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A Sociological Framework: Policy, Environment, and the Social Actors for Tree Planting

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Michael M. Cernea

ENVIRONMENTAL PROBLEMS AND SOCIAL ORGANIZATION

Like most other global environmental problems, the world's looming deforestation crisis will not be slowed, let alone arrested, through technical remedies alone. The root causes of deforestation are outside the forest sector itself: these causes are social, demographic, and economic, and countering them requires institutional and policy changes. The ultimate success of any reforestation strategy depends on the social forces that can be summoned to accomplish the task. Such forestry strategies are called not to pursue simply conservation of the remaining forests, but also to trigger massive additional tree planting both inside and outside forests. Thus reforestation provides a convincing illustration of the proposition that the resolution of the environmental problems of development is to be searched for in the realm of social organization.

For a long time the forestry programs of many governments and development agencies have lacked an explicit action-oriented sociological foundation. In fact, these programs have been little concerned with social actors, beyond the forestry departments and their technicians. The programs tended to regard people only as part of the problem rather than as part of the solution. Even the social forestry approaches promoted in the 1980s, particularly those usually called community woodlots, as we shall see in detail later, were not designed around adequate social actors. In addition, they lacked adequate incentives and benefit distribution arrangements. Confused sociological conceptualization and lack of sound social engineering have long impaired the effectiveness of public investments in forests and have

preempted the positive environmental effects that many social forestry programs could have reached. Improved and enduring forms of social organization—tenure systems, structures for collective action, new institutional arrangements, legal frameworks and enforcement mechanisms—are needed to reverse deforestation processes.

The starting premise of this chapter is that correctly addressing the sociocultural issues involved in investing for tree planting and forest management is as critical for success as is resolving the economic and technical issues. In the formulation and implementation of an overall policy for the forest sector, it is necessary to overcome the past underestimation of people's potential role in forest management and to pursue pragmatic step-by-small-step approaches that involve specific social actors and well-identified units of social organization.

This chapter examines the sociological components of afforestation programs and, in particular, explores what specific social actors may conceivably be mobilized, organized, and empowered—technically and financially—to carry out reforestation strategies.¹ The first section discusses the centrality of people, as opposed to commodities, in formulating environmentally sound development policies. The second and third sections define the social actors of deforestation and the failure of markets, the goals of social forestry as a people-oriented strategy, and the need to design it around well-identified social actors. The fourth section analyzes the sociological reasons why community woodlot projects have largely failed. The last two sections outline two fundamental types of actor-centered strategies in tree planting: family-centered and group-centered approaches.²

THE SOCIOLOGICAL PERSPECTIVE ON TREE PLANTING

Commodities and People

Although the abbreviated formula "forest policy" or "forest-sector policy" is commonly used in development jargon, for the purpose of this chapter I will use a longer name. Indeed, the policy that refers to the forest sector should be defined as the policy on tree planting and forest management.

¹ An earlier version of this chapter was presented in the workshop on forestry sector policies organized in December 1990 at the World Bank. The initial paper was written and used as a background sociological framework for the formulation of the World Bank's policy statement on the forest sector (published in September 1991). The current chapter is considerably expanded and draws on the author's earlier work in this domain (see *User Groups as Producers in Participatory Afforestation*, World Bank Discussion Paper No. 70 1989).

² Communication with, and comments from, A. Banerjee, O. Baykal, Ruth Cernea, R. Godoy, S. Guggenheim, Augusta Molnar, W. Partridge, V. Rajagopalan, and J. Spears helped refine some points of this chapter.

This wording is not chancy: there is more in a name or a concept than first meets the eye. "Forest policy" may simply indicate concern with commodities: wood, timber, fuelwood, and the like, whereas "tree planting" and "forest management" indicate a policy about human activities relating to trees and forests. And indeed, policies are about human activities, not about commodities.

The principle expressed in this conceptualization is that the very category of "forest" cannot and should not be the policy object. Policies apply to people and institutions.³ Thus forestry development policies and programs should explicitly focus on human activities—tree planting and forest management—rather than on timber, fuelwood, poles, or other commodities.

Some development practitioners may tend to dismiss this point as mere semantics, but it is not. Vocabulary is germane to substance.⁴ The starting point of any discourse on development largely influences the outcome: focusing on commodities tends to lead to a different thinking process than explicitly focusing from the outset on the social actors—the people, the institutions, and their activities. The latter type of thinking process requires constructing the policy approach around the social actors of development—the idea reflected in the title of this chapter. The other components of the policy—the technical, economic, and environmental ones—are integrated into the course of action prescribed by the policy for the multiple social actors it addresses.

A Historic Social Transition

It is important first to place the current worldwide deforestation crisis in a historical evolutionary context. Although forestry is part of the broader set of agricultural activities—farming, animal husbandry, and so on—that are necessary for human sustenance, there is a fundamental difference in the ways people satisfy their needs for food crops, on the one hand, and for fuelwood, on the other hand.

This difference needs to be spelled out explicitly. In its historical evolution, human society long ago emerged from its hunting-and-gathering phase

³ A similar issue came up some three or four years ago, when a "livestock" policy paper was being drafted by a development agency. Yet draft after draft failed to articulate a meaningful course of action for investment lending, of course not only because of this narrow *commodity* angle but, in my view, largely because of it. A development policy cannot be designed around livestock—cattle, or pigs, or goats, or camels—or any commodity as such. What was and is needed is a policy about investing in the human activities for animal husbandry, and obviously such a policy should focus on the people who do animal husbandry.

⁴ An interesting discussion of the terminology used in international development practice, particularly in financially induced development activity, is contained in Baré (1991).

in virtually all but one domain: the procurement of fuelwood. Initially, humans relied on mere gathering to obtain their vegetable food and on hunting wildlife to get their meat; however, they learned long ago to domesticate both plants and animals. Human society shifted from gathering to cultivating for producing its food crops, and shifted from hunting to animal husbandry for producing its meat. Humankind would have disappeared long ago had it not learned to do crop farming and animal husbandry on a regular and gigantic scale, thus meeting its continuously growing food needs.

In contrast, gathering, rather than systematic cultivation, has remained an important source of fuelwood. Although many people have substituted other energy sources in heating and cooking, a large proportion—according to some statistics, the majority of the world's population—continues to use wood as fuel. And for the bulk of their fuelwood needs, people continue to rely on Mother Nature—that is, on the spontaneous regeneration of trees, cutting naturally grown trees without systematically planting trees for fuelwood commensurate with their needs.⁵

A case in point is India, a country with some 800 million people. Only some 10 percent of India's farmers cultivate trees for fuelwood, but all need fuel and most consume fuelwood. The same is true for many other countries.

What had been sufficient for millennia ceased to be sufficient in the 20th century. The increasingly intense gathering of trees for fuel and construction, combined with other causes of forest depletion—clearing of forests for agriculture and ranching, industry-driven forest mining, acid rain—have shrunk the globe's tree-covered areas and considerably reduced the wood volume produced by spontaneous natural regeneration (Guggenheim and Spears 1991; Goodland 1991). In Africa, more than 3 million hectares of tropical forest are lost each year, and in Asia forests are disappearing at a rate of at least 5 million hectares per year. Recent remote-sensing data and ground surveys indicate that a total of about 17 million hectares of forest are lost worldwide every year (World Bank 1991).

Awareness is slowly emerging that without massive new tree planting, the current rate of use of forest resources will disastrously accelerate deforestation and will lead to a worldwide fuelwood scarcity, with far-reaching socioeconomic and environmental consequences. Increasing supply through systematic production of trees in addition to natural regeneration is crucial. Because most wood users in developing countries live in rural areas, the best way to satisfy their demand for wood is to mobilize their own labor and land, as well as public lands, for tree planting and better management of forest and nonforest trees. Thus the global human society must turn from basically gathering fuelwood to basically cultivating and producing trees. The users must become producers. This will be a social transition of historic magnitude.

⁵ To a certain extent, fishing in the world's oceans, seas, and rivers can be similarly seen as gathering, if compared with fish-farming and various forms of aquaculture.

Financially induced development programs can help accelerated this historic transition. Of course, such a transition will take generations, but it has started.

Users' Participation in Reforestation

That such a transition from gathering to cultivating is necessary and, in fact, intrinsic to mankind's evolution is demonstrated also by one subcategory of trees that is the major exception to the pattern of gathering: the fruit trees. People learned long ago to domesticate, cultivate, and propagate fruit trees, and fruit trees are now part and parcel of routine agricultural strategies. What was possible for fruit trees—integration into regular production systems—heralds the trend and future for trees for fuelwood and other uses.

