

2. Overview of the National Forest Economy

Forest Land Base

A little more than 20 percent of India's land base is classified as forest. India has about 64 million hectare of forest cover (FAO 2005),³ allocated among dense (59 percent), open (40 percent), and coastal mangrove (1 percent) categories.⁴

Forest ownership is concentrated in the public sector. In India, 65 percent of the forest is administered solely by the government and another 27 percent reserved for community and indigenous groups (through JFM) but still largely administered by government. Only eight percent of forest land is managed by private individuals on farms or by large forestry firms.⁵ The level of public ownership/administration in India is very high compared with many other developing countries with significant forest areas and community forestry programs (table 2.1).

Table 2.1 Forest Ownership in Selected Countries
(percent)

| Country | Public Ownership | | Private Ownership | |
|-----------|-------------------------|------------------------|--------------------------|---------------------|
| | Government Administered | Community Administered | Community and Indigenous | Individual, Private |
| Brazil | 77 | 13 | 0 | 10 |
| China | 45 | 0 | 55 | 0 |
| India | 65 | 27 | 0 | 8 |
| Mexico | 5 | 0 | 80 | 15 |
| Argentina | 21 | 0 | 0 | 79 |

Source: White and Martin 2002, and author

Forest stocking and productivity are generally poor. The average stocking level in India is 74 cubic meters per hectare—much lower than the 113 cubic meters per hectare in other developing countries (MOEF 2004). In addition, the average forest mean annual increment of 0.7 cubic meters per hectare per year is significantly below the global average of 2.1 cubic meters.⁶ Reasons for low productivity in India include human removal of forest biomass that is not recycled into soil nutrients, grazing pressure, fire, and over cutting (Bahuguna and others 2004). About 41 percent of the country's forest cover has been degraded to some degree in the past

³ FAO figures are derived from data supplied by the Ministry of Environment and Forests as part of FAO's periodic global forest inventory reporting. The Ministry of Environment and Forests may update these figures later, but the figures usually differ from the previous published figures in FAO reports in only minor ways. In this report FAO figures rather than data from the Forest Survey of India are used to allow global comparisons.

⁴ *Dense forest* is defined as land having tree cover with a canopy density of at least 40 percent. *Open forest* is defined as land having tree cover with a canopy density of 10–40 percent. Other categories include scrub forest, with a canopy density of less than 10 percent; mangrove forest, consisting of salt-tolerant forest ecosystems found mainly in tropical and subtropical intertidal regions; and nonforest areas, in which there is no tree cover of any kind (MOEF 2001b).

⁵ Figure was calculated by the authors, based on data from White and Martin (2002).

⁶ The mean annual increment is the total growth of trees in a stand up to a given age divided by that age. It is often expressed in annual cubic meters of growth per hectare. The mean annual increment changes with different phases in a tree's life. It is highest during the middle years and slowly decreases with age. The point at which the mean annual increment peaks is commonly used to identify the biological maturity of the stand and its readiness for harvesting.

several decades (converted to open or scrub forest, for example), due to intense pressure from a range of human and biophysical causes (box 2.1).

A regional and global analysis of forest cover provides a mixed message (table 2.2). India is the only country in South Asia with a positive increase in forest cover between 1990 and 2000 (38,000 hectares). This increase represents only about 0.6 percent of the national forest area, however. Forest per capita of 0.1 hectares in India is on par with other countries in the region, with the exception of Bhutan. The change in forest cover in India is a positive feature, but the per capita forest cover is very low.

Box 2.1 Pressures on India's Forests

Pressure on India's forest com from a variety of sources, including the following:

- the increase in population, from 390 million in 1950 to 1 billion in 2001
- the loss of 4.5 million hectares since 1950 through agricultural conversion and other uses
- the high percentage (78 percent) of forest subject to heavy grazing
- exposure of half of all forests to risk from fires
- shifting cultivation, which affects almost 10 million hectares of forest
- encroachment on 1.36 million hectares of forest by 2002, with evictions accounting for only 10 percent of affected land by 2004.

Source: India stat (2005); Bahuguna and others (2004).

