LTC Paper

AGROFORESTRY:

TENURE AND INCENTIVES

by

John W. Bruce* and Louise Fortmann**

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All views, interpretations, recommendations, and conclusions expressed in this publication are those of the authors and not necessarily those of the supporting or cooperating organizations.

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PREFACE

This paper presents a rethinking of the interactions between tenure (property rights) and tree planting in developing countries. It draws heavily on a five-year collaboration between the Land Tenure Center (LTC) and the International Council for Research in Agroforestry (ICRAF), a collaboration funded by the Ford Foundation. It has been enriched by the insights of John Raintree (ICRAF), Dianne Rocheleau (formerly ICRAF, now Clark University), and Jim Riddell (formerly LTC, now FAO). That collaboration began with Fortmann and Riddell's annotated bibliography, Trees and Tenure (1985), and continued through a jointly sponsored international workshop in Nairobi in 1985 on tenure issues in agroforestry, the proceedings of which have been edited by John Raintree as Land, Trees and Tenure (1987). More recently, Whose Trees? Proprietary Dimensions of Forestry (Fortmann and Bruce, 1988) provided a collection from the rich but very scattered literature.

The first three parts of this LTC Paper are a revision of a paper, "Agroforestry: Proprietary Dimensions," which we prepared for an AAAS Technical Session on "Agroforestry: A Global Perspective on Potentials and Constraints," San Francisco, January 15, 1989. It also includes a new final section on assessing tree and land tenure issues in agroforestry project planning, which will appear in an expanded form in FAO's Community Forestry series. The support and continuing interest in this work by Marilyn Hoskins of FAO is very much appreciated.

This long-term effort would not have been possible without its less direct support through the Land Tenure Center's Cooperative Agreement with the Bureau of Science and Technology of the U.S. Agency for International Development, which is also appreciated.

John W. Bruce
Louise Fortmann

Agroforestry:
Proprietary Dimensions

by

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Introduction

There have over the past several years been significant shifts in thinking concerning how tenure, or property rights in land and trees, affect farmer incentives for adoption of agroforestry practices. Our concerns include incentives for sound husbandry of existing tree stock, increasing the stock, and changing the species composition of existing stock. In particular we explore the applicability of and exceptions to the generally accepted "security of tenure" model of tenure impacts on farmer decision making.

We deal with three quite different tenure situations: trees on the agricultural holding; trees as commons (communal forests, village woodlots, and trees on commons not devoted primarily to forestry); and trees in reserves managed by the state. Agroforestry has tended to be associated primarily with forestry on the holding, but agroforestry is the incorporation of trees into a farming system and the farming system often involves use of resources outside the holding, especially as regards tree products. The farmer's decisions about trees are made in terms of his or her overall access to tree products, whether on or off the holding. The farmer may have tenure (rights) in all these situations. The tenure will be most extensive over the agricultural holding but the farmer may also have use rights in a communal forest as a member of the community, and may hold a license, for instance for gathering dead wood, in a state forest. A farmer's options concerning trees in any one of these tenure situations cannot be defined in isolation from the options in the other situations.

Our concerns here are ultimately very practical. How do we avoid serious miscalculations in agroforestry projects concerning incentives and responses to opportunities concerning trees? The final section of the paper suggests some ways to assess tree and tenure relationships in agroforestry project planning.

A. The Agricultural Holding

The majority of farming units in most countries consist of individual or household farming operations. These range from the households of subsistence cultivators in many developing countries to the heavily capitalized and incorporated American family farm. Tree planting as part of the farming system on these holdings takes a variety of forms, e.g., commercial monocropping of trees, alley-cropping, home gardens, or windbreaks. In developing countries, planners and donors tend to think of tree planting as a result of "projects," but rural people around the world have long planted trees on their holdings. Planting of trees by individual farmers for fuelwood occurs in Rwanda (Winterbottom 1985: 3), on a large scale in Kenya, where a high percentage of farm families collect and replant with seedlings on their holdings (Kenya Woodfuels Survey 1984: 10), and on a more modest but significant scale in Lesotho, where fruit trees are planted (Turner 1984). But in other cases few trees are planted, or not enough are being planted to meet future needs (Fleuret and Fleuret 1978). What determines the extent of tree-planting on the holding? Does tenure have an effect? The "security of tenure" model widely used in analysis of land tenure on the agricultural holding suggests that it does.