In a historic transition of this magnitude, the donor community through its policy and investment lending is only one of very many contributing factors. It definitely is not the only or the decisive factor. Yet the donor community's policies and strategic role can make a far-reaching contribution. Defining a policy for tree planting and forest management within this broad historical vision would position its investment programs on the main task of the natural historic process.

The need for purposive intervention to accelerate this evolution is made even more urgent by our planet's demographic processes: high birthrates will add 1 billion people to the world's population by the start of the 21st century. This will greatly increase the twin pressures on existing forests, namely, the demand for farming lands and the need for fuelwood and timber. Under such demographic circumstances, improved conservation alone will be insufficient. Only organized increases of supply hold hope for keeping pace with the growing social needs.

The sociological perspective just outlined leads to at least three conclusions:

1. Future investment policies by governments or donors alike must pursue a major change in the agricultural practices of the world's farmers, namely, the incorporation of planting trees as an integral part of regular farming systems.
2. The new planting should be complemented by investment in sound conservation and better management of existing forests, rather than in large-scale logging projects.
3. Accomplishing both these tasks requires identifying and empowering the social actors who stand to gain from planting trees, on the one hand, and restraining the social agents and vested interests responsible for forest depletion, on the other hand.

Out-of-Forest Trees: Regreening

"Regreening" is a relatively new term used to distinguish activities aiming at planting more out-of-forest trees (on private farms and common and public lands) from standard reforestation activities carried out in or around forests. Regreening is an integral part of the vast effort of reforestation. The current environmental debate about deforestation focuses primarily on tropical humid and dry forests, which are the world's most important forests. But deforestation is not limited to tropical forest depletion; consequently, reforestation should not be confined to forest lands. Much of what follows will discuss regreening activities that aim at planting trees on out-of-forest lands.

Conventional government agencies dealing with forests tend to give very low priority to out-of-forest trees: they concentrate on classified forests. But to meet the world's need for fuelwood, much more attention must be given to out-of-forest trees.

For farmers, planting trees out of the forest has enormous potential. Such trees may be planted with relative ease and acceptable survival rates. In many countries, lands under common or public property regimes have a significant tree cover. The scattered trees, bushes, and shrubs, growing on them cannot be classified as "forests," but they belong to the category of out-of-forest trees. Wastelands, shrublands, and abandoned farmlands as a habitat for out-of-forest trees represent key potential resources to be used in social forestry strategies.

SOCIAL FORESTRY: A PEOPLE-ORIENTED STRATEGY

Market Failure and the Social Actors of Deforestation

As we will strive further in this chapter to identify the potential actors of new tree planting strategies, it is first necessary to define briefly the processes and social actors responsible for deforestation.

The types of agents responsible for forest degradation—loggers, ranchers, industrial corporations, individual farmers, migrants, farming communities, or government agencies—and the causes of their behavior vary widely across regions and forest types. That behavior is often in contradiction with the interests of the overall society. But these deforestation agents too must be identified, in each specific country, with accuracy; otherwise their actions cannot be countered adequately. It is a mistake to assume that the same one or another actor is responsible at all times for forest depletion. In different historical stages there are different deforestation actors. The sociohistorical analysis of the forest sector in the Philippines (Sajise 1991), for instance, has demonstrated that deforestation has been caused by a succession of social forces acting alternately or concurrently: before 1900, deforestation was caused primarily by agricultural settlements; after 1900, first by logging, then by

waves of spontaneous migrants from the lowlands, then by government-sponsored settlements, by increased numbers of shifting cultivators, by commercial concessions, and the like. It is necessary to pinpoint, with both a sociological and an economic perspective, why these different social actors act—either occasionally or for extended periods—in socially detrimental ways, and what can be done to slow down or arrest their action.

As long as the excessive belief in market omnipotence alone informed government policies or forestry aid programs, it was hardly possible to understand that markets can, in turn, act one-sidedly and that the failures of the market may increase the risks for unanticipated deforestation. Markets place economic value on timber and other wood products. But markets are not able to place economic value on such social intangibles as forests' environmental protective functions, or on their role as the habitat of indigenous forest-dwellers. As a consequence, markets alone cannot economically compel the agents of deforestation to pay the costs of such broader societal services. Instead, the market's failure in these respects allows private interests to transfer and impose the economic costs of forest depletion (and of its adverse environmental effects) on the society in its entirety. The agents of deforestation can therefore derive unchecked direct benefits, while others bear the costs.

In turn, by minimizing the costs born by certain agents of deforestation, the markets' failure creates a chain of disincentives for reforestation: it lowers the benefits that rural people can derive from planting trees and pursuing appropriate forest management practices.

Market failures can also be compounded by distorted government policies. Binswanger (1989) has demonstrated that in Brazil, for instance, a combination of misguided tax policies, inadequate rules of land allocation for settlements, perverse economic subsidies, incentives, and credit systems has clearly accelerated deforestation in the Amazon region.⁶ Such distorting policy provisions must be removed before afforestation projects can succeed. Other large-scale social and demographic processes, some of which have already been mentioned, may further aggravate the effects of market failure on deforestation processes worldwide.

To correct such market distortions and failures, two main approaches are available: (1) sound public-sector policies and financial interventions, and (2) mobilization of the capacity of rural producers to intensify tree

⁶ Such distorted policies or incentives do not occur only in developing countries, but are present in industrialized countries as well, leading to similar forest depletion effects. In the United States, for instance, the Tongass National Forest in Alaska, which is North America's largest temperate rain forest, is a sad case in point. Because of price subsidies offered to timber companies and pulp mills, the U.S. Forest Service has been supporting unjustified logging rates in a major rain forest. As an editorial article in the *New York Times* put it, 500-year-old trees are being sold to pulp mills for \$2 per 1,000 feet or "about the price of a cheeseburger" (*New York Times* 1989).

planting. To slow deforestation, development-oriented government policies must address a host of factors, from protection of critical natural resources, clarification of legal property rights, elimination of perverse incentives and adjustments in policies outside the forest sector to financial allocations and trade reforms. The core of any such effort, however, will remain a policy focused on intensified, large-scale tree planting, with social forestry as one of its key strategies. Relying on a large spectrum of potential social actors and tailoring socially and technically appropriate tree-planting programs to their needs are imperative in most developing countries. This subject is discussed in the next subsection.

The Concept of Social Forestry

From their inception, social forestry programs were aimed primarily at helping small farmers and the landless to meet their consumption and income needs.⁷ The strategic objectives embedded in the very concept of social forestry are as follows:

- To encourage large numbers of people to plant trees;
- To promote the kind of tree growing that will best supply fuelwood, small timber, grasses, to the small producers themselves;
- To increase the income and benefits to poor people from tree growing and forest products; and
- To improve environmental protection.

In contrast to industrial forestry, the programs that fit the definition of social forestry attempt to influence a key sociocultural variable: people's behavior toward trees. Under conventional industrial forestry programs, business corporations or government agencies hire laborers to establish plantations on large tracts of land controlled by private business or agencies; the wood is harvested for use in industry or construction. Social forestry, in contrast, aims to induce a large number of small farmers to plant fuelwood trees systematically for their own needs and on their own (and other available) lands. These programs often attempt to promote collective action for tree planting and protection, institutional development, and establishment of enduring social structures and value systems that activate and energize grass-root actors.

By definition, social forestry programs require massive farmer participation. Their rise or fall depends on whether the farmers engage in the program. Financial investments alone, however big, cannot make such social

⁷ When social forestry was first proposed as a concept and policy in India in 1973, its goals were defined as follows: (1) to supply fuelwood to the rural areas and to replace cow dung; (2) to supply small timber; (3) to supply grasses and fodder and provide for grazing; (4) to protect agricultural fields against wind; and (5) to meet recreational needs (see Government of India 1973, 12).

forestry programs a success. Several social prerequisites must be met for them to succeed. Processes such as reforestation, environmental protection, and watershed rehabilitation depend not only on activities carried out individually and discretely, but also on collective or coordinated actions.

But how can coordinated action be stimulated? Collective actions are most likely to occur and be effective (1) when people belong to organized groups, (2) when they are informed and become conscious that it is in their best interest to act in a coordinated manner, and (3) when the group has developed leadership structures and internal norms and procedures likely to mobilize and manage its members and to overcome conflicts and deviant behavior.

