the lobby of forest-based industry.

In addition to the industry getting discredited in the popular press, two other factors must have weighed upon the minds of policy planners in suggesting a diminished role for forest industries on forest lands in the new Forest Policy. First, the popularity of eucalyptus among farmers increased the availability of pulpwood at a cheap price for the paper industry. In some states, such as Gujarat, large farmers even took to teak plantations, a timber crop which takes 30 to 60 years to mature. And secondly, liberalised imports of timber and pulpwood was permitted which eased the supply for the industry. With new sources of supply, it was no longer considered crucial for the industry to depend on forests.

The June 1990 Guidelines and Joint Forest Management

Although the 1988 Policy redefined the objectives of forest management, it did not envisage any direct role for the people in the day-to-day management of forests. It implicitly believed that government alone should control forests, albeit with changed objectives.

The case for public management of forests is hinged on a number of factors (Commander, 1986, p. 9). Firstly, forest management is associated with a wide range of externalities, as these provide external benefits to the rest of the ecosystem. Secondly, Forest Department operatives have often argued that management of forests requires a level of professional training and scientific competence that lies outside the capacities of peasants and forest users (Shyam Sundar and Parameswarappa, 1987). Thirdly, the time horizons for forest management would

favour public ownership and public investment. And lastly, it will allow for major economies of scale and a longer-term planning framework.

The strong case for exclusive government management gets diluted because the government is not in a position today to enforce its property rights. Forests are subject to intense pressure from human beings, livestock and urban markets. Over-exploitation by the people, which increased in the last three decades, is caused by several factors. First, increasing marginalisation of small landowners has forced them to seek new avenues of income, like headloading.[2] A study (Agarwal, 1987, p. 181) estimated that at least 3 to 4 million people were involved in headloading, making it India's biggest source of employment in the energy sector. Second, as village commons deteriorated, villagers turned to government forests for succour. And third, government policies raising commercial plantations further alienated the people from the resource. More than the official revenues which such policies brought to the government exchequer, it nurtured a new culture of rent seeking by those in power. The indiscriminate tree felling by the contractor-official-politician nexus has had a corrupting influence on the forest dwellers, who also wish to make hay while the sun shines.

Unlike other developing countries, extension for agriculture and shifting cultivation, the two familiar causes for deforestation, have not been the main cause of deforestation on forest lands in India at least in the last forty years. The alienation of forest lands from the people who need it for satisfying their needs, and consequently forests turning into open access lands has been one of the main cause for degradation as well as for increasing misery of the people. Till the mid-eighties the response of the government to this crisis of deforestation was to bring more land under the reserved category (which increased from 26 mha in 1951 to 46 mha in 1988), and plant non-browsable and market-oriented single product timber trees in order to reduce the pressure from local population and increase state revenues. This strategy became counter-productive and hastened the degradation process it was designed to prevent.

Given the ease of access to forests, indiscipline and socio-political culture it has been impossible, in practical terms, for the Forest Department to enforce its property rights, which required that people should fear from interfering with the state-owned property and that a symbolic presence of forest staff representing the authority of law would be sufficient to caution against the law breakers. Such conditions unfortunately do not exist in India today. These weaknesses in the enforcement of access to government property have led to forest areas being exploited as an open access resource by those who have no stake in its health, where all basic decisions are guided in terms of current income flows rather than capturing of delayed returns arising out of protection and long-term management.

Realising these realities, Government of India introduced participation of the people in managing forests by issuing a Joint Forest Management (JFM) resolution in June 1990 making it possible for the Forest Departments to involve people in the

management of forests. The resolution breaks a new path as it for the first time specifies the rights of the protecting communities over forest lands. Those protecting are to be given usufructs like grasses, lops and tops of branches, non-timber forest produce, and a portion of the proceeds from the sale of trees when they mature. This varies from 20 to 60 per cent of the timber sold. The order exhorts the State Forest Departments to take full advantage of the expertise of committed voluntary agencies for building up meaningful people's participation in protection and development of degraded forest lands.

Thus in the previous policies people and the environment were seen, all too often, as antagonistic. The forest-people interaction was conceptualised as a zero-sum game, in which both parties could not win. According to the JFM philosophy, the conflict model is neither necessary nor useful. To the contrary, ways can be sought in which the interests of people and of long-term sustainability are harmonised in a mutually supporting manner.

Progress of JFM in the States

Participative policies have taken different forms in different states today. In some states, forests have been leased to local communities, whereas in some village forest communities share the responsibility for protection with Forest Department. In some others, the villagers on their own had been protecting forests without any goading from the forest department. By 1997, eighteen state governments have issued enabling resolutions (GRs) permitting partnerships with local people. These states have 80 per cent of the country's forest land and 92 per cent of the country's tribal population. In the eastern states of Andhra Pradesh, Orissa, West Bengal, and Bihar there are a large number of groups protecting forests either on their own or initiated by the Forest Department. The JFM programme has now become the central point of future forest development projects funded by the Government of India and the donor agencies. It is estimated that 36,130 village communities are protecting about 10.2 million ha of forests (both quality of protection and its sustainability need improvement), which comprise 17 per cent of the total forest cover in India (Table 1). With more imaginative policies and innovative silviculture (Saxena, 1997), this area could be increased to 15 million ha in about a decade, thus covering about a quarter of the total forest cover.