Table 2.2. Forest Cover in India, other Countries in South Asia, and other Regions, 2000

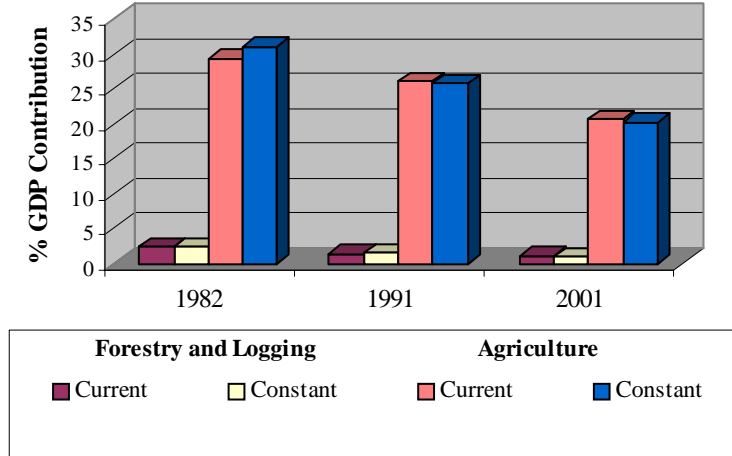
| <i>Region</i> | <i>Forest Cover (percent)</i> | <i>Forest per Capita (Hectares)</i> | <i>Annual Change in Hectares (000)</i> | <i>Forest Cover 1990–2000 Percent</i> |
|-----------------------|-------------------------------|-------------------------------------|--|---------------------------------------|
| South America | 50.5 | 2.6 | -3,711 | -0.4 |
| Europe | 46.0 | 1.4 | 881 | 0.1 |
| North/Central America | 25.7 | 1.1 | -570 | -0.1 |
| Africa | 21.8 | 0.8 | -5,262 | -0.8 |
| Asia | 17.8 | 0.2 | -364 | -0.1 |
| World | 29.6 | 0.6 | -9,391 | -0.2 |
| <i>South Asia</i> | | | | |
| Bhutan | 64.2 | 1.5 | -- | -- |
| Sri Lanka | 30.0 | 0.1 | -35 | -1.6 |
| Nepal | 27.3 | 0.2 | -78 | -1.8 |
| India | 21.6 | 0.1 | 38 | 0.1 |
| Bangladesh | 10.2 | -- | -- | -- |
| Pakistan | 3.1 | -- | -39 | -1.5 |
| Afghanistan | 2.1 | 0.1 | -- | -- |

Source: FAO (2005).

Contribution of Forestry to Gross Domestic Product

As a major land use, primary forestry pales with agriculture. Forestry and logging accounted for 1.1 percent of India's GDP in 2001, while primary agriculture accounted for 20.7 percent (figure 2.1).⁷ The share of Indian GDP for both sectors has declined slightly in current and constant terms since 1982. However, the percentage drop in forestry and logging is almost twice that for agriculture.

Figure 2.1 Contribution of Forestry/Logging and Agriculture to India's GDP, 1982–2001

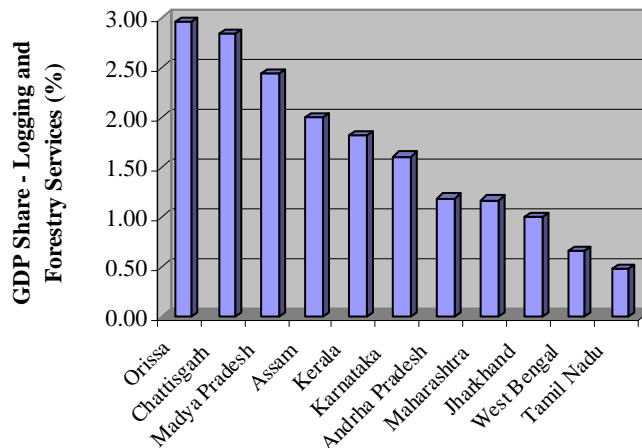


Source: World Bank (2005a). World Bank data bases.

Across selected states, forestry and logging account for 0.48–2.97 percent of GDP in current values (figure 2.2). The strict definition of GDP underestimates the total economic value of forests in India, however, as many goods and services from the forest are not traded in formal markets (examples include subsistence nontimber forest products, fuelwood, and vital ecological service functions, such as carbon sequestration, aesthetic values, and soil stability on steep slopes).