The objective situation of many people as users of a certain resource is a propitious circumstance that can help motivate and organize them for producing that needed resource. The purposive construction of user groups is therefore particularly important for husbanding a common pool resource in programs such as afforestation or irrigation, which depend on sustained, long-term consensual action of many individual actors.

Designing Strategies Around Social Actors

Central among the social prerequisites of any innovative program is a unit of social organization capable of sustaining that program. Therefore, from a sociological viewpoint, afforestation projects must:

- start with identifying (or establishing) such a viable unit or group;
- seek to engage the rural users of fuelwood in patterns of coordinated action for producing the fuelwood they need;
- ensure a match between the silvicultural technologies the projects promote and the social groups they address; and
- deal with the issues of social engineering (group formation, leadership, participation in decision making, intragroup structures, incentives, penalties, communication, benefit distribution) with the same scrupulous attention that the technical or financial elements of the strategy receive.

Forming groups is vital for the success of development programs involving (even to a small extent) natural resources that are under a common property regime or that lend themselves to group use and management even if they are under a state property regime. To ensure both the short-term use and the long-term renewal and sustainability of a jointly owned natural resource, the owners must act in consensus and subject themselves to the same norms, rights, and restrictions.

To act as a group, people need to be a structured social group, not just a set of unlinked individuals. Intragroup connections are forms of influence, help, and mutual control. The absence of structures and strictures leaves the way open to unchecked and counterproductive individual free-riding behavior.

Unfortunately, the planners of financially induced social forestry programs often do not yet realize that consideration of these social factors has to be woven into the fabric of such programs from the outset. There is often a contradiction between the theory and the practice of social forestry and, as Fortmann (1988) writes, "many projects that are called social forestry are a far cry from the theoretical vision of social forestry." The penalty for ignoring the social factors is project failure.

Because of the enormous diversity of country and local conditions, it is important not to search for universal recipes about how to define and select social actors or create units of social organization. Sociologically informed forestation strategies have to be tailored and retailored anew for various countries or socioecological contexts (Guggenheim and Spears 1991). To combine the technical and social approaches into coherent reforestation programs, foresters, planners, sociologists, and anthropologists have to cooperate, search, design, test, monitor, learn, and redesign such approaches again and again.

Entrusting a social forestry program (and development programs in general) to the wrong social actor will lead to the failure of that program, as in fact has happened repeatedly. The loosely defined concept of community forestry used by some national or international development agencies in the recent past has reflected just such a vague or mistaken definition of the social actors. Some statements or articles are repeating the term *community forestry* from title to end hundreds of times, as a mantra, without once bothering to discuss what specific social groups, strata, or classes compose this mythical "community" and what accounts for their differential behavior vis-à-vis tree planting. In social forestry, it is necessary to disaggregate the broad term *people* and identify precisely which units of social organization can do afforestation, and which social units and definable groups can act as sustaining and enduring social structures for long-term production activities.

Such units of social organization, or social actors, can be (1) natural (existing) social units, such as the individual family household or a tightly knit kinship group or subgroup; (2) groups organized purposively to plant, protect, and cultivate trees; or (3) groups (or organizations) that were established for purposes other than forestry but are able to undertake forestry-related activities as well.

Examples of units of social organizations for each of these three categories are discussed later.

Construction of Groups for Resource Mobilization

Like any development activity, reforestation requires both public and private investments. Opening up social forestry strategies to many potential social actors—including discrete families and multiple-group structures—is a way to amplify investments and resources for afforestation. Tree planting

can be expanded only if farmers' economic incentives and cultivation skills, as well as their organizational capacity for collective action, are enhanced.

The establishment of groups as action units opens up opportunities to mobilize resources of land and labor that would not be harnessed otherwise. There are, for instance, significant land areas under state control for which the public sector may not have the investment resources required for tree planting. Leasing such lands to organized groups ready to invest their labor in planting and protecting trees puts those lands to use without the risk of fragmentation or alienation and with relatively low transaction costs. In sum, group-based strategies, combined with some public-sector support, can make better use of available but dispersed resources.

In other situations, lands that in principle are common property are often not managed as a group-owned natural resource because the group lacks cohesion, linkages, and authority systems. Such lands slide toward open-access abuse; returns diminish and ecological destruction increases (Bromley and Cernea 1989). The reestablishment or strengthening of the structure and functionality of the group recovers the common property resource for the group's own benefit.

When groups act as economic agents, they can achieve for their members significant economies of scale in the labor required for tree planting, cultivating, protecting, harvesting, and transporting. Furthermore, when selling the harvest or negotiating with authorities, groups usually can bargain more effectively than individuals.

Relying on enduring units of social organization as development actors is particularly important in view of the long duration of a tree-production cycle. Even small groups enhance the productive capacity of their individual members: they maximize the cumulated impact of the contributions of individuals and enable them to perform activities and achieve goals that might not be attained by each one acting separately.

Some technological needs may be more easily solved by groups than by individuals (or separate families) alone. For instance, watching and protecting tree plantations for a long time and over large areas against theft, fire, or destruction by animals can usually be done more effectively by producers associated in groups than by individual families. Groups can also be powerful psychological motivators for the consensual action of their individual members.

The need to capture the synergistic potential of such social units introduces social engineering demands on the activities of forestry departments. Forestry departments are not accustomed to social work and need to be reoriented in light of these social engineering demands. There are also, of course, many hurdles on the road to forming groups other than the lack of social skills among the staff of forestry departments. Political adversities in particular are both numerous and hard to overcome. The establishment of organized groups of small farmers is often perceived as a threat by either the privileged village elites or the state and its agents. Evidence indicates

that nongovernment organizations concerned with poverty alleviation and environmental conservation can be instrumental in helping users organize themselves for tree planting (Cernea 1988a).

If properly conceived, social forestry projects can become a mechanism for encouraging and forming groups, thus building up the social capacity for development. Establishing a functional social group means, of course, much more than simply lumping individuals into an artificial entity existing on paper alone. The process involves selection or self-selection of the members, a willingness to associate, the members' perception of self-advantage and co-responsibility, and the establishment of an enduring structure with well-defined functions. This process, in turn, helps mold patterned behavior among members and is the essence of grass-root, purposive institution building.

Helping users of fuelwood to organize themselves into groups and to undertake production and management functions in forestry would, in fact, restore the "participation equation" to normality: the users of forests and forest products would act as the primary producers and decision makers, and the forestry departments would then participate in the tree growers' activities, rather than the other way around.

When the actor is a group of farmers, rather than an individual farm family/household, social forestry programs must address issues of joint dependence on a piece of land and, sometimes, group tenure over trees; issues of group management, labor allocation, and monitoring; and, probably the most sensitive, the issue of benefit distribution. Therefore, organizing and promoting groups as units of social organization for social forestry programs (where groups are pivotal actors or economic agents of such programs) means more than just bringing several individual farmers to one or more meetings: it means designing clear social arrangements for tenure, management, and distribution—arrangements that are known, implemented, and adhered to consensually by the group.

The Fit Between Technology and the Social Actor

The social arrangements required for group forestry may need to vary with the technologies envisaged for reforestation in different ecological areas. The appropriateness of tree husbandry technologies is not neutral with respect to social structures. The technical and physical characteristics of a forestry program and the social characteristics of its actor should be compatible.

When forestry programs are designed, it is essential to realize that the various potential social actors are not equally fit for carrying out all the technical (silvicultural) approaches to forestry, such as site selection, nursery development, species selection, planting technology and configurations, fertilization, plantation management, enclosure or other protection, and marketing. For instance, to determine which of three types of tree arrange-

ments—block planting, linear planting, or alley cropping—is best in a particular case requires identifying the needs of the farmers themselves and assessing the local land-tenure systems and land availability.

The same refers to the choice of tree species. In addition to their biophysical attributes, trees have socioeconomic attributes “wholly ascribed to trees by people” (Raintree 1991), and the same tree may have different uses and meanings to different people in different cultures. Farmers are interested in planting multipurpose tree species, rather than planting trees just for fuelwood alone. Therefore, recommending tree species adequate to the various needs of specific populations is an important technical and cultural decision, to be made in a participatory manner. Calibrating the overall fit between the technical/biological characteristics of trees and the social actors around whom the afforestation strategy can be built is at the heart of the cooperation among tree growers, foresters, and sociologists.

Tenure Rights, Incentives, and Awareness

Designing strategies around specific social actors, and constructing or strengthening groups, requires at least two more key elements: (1) tangible economic incentives and benefits to the envisaged social actors and (2) awareness of the need for afforestation.