New Guidelines for JFM

On February 4, 2000, almost ten years after the original Joint Forest Management (JFM) guidelines were passed, the Ministry of Environment and Forests (MOEF) issued a new set of policy instructions that both expanded the national strategy and addressed a number of important questions regarding legal, gender, and operational concerns. The new JFM policy includes the following:

- *Rights to Good Forests* - Allows forest dependent communities to co-manage productive, well-stocked forests and have a 20 per cent share in timber

production. Initially, forests available for JFM will be limited to those areas within 2 km of the village boundary.

- *Recognition of Self-initiated Groups* - Acknowledges informal village-based forest protection groups that have not been recognised by the forest department in the past because they fail to conform to state guidelines for JFM committees (JFMCs). Under the new guidelines, non-conforming JFMCs are to be recognised and derive benefits from JFM support programmes.
- *Legal Identity* - Provides a legal identity to forest protection committees. New guidelines urge state forest departments and NGOs to assist forest protection committees to register under the Societies Registration Act.
- *Conflict Resolution Mechanisms* - To resolve conflicts related to Joint Forest Management initiatives, state governments are directed to form working groups at the state and divisional levels comprising of different stakeholders participating in JFM projects.
- *Women's Involvement* - To encourage the involvement of women in JFM, women should constitute at least 50 per cent of the JFM general body and 33 per cent of the membership in the Executive committee.
- *Investments in Forestry* - A joint contribution of 25 per cent of timber revenues from the JFM Committees and the Forest Departments should be reinvested for the conservation and development needs of the forest.
- *Integrated Planning* - The creation of a new JFM working circle to facilitate the integration of village-based micro management plans with forest department working plans, and initiatives by other development agencies.
- *JFM Monitoring and Evaluation* - JFM progress should be monitored and evaluated at intervals of 3 years and 5 years at the state and divisional level.

Little is known about the impact of these guidelines in the field.

Overall Assessment and Policy Issues

Although the quality of participation is not uniformly good in all the JFM villages, yet the results of involving people in forest management have been quite encouraging in some places at least. For instance, in an DFID (Department for International Development)-assisted project in Karnataka the villagers earlier fear of Forest Department had declined (Saxena and Sarin, 1998). This has resulted in the VFC (Village Forest Committee) members' improved access to forests for meeting their bonafide requirements of firewood, grazing and fodder. In some VFCs irresponsible cutting by the local people in forests has been reduced due to improved relations. The consumption of fuelwood had also come down in some places because of the use of fuel saving devices supplied by the Forest Department. In some projects

NGOs are playing an important role in organising the people, and helping them through non-forestry activities. Peoples' participation is higher in those VFCs where NGOs are active.

TABLE 1. STATEWISE COVERAGE UNDER JFM

(*sq km.*)

State (1)	No. of committees (2)	Total forest cover (3)	Area under JFM (4)	JFM area as per cent of total forest sector (5)
Andhra Pradesh	6,575	43,290	16,322	37.70
Arunachal Pradesh	10	68,602	53	0.08
Assam	101	23,824	31	0.13
Bihar	1,675	26,524	9,350	35.25
Gujarat	706	12,578	910	7.23
Haryana	350	604	607 [3]	100.50
Himachal Pradesh	203	12,521	620	4.95
Jammu and Kashmir	1,599	20,440	793	3.88
Karnataka	1,212	32,403	128	0.40
Kerala	21	10,334	40	0.39
Madhya Pradesh	12,038	131,195	58,000	44.21
Maharashtra	502	46,143	947	2.05
Mizoram	103	18,775	58	0.31
Nagaland	55	14,221	6	0.04
Orissa	3,704	46,941	4,193	8.93
Punjab	89	1,387	390	28.12
Rajasthan	2,705	13,353	2,356	17.64
Sikkim	98	3,129	22	0.70
Tamil Nadu	599	17,064	2,244	13.15
Tripura	157	5,546	162	2.92
Uttar Pradesh	197	33,994	345	1.01
West Bengal	3,431	8,349	4,906	58.76
Total	36,130	591,217	102,483	17.33

The World Bank forest projects in the states of Maharashtra, Madhya Pradesh, Uttar Pradesh, West Bengal, Andhra Pradesh and Kerala were evaluated recently (Kumar *et al.* 2000). Besides, a few more studies have looked at peoples' participation and policy issues (PRIA, 1998; Saxena *et al.*, 1997; Sundar and Jeffrey forthcoming; Khare *et al.*, 2000; Rangachari and Mukherji, 2000; Hobley, 1996). The main findings from these studies are summarised below:

- Effective participation of local populations and equitable distribution of benefits did not happen in many cases, mainly due to institutional weaknesses.