Fuelwood trade in India is estimated to have an annual turnover of about \$17 billion (MOEF 2000b) and is a source of livelihood for more than 11 million people, making it the largest employer (formal and informal) in the Indian energy sector. Ecotourism and carbon sequestration in forest areas have been estimated to increase national GDP share from forests from 1.1 to 2.4 percent (Chopra, Bhattacharya, and Kumar 2002). But even adding these values and

Figure 2.2. Contribution to GDP of logging and forestry services in selected Indian states, 2001



Source: World Bank databases.

⁷ Figures are from World Bank database and the Central Statistical Organization. State-level GDP data do not disaggregate secondary forestry activity (sawmilling, pulp and paper, millwork, furniture and milling, and other subsectors) from manufacturing. Thus GDP comparisons are restricted to logging and forestry services.

considering nonmarket fuelwood and nontimber forest products, the share of forestry GDP is still far below that of agriculture.

Structure of Domestic Forest-Based Industry

Most of India's processing capacity is small scale. India's forest-based secondary industry encompasses a wide range of small, medium, and large-scale firms that process primary timber (logs) into a variety of products for the domestic market (table 2.3). The vast majority of plants and production capacity is small.

Table 2.3 Secondary Forest Industry in India

| <i>Subsector</i> | <i>Number of Production Units</i> | <i>Capacity Share of Small - Scale Plants (Percentage of Production)</i> |
|----------------------------|-----------------------------------|--|
| Pulp and paper, paperboard | 406 | 66 ^a |
| Wood-based panels | 506 | 80–90 |
| Sawmills | 23,000 | 82 |
| Matches | 12,000 | 82 |
| Doors, woodworking plants | 98 | 25 |

Source: World Bank (2005c). See appendix 2 for more details.

a. Percentage of total capacity.

Several emerging investment constraints impede the growth of the sector. These include shortages of raw material (mainly for logs, due to felling bans in many state forests until forest management working plans are completed and numerous restrictions on log supply from private land and farmers); growing concern over environmental issues (mainly in larger production facilities, such as pulp and paper mills); judicial decisions to close unlicensed mills (particularly in the North East); economic liberalization and competition from imports (especially pulp imports); and poor management and technical skills (in sawmills, for example, less than 3 percent of lumber meets Indian grading standards).

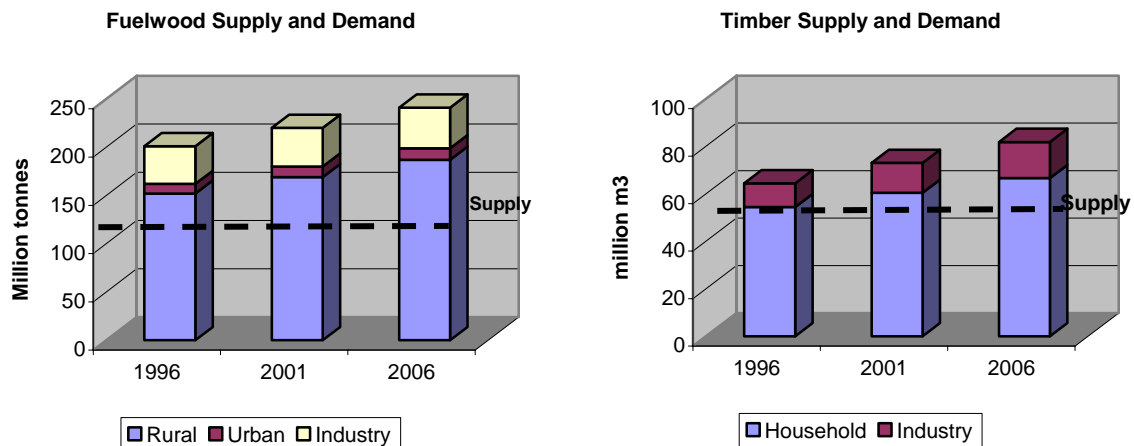
National Wood Supply and Demand Trends

India is facing serious imbalances between the supply of and demand for wood (figure 2.3). Demand for timber (logs) and fuelwood is projected to increase between 1996 and 2006, while supply is projected to remain flat, leading to significant and growing fiber supply deficits (Bahuguna 2004; ITTO 2003). These projections suggest that by 2006, an estimated 139 million metric tons of fuelwood will be harvested above the sustainable supply from regulated sources. Other estimates indicate fuelwood over-cutting of 131 million cubic meters (Saigal, Arora, and Rizvi 2002). Perhaps half of this gap is made up by subsistence collection of deadfall and nondestructive wood sources from natural forests (collecting branches and litter) in rural areas. The balance of the deficit is met through unregulated removal of fuelwood from natural and plantation forests and regeneration on degraded lands or wastelands, with subsequent impacts on forest productivity and sustainability.⁸ Driving the fuelwood deficit is the relative high cost of liquid propane gas for lower income households in rural areas and the lack of distributional networks (UNDP/World Bank 2003). Supplies of timber from natural forests have been limited by the 1988