An extraordinarily important incentive is clarifying the land-tenure systems on forested and savanna lands and protecting the land rights of the tree producers. Similarly, tenure on trees must be clarified and secured legally. Customary land-tenure rules often discourage tree planting by tenants, because planting and owning trees traditionally entail title to land. Conversely, modern regulations in some developing countries have introduced disincentives in other ways—for instance, by limiting farmers' rights to cutting and harvesting trees that they planted on their own land. Recognizing farmers' tenure on trees and their decision-making rights to harvest, use, or sell their trees whenever they wished would increase the incentives to tree planting.

The public sector can introduce additional economic incentives (e.g., contributions of free or subsidized seedlings, technical advice, tax mechanisms, policies supporting markets for fuelwood). Fuelwood producers will be even more price-responsive when producing fuelwood becomes a source of income. Because the time lag between planting and harvesting trees is long and tree growers can rarely afford to wait several years for income, particularly where land is scarce, substitute income sources may be temporarily needed to foster behavior change. Altogether, the effectiveness of economic incentives can hardly be overstated.

Not only economic but also cultural and symbolic incentives perceptible to the farm family should be provided, based on an understanding of the local culture and value system. The symbolism of tree planting can be linked to events in the life of the family and the village that are imbued with

positive values—from childbirth, or marriage, to receipt of title to land. Such linkage—tree planting to celebrate family events—is being encouraged, for instance, in Japan, even though it is a country not at all threatened by deforestation (Umebayashi 1991). The articulation of various types of incentives including cultural and symbolic ones (rather than just throwing money at problems), is an important component of responsible social engineering, and sociologists must help design multiple-incentive systems.

In turn, increased awareness of the need for afforestation may reduce the time lag with which wood shortages are usually perceived and spur individuals to collective action to satisfy their common needs. Better communication, extension, and education also can open farmers' eyes toward the more subtle benefits of tree growing, like retaining soil moisture, decreasing wind effects and soil erosion, or building up savings over time in the form of valuable trees that can be drawn on in times of sudden need (Chambers, Saxena, and Shah 1989). Moreover, promoting broad awareness of the role of trees in averting soil degradation, land slides, or flash floods may help reduce societal demand for products that require cutting trees and spur the search for wood substitutes.

There are many potential social actors for forestry projects, but not all are equally adequate: communities, forest villages, local governing bodies, farm families, groups of farmers, cooperatives, private companies, loggers, public agencies, nongovernment organizations, temples, schools. The strengths and weaknesses of some of these actors are analyzed in the sections that follow.

III-Defined Social Actors and the Failure of Village Woodlots

Until recently, the village woodlot was widely promoted as the desirable model in social forestry, but results have fallen well short of expectations. Many planners and foresters assumed that massive planting of fuelwood could best be induced on communal lands by simply asking people to plant trees. The apparently plausible social assumptions were that communities as groups would influence their members to plant on the commons and would collectively protect the young plantations on "their" land. The term *community forestry* became a buzzword. Unfortunately, very few bothered to define the social actor of the woodlot or the composition of the village community.

Successful village woodlots in countries such as Korea and China, which were organized authoritatively by those governments, were assumed to be valid models for other social contexts. However, the results of replicating community woodlots in Uttar Pradesh, Karnataka, Gujarat, and other Indian states, in Niger and other African countries, and elsewhere have been disappointing. Evidence about community woodlots increasingly documents that, when scrutinized, they are not what their name suggests them to be, namely, genuine community undertakings, and therefore do not achieve their stated objectives.

Over the past 10 to 12 years considerable financial resources have been channeled by both international donor agencies and national governments in many developing countries to social forestry programs that have used the community woodlot model. Between 1977 and 1986 about half of the World Bank's lending for forestry went to 27 projects that included some form of community forestry. Furthermore, during 1987 and 1989 the Bank's lending for social forestry tripled compared with its lending for the full prior decade. Major resources came also from bilateral donors like the U.S. Agency for International Development (USAID), Canadian International Development Agency (CIDA), and Swedish International Development Agency (SIDA). Yet most evaluation reports reveal that the actual plantings accomplished under the community model fall below targets and do not justify the investments.

Structural Limitations of Community Performance

The initial assumption—that communities (villages) would be effective agents for implementing community forestry—was not confirmed. This assumption was sociologically naive and exhibited a lack of understanding of the structure and social stratification of village communities.

For instance, none of the three large social forestry projects assisted by the World Bank in India—in Uttar Pradesh, Gujarat, and West Bengal (World Bank 1979, 1980, 1981)—came close to its targets for establishing community woodlots.⁸ In Uttar Pradesh the project aimed to establish 3,080 hectares of village woodlots but achieved only a total of 136 hectares (each woodlot averaged two hectares). In Gujarat the self-help village woodlots component achieved only two-thirds of the 9,200 hectares targeted. Summarizing the causes of such failures, a World Bank report noted:

Poor villagers in Uttar Pradesh proved unwilling to contribute their labor as expected by the project in exchange for rather limited potential benefits from a small woodlot, after many years of protection and maintenance. . . . The social forestry organization lacked relevant know-how and resources to deal with the sociological and technical problems associated with densely cultivated areas and very small farms (World Bank 1985).

Many of the newly established village woodlots are beset with social, management, and distributional problems that prevent them from accomplishing their objective to enhance community fuel supply and to alleviate poverty. A sociological field analysis in India concluded that no user-created management system for the protection and maintenance of community woodlots has emerged so far (Salam 1989). Communities as a whole are not

⁸ However, these projects were effective in other approaches and—to some planners' surprise—even surpassed their targets in *farm* forestry.

getting involved; instead, the village panchayat—or the state forestry department—takes over the administration of the woodlot, often sells the products outside the village, and invests the revenue in other assets (World Bank 1988). Among the subsistence farmers, disappointment with the distribution of benefits from these woodlots saps future interest in maintaining or expanding them. An evaluation of Orissa Social Forestry project by Arnold and Stewart (1989) found that 82 percent of the villagers did not know how the produce from village woodlots would be distributed; most of the people did not expect any share from the final output and looked on such woodlots as another category of reserved forests. It is therefore not surprising that in such social forestry programs “on village commons and wastelands . . . villages have proved most reluctant to manage trees planted as a corporate resource” (Shepherd 1986).

Farmers' response to communal woodlots was found to be “ambivalent or negative” in Tanzania as well (Shanks 1990); in West Africa the community system was evaluated as “ill-suited . . . to serve as a vehicle for reforestation” (Thomson 1980). The system's adequacy was questioned also in most Asian countries. Often forestry departments were asked to set up the village woodlots and then to hand them over to a village committee. This practice deprives the community woodlot of all or most of its social forestry content and belies its social label. Moreover, village committees were often unaware of what they should do with the woodlots. For instance, referring to many government projects in India (not financed by the World Bank), Sen and Das (1987) conclude:

One of the most vital problems being faced by the community forestry program is lack of people's participation. The very mechanism of raising, maintaining and protecting the community plantation . . . should be examined carefully. . . . Villagers are rarely consulted at the preplanting stage . . . and selection of site and species is generally done by the local forest officials. The village panchayat or similar agencies offer the land (often with no or half information to their members) for plantation activities by the forest departments.

Similarly, Arnold and Stewart (1989) have synthesized the findings of numerous evaluations of woodlot projects on communal lands in India during the 1980s, and insisted on the missing social arrangements:

The communal groups charged with the dialogue with forest departments over the planning of woodlots and with their eventual takeover have nearly everywhere been panchayats . . . rather than a user group or a body selected by a village specifically for managing the woodlot. . . . Mechanisms for direct consultation by the forest department with villagers have generally not been put in practice. . . . Benefit sharing agreements are frequently neither finalized nor formalized. . . . Most of the people did not expect any share from the final output.

From Thailand, Yaowalak Apichatvullop (1991) reports in the same vein:

Many socially-based forestry projects in the Northeast failed to gain adequate participation from local people because local people do not perceive benefits from those projects or they do not believe that the benefits will be distributed locally. Such feeling may be caused by the existing forest laws and regulations. . . . People are reluctant to participate in a community plantation as the law determines that trees in the state forest cannot be cut for personal use.