- Poverty alleviation, tribal welfare and women's empowerment have neither been stressed nor monitored in government programmes, hence not achieved. Benefits to the poor beyond wages are limited.
- Links between forestry with pastures and watershed development are poorly understood and are not given sufficient importance in the projects.
- Integrated land use planning is not being attempted, and common lands adjacent to forests get a low priority in projects after 1991.
- Focus on farm forestry has been surprisingly diluted since 1991 despite its enormous potential, especially in the agriculturally backward areas. There are better social returns in promoting agroforestry models in the rainfed or semi-arid regions which contain most of India's marginal lands.
- Measures to sustain JFM beyond the project period have not been conceptualised. These relate to: building one-to-one correspondence between user groups and forest patch through a new forest settlement, recognition of JFM groups in law and linking them with statutory panchayats, and integrating the activities of such groups with other income generating programmes such as watersheds and marketing of NTFPs.
- Issues relating to productivity, access and marketing of NTFPs are neglected. Local value-added activities, such as processing, based on NTFPs are not part of the projects.
- Poor understanding of the social implication of technology; projects should consider changing forest technology by shifting attention from timber to floor management and production of more gatherable biomass.
- Continuing subsidies on government supply of wood and bamboo to industries, which acts as a disincentive to industry to pay a remunerative price to the farmers.
- Growing short rotation crops on forests, thus reducing the size of the market available to the farmers. Since the demand for marketed wood in India is limited, duplicating the same species like eucalyptus on forest lands as on farm lands ultimately cuts into the profits of the farmers, and thus undermines the farm forestry programme itself.
- The current import policy; government must review its decision to allow cheap and duty free import of pulp. While free import of timber may continue, as it reduces pressure on forests, such facility for pulp hits only farmers, as both eucalyptus and bamboo are short gestation crops eminently suitable for the farm sector.

- Failure on the part of government to look at personnel and organisational issues relating to quick transfers, declining morale, and inadequate financial and functional delegation.

One the whole, performance has been satisfactory, but forestry projects have not been able to realise the full potential of this sector, particularly the poverty alleviation focus of the 1988 Indian Forest Policy.

II

RESEARCH ISSUES

Forestry as an organised governmental activity in India is now more than 120 years old. Traditional research in forestry up to 1980 was generally confined to issues of a bio-technical nature. Since then the available literature can be divided into three categories.

First, there are several evaluation studies of donor-assisted projects (Dove, 1992; Femconsult, 1995; USAID, 1988; World Bank, 1993; Kumar *et al.,* 2000). These generally raise prescriptive issues, such as institutional arrangements needed to stimulate local participation in planning and implementation. These reports are based on personal impressions gained through hurried visits to the project area. The apparent success of JFM observed in such visits may not be sustained for two reasons. First, a project brings new funds and opportunities of wage employment in a village leading to spurt in enthusiasm that is interpreted as support for the JFM methodology. Second, the poor are able to shift their pressure to distant forests that is not under JFM. Thus the project area looks green but at the cost of a non-project area which is not monitored. The available data through such reports is also not amenable to inter-state comparison, nor does it help in establishing any link between outside intervention or incentive mechanism and benefits to and involvement of the poor.

Secondly, many 'environmentalists' and social activists have written books on the subject (Fernandes and Kulkarni, 1983; Agarwal and Narain, 1991; Gadgil and Guha, 1992; Shiva, 1988; Agarwal, 1992). They have been rightly opposed to custodial approach to forestry, and its timber orientation. However, their work lacks academic rigour. For instance, their assumption about the rural communities being homogenous and capable of enforcing discipline necessary for managing forests or about the nature of state power in India, which is often characterised as being obsessed about revenues from forests, may have little empirical support.

Finally, the subject has attracted the attention of serious researchers (Chopra *et al.,* 1989; Kolavalli, 1995; Nadkarni, 1989; Jodha, 1995; Jeffery and Sundar, 1999). Though based on sound methodology and hence extremely useful, the reach of their work has been limited and the conclusions of such research have not been adequately used for policy analysis. Their findings are scattered, and there is urgent need to synthesise and put them together.

A common shortcoming in all the three categories of literature is their inadequate understanding of technical and silvicultural issues and how these affect peoples' welfare. Although after the advent of the new forest policy in 1988 there has been some attention of researchers on participation, little thought has been given to examine necessary changes in the technology which will be suitable to achieve the changed social objectives. Multiple objectives to maximise outputs from many products will require research on innovative and experimental silviculture, on the management of shrub and herb layers, and on forest floor management to enrich the soil and encourage natural regeneration. Unfortunately there is not much evidence that the Indian Council for Forestry Research or the state forestry and agricultural research organisations are alive to the need for studying how new silvicultural practices can promote JFM or the livelihoods of the poor.

Some of the other important gaps in research are being summarised below.

