

5. Forest Management Systems and Community-Based Forestry

Resource Assessment and Planning Systems

Effective management planning and inventory are critical features of sustainable forestry. Sustainable forest management depends on a strong underlying policy and legal framework, efficient property rights, clear management goals with provision for stakeholder consultations, competent management institutions, and effective long-term planning. Long-term planning requires a good understanding of the state of the forest resource for a specific area and how and why it is changing over time. Basing forest policy and management planning decisions on weak resource inventory information can result in unsustainable resource use, with long-term consequences on forest health, biodiversity conservation, and the socioeconomic welfare of forest-based communities, both large and small.¹⁸ Studies in the three states identified a number of resource assessment and planning issues that hinder communities from assuming greater responsibility for forest management and at the same time, providing sufficient information and confidence to state forest departments to allocate more responsibilities to communities.

Poor inventory data are limiting planning effectiveness. Assam, Jharkhand, and Madhya Pradesh are at different stages of development with respect to their forest resource assessment and management planning systems and the working plans that must be approved by the Ministry of Environment and Forests.¹⁹ Madhya Pradesh has 97 percent of its working plans approved, Jharkhand has 52 percent, and Assam has 25 percent (table 5.1). Without an approved working plan, harvesting of standing timber is prohibited under past Supreme Court rulings. The higher level of plan approval in Madhya Pradesh reflects the forest department’s progress in establishing forest resource assessment systems and engaging in forest management planning relative to the other two states. Management plans in Madhya Pradesh are supported by reasonably adequate forest inventory. By contrast, Jharkhand is constrained by weak forest resource data and information management systems. Robust growth and yield data, essential to estimate current and longer term forest structures and sustainable timber harvests are almost nonexistent in the working plans. There are no functioning permanent forest sample plots in the state that provide ongoing and reliable stand-level data to develop local growth and yield models. Consequently, the forest department is unable to provide robust estimates of the forest age class structure, spatial distribution across tenure types, site index, growth and yield, stocking, regeneration, or mortality at division levels, which could then be aggregated to a state-level inventory. The lack of data makes it difficult to make accurate estimates of current and projected resource supply, even for the main timber species, such as sal. Assam is in

Table 5.1. Working Plan Approval In Focal States

<i>State</i>	<i>Number of Divisions</i>	<i>Plans Approved by Ministry of Environment and Forests</i>		<i>Pending or under Revision</i>
		<i>Number</i>	<i>Percent</i>	
Madhya Pradesh	62	60	97	2
Assam	28	7	25	21
Jharkhand	25	13	52	12

Source: Background studies

¹⁸ See appendix 7 for attributes of effective forest management planning and the general approach in India.

¹⁹ Working plans are the primary mandated management plan for states. They operate at the division level and are revised every 10 years.

a similar position, but it is encouraging to note that the forest department sees a way forward despite its severe financial constraints. The Assam forest department is making good (albeit limited) use of new technology to establish a good inventory baseline.

Resource assessment systems at the community level are weak. Micro-plans associated with JFM programs do not provide communities or local forest department staff with sufficient information for effective management and regulation of JFM forests to meet multiple demands and livelihood opportunities.²⁰ Inventory work undertaken by forest department field staff as part of the micro-planning process generally consists of one or two short transects for visual surveys to note major forest cover types and general condition (good quality, degraded, and so forth). Measurements are not taken as part of a more systematic inventory process, in which sample plots (random or spaced along transects) would be used and key species in each plot recorded for trees of different ages, diameters, heights, numbers of stems, and quality. Silviculture prescriptions are based on broad working plan prescriptions, which are often based on poor inventory and growth and yield models. While more intensive inventory systems for JFM are costly, better quality resource information is critical. Given the low quality of resource information generated by the current system, it is difficult to see how micro-plans can properly guide local management decisions for either timber or nontimber products.