These and many other findings support the conclusion that community woodlot projects initiated during the past dozen years amounted to an extraordinary case of national and international programs that pursued environmentally desirable goals and were intended to be genuinely participatory, but nevertheless were launched and financed by agencies that lacked a sound understanding of the social process and system they had to put in motion. Investment in the technical process far outpaced and outweighed the investment in the human and institutional process. The latter was not recognized as the unavoidable learning curve that it must be. Knowledge about how to invest in the institutional components of social forestry was lacking. The technical act of planting trees was generously financed before the cultural construction of new norms and institutions to support such treelots was formulated theoretically or tested experimentally. Although the institutional arrangements should have been the stepping-stones to the success of the technical process, the financial outlays were rushed into the latter without a prayer for the former.

The absence of the basic sociological knowledge to guide social forestry interventions is far more consequential than the routine bureaucratic hindrances that always appear during the implementation of induced development programs. Bureaucratic hindrances aside, the weaknesses during project execution were not the primary reason why community woodlots were ineffective. Community woodlot schemes were misconceived and could not be effective because they were inspired by the romantic myth of homogeneous villages, without new and appropriate social arrangements being put in motion. Eric Wolf (1966) and Louis Dumont (1980), among many others, have demonstrated that corporate peasant villages are disappearing in the contemporary world and that the very term *village communities* is not adequate for India because it conceals the existence of factions and the omnipresence of hierarchies.

In light of the empirical results examined earlier, there are at least seven basic sociological reasons why—given their internal social stratification and structure—whole communities are not ready-to-use corporate units of social organization for afforestation programs:

1. Communities and villages are geographic residential population clusters, but not necessarily corporate organizations. Physical proximity alone is not sufficient to engender the type of long-term collective action required for a woodlot enterprise.

2. Community subgroups often have widely different interests that preclude the kind of collective unified action required by long-term afforestation programs. Most communities are heterogeneous population clusters, stratified and split into factions and subgroups with fragmented socioeconomic interests. What is advantageous for one subgroup is not necessarily advantageous for another.

3. Community land is so limited that villagers often are reluctant to make it available for tree planting. Tree block sites are small, costs are high. Research has demonstrated that poor households are much more dependent on products from the commons than are better-off households (Jodha 1986). Thus the poorest households have a vested interest in not allowing the commons, which to them are a continuous if meager source of products, to become a closed, inaccessible woodlot.

4. The tenure status of the common lands is often uncertain and engenders insecurity about the tenure on trees. The social body that has jurisdiction over the allocation of common lands is similarly unclear.⁹

5. Authority systems have uneven mobilization power over community subgroups. Local community leaders often appear reluctant, or too weak, to mobilize the individuals belonging to different subgroups to work for establishing woodlots, or to enforce restrictions for tree protection.

6. Distributional arrangements for benefit sharing to ensure that the woodlot products reach the recipients entitled to them are seldom specified at the outset and have not worked in practice. The lack of intragroup rules and guarantees for distribution of benefits commensurate with contributions of labor are lacking, and this problem alone is sufficient to doom the wholesale community approach. Exclusionary rules against noncontributors are missing, too. The length of the three production cycle reinforces doubts in those planting today that they will actually receive wood eight or more years later, and feeds the lingering suspicion that the authorities will appropriate the wood anyway.

7. Last but not least, most communities are not organized as joint producers in other respects and thus do not offer a matrix on which additional activities can be grafted. Externally designed

⁹ Michael Horowitz (1982), analyzing rural afforestation alternatives in Zimbabwe, pointed out that "the important issue where communal lands are involved is correctly identifying the locus of authority over land use allocation."

programs that do not bother to establish grass-roots organizations cannot foster by decree the kind of close interdependence of members that community-based schemes would require.

Because such sociological characteristics tend to be widespread, results are likely to be poor in the future as well, whenever such corporate woodlots would be expected to be sustained by noncorporate communities. Those positive results with village woodlots that have been achieved tend to be exceptions linked to particular circumstances in one community or another.¹⁰ When successes occur it is important to identify the specific structural, cultural, or political conditions that make them possible or replicable.

Alternative Social Actors

What alternative vehicles should social forestry adopt in light of the failure of community woodlot approaches?

Clearly, future social forestry programs should be built on more carefully elaborated social and institutional arrangements. The social actors for such programs need to be more precisely defined. Better social engineering should be used to get the poor and the landless, including the women, appropriately involved, while the size of groups that are to be organized should be compatible with the actors' self-management capacity, mastered technology, and available labor and land resources.

Two specific questions must be answered:

1. If the community as an entity is usually not a homogeneous collective actor in afforestation, are there other units of social organization that are able to assume and execute such a role?
2. Are there tenurial innovations (in either land tenure or tree tenure, or in the granting of usufruct rights) that can be promoted to mobilize and facilitate performance by such alternative units of social action?

To both questions, the answer is positive. There are social groups within the stratified, nonhomogeneous communities, namely, specific subsections of such communities, that can act collectively. Moreover, such groups can be purposively organized. Furthermore, making more refined distinctions between forms of land tenure and various systems of tree tenure, as Fortmann

¹⁰ For instance, Mathew S. Ghamser (1987) reported on an interesting community forestry project in Sudan (Um Inderaba) where the village community (some 600 families) effectively in planted, hand-watered, and maintained the trees against a complete lack of rain and large transient animal herds. It appears that the village committee and the local sheikh were able to coordinate the villagers' activities effectively while incentives and protection payments were provided, and foresters provided technical advice.

proposes (1988b), would permit more imaginative combinations and innovations in forming action groups. The challenge is to identify the population subsections able to implement and sustain such innovative approaches.

Two fundamental strategies are available and likely to be more successful than the previous community woodlot approach: family-centered strategies and group-centered strategies, based on groups larger than the farm family. Public investments in social forestry should be made through both, thus enhancing and reinforcing the investments made by the private producers themselves through labor, land, and inputs. The next two sections of this chapter explore the characteristics of the actors of each of these two basic strategies.

THE FAMILY UNIT AS ACTOR IN SOCIAL FORESTRY

Family Agroforestry

The accumulating evidence of the ineffectiveness of the community-centered approach mandates a shift in thinking. Foresters and planners must focus on the individual family farm unit as an alternative to the community-based programs in social forestry.

The family-centered approach goes by various names, such as farm forestry, family woodlots, and agroforestry. The common denominator in this semantic diversity is that the family household becomes the social unit around which reforestation is planned and financed. The technical approach to family farm programs also differs from the one proposed for community woodlots: it is designed to suit the labor and land opportunities available to the individual family farm.

Of course, this is not to say either that all interest in promoting village woodlots has now disappeared, or that promoting tree planting on individual farms is a totally new orientation. But there is a perceptible shift in emphasis, and a refinement and diversification of social forestry strategies. This shift implies a change in the sociological underpinnings of certain forestry programs.

Various World Bank-assisted forestry projects—in Karnataka, Kerala, Haryana, and other Indian states, as well as in Mali, Tanzania, Nigeria, Nepal, Haiti, and elsewhere—now provide support and incentives for tree planting on small family farms. In the design of India's Jammu and Kashmir and Haryana social forestry project, village woodlots represent only 11.3 percent of the total planting program, while farm forestry, supported by a distribution of about 47 million seedlings free to individual farmers, represents about 43 percent (World Bank 1982). A similar approach was taken in an ongoing Kerala Project (World Bank 1984a). Some of the most spectacular results in family forestry are being obtained in Gujarat and Himachal Pradesh, where farmers have responded to project-provided incentives (free

seedlings, etc.) and technical assistance. During the first three seasons of the National Social Forestry Project in India (1985–88) farm families planted on their private lands approximately 500 million seedlings (the equivalent of over 325,000 hectares in block planting), exceeding the already high target by some 18 percent (World Bank 1988).

The vast potential of the family farms to incorporate tree planting was dramatically demonstrated in Haiti by the Agroforestry Outreach Project (AOP) funded between 1981 and 1985 by USAID. Guided by prior ethnographic knowledge of Haitian tenure systems and cropping patterns, the AOP stands out as one of the social forestry projects that had a clearly conceived sociological strategy, purposively designed around the family farm as its central social actor and accompanied by a technically appropriate reforestation package. The project started with the farmers' needs, values, and actual behavior. To reduce the opportunity cost of lands, the project proposed that the family farm (the average small holding in Haiti is 1.5 hectares) plant 500 trees of fast-growing fuelwood and pole-producing species in intercropping and border planting. Light-weight seedlings and technical assistance were provided free to the peasants. Most important, the project guaranteed that "the peasants themselves, and not the government or the project, would be the sole owners of the trees and that the peasants would have unlimited rights to the harvest of the wood whenever they wished" (Murray 1987). Social anthropologists directed the implementation of this social forestry project, in close cooperation with technicians. Nongovernment organizations were involved in carrying the project messages to the farmers. The results were spectacular: whereas the four-year target was to plant 3 million trees on the land of 6,000 peasants, 20 million trees were planted on 75,000 family farms (Murray 1987).