Forest Cover

No firm data are available in respect of the extent of loss of forest cover in India or its annual rate of deforestation. It is generally believed that India lost its forest cover quite heavily during the 1970s, but the trend was reversed from 1980s onwards. In 1984 the NRSA published data for the years 1972-75 and 1980-82 showing that the country lost[4] 1.3 mha of dense forests (with crown cover of more than 40 per cent) every year, and its area fell from 46.42 to 36.02 mha during that period. However, the area of dense forests has remained almost stable since 1981-83, as Table 2 based on the data published by the FSI (Forest Survey of India) shows:

TABLE 2. AREA OF DENSE FOREST COVER IN INDIA AS REPORTED BY NRSA

(mha)

Year (1)	Dense forest cover (2)
1972-75	46.42
1980-82	36.14
1985-87	37.85
1987-89	38.50
1989-91	38.56
1991-93	38.58
1995-97	36.73

According to the FAO (1998), deforestation continued at the rate of 0.6 per cent during 1980-90 in India. It however defines deforestation as loss of natural forests, not counting plantations. According to the FAO, changes in the area of natural forests and plantations during the period 1980-90 were as follows:

TABLE 3. CHANGES IN TREE COVER DURING THE 1980S IN INDIA

(*mha*)

Particulars	1980	1990	Annual rate of increase/decline (per cent)
(1)	(2)	(3)	(4)
Natural forest cover	55.12	51.73	(-) 0.6
Plantations	3.18	13.23	(+) 14.0
Total tree cover	58.30	64.96[5]	(+) 1.0

FSI vs. FAO - who is right? - Part of the problem is definitional. The FSI data about tree cover includes plantations on farm and degraded lands (whatever can be observed by the satellite), whereas the FAO calculates the rate of deforestation only on natural forests, and discusses the figures of plantations separately (these are based[6] on government data and obviously do not accurately take into account mortality etc). When the area under plantations is added to that of natural forests, the FAO data show that the tree cover in India during 1980-90 has increased from 58.30 to 64.96 million ha!

One explanation of the improved scenario could be the general ban on green felling which many Indian states have clamped since the late eighties. How effective has been this ban, and what has been the impact of the Supreme Court order in January, 1997 on logging ban, is not very well known. The relative contribution of forests to state revenues has been falling dramatically since Independence, just as it has fallen for land revenue, because of expansion of economic activity outside land. This has enabled the states to forego incomes from logging. Other factors, such as liberalised wood imports (touching 1.3 billion US $ in 1997-98), natural spread of *Prosopis juliflora* shrubs, and the success of farm forestry have contributed in reducing pressure on forests. Finally, the success of participatory policies may have led to improvement in forest cover. Even when the forest cover has remained unaltered, little information is available on the species composition and changes in the total forest stock.

Demand, Availability and Prices of Fuelwood

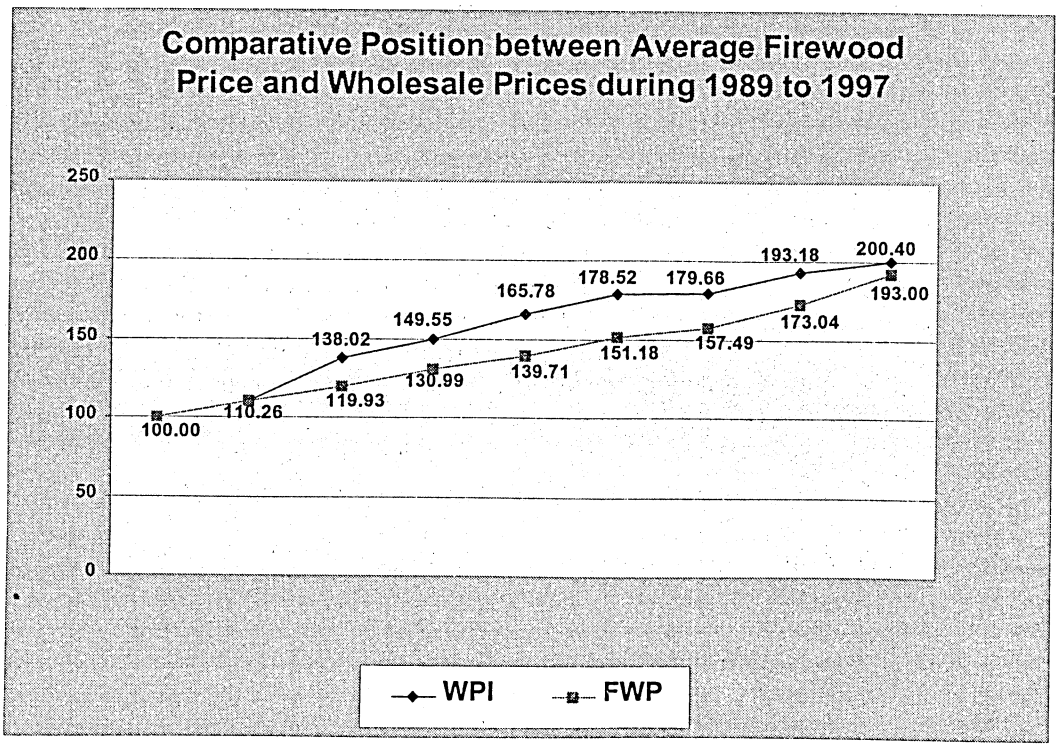
Several estimates for fuelwood demand are available, but these are so disparate that a degree of agnosticism is in order. There are differences even in the figures of actual consumption estimated by different agencies. The National Forestry Action Plan, 1999 of the Ministry of Environment and Forestry estimated removal of fuelwood from forest lands alone as 270 million tonnes, whereas NCAER put the total figure of fuelwood consumption including all sources as 94.5 million tonnes in 1978-79 and TERI's estimate for 1991 was 175 million tonnes (Ravindranath *et al.*, 1996).