Nontimber forest product inventory systems are very weak in all three states. Field surveys for micro-planning do not routinely gather nontimber product data, even for products that are significant sources of revenue, such as kendu leaf in Jharkhand and Madhya Pradesh. In some ways, this is not surprising. Many nontimber forest products are short lived and seasonal; for others, the supply is highly irregular from year to year. Fruit and flower crops on trees are difficult to estimate even in sophisticated orchards. For some commodities, such as exudates bled from trees, vines, or agarwood, the available stock can be estimated only by destroying some crops. Perhaps more important, in all but a few cases, no production or yield models are available as a guide for measured performance. Each state has small amounts of data for certain nontimber forest product species, but in many cases the data are old, are fairly site specific, and have not been replicated.²¹ While periodic biophysical studies have been conducted for various species in some states, such as Assam, there is no systematic approach to collating this information or collecting new field data.

Plans lack sufficient attention to markets and economic analyses. Although working plans provide estimates of resource supply (with varying degrees of reliability), there is a serious deficiency in market information and demand forecasts for key timber and nontimber forest product species. A major contributor to the problem is the fact that state forest departments do not as a rule have a policy and economics unit, which could potentially provide management planners with market intelligence from a variety of sources for state, national, and international markets, at least for key species. Micro-plans appear to lack any kind of market analysis. This is unfortunate, since it is market access that will largely determine whether or not the community will be able to increase productivity and generate increased income from the managed forest.

Poor mapping constrains more effective forest management planning in the three focal states, particularly in Jharkhand, local cadastral and topographic maps used to develop forest base maps for working plans are 20–30 years old. Soil maps are also often outdated. The lack of reliable maps means that forest tenure cannot be determined with any accuracy in each division, putting long-term investments in forest stocks at risk in areas where boundary uncertainty exists. It is difficult to link

²⁰ Micro-plans are the community-level management plan. They have a 10-year outlook and are implemented through annual operating plans.

²¹In Assam several surveys were undertaken of nontimber forest products in the late 1970s, but the surveys were not conducted on a regular basis. They have not been updated in many years.

existing site-specific forest resource data, such as data from micro-plans, with precise geographic locations in each division. To address this issue, the forest department has established a small central Geographic Information System (GIS) unit in Ranchi, but the system remains in the prototype stage.

In Assam the development of GIS is one of the stronger points of the inventory program. For several years all maps attached to divisional work plans have been derived from GIS systems, and a number of officers are moving up the learning curve. Some of the initial digitizing has been subcontracted to another state-owned but semi-commercial agency, to which an experienced forest department working plan officer has been seconded. Financial constraints are limiting progress, however.

In Madhya Pradesh existing stock maps are kept reasonably up to date through the ongoing working plan effort. A program is currently underway to combine all necessary geographic information into a GIS for the forest lands in the state.

In all three states, assuming GIS capacity increases, developing efficient mapping capacity to support JFM will be a much bigger job than work at the divisional scale. Serious capacity and funding constraints undermine efforts to transition to more modern forest management support systems.

Management information systems (MIS) need significant upgrading. A well-structured computerized database of information is essential to compile inventory, production, market, and financial data for queries, reporting, and analyses. MIS for forestry is complex because of the long rotation period for some species, the need to build in predictive models for various silviculture regimes, the requirement for evaluating management approaches, and the need to ensure non-declining forest yields. The forest departments in Assam and Jharkhand are at the beginning of the MIS development curve but lack sufficient internal financial resources and specialized expertise to move forward. Madhya Pradesh made progress through previous World Bank support programs but still has some way to go to be able to quickly provide information, such as the breakdown of forest types and forest production in JFM and non-JFM areas. Even in Andhra Pradesh, where a sophisticated GIS is operational in the forest department, the development of MIS has not progressed much beyond simple aggregation of the most recent stock-taking in each compartment. This restricts answering “what-if” queries to evaluate management alternatives.