Sociological and Technical Variables

Sociologically, the advantages of a strategy centered on the family are manifold. Land tenure and tree tenure are much less ambiguous than in community forestry, responsibility and management authority are vested in real persons, and divisive issues of intragroup benefit distribution are eliminated. Moreover, the transaction costs entailed by the work for establishing groups are avoided.

Technically, on family-owned lands trees can be grown not necessarily in blocks (family woodlots) but also along linear landscape features such as farm boundaries, internal field borders, roads, and watercourses. Under conditions of wood scarcity, the economics of family farming favors expanding tree planting. Yet smallholders tend to weigh the opportunity costs of labor and land more than planners and foresters usually realize, as the latter often hold erroneous beliefs about farmers' thinking (Dove 1991). Tree-planting technologies that maximize the use of interstitial locations and

other marginal land patches are particularly suitable for individual small farmers because they do not compete with existing land uses and other crops. Even small farms that cannot afford to set aside an arable plot for a tree block can use their hedgerows for planting.

Individual trees scattered around the family farm's cultivated areas generally grow faster than plantation trees that compete with one another in dense woodlots (e.g., the volume of free-growing eucalyptus at the age of 10 years is at least five times that of trees grown at a stand density of 1,600 trees per hectare). Moreover, because farmers obtain most of their fuelwood by lopping branches, trees along homestead boundaries can produce more volume per tree and more frequent supplies of small quantities of wood than trees felled on far-away plantations. On-farm tree growing can go a long way toward mitigating fuelwood shortages, because it is easier to persuade farm families to plant on their own farm boundaries than to persuade communities to provide scarce land for block plantations. Technical options for expanding tree planting are indeed numerous, and they can be put to use if foresters will become better attuned to how small farmers themselves view their farm.

Incorporating trees into the farmers' own farming system (rather than leaving them parallel to it, on a remote communal lot) may promote multi-purpose tree species that will respond to several user needs: fuelwood, shade, small timber, and so on. For instance, species suitable for animal fodder, with fuelwood as a secondary rather than primary benefit, often integrate more organically into the overall farming system than species such as the eucalyptus that is widely promoted by many programs. If marketable species are selected, trees can become a cash crop and bring income, and not be merely a source for household subsistence consumption. In favorable ecological circumstances, with reasonable rainfall, an average rural family needs comparatively few mature trees to cover its cooking and heating needs, and some species, if correctly spaced, can help increase agricultural crop yields. It therefore appears that small land holdings need not be regarded as a barrier to family forestry, and forestry can complement rather than compete with food crops.

Eliciting and motivating such change in users' behavior is a part of the social strategy for reforestation. Every technical approach must incorporate extension for communicating silvicultural information to farmers, influencing their perception of existing opportunities, and activating the little-used but existing thesaurus of farmer knowledge about trees. Successful forestry programs (e.g., in West Bengal, and in Jammu and Kashmir and Haryana) employ special change agents (extension agents called motivators or social forestry workers) to persuade farmers to plant trees and to help them do so. In recent years social scientists in Thailand and India have been refining extension techniques tailored to the specifics of reforestation (FAO 1988; Indian Institute of Management 1988).

Disincentives

An abundance of naturally grown fuelwood, however, may limit the interest of the family farm in tree planting. A recent study of agroforestry in sub-Saharan Africa concluded that as long as rural producers can collect wood from common lands at low cost, there will be little economic incentive to plant trees on family farms to meet fuelwood demands (Cook and Grut 1989). For instance, field investigations in Malawi found that the returns to labor invested in gathering fuelwood are 15 times higher than the returns to labor invested in growing fuelwood and more than 5 times higher than to labor invested in growing trees for poles (World Bank 1984b). In light of these and other findings, the study on sub-Saharan agroforestry pessimistically predicted that "agroforestry for fuelwood will not be widely adopted in Africa until the free wood resources of the commons have virtually disappeared" (Cook and Grut 1989).

Even though such pessimistic conclusions may be disputable, the facts that led to them are a reminder that agroforestry has its own limits. This is why alternatives to family-centered forestry strategies, as well as conservation and prevention measures, must be promoted.

GROUP-CENTERED STRATEGIES: USING ALTERNATIVE UNITS OF SOCIAL ORGANIZATION

Group-centered approaches must not be written off because of the ineffectiveness of the wholesale community approach or because of the diffusion of family-centered forestry. It would be akin to throwing out the baby with the bath water if the deemphasis of community woodlots were interpreted as renouncing all group-centered approaches.

Small Groups

The social engineering question to be asked is, Which social formations, ranging on the continuum between the entire community and the individual farmer, would be capable of acting as supporting structures for afforestation? Is it possible to avoid the weaknesses of the community-based approach, yet elicit and make use of the social synergy of group-powered efforts in forestry?

Alternative types of groups definitely can be identified or constructed. Some have already been formed as a result of local social invention under favorable conditions. The key is to identify a group that is free from the inner conflicts of large communities, yet able to generate the synergy that makes a group more effective than the sum of its members.

The limitations intrinsic to communities as social actors stem, as discussed earlier, from their large size and internal stratification. Homogeneous cor-

porate groups of a manageable size could prove more functional. Their smaller scale would reduce the problems of system maintenance which are sometimes more complex than the tasks the group is called upon to solve. Even the use of lands under common property regimes is not tied exclusively to the pattern of whole-village involvement, but can be arranged through contractual arrangements with smaller groups (Bromley and Cernea 1989; Seymour and Rutherford 1990).

Small groups can meet a common need more effectively by joint action than individuals acting separately can do. Users of fuelwood can cooperate not only for joint procurement but also for joint production. Furthermore, a simple rule for members' contribution and benefit distribution (e.g., equal shares for all) can eliminate actual disadvantages or misperceptions of advantages. A small group can also enforce rules through peer pressure and mutual control, so as to restrain free-rider behavior. Members of small groups enter into face-to-face contacts simultaneously as users, producers, and enforcers. Small groups often manage other natural resources (as in the case of a water users' association formed around a small branch of the irrigation system) and could operate a woodlot largely without the conflicts that surround community plantations. Also, given their ability to reinforce and speed up dissemination further, groups may become "contact" partners (more effective than individuals) for extension services.

Two experiences relevant to the formation and use of small groups are the group farm forestry and the Arabari experiment, both in West Bengal, described in the next subsection.

Group Farm Forestry

The principle underlying this approach is to link specific groups of people who have surplus labor resources with well-defined plots of land that are unused or underused and can be brought under tree cover. As embodied in West Bengal, group farm forestry is being practiced by a group of landless families to whom the state government leased marginal public land on a long-term basis (99 years) to enable and encourage them to grow trees with security of benefits. The lease was offered to groups of landless people with the guarantee that it can be inherited but with the restriction that the land cannot be alienated (sold or used for nonforestry purposes). The plots of land are contiguous, thus facilitating collective action in planting and protecting (such as taking turns in watching the plantations), because these tasks are performed more effectively than if carried out individually. However, the ownership of the trees, maintenance obligations (fertilizer application, replacement of dead trees, etc.), and the right to dispose of the products are vested in the individual leaseholders. This system also provides for group control over the temptation to change land use or to mortgage the land.

The area allotted and the number of trees to be planted guarantee enough wood from lops, tops, branches, and dead trees to meet a substantial part of

a family's domestic requirements. The stem volume is then available for sale, and the total income meets participants' interests. The group strategy thus not only maximizes land use for forestry but also provides the users with fuel, construction materials, and cash income. These plantations have generated good revenue¹¹ which some families have invested in purchasing land, planting potatoes, and achieving other such gains.

As a social innovation, group farm forestry privatizes the use, but not the ownership, of public wastelands, providing an economic incentive to landless people to raise trees as a cash crop. Where surplus labor is available and employment is scarce, this option can significantly benefit the landless. However, it also requires prudent implementation to avoid depriving other vulnerable households dependent on wasteland products.

The Arabari Forest Management Model

The innovation accomplished by the Arabari experiment in West Bengal was to stop forest depletion (encroachment, theft, etc.) through making major changes in the prior system of forest management, which had been based on seeing villagers as the forest's enemies and on keeping them at arm's length. A set of specific and interrelated management measures were introduced that encouraged villagers' participation in forest management by making them economically interested in planting and protecting the trees, and even by offering revenue-sharing arrangements. The new system provided villagers with an amount of employment in forest protection and replanting that would be at least equivalent to the value of what the villagers had earned by sale of stolen forest products.