These differences arise perhaps for several reasons. First, it is difficult to be precise about the demand for an item which is mostly collected and where substitutions occur: smaller twigs and leaves can substitute for larger sticks and logs; and where fuelwood is easily accessible and opportunity cost of rural labour remains low, fuelwood can substitute for other non-commercial and commercial fuels, leading to higher estimates of needs. Second, there are difficulties in assessing direct and indirect impacts of various causal variables such as product price, prices of substitutes, size and location of user households, price and income elasticity of demand, and likely changes in the causal variables themselves.

Third, consumption of fuelwood is highly supply elastic and varies a great deal with availability. For instance, the annual amount of wood used in Raipur (Madhya Pradesh), which is surrounded by dense forests, was almost 1 tonne/household, whereas in Hyderabad (Andhra Pradesh), a metropolitan town, it was less than 0.5 tonne/household (Dunkerley *et al.*, 1990). Variations in total consumption of cooking fuels by households and the mix of fuels used were influenced by household income, accessibility and prices of the different fuel supplies, climate, resource endowment, size of city, household fuel preference, social characteristics, food habits and regional cooking styles.

As for consumption, the Forest Survey of India (FSI, 1988, p. 46) estimated that there was a gap of 130 mt in demand and internal production of firewood in the country in 1987. Estimates for the year 2000 A.D. vary from 92 mt by the Working Group on Energy Policy of the Planning Commission to 300-330 mt by the Advisory Board on Energy. The demand projections of many such studies for future years have often not been matched by the figures of actual consumption in those years, and the predicted demand has been found to be exaggerated, often by a factor of 2 to 4, as compared to actual consumption (Saxena, 1997). This suggests that the methodology followed in these studies for estimating demand should perhaps be put to critical scrutiny. Firstly, the term demand should be sharply defined and distinguished from the need or requirement. It is more precise to measure consumption than demand. Secondly, the discussion on quantification of demand should take into account the prevailing or anticipated price. The present estimation process make no reference to prices. Thirdly, the experience of glut of eucalyptus wood in several north Indian markets whereas shortage existed elsewhere shows that the gap between supply and demand cannot be bridged by simply enhancing production, other constraints may be equally relevant.

Prices - It is generally believed that although fuelwood prices in India increased fast during 1970-85 (UNDP, 1986; Bowonder *et al.,* 1988), these have since then stabilised, although little published information is available on the trend of prices in the last 15 years. The author collected raw data from the Labour Bureau, Shimla given in Figure 1, which would show that the rise in price in fuelwood (FWP) during the period 1989-97 has been slightly less than the rise in wholesale prices (WPI).



In addition to farmers in the commercialised and surplus regions of India producing a great deal of eucalyptus wood, which had to be sold as fuelwood, being surplus to the needs of poles and pulpwood, the main source for supply of fuelwood at little opportunity cost is through shrubs on degraded lands, such as prosopis (*Prosopis juliflora)* and lantana (*Lantana camara*). These are not favoured species, because of the presence of thorns in the case of prosopis and low density in the case of lantana. Yet the absence of commercial interest in these species help the poor in their access to such shrubs. In many semi-arid regions the natural spread of *prosopis* shrubs provides excellent fuelwood for both consumption and sale at almost zero opportunity costs to the poor. These positive developments, though unconnected with government policies, still leave out a large proportion of rural population for whom fuelwood is scarce.

As a consequence, to speak of a 'fuelwood problem' in India is somewhat misleading. Land production capabilities and access to biomass vary from region to

region and this has an impact on whether or not energy for cooking is a problem for people in the rural areas. One way to classify regions with respect to fuelwood availability could be: (1) regions with proximity to forests, (2) fertile and irrigated cultivated land, (3) areas with access to *prosopis* shrubs, (4) areas where farm forestry has been successful and (5) areas where dung must be returned to fields for maintaining productivity.

Although empirical data on each of these regions is sadly lacking, one could hypothesise on the basis of field experience that fuelwood is an acute problem more in the last type of region, which may cover roughly half of India's geographical area. In forest regions, the issue is not of physical scarcity but of lack of incomes, which leads the poor to do headloading. In regions 2 and 4, there would be a class dimension too, that is the poor and landless may face shortages, even when it is not an issue for the surplus farmers. Even if the poor have land, their immediate preoccupation is the need for quick solutions to desperate food and income deficits (Cecelski, 1987), and they cannot be expected to use their lands for production of fuelwood. Thus the earlier social forestry projects, in focusing only on fuelwood, proved insufficient in defining what is needed by the target population.