⁸ These estimates must be viewed with caution (see Pandey 2001). Much of the supply is not market based and is used for subsistence. Supplies often consist of twigs and forest litter (nondestructive) rather than larger logs (destructive), especially where natural forests are located far from the village and people gather material from wastelands. Most studies do not examine the provenance or form of fuelwood. Moreover, prices (either at collection time or through market prices for commercial fuelwood) are not usually factored into demand estimates. There is an urgent need for a detailed analysis of fuelwood supply and demand at the national level and an assessment of the impact on growing stock. In the interim, most analysts agree that fuelwood consumption is largely uncontrolled and represents a major drain on the forest.

National Forest Policy, which discourages harvesting of natural stands, and the 1996 Supreme Court decision requiring an approved working plan before commercially harvesting green timber in any state forest division.

Figure 2.3 Projected Supply of and Demand for Fuelwood and Timber in India, 1996–2006



Source: (Bahuguna 2004; ITTO 2003; Mahapatra 2003, MOEF 2000)

While supplies are likely to increase in the future as management plans continue to be approved and new plantations come on stream, they will not meet rising domestic demand. The projected timber supply deficit for 2006 is 39 million cubic meters. This shortfall will be met partially through imports of logs from overseas suppliers, particularly, Indonesia, Malaysia, Myanmar and Nigeria. Log imports are supported through a favorable tariff regime of 5 percent on logs, compared with 25 percent on sawn wood. On a volume basis, about 95 percent of all wood imports to India are industrial roundwood, mainly tropical hardwoods. On a value basis, roundwood accounts for about 42 percent of total forest products imports (ANU 2003), but roundwood imports were only 2.1 million cubic meters in 2000–01. For products like pulp and paper, alternative supply options, such as bamboo or importing pulp and paper directly, exist. But for timber the current level of log imports does not come close to meeting the supply gap. While available data preclude a detailed analysis of the national timber market, the inevitable conclusion is that much of the log supply deficit is being met through illegal harvesting, putting additional pressure on remaining high-quality dense forests. The supply-demand situation underscores the national government’s strong support for forest conservation, manifested through efforts to protect existing forests and grow new plantations under JFM.

Primary Institutions for Community-Based Forestry in India

The Ministry of Environment and Forests is the dominant national forestry agency. It is the lead agency for forestry, wildlife management, conservation, environmental management, and international conservation programs. Forestry is a major unit in the ministry, with direct responsibility and supporting structures for national-level forest management, conservation, and wildlife programs. Forest management is delivered through five business units, responsible for forest cover mapping, policy, protection, regional forest programs, and research and training. Training is supported by four national training centers. Research is coordinated by the Indian Council of Forestry Research and Education (ICFRE), which oversees 10 national research centers.

National wildlife management is delivered through four business units that handle national parks, other protected areas, and species management Conservation houses the National Afforestation and EcoDevelopment Board, which delivers central financing to states and communities (through JFM) for forest rehabilitation and plantation establishment.

Forest departments are the lead public agencies at the state level. The organizational structure focuses on traditional forest management functions and the emerging community forest program. The forest department organizational structure is similar across most states, with a Principal Chief Conservator of Forests at the apex reporting to a Principal Secretary and managing main business units headed by an Additional Principal Chief Conservator of Forests. District Forest Officers (FDO) are the senior professionals operating at the subdistrict level. Business units tend to focus on planning and inventory, forest rehabilitation, forest production and marketing, protection and enforcement, wildlife management, and social/community forestry. For marketing of high-value nationally listed species such as teak, many states (including Jharkhand and Madhya Pradesh) have a separate government marketing corporation, usually acting as a legal monopoly.