Poor monitoring systems limit the ability of forest departments to track changes in the forest. Deficiencies in forest resource assessment systems, mapping, and MIS make it difficult for state forest departments to effectively monitor how the forest is changing in response to ongoing pressures from people, fire, insects, disease, and altered land uses. In particular, there is a serious information gap related to JFM-related data (forest production, removals, value of production, employment, income). Forest departments are not well equipped to gather, manage, analyze, and disseminate community-level forestry information in a systematic way. As a result, the impacts of forestry programs on livelihoods and poverty are not monitored, making it difficult for forest departments to readily respond to public criticism that JFM is not improving community livelihoods or addressing poverty. Instead, forest department performance tends to be measured against inputs and targets, such as the number of communities registered for JFM, micro-plans completed, or hectares of new plantations. There is a need to move beyond inputs and targets to measure outcomes and impacts.

Forest Management Systems

The capacity of forest departments to model forest stand development is weak. Forest management prescriptions for core timber and nontimber species in both JFM and non-JFM areas must be guided by more robust silviculture models, based on high-quality resource information and research. Forest departments at the state level in the three states studied employ a number of standardized silviculture models for high teak and sal forests and coppice in various states of understocking. Generally, the better stocked areas are slated for rehabilitation, using protection against grazing and natural (coppice) regeneration; gaps in more depleted areas are restocked by artificial regeneration, using presprouted stumps. These models are very traditional, aiming at restoring even-aged forest architecture, with few innovations to meet changing livelihood needs of communities. Developing commercial teak plantations on degraded forests can affect nontimber forest products. Kendu leaf production can decline as the canopy cover increases (Hill and Shields 1988). Defining the optimal mix of teak or sal overstory and nontimber product understorey is critical to developing JFM and meeting local needs. Strengthening capacity in yield modeling will require better growth and yield information. While the Madhya Pradesh Forest Research Institute at Jabalpur has an ongoing program of growth and yield data collection, the methods employed are geared toward classical forest architectures. Both the layout of permanent plots and the methods for analysis and modeling need to be strengthened to better predict the outcome of new silviculture regimes. Similar exercises should be extended to yield regulation techniques for nontimber forest products that will guide management practices that are locally appropriate, cost-effective, simple to use, and reliable (Maharjan 1998).

Micro-plans are still driven largely by general working plan prescriptions. Broad “rule of thumb” prescriptions for major forest cover types from the division-level working plans provide a quick reference for forest department field staff to identify silviculture treatments for the JFM forest, but they may not always be the best site-specific prescriptions to manage secondary local species for community livelihood needs. A study in Orissa suggests that a traditional focus on managing a sal dominant monoculture for timber or the adoption of inappropriate management practices for other nontimber forest products can endanger the longer term sustainability of the forest (Bhattacharya and Prasad 1998).²²

Private sector space for JFM planning needs expansion. All three states lack opportunities for private sector forestry consultants to engage directly with communities in the forest management component of micro-planning. This puts added pressure on limited forest department field staff to undertake this function in addition to their other duties.

Forest Department Capacity and Community-Based Forestry

Human resource capacities at the field level vary across the three states. Service delivery usually begins with the range forest officer, who is normally in charge of organizing JFM committees, helping prepare the micro-plans, and overseeing their execution. Range officers may be secondary school graduates with two years of technical forestry training or individuals with slightly lower standards of education who have been promoted over time. Each range officer usually supervises four to six beat officers (also called foresters), who assist in the production of

²² Sal is a dominant species in Jharkhand and Madhya Pradesh. Although it is not the dominant tree species in Assam, it is the main source of sawlogs. The lessons of the Orissa study could relate to other forest stand types, such as teak, where certain nontimber forest products grow in the understorey of mature and semi-mature stands. See appendix 8 for more details.

JFM micro-plans and annual work plans. In current JFM models, the forester is the member-secretary of the JFM committee, operating the JFM savings account jointly with the president of the committee and keeping and maintaining monthly receipt and expenditure accounts. Foresters are secondary school science graduates. They receive one year of training at departmental training institutes in each state. Forest guards are the department's field presence in the community. In addition to assisting the village committee and forester in the execution of their duties in JFM, they are also supposed to focus on enforcement. They will normally have at least a grade seven education plus six months of technical forestry training.