Much of fuelwood is still gathered and consumed and thus fuelwood continues to be by and large a non-monetised commodity. Even when firewood is traded, studies show that rural wood markets are small, localised, lack capital and hence buying capacity (FAO, 1987). Fuelwood is supplied to these markets from farmers' produce as also supplies from head-loaders, bullock carts, and merchants who buy wood from forest auctions. The fact that fuelwood markets supply hardly 15 per cent of the total fuelwood which is consumed has two implications for the production of fuelwood as a farm crop. First, the gatherers can always beat the producers over the pricing of fuelwood; the producers would be price-takers, rather than price-makers. Second, the market price of fuelwood would always be lower than its social cost for replacement of growing stock through investments in plantations. These considerations make production of wood by farmers for fuelwood markets a non-viable proposition. These considerations indicate that the fuelwood gaps can be met only though such trees on public lands which produce a lot of twigs and branches, which can be gathered, and not through commercial production on farm lands. In fact French (1985) has argued that in developing societies with plenty of open public lands and poverty, producers will have no incentive to produce wood on farm lands in view of the depressed prices of wood due to gathering. This hypothesis needs to be tested under Indian conditions.

Private Tree Planting

When farm forestry was launched in the late 1970s it was initially believed that the farmers would plant only a few trees on homesteads or on uncultivated lands for fuelwood and fodder for their own use (Government of India, 1976). However, the farmers' response was quite different, both in scale and purpose of planting, from what was planned. Most trees came up on farm lands either as woodlots or on

boundaries, and not on uncultivated lands. Against the original target of distribution of eight million seedlings to farmers in Uttar Pradesh in the period 1979-84, the actual distribution had to be stepped up to 350 million to meet the farmers' demand (World Bank, 1988). In Haryana, the area under trees on farms grew at a rate of 53 per cent per annum between 1975 and 1984 (NCAER, 1987). As against the existing 49 million mature trees in Gujarat, in 1983-84 farmers planted 195 million trees in that state (Government of Gujarat, 1986). That is, in one year alone, the farmers in Gujarat planted as many as four times the number of the total existing trees in the state. More trees were planted in commercialised and surplus producing agrarian regions than in subsistence oriented eastern states, despite the fact that rainfall and soil conditions were more favourable to trees in the east rather than in the low rainfall (but irrigated) north-west India. Several issues however are still to be thrashed out.

There is little understanding of the circumstances under which the growing of trees by smallholders becomes a viable economic activity. What accounts for inter-state and intra-state differences in the spread of farm forestry? What measures could revive the interest of farmers in planting trees on their lands in states, such as Haryana and Gujarat?

The greatest potential for agro forestry is in regions of rainfed agriculture. The constraints why farm forestry has not caught on in these regions need to be identified. In what manner is the involvement of the farmers in tree plantation related to the local climatic and environmental conditions, socio-economic structure, status of land records, revenue and forest laws describing the access of the small holder to land and trees, labour constraints, market conditions and government subsidies? What kind of policy intervention from the government is likely to influence small holders' response? What measures would improve the participation of rural women in farm forestry programmes? Is their access to and ownership of agricultural land declining over the years?

Lack of tree planting by resource-poor farmers is generally attributed to their poverty and short time horizons. It is believed that they have to give absolute priority to their immediate subsistence needs and cannot undertake long-term investment. The gestation periods of trees before they yield income or capital value, in this view, makes them unattractive to poor farm families. Is this hypothesis true for some of the very poor, or does it mislead and divert attention from other crucial factors? What are the circumstances when the poor plant trees on their lands? This issue is important not so much from equity point of view, but because a lot of land has been allotted to the poor, which is not fertile enough for crops, but suitable for trees.

Research done about the behaviour of small holders from different ecological regions in India needs to be synthesised for policy purposes. Will they, as in the case of green revolution, follow in the footsteps of large farmers sooner or later, or are there structural constraints that inhibit participation of the poor in tree growing programmes? Do the poor enjoy sufficient security of land tenure so as to sustain their involvement in an activity where economic returns flow after several years? Do

the species that are being promoted by the Forest Department take into account the specific needs of the poor, especially women and children? How does it affect employment?

What is the nature of forestry product markets? What are their channels, boundaries, costs, strengths and weaknesses? Would it be able to accommodate farm forestry produce from small holders at a fair price or will it soon reach a saturation level with the produce of medium and large farmers?

Lack of systematic data on multiple use species may be because of tradition of a less demanding industrial forestry that depended on a handful of species. As farmers increasingly turn to agroforestry, they would like to know the relative degree of competition or complementarity between trees and crops. The changed scenario of community forestry and agro-forestry requires thorough knowledge of the range of roles which each tree could perform and match it to the local land use system and needs of the community/farmers.