The notion that security of tenure affects agricultural production is relatively recent. Redistributive land reforms in the classical and medieval periods aimed at equity and new political equilibria. France's eighteenth century philosophes, however, saw pre-revolutionary tenure patterns as stifling agricultural improvement, and in 1776 Adam Smith argued in The Wealth of Nations that large-scale holdings and servile tenures discouraged progress.

There is in fact a folk consciousness of tree/tenure interactions rooted in early English tenure history. Denman (1969: 1) quotes an old English epigram, "Oaks scorn to grow except on free land." Before the abolition of copyhold tenure, he notes, oaks belonged not to the copyholder, but to

> the lord who held the manor in fee. Copyholders would not plant oaks to enhance a bounty which was not their own. Freeholders in contrast owned what grew on their land.

By 1870, when John Stewart Mill urged productivity as well as equity considerations in establishing the Land Tenure Reform Association, the idea had entered popular thought about "development." A variety of development-oriented arguments for reform of land distribution and land tenure rules has since been articulated. The most influential and the one of particular interest to us here is the argument that a landholder's incentive to invest in the landholding increases with security of tenure (the sense that one is safe from ouster from the holding).

The literature on land tenure in developing countries is replete with references to the relationship between land tenure and investment in the land. The simplest relationship, most often noted, is that insecure tenure discourages investment because the farmer cannot be confident of the opportunity to reap the returns from investment. While the planting of a new annual crop is an investment in the land, it is usually excluded

from such analysis. Most crops only take a few months to mature, and after all, a farmer must plant crops even in the face of some insecurity if the household is to survive. Where the right to the land is lost, the loser may still have the right to reap crops in the ground so that there is no risk in planting them (Bruce and Noronha 1987).

The investments which concern us, however, are the planting and conservation of trees. Many trees are so slow-maturing that they must be treated differently from annual crops. Seedling costs may represent a substantial investment, especially where fruit or other economic trees are planted. When trees take up land that would have been used for other crops, there are considerable opportunity costs involved, costs which will only be recouped in the long run. At least in terms of the relationship of land tenure to investment in the holding, most tree planting resembles more closely a permanent improvement such as the digging of a well or the construction of a fence than the planting of annual crops (Bruce 1986: 28, 87; Brokensha and Castro 1984).

Authors directly concerned with encouraging agroforestry on farmers' holdings in developing countries such as Nigeria, Haiti and Jamaica have stressed the importance of clear tenure rules, assuring the farmer that the trees planted on the holding will belong to the farmer (Adeyoju 1976; Murray 1982; Blaut 1973: 63). The sources of insecurity are varied. A traditional tenure system which involved annual redistribution of parcels, such as that reported by Uzozie (1979: 344) among the Ibo of Nigeria, clearly poses problems for on-farm forestry. Elsewhere, uncertainties about rules of inheritance may present difficulties. In West Java, there has been conflict between three very different sets of rules (Roman-Dutch, Islamic and customary) which might govern the inheritance of trees (Bompard et al. 1980). Where the state has legislated state ownership of trees on the holding and cutting permit requirements to protect such trees, as under forestry codes in the Sahel, the principal consequence has been a loss of incentives to plant trees on the part of the landholder (Thomson 1982; Lai and Khan 1986; Elbow and Rochegude 1989; see also Sitaraman and Sarin 1980 for Indian examples).

Perhaps the most straightforward evidence of the impact of tenure on tree-planting is provided by studies of farmers who have access to a number of parcels of land under different tenures. The cash crops of farmers in Tucurrique, Costa Rica, include coffee and peach palm and their tenure arrangements include ownership, relatively secure use rights, tenancy, land-borrowing and squatting. Survey research found that farmers were growing trees on land held in more secure tenure and annual food crops on less secure landholdings (Sellers 1977). In St. Lucia tenure considerations explain why trees are planted on soils and in ecological niches for which they are not best suited, with farmers utilizing individually titled valley land for trees and hillside land under the somewhat ambiguous "family land tenure" regime for food crops (White 1986: 83).