The numbers of field staff (deputy range officers, foresters, forest guards) in each of the states ranges from 950 in Jharkhand to 16,550 in Madhya Pradesh (table 5.2).²³ The higher echelons (from principal chief conservator of forests down to DFO) in the forest department are Indian Forest Service graduates and in state Forest Service categories.²⁴ These

professional groups are reasonably well staffed. The largest staffing gaps occur in field positions of forester and forest guards. In Jharkhand 34 percent of positions are vacant; in Assam the figure is 10 percent (data are not available for Madhya Pradesh, where the department is restructuring). Each field officer is responsible for a large block of forest and a wide range of management and oversight functions in the current JFM model. The data and field interviews suggest that one forest department officer cannot effectively cover such a large area for all the broad functions currently mandated, including inventory, monitoring, protection, oversight of JFM planning and implementation, enforcement, particularly given the lack of field equipment, maps, and transport.²⁵ Overcoming these issues at the field level by trying to establish new positions is difficult, due to general restrictions on state government recruitment or, in the case of Madhya Pradesh, staff reductions in response to fiscal pressures. None of the forest departments had undertaken a comprehensive strategic planning process to guide internal organizational reforms in response to the changing biological, business, economic, social, and political environments. Very few women hold field positions, making it culturally difficult for the department to work with village women involved with forestry activities such as collecting fuelwood and nontimber forest products. In Uttar Pradesh, for example, only 8 of 200 Indian Forest Service officers are women; at the forest ranger/forest guard level, there are no women officers on staff.

Table 5.2. Field Staffing of Forest Departments in Assam, Jharkhand, and Madhya Pradesh

<i>Item</i>	<i>Assam</i>	<i>Jharkhand</i>	<i>Madhya Pradesh</i>
Number of field staff	5,089	950	16,550
Recorded forest (millions of hectares)	2.6	2.3	7.5
Field staff vacancy rate (percent)	10	34	—
Forest area per staff (hectares)	514	2,421	453

Note (-) Not available.

Source: Background studies

²³ Madhya Pradesh is in the process of reducing staff numbers as part of government structural reforms. Current posts have been reduced from about 38,000 to 21,000. The proposed goal is about 18,000 posts.

²⁴ Indian Forest Service officers represent a national service, with extremely competitive recruitment from across India. They are deployed by the Ministry of Environment and Forests in Delhi and in state forest departments in senior positions (graduates may also be appointed to public service posts outside forestry). State Forest Service (or Department) staff are not Indian Forest Service graduates; they tend to occupy lower level positions in the state forest departments.

²⁵ Forest Guards, for example, usually provide their own bicycles for transport. They normally do not have a field kit, consisting (at a minimum) of a local forest cover map, compass, measuring tape, notebook, and pencil. Field offices also lack basic inventory equipment, such as a survey chain, a diameter tape and clinometer for measuring tree size, and an increment corer for measuring tree age.

Many field staff lack advanced forestry knowledge and skills for JFM. The average field staffer is about 50 years old. Most have little if any, training in modern techniques of community-driven development, such as participatory planning, social mobilization, and group formation. Many forest department staff does not fully understand new concepts of rural livelihood development and how forests can address poverty (box 5.1). Extension service delivery is quite poor in most cases, due to lack of transport, overstretched field staff, and the fact that practical research results are rarely geared to community problems.