Forest Development Agencies (FDAs) are responsible for several centrally funded forestry initiatives. FDAs operate in each state at the forest division level. They are designed to improve linkages between rural development, rural employment generation, and forest conservation. The executive body of the FDA is chaired by the Conservator of Forests, with the DFO as Member Secretary. Experts from other line agencies are represented but have no voting rights. JFM committees are represented through 15 nominees from the general body, seven of whom must be women. On average one FDA represents 25–50 JFM committees for the centrally funded forestry conservation schemes. The fund flow is through JFM committees, with villagers hired mainly to plant trees.

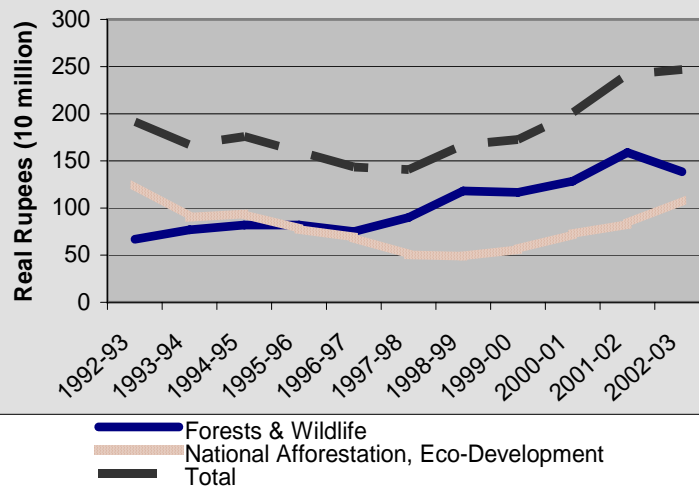
The capacity of community support organizations to assist with JFM varies across states. Several community support organizations operate development programs in each state, usually for agriculture and development in health, education, forest management and forest villages. Some community support organizations are affiliated with larger national organizations, others are local in origin. Constrained forest department resources generally preclude a more prominent role for community support organizations in JFM.

The private sector plays a small role in community-based forestry. In most states the private sector actors may act as marketing agents for government marketing corporations, purchasing commercial nontimber forest products from communities. There is very little space for private forest consultants to work directly with communities to assist with management planning or marketing. Private farm forestry has strong potential to help address domestic wood supply requirements, but restrictions on harvesting and transport for certain commercial timber species are strong disincentives to grow forests. Partnerships between communities and larger processing firms are limited by government policy, which bars private companies from accessing government-owned forest lands. Companies cannot easily work with larger farmers to establish plantations because of legislation restricting the area of land that individual farmers can acquire. Instead, firms need to work with larger numbers of small farmers to develop their wood supplies, which could increase their costs.

Public Expenditures on Forestry

Real expenditures by the central government are rising to meet timber supply challenges. At the national level, the Ministry of Environment and Forests allocates central plan financial resources to forestry programs, through both individual states and independent national activities, such as R&D.⁹ These funds make up the majority of public resources allocated for capital investment and recurrent costs in forest management in India. In nominal terms, central plan expenditures by the Ministry of Environment and Forests were about Rs990 Crore in 2002–03 (or \$220 million), representing roughly 4 percent of national GDP. In real terms these expenditures increased from just under Rs300 Crore in 1992–93 to Rs543 Crore in 2002–03, representing aggregate real growth of 81 percent, or average annual growth of 8.1 percent over the 10-year period. Within this aggregate envelope, expenditures on forest management through Forests and Wildlife and, National Afforestation

Figure 2.4 Plan Expenditures by the Ministry of Environment and Forests on Forest Management, 1992/93–2002/03



Source: National Planning Commission (various years)

and the Eco-Development Board increased from Rs192 Crore to Rs247 Crore between 1992–93 and 2002–03, or about 29 percent over the 10-year period (figure 2.4).

A breakdown of the forestry and wildlife outlays shows that the budget is allocated among five major program areas, with the majority of funds directed to R&D, education, and training (figure 2.5)¹⁰. R&D education and training supports the Indian Council of Forest Research and Education and several national forest research institutes, including those working on genetics, plywood, coastal and marine management, wildlife and forestry. It also supports environmental and natural resource training programs, and curricula development, and the training programs for Indian Forest Service.