NTFPs

Almost all important NTFPs, such as bamboo, sal seeds and tendu leaves, are nationalised, that is, these can be sold only to government agencies. The nationalisation of the NTFP commodities, done in different states in various years from 1960s to the end of 1970s, presumably with the intention of helping the poor, has continued despite the 1988 Policy and may have affected the interests of the forest gatherers adversely. Nationalisation reduces the number of legal buyers, chokes the free flow of goods, and delays payment to the gatherers, as government agencies find it difficult to make prompt payment. This results in contractors entering from the back door, but they must now operate with higher margins required to cover uncertain and delayed payments by government agencies, as well as to make the police and other authorities ignore their illegal activities. This all reduces tribals' collection and incomes. On the other hand, it can be argued that gatherers are no better off even where the marketing of non-nationalised items is concerned. Their weak economy, lack of processing at the village level, seasonality of supply, barriers to entry for private trade, and poor flow of information about the terminal markets are some of the factors that work against the gatherers. The issue therefore is, if private trade is exploitative and Government intervention is monopolistic and inefficient, what marketing arrangements would be best suited to safeguard the interests of the gatherers?

NTFP Issues in Schedule V States

The Government of India passed a new legislation for Schedule V tribal areas of Central India according to which Gram Sabha/panchayat, and not government is the owner of minor forest products. Although this law has been on the statute since December 1996, its follow up by the states and implications for tribal incomes has not been researched. The Ministry of Environment and Forests wrote to all the State

Governments in July, 1998 against government monopolies and in favour of Gram Sabha control, but unfortunately did not pursue the compliance of its own orders, with the result that no change may have taken place on the ground despite a strong Central law.

Joint Forest Management (JFM)

It is not very well known under what conditions JFM does well, and whether these conditions are internal to the group (such as cohesiveness and size of the community, remoteness from market and roads, nature of village economy, and dependence on natural resources), or more influenced by governmental policies (security of tenure, rights and privileges over forests, laws pertaining to NTFPs, market distortions, decentralisation, gender concerns, Working Plans, silvicultural practices, etc). How do these factors impact on participation?

Participation in JFM programmes has generally been confined to information sharing (one way communication) and consultation (two way communication); rather than collaboration (shared control over decisions and resources) and empowerment (transfer of control over decisions and resources). Often, participation is introduced too late asking people to agree to and go along with a project, which has already been designed for them. In other natural resource management projects too participation has tended to try to make people aware of their responsibility without giving them any authority to spend funds or to manage assets.

One of the characteristics of participation is that it cannot be turned on and off like a tap, that is, "now you participate, now you don't". Attempts to establish participation in the later stages of operation and maintenance are not only misguided but have contributed to ineffective projects. Participation should be viewed as a process that starts with planning and ends with operation and maintenance, rather than as an element that can be injected in the later stages of a project whenever outsiders determine.

In addition to participation, sustainability of government efforts as well as its impact on the poor should also be studied. The overwhelming evidence on natural resource management projects, such as forests and watershed management, is that the benefits are not sustainable in the long term. After the source of funds from government dries up, plantations disappear, committees are disbanded or abandoned, and the livelihood base of the poor remains only marginally improved, if at all. Perhaps in some cases they create sustainable social capital by raising awareness amongst the poor. However the evidence suggests that most of the social capital which projects create is held by the rich, and that in fact most projects have contributed to a further entrenchment of their powers.

Village vs. Panchayat

What is the relationship of the village level committee with the statutory village Panchayats? How is power and responsibility being shared between the two? Some

GRs suggest that panchayats should play an oversight role in monitoring the activities of village groups, as in West Bengal. If, however a forest tract and managing communities are spread over a large area covering several panchayats co-ordination may be more difficult. There is some concern that if JFM groups were absorbed by village panchayat, vested interests might exert control over decision making. Since small user communities may comprise less powerful groups, they may lose authority to elites if the management becomes a direct adjunct of the panchayat. On the whole, there is need to study (specially in the context of new Schedule V law) the relationship of local forest management groups to panchayats, as simply subsuming them as part of the panchayat could threaten their effectiveness.

On the other hand, since JFM groups are not statutory bodies, protection beyond the project period is a problem. Panchayats are responsible for development planning for the whole Gram Panchayat, and would be the natural apex body for protection and linking forest development into other objectives. Unlike the JFM committees, panchayats are democratically elected, with representation for disadvantaged groups. On the whole, we need more empirical work to study the effectiveness of the two institutions.

Ecological and Economic Issues

While some research has been carried out on social issues in joint forest management, much less is known regarding the dynamics of natural regenerative processes in degraded forest ecosystems and how they might be managed to enhance forest productivity. Research questions may raise issues regarding sustainable yield levels, regeneration rates, species productivity, seasonality and changing diversity, processing and marketing systems, and pricing policies. Studies might focus on concerns over fuelwood headloading and how pressures could be reduced and changing extraction practices to minimise disturbance, sustainable yields and methods for leaf or fodder grass and mulch collection, or optimising the efficiency of quality NTFP raw materials to artisan communities. Thus, once protection is in place, which species predominate and which species are suppressed? What changes in succession are likely to occur over what period of time? What is the rate of regeneration for different species? What is the total increase in biomass? How does the natural regeneration process change under different types of silvicultural manipulations (cleaning, stool leveling, multiple shoot cutting, final harvest, etc.)? What effects do various enrichment planting strategies have on the volume yields of important commodities? What levels could be achieved for a maximum sustainable yield?