Box 5.1. Field Realities and Operating Constraints Facing District Forest Officers

- Most lower level field staff have an enforcement mindset that makes it difficult for them to adjust to a new role as facilitator/negotiator of JFM activities. They perceive JFM as an erosion of their authority. They therefore often mechanically go through the motions, in the hope that JFM is yet another fad that will disappear in a few years. Motivating staff to break out of their traditional mindset is very hard and takes time. There is no incentive for officers or staff to work on JFM activities, since their performance assessment does not depend on the success of JFM.
- Even for honest lower level officers, enforcement activities offer a sense of power and status. For others enforcement offers an opportunity for rent-seeking behavior. It is natural that over time, a distortion of priorities has taken place in favor of risk-free enforcement-related activities.
- Lack of fresh recruitments, poor opportunities for career advancement, and little improvement in technical and management skills have contributed to low morale and development of a passive attitude among many field staff.
- The impact of JFM can be felt only after several years, while the tenure of a DFO is usually less than three years. There is no guarantee that the officer's successor will sustain the work with the same tempo and spirit. The fact that officers may not see the fruits of their labors reduces their motivation to implement JFM .
- In many places, field staff work under extremely hostile conditions, without adequate resources. Low-level officers protect thousands of hectares of forests without any arms or vehicles.
- Boundary demarcation is one of the major factors leading to increased encroachment and litigation over the ownership of the land. Old forest maps do not coincide with current revenue maps; the forest department's initiation for joint inspection of disputed areas usually meets with a lukewarm response from the revenue administration, mainly because they remain overburdened with other pressing problems (for example, many revenue officials also function as the territorial executive magistrates).
- Most villagers or tribal people have no documentary evidence of their existing rights on the forests. This makes it difficult for DFOs to set objective criteria for sanctioning tenure rights, and it leaves them vulnerable to political pressures.
- The micro-plan is an important planning document whose preparation requires care and attention. In practice, however, because of lack of time and technical expertise and the resistance of some field staff to seek external assistance or collect data, the plan is just another routine document rather than a real planning tool. DFOs are generally busy with other departmental activities and are not given enough time to scrutinize plans. (On average up to 40 percent of a DFO's work time can be spent on forestry-related legal problems, including attending court.)
- The working plan, which is the basis for micro-plan prescriptions, should be an important strategic planning document for the department. In general, however, working plan officers do not have independent resources. They are required to share the division resources and are totally dependant on the local territorial DFO. Naturally, officers are not motivated to work as working plan officers and can view doing so as a punishment posting.
- In general, the forest department lacks technical knowledge and information regarding recent developments in agro-forestry, nontimber forest products, marketing, and other areas.

Source: Personal Communication from a forest department field officer.

Social Capital Building Processes and JFM

Current processes in JFM for building social capital are weak. The current JFM registration and micro-planning processes give insufficient attention to social mobilization and group formation within the community. In some cases the entire process of community engagement, committee registration, and micro-planning can take as little as two weeks. As indicated in the previous chapter, local institutional and governance structures in forest fringe communities are complex, particularly among tribal groups, where informal systems for managing local forests may exist. Community capacities are often very weak, given high levels of illiteracy.

Assam is just beginning to climb up the JFM learning curve, building on forestry experience in states such as Andhra Pradesh and Madhya Pradesh, as well as other sectors in India in which community-driven development is a central feature.²⁶ Jharkhand has gained limited exposure to better approaches using community support organizations to integrate JFM communities with larger donor-funded development projects. Madhya Pradesh has gained useful experience in social and institutional development through World Bank-funded programs. With limited budgets, it has tried to build appropriate skills in field staff.

The forest departments in Andhra Pradesh, Jharkhand, and Madhya Pradesh recognize that a more comprehensive social capital building process would be beneficial. However, they are hindered from applying a more robust approach by limited staff, inadequate social and institutional training, and above all inadequate financial resources. While a process lasting several months and partnered with community support organizations may build highly empowered and enduring community institutions, it may not be realistic given current budget allocations to JFM social development. A better approach however, is needed that provides for more comprehensive institutional assessment in each community and strengthens social mobilization, group formation, appropriate training, and confidence building. Stronger up-front investment in institutional development will reduce the risk that JFM benefits are captured by village elites and poorer groups in society become marginalized (Hill and Shields 1988). What is clear from the previous chapter and field examinations is that imposing a one-size-fits-all JFM model on all communities, especially where multifaceted traditional tribal institutions exist, is ill advised and will not build sustainable local institutions that can support national and state forest conservation goals in concert with improving rural livelihoods and equity. Such an approach also fails to provide interested communities with the skills and expertise to gradually assume greater management and marketing responsibilities.