Given the relationship between trees and tenure, it follows that state action or inaction with respect to tenure systems can encourage or discourage tree-planting and commercialization of tree crops. Tenure reform may then be a part of the answer to the question of how we can create adequate incentive packages for farmers to plant more trees. There are few relevant studies, but

Burley's comparative examination of India and Kenya concludes that tree-planting responds to tenure reform (Burley 1982). In a more localized study from Kenya, Brokensha and Riley examined "forest, foraging, fences, and fuel" among the Mbere of Embu District in the late 1970s, during Kenya's major program of tenure individualization and land registration. They conclude that tenure change has had a positive impact on tree-planting, but make an important point: tenure reform may be a necessary but is almost never a sufficient condition for adequate fuelwood production. Markets must also offer adequate incentives (Brokensha and Riley 1978).

The model presented above, in which insecurity of tenure dilutes farmer incentives for tree-planting and in which those incentives can therefore be increased by providing greater security of tenure, appears fundamentally sound. It is increasingly apparent, however, that it has some important limitations. Empirical research has contributed several insights which suggest that its indiscriminate use can be misleading.

1. Tree Tenure

People who have been exposed only to the more familiar forms of western property law often assume that trees are part and parcel of the land on which they grow. They are "fixtures," and like buildings are assumed to be owned by whoever holds the land. Indeed this is an unstated assumption of the model outlined above. But, in fact, trees can, like minerals and water, be an object of property rights separable from the land on which they are located, a concept obvious to anyone who has witnessed the Japanese transplanting a twenty foot tree carefully wrapped in rice straw or the wholesale movement of twenty five foot palm trees from a nursery to a California subdivision. These are rights in trees which have been severed from the land, but many tenure systems confer property rights in standing trees quite distinct from the land on which they stand, and may confer those rights on someone other than the landholder.

Fortmann (1985) drew together a rich literature and has forced a fundamental reassessment of the importance and complexity of tree tenure. A tree tenure regime can be complicated, drawing important distinctions on several bases. It may distinguish between planted trees and wild trees (Duncan 1960; Obi 1963: 89-94). Even where the ownership of land is one determinant of ownership of the tree, the species of tree may be subject to particular tree tenure rules which affect the outcome. Among the Naga tribe in India, bamboos were the property of the planter irrespective of the ownership of the land. Unless a landowner had forbidden the planting in advance, the owner could not uproot the new plants on land near the village and was responsible for clearing a fireline around them to protect them when burning the land for shifting cultivation. However, if the land were far from the village, the landowner could uproot and discard the bamboos (Hutton 1921: 68). The Ibo law of property in Nigeria reflects similar principles (Obi 1963: 89-94). Rights to use trees' products may also depend upon the nature of the use, for instance whether the produce is taken for personal or commercial use (Brokensha and Riley 1978; Mukwaya 1953). It may also reflect the user: in Kenya and Sri Lanka children have special rights to the produce of certain trees and fruit-stealing by children enjoys a customary tolerance in southern California and England (Fortmann and Bruce 1988: 14; Aschmann 1963).

Rights in a tree may be distributed among several individuals, often according to provision of labor and other productive factors. In the riverain Sudan a particularly complex system of rights to date palms and their produce is linked to provision of the seedling, land, labor and water. Each may be provided by a different individual (Leach 1919). In parts of Portugal the division of the fig and olive crops between the farmer and the landowner similarly depended on the division of labor and costs. The valuable prunings were the property of whoever paid for the work (Stanislawski 1963: 21, 204). In both the Sudanese and Portuguese cases subdivision on succession led to trees with numerous co-owners, in the case of Sudan a multitude of co-owners. Not only does Elwin (1953: 55) describe a similar system of heirs sharing the produce of sago plants in the Bondo highlands of India, but the same system has evolved among heirs of a large California timberland estate (Don Beattie, personal communication).

In short, tree tenure is a system of property rights every bit as variable as land tenure, mineral rights or water rights. Tree tenure is not some bizarre phenomenon found in out of the way places, and it should no longer be treated as an exception. Rather, as a matter of course, the question should be asked: what rights exist in trees, and what factors, possibly land rights among them, determine the distribution of those rights? We are only beginning to understand the potential of such rights in trees as development tools. They were critical in the commercialization of cocoa on customary tenure holdings in West Africa, allowing trees to serve as security for loans when farmers could not legally mortgage their communally-owned land (Adegboye 1969; Berry 1975; Hill 1963). Where there are few individual rights in land, whether because shifting cultivation is still practiced or for other reasons, tree tenure may provide the requisite security of expectation of continued use and control of trees and their products. Similarly, where some class of individuals is disadvantaged in terms of land rights--for example, women in Africa, who often hold land only in their status as wives--tree tenure for that class may provide the necessary incentives for tree planting or conservation through security in the trees themselves. And in socialist states, where nationalization of land has diluted farmers' incentives to plant trees, perhaps tree tenure can provide the needed security and incentives. If we focus on tree tenure rather than simply land tenure, we will be more likely to discern such potentials and, eventually, to gauge their effectiveness better.