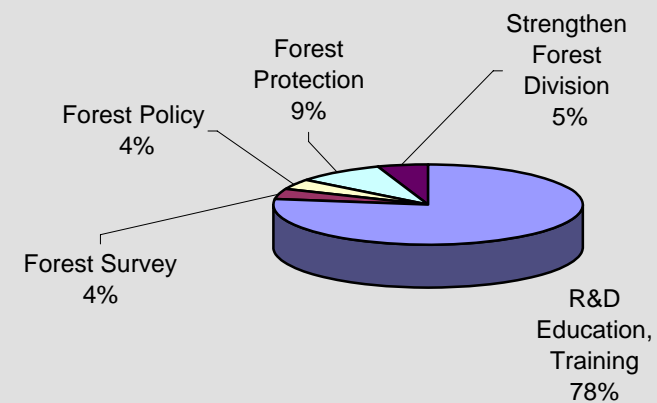
⁹ For additional material, refer to appendix 3.

¹⁰ Note: Forest survey: Supports national forest cover surveys by Forest Survey of India in Dehradun
 Forest policy: Policy development and forest sector information
 Forest protection: Programs to reduce losses from fire, insects, and disease.
 Strengthening of forest division supports forest agency infrastructure.

A relatively small share of the budget is allocated to forest surveys and policy, which are critical to support community forest management programs. In addition to central plan financial support, states also allocate budget support to local forest departments.

The Ministry of Environment and Forests, through its Central plan allocations, provides the bulk of public finance for capital investment in forest management for plantations (through community programs), recurrent forest research, protection, monitoring, and inventory. While real expenditures are rising, questions remain about how well spending is supporting the evolution of JFM at the state level.

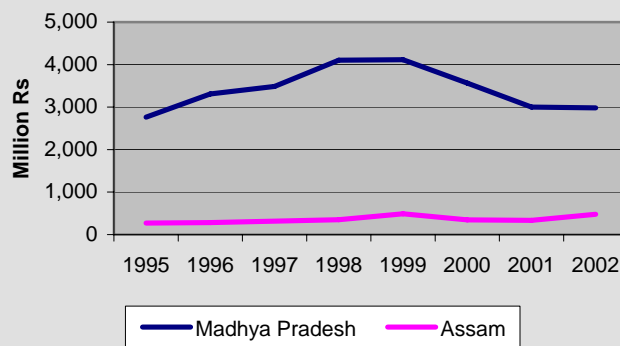
Figure 2.5 Breakdown of Spending on Forestry and Wildlife by the Ministry of Environment and Forests 2002-03



Source: MOEF (various years).

Real state budgets are rising slowly, but they mainly cover recurrent costs. In Madhya Pradesh real forest department expenditures from state allocations increased from Rs2.8 billion (\$61 million) in 1992 to Rs3.0 billion (\$66 million) in 2002 (figure 2.6).¹¹ But much of the rising trend to 1999 was due to budget support from the World Bank JFM project in the state. After completion of the project, real expenditures were not much higher than they were in 1995. About 75 percent of these

Figure 2.6 Real State Forestry Expenditures in Assam and Madhya Pradesh, 1995–2002



Source: World Bank (2005b); TERI (2005)

nonplan expenditures are for recurrent costs of field operations (territorial and production) and commercial harvesting. Research and training account for less than 2 percent of total recurrent expenditures funded by the state. In Assam real state budget allocations for forestry peaked in 1999 and declined thereafter; they have slowly increased to 1999 levels. Most nonplan expenditures are for recurrent costs and mainly cover salaries. In Jharkhand the allocation of annual state budget to forestry in undivided Bihar forest departments was less than 0.7 percent prior to 2000; this figure was 3 percent in 2002-03.¹² Nonplan operating budgets are about Rs.1 billion (\$22 million), with 70 percent spent on forest management. A worrisome feature, common to the other two states, is the relatively small budget allocations to critical supporting forest management functions, such as inventory, planning, and research.

¹¹ Detailed budget data are available from the forest department.

¹² Detailed budget figures are available only for 2002–03.

Extent of Joint Forest Management in India

JFM continues to expand as a community-based forestry model. It now covers 27 states, 85,000 village JFM committees, and 17.3 million hectares of forest land. Four states (Andhra Pradesh, Chhattisgarh, Madhya Pradesh, and Maharashtra) account for two-thirds of all forest cover under JFM and 39 percent of all JFM committees (table 2.4). Nationally, the average area of forest per committee is 217 hectares. Villages included in JFM programs encompass 8.4 million families. Assuming an average family size of four people per household, this represents almost 34 million people. Tribal families account for one-third of all families in JFM programs.