The experiment had several elements:

- Villagers were paid to plant trees (acacia, eucalyptus, etc.) and grasses (e.g., mesta, a poor man's jute) on empty patches.
- Jobs were phased in and spread throughout the year to match the seasons of most severe underemployment in the area.
- Villagers were given responsibility for tree protection, with minimum official interference.
- The Forestry Department offered a revenue-sharing arrangement under which the villagers received 25 percent of the selling price of the mature trees in cash (this element was introduced later).
- The Forestry Department made an intensive effort to explain the incentives and the experiment rationale to the villagers.

¹¹ The economic analysis of such a land-lease scheme indicates that if some 2,500 seedlings can be given free to each participating family for staggered year-by-year planting over 10 to 12 years, the family would become self-sustaining on tree cropping alone when the first year's plantation reaches maturity. The family would satisfy its domestic fuelwood needs from lops, tops, and fallen wood and could sell the main stem volume for cash, replanting anew each year to replace the mature trees harvested.

The results confirmed most of the experiment's assumptions (with the exception of relocating grazing outside the forests), in that the villagers enforced total protection of the forest, primarily by refraining from making illegal cuttings, while their employment in replanting generated revenue for them and for the project. The self-imposed and self-enforced reduction of firewood cutting and the patrolling by villagers acted as a "social fencing" around the state forest. The tensions between the villagers and the Forestry Department eased. The upshot of this successful experiment was that the once-degraded forests were rehabilitated spectacularly within five years and have continued to grow since.

Recent assessments have confirmed not only the sustainability of the initial Arabari model but also its rapid spread in the mid- and late 1980s to many more areas. Although the experiment started with no formal group formation in each of the small villages involved, the subsequent follow-up took on stronger characteristics of group creation, with the establishment of village protection committees. A.K. Banerjee (1989) reports that some 700 to 800 such groups were formed in the southwest zone of West Bengal, protecting some 70,000 hectares of degraded and replanted forests:

In this area, people have formed formal groups composed of one member from each family. These groups meet once in a while, take decisions and keep minutes. Each family provides a forest watcher at regular intervals. . . . The will to do so developed as these groups believed in the assurance of sustained benefits. . . . Their collective action is productive as there is an action plan [for the group].

The sociological principle involved in this model is to create a clear economic interest for a well-defined group in the rational management of a well-defined tract of forest land. Group members need to perceive a clear correlation between their contributions and returns. This awareness motivates them to cooperate. Authority and benefits must be restricted to the members of the group, not left open to free-riders.

Interesting experiences about the creation and productive activities of small user groups have been reported from Nepal (Messerschmidt 1986), Indonesia, Niger, and elsewhere. Analyzing the collective management of hill forests in Nepal, Arnold and Campbell (1986) emphasize user group motivation, organization, and establishment of legal agreements among the government, the panchayat, and the members of the user groups. The core of the legal agreement is the management plan, which regulates the cutting regimes, product collection, and group harvesting.

The prevalence and diversity of such arrangements show the potential for varying the degree and forms of group cooperation as called for by the task at hand and by the people's subjective preparedness for cooperation.

Forest-Dwelling Groups

Indigenous and forest-dwelling populations must be recognized as important social actors in forest-related programs. These groups are sometimes small, remote, and dispersed, but overall statistical estimates count their numbers in the millions or tens of millions in some countries, and worldwide in the hundreds of millions.

The people living in and around forest areas can be grouped into three broad categories: (1) indigenous people who have lived in the area for generations, (2) people who have moved more or less recently into the area (settlers), and (3) nonresident groups who enter periodically to extract selected resources (Partridge 1990). The first two groups actually reside in the forest. They often have a low level of social organization, but their involvement and participation in forest management is of growing importance. These groups also possess forestry-relevant knowledge and skills (Warner 1991; Warren 1991). Development strategies designed to relieve local-level pressures on forests must be tailored to reflect the needs and to enhance the capabilities of these different types of populations.

Communities that have occupied a forest for generations often base their production system on shifting cultivation with long fallow periods. This situation presented little threat to forest areas as long as settlement size and population density remained low, but the environmental effects of slash-and-burn practices become increasingly adverse as forest-dwelling populations grow, fallow periods are reduced, and previously viable production systems become more precarious. Field research among shifting cultivators in Orissa, for instance, has found that they themselves become increasingly aware of the unviability of their farming system, but in order to adopt alternatives they need significant outside assistance (Bogaert et al. 1990).

Forest-dwelling populations rely also on what outsiders often call "minor forest products" but what are indeed of major significance for the livelihood and culture of forest people, as a source of either food or cash. Such products range from usable leaves to medicine, from sponge fibers to building materials, or from small forest animals to edible plants and fodder (Falconer 1990). Their need for such products cannot be overlooked in any alternative approach seeking to protect the forests by stabilizing the dwellers' production systems.

Government agencies have little knowledge about how to enlist forest-dwelling groups in programs for protecting and managing primary forests. Organizing indigenous dwellers to conserve forest areas and parks, as well as to modify and stabilize their own agricultural production systems, is still an unresolved task, for which little successful experience exists (Serageldin 1990; Revilla 1991). Yet it is an imperative. Forestry departments must experiment with institutional arrangements that are culturally acceptable to

tribal and indigenous groups and would protect them from exploitation. Ways of channeling benefits to indigenous communities include soil improvement, forest co-management, adequate species selection, extractive reserves, and fair marketing of forest products (Partridge 1990; Guggenheim and Spears 1991).

The conventional and painful "solution" to the effects of shifting cultivation attempted in various places by forestry departments or by the administrations of reserve parks—the involuntary displacement of forest-dwellers—has generated complex new socioeconomic problems and solved none. Ironically, the recently increasing environmental concerns for preserving wildlife and biodiversity through new national parks and enforcement of protective park regulations, have been accompanied by indiscriminate efforts to forcibly evict forest-dwellers from their habitat. Such involuntary resettlement should be avoided whenever possible, because it carries with it a high risk of further impoverishment for indigenous populations (Cernea 1988b, 1991; West and Brechin 1991). Involuntary resettlement of forest-dwellers is also rarely practical: alternative lands are hard to find and frequently the outcome is that other settlers quickly move into the cleared areas. Generally, alternative approaches should be tested and developed that would incorporate forest-dwelling people as participants and beneficiaries in the implementation and operation of forest projects.

People living outside but near forest areas usually have customary rights to gather fuel, fodder, and nontimber forest products. Farming communities living outside the forest can put more intense pressure on the forest than forest-dwellers do. The failure of traditional restrictive measures through state intervention implies that additional economic and social approaches to stabilizing agricultural production systems near forest areas are needed. To cope with such pressures, agricultural diversification and intensification programs in areas near the forest should mitigate the threats of forest encroachment by emphasizing food production and income generation. This action should be complemented by regional planning to direct migration away from forest areas.

Cooperatives for Tree Planting and Forest Management

Even when tree planting is done by farmers on individually owned land, the creation of a farmers' association may be beneficial for specific activities such as the management of adjacent treelots or the marketing of tree products. In some countries, the forestry departments help establish tree growers' associations or similar organizations to help farmers market wood produced under individual family forestry.

The forestry cooperative is one such structure. Although forestry cooperatives are less common than agricultural cooperatives, in some regions (e.g., Scandinavia) forestry cooperatives are numerous and their organizing principles work effectively (Kilander 1987). From Japan, Oya (1991) reports

rich experiences with two types of forest cooperatives. One is the "cooperative of individual forest owners" in which owners of small patches of forest land form associations to obtain economies of scale in purchasing seedlings and in planting, harvesting, and marketing trees. The other is the "cooperative of joint owners of forest," which unites into a distinct organization the village households that share entitlement to the forested commons of the village; this cooperative enables the joint owners to carry out production, marketing, and distribution independently, rather than through the local government. Together, these two types of cooperatives account for a considerable, and currently expanding, share in Japan's forested land.

Oya (1991) also reports that some of these forest cooperatives have recently adopted a profit-sharing arrangement whereby they mobilize financial resources of urban residents, who are invited to contribute a certain amount of money for tree planting and forest management; in return, urban residents are entitled to a share of the profit accruing from the forest harvest. These and other experiences demonstrate that with a clearly defined and not too large membership, forest cooperatives can be a more coherent and goal-oriented unit of social organization than the village community as a whole.