Tree tenure has been ignored too long, then treated as an exception, simply because it is a complication. The security of tenure model must be applied to trees themselves and not to land with trees as fixtures.

2. Trees May Secure Tenure in Land

The "security of tenure" model we have reviewed assumes that without tenure security in land, tree-planting on the holding will be discouraged. One flaw in this line of reasoning has already been discussed: tenure in trees may be secure even if tenure in land is not. But there is also evidence that in certain circumstances tree-planting can increase security of tenure in land.

In some cases this is simply a consequence of tree tenure and the fact that control of trees often confers (for most practical purposes) control of

land on which they stand, at least if they are thickly planted. A farmer may thus obtain, de facto if not de jure, a longer-term control over land by planting trees. But tree-planting may actually give rise to land rights under customary tenure systems, because the planting of trees is seen as tantamount to ownership, proof of an intention to assert a right which, if unchallenged, ripens into conclusive proof of right. For example, palm planting is proof of ownership of land under several customary laws in Tanzania and Zambia (James and Fimbo 1973: 301, 353). It is in these circumstances that land-owning groups may resist attempts by members to plant trees, a phenomenon noted in Tanzania (Brain 1980, Ng'andwe 1976). Or permission from a chief may be necessary, as in Lesotho (Duncan 1960: 95). The problem of community opposition was more recently encountered by alley-cropping trials in south-eastern Nigeria, where tree planting would have disrupted a community-managed system of rotation (Francis 1987).

There is a more complicated relationship between trees and tenure where the farmer enjoys only derivative, temporary rights in land, such as leasehold. Sellers (1977), writing of Costa Rica, notes that where tenure rights are ambiguous, trees can provide a means of prolonging the farmer's possession of a parcel. Landowners often react against this possibility by refusing to allow tenants to plant trees, regarding this as an attempt on the part of the tenant to tie down the land indefinitely. In Africa the planting of trees by someone other than the owner of the land is commonly seen as a claim to ownership of the land (Elias 1963; Ng'andwe 1976; Tanner 1960; James 1971: 264). In the developing world tenancy arrangements are not necessarily arm's-length bargains freely negotiated by the parties but instead may represent institutionalized conquest, with those whose ancestors owned the land now working it as tenants for the victorious tribe or clan. Tree-planting may be a way for a subject group to reassert claims to land. A well documented case concerns Giriama tenants and squatters and Arab landlords on the Malindi Coast of Kenya. The Arabs established themselves on the Coast in the eighteenth century, during slave-raiding times. Giriama cultivators as early as 1937 began to plant cashewnut trees on Arab-owned land, thereby claiming long-term rights to land use and generating disputes that troubled both the colonial administration and later the government of independent Kenya (Shambi [c. 1955]).

A somewhat different dynamic operates in cases where the modern state is the owner of the land in which tenure is to be secured by planting trees. Here one is commonly dealing with tenure systems in which land is subject to allocation by the state to others if "unused," in which case tree planting can be motivated by a desire to incontestably establish use. Cocoa and coffee planting in an area development project in Liberia in the early 1980s was apparently driven by such a dynamic (Harbeson et al. 1984: 6). Equally, tenure systems which authorize grants of more secure rights based on demonstrated use can encourage tree-planting as an unambiguous demonstration of use. This dynamic has been cited as central to the Ivory Coast's impressive record in expansion of smallholder cocoa, having led both to clearing of virgin forest and planting of tree crops (Hecht 1983: 33). On the other hand, it has been suggested that natural forest has been destroyed on a more extensive scale than would otherwise have been economical, because more extensive land rights were thereby established (Tiffen forthcoming). Serious tensions exist between forest conservation and tree commercialization objectives under such systems.