Table 2.4. National JFM Characteristics

| State | JFM committees (no) | Forest area under JFM (ha) | Share of JFM area (%) | Forest area per committee (ha) | Population characteristics (families) | | | | Average families per JFM area | Tribal families per JFM area |
|-------------------|---------------------|----------------------------|-----------------------|--------------------------------|---------------------------------------|------------------|--------------|----------------------|-------------------------------|------------------------------|
| | | | | | Scheduled Caste | Scheduled Tribes | Other Groups | Population Under JFM | | |
| Madhya Pradesh | 13,698 | 5,500,000 | 32 | 402 | 291,000 | 709,000 | 641,000 | 1,641,000 | 120 | 52 |
| Chhattisgarh | 6,881 | 2,846,762 | 16 | 414 | 251,012 | 760,892 | 348,347 | 1,360,251 | 198 | 111 |
| Andhra Pradesh | 7,245 | 1,886,764 | 11 | 260 | 136,789 | 188,621 | 285,685 | 611,095 | 84 | 26 |
| Maharashtra | 5,322 | 1,411,215 | 8 | 265 | 107,409 | 308,934 | 505,291 | 921,634 | 173 | 58 |
| Uttaranchal | 10,107 | 859,028 | 5 | 85 | 87,500 | 15,000 | 397,480 | 499,980 | 49 | 1 |
| Jharkhand | 3,358 | 847,967 | 5 | 253 | 53,617 | 76,615 | 165,903 | 296,135 | 88 | 23 |
| Orissa | 15,985 | 821,504 | 5 | 51 | 0 | na | na | na | na | na |
| West Bengal | 3,892 | 604,334 | 3 | 155 | 113,304 | 115,836 | 236,255 | 465,395 | 120 | 30 |
| Tamil Nadu | 1,816 | 445,965 | 3 | 246 | 72,290 | 11,484 | 187,160 | 270,934 | 149 | 6 |
| Rajasthan | 3,667 | 376,766 | 2 | 103 | 33,229 | 152,017 | 115,049 | 300,295 | 82 | 41 |
| Himachel Pradesh | 835 | 290,922 | 2 | 348 | 62,915 | 7,024 | 189,130 | 259,069 | 310 | 8 |
| Bihar | 493 | 267,240 | 2 | 542 | 53,377 | 31,618 | 157,644 | 242,639 | 492 | 64 |
| Karnataka | 3,470 | 232,734 | 1 | 67 | 50,465 | 37,303 | 155,589 | 243,357 | 70 | 11 |
| Kerala | 323 | 170,712 | 1 | 529 | 3,828 | 11,371 | 25,425 | 40,624 | 126 | 35 |
| Gujarat | 1,424 | 160,525 | 1 | 113 | 5,748 | 123,347 | 20,096 | 149,191 | 105 | 87 |
| Uttar Pradesh | 2,030 | 112,652 | 1 | 55 | 196,793 | 7,240 | 416,152 | 620,185 | 306 | 4 |
| Manipur | 205 | 93,941 | 1 | 458 | 57 | 13,883 | 5,511 | 19,451 | 95 | 68 |
| Arunchal Pradesh | 308 | 80,217 | 0 | 260 | 0 | 20,474 | 0 | 20,474 | 66 | 66 |
| Assam | 503 | 79,251 | 0 | 158 | 4,145 | 31,583 | 21,613 | 57,341 | 114 | 63 |
| Punjab | 287 | 56,243 | 0 | 196 | 20,029 | 9 | 17,984 | 38,022 | 132 | 0 |
| Harayana | 875 | 56,000 | 0 | 64 | 31,000 | 0 | 134,500 | 165,500 | 189 | 0 |
| Jammu and Kashmir | 935 | 49,544 | 0 | 53 | 4,789 | 5,324 | 38,347 | 48,460 | 52 | 6 |
| Tripura | 234 | 34,154 | 0 | 146 | 2,896 | 11,291 | 6,052 | 20,239 | 86 | 48 |
| Nagaland | 306 | 22,930 | 0 | 75 | 0 | 57,492 | 0 | 57,492 | 188 | 188 |
| Goa | 26 | 13,000 | 0 | 500 | 36 | 0 | 300 | 336 | 13 | 0 |
| Mizoram | 249 | 10,980 | 0 | 44 | 1 | 32,240 | 0 | 32,241 | 129 | 129 |
| Sikkim | 158 | 600 | 0 | 4 | 669 | 835 | 1,764 | 3,268 | 21 | 5 |
| Total | 84,632 | 17,331,950 | na | na | 1,582,898 | 2,729,433 | 4,072,277 | 8,384,608 | na | na |