Conflict resolution under JFM needs to be more equitable. Conflicts always arise in natural resource management; different groups in society often disagree over objectives and values associated with forests, how the forests are allocated, how they are used, who benefits, who bears the costs, and so forth. These disagreements are exacerbated in India, where population density is high; some rural groups such as tribal people, have strong links to the forest; and emotional and political issues surround land and forests. Formal mechanisms under JFM for resolving conflicts between communities and forest department are heavily weighted in favor of the government. In general, the local forest department officer has the authority to arbitrarily resolve conflicts between the community and the department, in the extreme by disbanding the JFM committee. Field examinations in all three states indicate that many field officers work very hard to resolve conflicts informally and fairly through dialogue, usually with positive results. However, an underlying system that ensures a balanced and equitable resolution of conflicts between a community and

²⁶ A small team visited Karnataka to learn from the Bank-funded Karnataka Watershed Development Project, a major initiative in five districts that focuses on soil and water conservation and livelihood improvements through community-driven development.

forest department is not in place. Furthermore, conflicts between communities are common, but JFM does not provide a simple mechanism to address these conflicts. As noted already, unclear boundaries lead to chronic conflict and court actions, all of which consume considerable staff time.

Decision making processes regarding alternative land use are weak. Conflicts occur between communities and alternative economic land uses, such as mining, particularly in states, such as Jharkhand, that are rich in subsurface minerals. Forests have multiple values; in some situations nonforest uses may be more economic. Field interviews with communities in Jharkhand indicate deep frustration in some areas where small mining interests or other forms of industrial development have encroached with impunity on what villagers perceive as their forest. This raises questions about how decisions regarding alternative land uses are made in forest areas, the efficacy of environmental assessment processes, and how communities are compensated for loss of forest livelihoods. It also brings to question how well informed villagers may be about their legal rights over local natural resources and compensation processes.

Economic Incentives for Community Participation in JFM in India

Communities may not have strong incentives for making greater commitments to JFM. The participation rate of communities in JFM is strong nationally, but many JFM committees may not be fully functional. Moreover, many communities involved with JFM feel little sense of ownership of the resource or the program. The main community benefits are minor forest produce. Although JFM legitimizes and provides increased security and access to these resources, many communities would be harvesting subsistence production without JFM. Without investments to improve collection rates and value addition, JFM thus does not provide a true incremental benefit. Timber harvesting and marketing, especially for nationally listed species, is managed solely by the forest department, with the community providing labor for commercial harvests and ostensibly receiving a share of net revenues through current and rather opaque benefit-sharing schemes. Coupled with the lack of efficient resource use rights, communities tend to lack strong incentives to assume greater responsibilities and make greater commitments toward long-term forest management as capacities are improved over time.

Immediate incentives may also be weak for agro-forestry and homestead forestry. What are the relative financial returns to villagers from using land in alternative uses? A villager in Assam

with homestead land faces difficult choices (table 5.3). Forests would not be the crop of choice unless the land is unsuited for agriculture. Reasons identified for low adoption of agro-forestry include inadequate technical expertise within the Department of Agriculture and the forest department, poor service delivery, poor coordination between agriculture and forest departments, and lack of transport.

Table 5.3. Returns to Alternative Land Uses in Assam

<i>Crop</i>	<i>Years to First Revenues</i>	<i>Net Sustainable Revenue at Full Production (Rs)</i>	<i>Accumulated Costs before Revenues Accrue (Rs)</i>
Rice	1	6,000	10,000
Vegetables	1	23,000	47,000
Patchouli	1	44,000	44,000
Bamboo	5	28,000	28,000
Poles	20	23,000	23,000
Teak	60	4,000,000	67,000

Note: Accumulated costs for all options include initial preparation of land, which is a one-time investment. For crops such as rice and vegetables, subsequent annual crop revenues would eventually recover these high investment costs.

Source: Background studies