The practical implications of tree-planting securing land rights are clearer in some respects than others. If tree-planting is in certain circumstances a response to land tenure insecurity, measures to increase land tenure security will not have the positive impact on tree planting which might be anticipated under the classic security of tenure model. It could conceivably slow tree planting, though no one would seriously contemplate insecurity of land tenure as a means of encouraging tree planting; security of tenure has many values beyond its impact on tree-growing. On the other hand, when tenure is weak or ambiguous and tree-planting is in any case sound economically, to tie creation or upgrading of land tenure to tree planting could be a useful strategy. It would need to be used with caution, however, and targeted on already deforested areas. Otherwise it could potentially speed up destruction of natural forests in the rush to claim land by planting commercial tree crops.

3. The Gender Issue: Whose Security, Exactly?

Those who use the security of tenure model tend to assume the household's holding is under a single management, and that the security of tenure of the household head is the only relevant security of tenure for the household. While this is sometimes true in farm households, it cannot be assumed to be the case, especially in many developing country situations. There the household's landholding, even if "owned" by a male head of household, may consist of several plots, each held and managed fairly independently by a wife. Insofar as the wife makes the management decisions, whose security of tenure matters, hers or her husband's? If she is the one who must make the decisions concerning trees and bear the cost of planting trees, certainly her own security of tenure is critical. This is cause for concern because in African societies, whether inheritance is patrilineal or matrilineal, most women do not inherit land. If they do inherit it, they tend to inherit it in lesser amounts. Except for a very few transactions, they have access to it by virtue of their rights to use of a part of their husband's land (Fortmann 1986; Cloud and Knowles 1988; Davison 1988). A wife's security of tenure may depend in part upon her husband's security of tenure, but be subject to additional limitations; a husband may be entitled to shift his plots among wives as he chooses. Recent land tenure research in Senegal's Peanut Basin by Elise Hardy Golan has provided a framework for analysis of security of tenure on a field manager (rather than a parcel "owner") basis. She demonstrates that within a single compound whose land is owned by the head of compound, perceived security of tenure varied dramatically among field managers such as wives, brothers and sons of the owner, with wives feeling the least secure (Hardy 1989: 64-72).

Since the specific rights which women may enjoy will differ significantly from one society to another, in order to understand the likely effect of gender in a specific situation on planting and conservation of trees, a series of questions may be useful. What are women's use rights? Can women use the full range of tree species that grow locally or are they prohibited from using certain kinds of trees that might be useful in fulfilling their responsibilities? Do women have access to all trees on the holding or are they restricted to certain niches, such as the garden-plot near the house?

Women may want to increase the security or convenience of access by planting their own trees. This raises additional practical questions. Will

they be allowed to plant trees at all? Chavangi et al. (n.d., reprint 1988) describe cultural restrictions on women's tree planting in Kenya and means for circumventing them. They demonstrate the need for understanding trees as social as well as biological constructs. Will women be allowed to plant the species they want? Will they control the trees they plant? Does this depend on where they plant them? Rocheleau (1987) points out that farms and other land used by women comprehend several socio-ecological niches, in some of which (such as the garden plot near the homestead) women are better positioned tenurially than in others. Not only the tenure niche (a category of land to be used by certain groups in the society and for particular purposes) but species considerations affect women's rights to plant trees. The full array of rights by women in trees and land rights relevant to tree planting can be elaborate, as among the Ibo in Nigeria (Obi 1963: 89). Land tenure and tree tenure jointly determine women's security of access and rights in trees.

Insecurity of access for women can also result from lifecycle changes (marriage, childbirth, divorce, widowhood) and changes in national policies such as land registration (Rocheleau 1987a), in technology, and in value of tree products. Widowhood is probably the most significant life cycle event in terms of security of property rights. A widow may retain certain of her husband's land and tree rights (Chubb 1961; Hoben 1973: 146-148; Obi 1963:89-94) or she may lose them altogether as in the case of a Peruvian cooperative (Skar et al. 1982). Upon divorce, women in Cameroon lost all rights to personal possessions, food supplies and unharvested crops, hardly a property system conducive to tree planting by women (Brain 1972: 162). Even during her husband's lifetime, a woman cannot necessarily depend on him to protect her property rights. Women in the Dominican Republic who used trees controlled by men for hog food lost their supply of palm fibres for handicrafts when, after a swine fever epidemic, the men cut down the trees (Fortmann and Rocheleau 1985).