Source: Bahuguna (2004).

These numbers represent a remarkable success by many measures. But this progress should be viewed with caution. Using Maharashtra as an example, 10,420 JFM committees cover 65 percent of the villages in and around state forests. But only 1,613 villages are actively operating under new FDAs (Dharia 2005). The remainder may have JFM committees that are not fully operational or engaged with the forest department.

Global Forest Transitions and Community-Based Forestry

The international forest sector is undergoing several transitions—transitions that create opportunities for communities in India. Global demand for forest products is growing, especially in developing countries. Delivered wood costs for small diameter spruce and pine logs in North America, Western Europe, and Eastern Europe are now significantly higher than in South America, South Africa, and New Zealand. The timber industry is becoming more concentrated, with 50 companies processing 41 percent of the world’s industrial roundwood. Demand for secondary processed wood products is growing (Molnar 2004). These transitions are creating opportunities for small-scale producers in communities and private farms who can produce various forest products at competitive costs (box 2.2).

Box 2.2 Opportunities for Small-Scale Producers Created by Global Forest Transitions

Changes in the global forest sector are creating a variety of opportunities for small-scale producers in India. These changes include the following:

- **Increased control of forests:** As a result of recent government recognition of local claims and devolution, nearly one-fourth of the forest estate in the most forested developing countries is now owned (14 percent) or officially administered (8 percent) by indigenous and rural communities. Local ownership offers opportunities to capitalize on forest assets.
- **Growing product demand:** Although demand for forest products in developed countries is growing slowly, demand in developing countries is growing rapidly—and this demand will have to be met mainly by domestic production. New processing technologies are creating demand for small-diameter, lower quality wood, which communities can and do produce.
- **Rising value of natural forests:** The supply of tropical hardwoods from natural forests has declined greatly, due to deforestation, overharvesting, establishment of protected areas, and civil disturbance. As a result, stands of natural tropical hardwoods are becoming more valuable. Local people hold a substantial and increasing share of these stands.
- **Demand for environmental services:** Environmental concerns are creating new markets for certified forest products and ecosystem services. Socially and environmentally aware investors are exploring opportunities to invest in sustainable forest management, including local farm and community producers.
- **Forest intensification:** Demand has prompted intensified forest management. Forest scarcity, increased prices of timber relative to those for grain, expansion of farming into marginal lands, tree domestication, and outgrower arrangements have stimulated extensive tree growing and commercialization on small farms.
- **Globalizing markets:** While globalization often favors highly efficient, lower cost producers, it is also opening opportunities to nontraditional suppliers, as new niche markets are created and buyers become more proactive in seeking and securing reliable sources of scarce forest commodities.
- **More democratic governance:** Investor and consumer demands for socially responsible forestry are beginning to drive improved social protections for forest communities. Democratization is fostering reforms in forest governance that give greater voice to local people. International norms increasingly support indigenous land rights.

Sources: Wunder (2001); Neumann and Hirsch (2000); White and Martin (2002).

Rising domestic demand for timber products and supply deficits from existing natural and plantation forests represent growing opportunities for communities in India. For tropical hardwoods like teak, diminishing global supplies and rising scarcity values should open up opportunities for these products from small-scale producers. Export markets are also expanding for certain kinds of forest products, especially in China, where imports of timber products are 20 times those of India and growing rapidly (White and Xu 2004). Global markets are widening for specialized niche products, such as high-value nontimber forest products. Opportunities appear to exist for forest communities in India to take advantage of these market prospects. For them to do so, however, JFM programs will need to recognize national and international market transitions. To benefit from these transitions, JFM will also need to continue evolving, supported by appropriate policy and program reforms, discussed in the remaining chapters of the report.