Cooperative forestry structures are expanding in India as well, as a result of the initiative to form "tree growers' cooperatives" launched by the country's National Dairy Development Board. This attempt to transfer and adjust the pattern used by the well-known Anand dairy cooperatives is obviously risky but promising. Such tree growers' cooperatives are envisaged to operate on unencroached wastelands in Orissa, Andhra Pradesh, and other states, with each cooperative covering some 100 hectares of private marginal lands and 50 hectares of common wastelands (National Dairy Development Board 1985).

Subgroups Defined by Gender or Age

Many traditional societies, particularly in Africa, entrust certain maintenance or service functions in the society to subgroups that are defined by age or gender. These groups are accountable to appointed leaders or to the overall village authority structure. Similar groups could also be used for certain forestry development activities.

The creation of women's groups to plant trees is expanding in many countries. The gender division of labor in many traditional cultures makes women the primary gatherers of fuelwood. In certain areas of Nepal, for instance, the time a woman spends collecting fuel is estimated to be between 20 and 40 days a year. Therefore, producing rather than collecting fuelwood may save both time and labor. Rural women generally possess a good knowledge of the characteristics and requirements of various tree species. For both reasons, women are often more interested than men in raising trees for fuelwood. Recent evidence reported and analyzed by Molnar (1991)

illustrates the important contribution women are making to many social forestry programs.

Although women's associations for various productive or household-related activities have been promoted in many countries, until recently little has been done to encourage women's organized group action for cultivating woodlots. Even in a country such as Kenya, where women's groups are widespread and effective, a sociological field study reported a few years ago that out of 100 women's groups active in the Mberere district, none was directly involved with planting trees (Brokensha, Riley, and Castro 1983). According to statistics for 1989, however, hundreds of women's groups are now involved in forestry in Kenya, and this trend is growing in other countries as well. In India's Himachal Pradesh, multipurpose women's groups called Mahila Mandals, which have been in existence for many years, now frequently include tree planting among their activities (Dioman 1989).

Women's groups could become the prototypical grouping of discrete "users turned producers" in forestry. A strategy is needed to facilitate women's tenure (usufruct or custodianship) rights to suitable land tracts and their secure tenure on trees, as well as to help with group creation.

One of the notable recent successes has been the involvement of school-age youths in establishing tree nurseries for social forestry, as reported from Kenya, Malawi, India, Haiti, and other countries. The characteristics of such groups are propitious for undertaking certain collective actions: schoolchildren form a homogeneous age group, are organized by virtue of their main activity (going to school), and are subject to a built-in leadership system. Although the temporary nature of this age group limits its participation in forestry activities of long duration, the group is well suited to short-term collective efforts such as the production of seedlings.

Nongovernment organizations like CARE have been instrumental in enlisting and financing high schools in developing forest tree nurseries. In Ecuador, for instance, work in three agriculture high schools has revealed both the strength and the weaknesses of schools as existing social groups likely to carry out seedling production, as well as their relative advantages over government nurseries (Desmond 1989). In Gujarat, the Forest Department encouraged schools to raise seedlings to respond to the demand created by a social forestry program in the state, and within three years about 600 schools opened nurseries in which students produced several million seedlings a year. Drawbacks and limitations in this approach often result from the teachers' rather than the students' lack of time, low competence, and weak incentives (factors that can be corrected). It is important that seedling production be combined with strengthened forestry and environmental education of both students and teachers. To formalize and expand the support of schools as existing units of social organization to social forestry, institutional arrangements can be promoted in the form of a "partnership between schools, communities, and government agencies" (Chowdhry 1983).

Temple and Shrine Forests

Temples and shrines are not usually thought of as social units likely to play a role in tree planting and social forestry, yet in some cultures they clearly have this capacity. Research in Thailand and Japan has provided evidence that the monks living around many Buddhist temples in rural locations, or around the Shinto shrines in Japan, maintain an adjacent forest area and promote tree planting. The temple or the shrine acts as a unit of social organization that mobilizes resources for tree planting and maintenance and enforces protection rules. The areas covered by such temple or shrine forests may range from several hectares to several tens of hectares or even bigger. In Japan, Buddhist temples and Shinto shrines often mobilize volunteer labor among their constituencies to help the monks plant or carry out maintenance and conservation works in the temple forests (Oya 1991). In Thailand, where 9,000 Buddhist temples exist inside National Forest Reserve lands, some temple-related monks have emerged as supporters of conservation activities and militant opponents of illegal logging or other forms of forest depletion (Traisawasdichai 1991). The potential of such units for intensifying afforestation is large.

Watershed Forestry

Watersheds are geophysical entities, and the people who inhabit them are not organized as a social unit. But the topographic pattern of the watershed and its resources shape human activities, division of labor, and settlement patterns. Many human societies in different parts of the world have adapted themselves to the watershed landscape in similar ways; as Lovelace and Rambo (1986) note, there are often "parallels between the ways in which human groups are organized and spatially distributed and the physical characteristics of the watersheds." Planning for watershed use, erosion control, and reforestation cannot be effective and sustained unless watershed inhabitants are enlisted in rehabilitation work.

Rehabilitation of deforested watersheds demands much more than massive planting of trees. It involves flood control and soil conservation; bench terraces often need to be built, and they require excavation, leveling, and refill work. Changes may be needed in land-use rights, rules of land transmittal, settlement patterns, and number of inhabitants. These changes are beyond the scope of what individual farmers can do as discrete actors, and group action, as well as support from technical agencies, is required. Sometimes groups are formed spontaneously for such activities. In Haiti, for instance, independent groups of small landholders in the Maissade area have voluntarily collaborated to construct conservationist treatments on commonly held ravines in small watersheds and on contiguous private lands (White 1990).

As pointed out earlier, however, coordinated action does not automatically ensue just because individuals stand to gain from it. People must

understand subjectively their common interests, be willing to act consensually, and organize themselves into some kind of group structure, with goals and rules conducive to carrying out the requisite activities. Coordinated social action to manage watershed resources is probably one of the most complex types of collective action, particularly when structured groups have to be organized.

Creating organizational structures for social action and engineering the formation of a self-managed group from discrete (and not necessarily interactive) farmers is a task no less difficult than any of those previously discussed. Watersheds and microwatersheds can be used as the physical subdivisions within which farmers' activities can be aggregated into coherent group efforts. Such groups could get involved in the design of a land-use plan for the watershed and gain the strength to sustain it through jointly enforced rules.

SUMMARY

The various types of social units just examined do not exhaust the list of potential social actors for afforestation programs. The same line of thinking can be continued in order to spotlight other kinds of social units and thus multiply the array of actors able to involve themselves in forestry development.

Forestry departments themselves are also a form of social organization created to perform, by using state financial resources, the functions of conserving, managing, and developing forests. As administrative bodies, forestry departments have an organization that is different from the types of social units (organizations of people into groups) discussed in this study. By their position, forestry departments and foresters have a critical role in fostering and encouraging the formation of such groups among users of fuelwood and in providing them with silvicultural, organizational, and economic assistance to produce trees. Even though foresters are generally untrained to carry out the social component of their tasks, they must gradually learn to work with people as well as with trees.

In turn, many nongovernment organizations interested in environmental conservation may also organize groups of people and help fuelwood users to structure themselves as producers. Identifying or creating social units is a task that requires a sociologically informed understanding of what is to be done and the methods and skills for social organization. The point is that such social forms do not have to precede the intervention of development organizations, nor should they all be created from scratch. Enhancing people's capabilities through organizational strengthening, adaptation, and innovation is integral to the development process.

Social forestry connotes both a philosophy of development and a pragmatic operational strategy. The philosophy postulates the centrality of people in forestry, the centrality of the masses of users becoming producers. It

breaks radically with the stereotypical assumption that forest growth is only the business of professional foresters, or of Mother Nature.

In turn, the operational strategy to service this philosophy pertains to the how-to questions and is being fashioned with every new project or bold social experiment that attempts to get people involved in tree growing. The practice of social forestry is wide open to multiple approaches for creating diverse patterns of social organization as matrices for action. It is open to imaginative and informed innovations in land tenure and tree tenure, to various forms of ownership or usufruct, to tested or unorthodox tree-growing techniques, and to age-old or novel social structures ranging from the farm family to all types of purposively created groups.

No single social approach will prove best for all situations of participatory afforestation. The possible strategies span a broad spectrum and should be encouraged as social inventions for accelerating development. Sociological knowledge is instrumental for conceiving and implementing each approach through testing and continuous learning.

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