Leasing of Forests

The World Bank has often suggested leasing of degraded forest lands to paper industry. However, the comparative cost of production of wood from such lands vis-à-vis the existing sources of supply (from Government forests, farm lands and

imported pulp) have not been studied. Then, the paper industry in India has been exercising managerial control over bamboo forests in many States, such as, Maharashtra, Orissa and Andhra Pradesh. The impact of such control over re-plantation and availability of bamboo also needs to be investigated.

Legal Issues

The legal and organisational framework for joint management needs to be studied. In many states, villages distant from forest areas have settlement and use rights. Thus, a forest patch does not have a well-defined and recognised user-group, admitting the rights of the entire population of that region or the entire forest area. This kind of a `right-regime', which makes forests open-access lands, is not conducive to successful protection, as rights of contiguous villages protecting forests may come in conflict with those of distant villages, not protecting but still having rights to enjoy usufruct. Therefore, user rights should be reviewed to see whether these are in harmony with the 'care and share philosoph'which is the basis of JFM.

III

SUMMING UP

Rapid expansion of forest programmes has proceeded in India in the last two decades without growth of systematic knowledge about how and why it affects environment, or rural people. There is as yet no identification of the key factors that must be evaluated, so that the outcomes of various types of tree production activities - community, farm, protective, and production forestry - can be explained, predicted or improved. Forestry in India has also attracted a great deal of media hype resulting in too much of inspired writing on the subject without corresponding research backup. While this form of writing has its attractions, it is extremely vulnerable in the large scale activities that forestry has attained. It cannot yield the generalised knowledge that is needed to explain why the results of policies, programmes and projects differ from expectations, how possible changes would achieve different effects, or, for that matter, which aspects of performance deserve scrutiny if the large commitments are to be evaluated in ways that help improve their impacts on rural welfare and land productivity. The scale and importance of afforestation programmes have grown far beyond the point where reliance upon personal insights is a sufficient basis for learning and progress.

Development programmes in India today require a strong element of peoples' participation. It is believed that involvement and collaboration of the people can make the development efforts by governments in programmes of natural resource management such as irrigation, drinking water, pasture development, and forests more effective, transparent and sustainable. In the context of forestry projects participation of local communities would improve forest productivity, alleviate poverty and increase environmental stability. It would also build consensus within the community, which is often vital for effective protection and regeneration of denuded

forests. In this context India's experiment since 1988 with a new people-oriented forest policy and with involving the local communities in management assumes great significance for the developing countries both for resource development and poverty alleviation. However, its implementation has so far been uneven and halted. The reasons for indifferent performance may be rooted in the nature of resource, nature of communities or government policies. The relative importance of these factors is not very well known. Time has come for the academic institutions to provide a critique of the past and current forest policies, review the implementation of participatory forest management in several Indian states, explain why community action is sustained over time, and embed the conclusions in the wider theory of property regimes by linking hypotheses of collective action with empirical evidence. These findings also need to be contrasted across the states with diverse experience in participation in other programmes of natural resource management, such as irrigation, watersheds and groundwater.

A development concept faces very different constraints and opportunities when it is new, unproven, and unaccepted, compared with when it is long-established and widely accepted - and the role of those who are in charge of its promotion must vary accordingly (Dove, 1992). For example, much of the effort of the `sympathisers' of the JFM to date has concentrated on promoting the advantages of JFM to the government, NGOs, and local communities. Such promotion may be valuable in the early phases of a programme, but there are potential problems in sustaining it for too long. The nature of promotion results in too much emphasis on positive aspects of the programme and too little critical analysis. At the outset it is important to be able to persuade key actors of the merits of peoples participation, but it eventually becomes important to temper this with critical appraisal, long-term strategies, and the building of capacity to implement such policies. This would require sustained interest of researchers into both socio-economic as well as into silvicultural aspects of the programme.

NOTES

1. There is no uniformity in the number of dependents as assessed by different authorities. One reason for this variation could be that dependence has not been rigorously defined in these studies.

2. Fuelwood collection by the poor from public lands and carrying it on their heads to the nearest market. In Orissa, for instance, a headloader would earn Rs. 25 to 30 a day for a shoulder load and Rs. 50 to 60 for a cycle load in 1992. This was against agricultural wage rate of Rs. 25 per day fixed by the government, and actual payment of about Rs. 16 - 17 a day (Jonsonn and Rai, 1994). However, agricultural work is available in mono-cropped areas barely for four months in a year.

3. Includes non-forest area also which along with forests is under peoples' participation.

4. For the period 1975-81, the World Resources Institute (in its book called *World Resources*, 1990) painted a dismal picture by citing a 2.3 per cent deforestation rate corresponding to a loss of 1.5 million ha a year. Had this rate continued uptil now India's forest cover would have shrunk to just 40 per cent of what it was in the early seventies.

5. FAO's estimate for 1995 is 63.85 million ha, thus showing little change since 1990.

6. FAO calls it 'reported area' based on the number of trees planted or delivered from nurseries, assuming a survival of 70 per cent.

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