There is a paucity of literature on the questions we have raised here, and a need for considerable further research. Still, it is clear that people who do not consult or consider women cut themselves off from women's specialized knowledge and skills, ignore the poorest section of the community, and may harm the on-going activities of women (Fortmann 1986; Hoskins 1979; Hoskins 1980; Hoskins 1983; Williams 1985). Many social forestry and agroforestry projects address women's problems--e.g., the scarcity of fuelwood and fodder--but they do not necessarily benefit women. A first step is to begin to adjust our tenure analysis to treat the rights of women managers and users of land and trees as a discrete and explicit category. While the degree of independence of plot management by women landholders will differ substantially from case to case, it is no longer tenable simply to assume that security of tenure for a male head of household translates into incentives for women in the household to plant trees.

B. The Commons

In some instances forests and trees outside the boundaries of agricultural holdings constitute a no-man's land where use is "first come first served" and where there may exist patterns of forest use but not rights of use. Access is open, without the dominion by some social entity which can

give rise to the rights to exclude or regulate use (Moench 1988). This situation is unusual however. Most forests and non-forested commons are claimed by some group or divided among groups. These commons involve a community, the proprietor of the communal forest, whose members are the only persons entitled to use of the commons. There are a number of advantages to community control of forest resources. First, the resource can be managed as a whole, eliminating the unanticipated cumulative effects of myriad individual management strategies. For example, Hosmer (1922) and Netting (1981: 67) note that communal management has maintained Alpine woodlands intact to prevent avalanche damage. Second, use can be spread over a wide area rather than concentrated in a single spot. Third, forest products can be distributed more equitably across the community. Fourth, the community can use the forest as an asset to meet community needs as in the case of a Yoruba community described by Lloyd (1962) which harvested oil palms communally, sometimes using them to pay debts incurred by the village as a whole. Finally, the combined social and physical force of a community may be better able than single individuals to protect a resource against incursions by outsiders. Community property provides the basis for management of use and the possibility of control and restraint in the common interest. This management may however be unambitious and ineffective. Whatever the right or the aspiration, effective control is often difficult.

Any discussion of the commons must consider Garrett Hardin's (1968) theory of the "tragedy of the commons." Briefly, Hardin held that resources held in common would inevitably be degraded. Hardin's thesis has been criticized by scholars using contrary empirical evidence and/or theoretical critiques of his assumptions (Ciriacy-Wantrup and Bishop 1975; Gilles and Jamtgaard 1981; Runge 1981; McCay and Acheson 1987), drawing to some extent on the earlier work of Olson (1965). However, as Bonnie McCay (personal communication) has pointed out, Hardin's model is perhaps best used as a Weberian ideal type against which is posed the question: what factors facilitate successful management of the commons?

In this regard, we explore two tenurial issues here. First, a series of problems arise out of the state's frequent failure to recognize the commons. Often the state advances the claim that it owns all uncultivated land, frequently in concert with the principle that individuals can establish their claims to land by clearing it (the legal term is "assartment"). This latter idea is partially responsible for the drive by peasants and others into the world's natural forests. They are, as it were, "privatizing" state forests. Second, we consider factors affecting the emergence and success of institutions for community management of common forests and trees.

1. When the State Won't Recognize Commons

Deforestation has been promoted by laws or customs that fail to recognize rights in the commons and instead confer land rights on the person who first "clears" the land. This is still the legal situation in many developing countries today. The legal concept of assartment, developed in a less crowded world, appears across centuries and in cultural situations as diverse as seventeenth century England, where John Locke saw the origin of property in the mixing of labor with the soil, and seventh century Arabia, where the Koran enunciated the concept of ihya al-mawat, which grants title to vacant land to the one who clears it and places it under cultivation (Schacht 1964: 141).

The process of deforestation now underway in the Third World took place centuries ago in Europe. This history of the clearing of the woodland in Europe makes clear the importance of assartment in the destruction of European forests, both in post-Doomsday Book Britain and on the continent (Darby 1956: 191-195). The process has gone on into relatively recent times in some parts of Europe such as Ireland (Regan 1982). Forest regeneration has proved and continues to be difficult in particular situations all over the globe. Griffin (1971) examines the regeneration of oaks in the United States, and Farnsworth and Golley (1974: 131) give examples from tropical forests where because of high rainfall and warm temperatures, soils have been depleted of their nutrients by tree uptake and leaching. However, the problem seems more intractable in much of the developing world for a number of reasons. Tropical forests are particularly difficult to regenerate because of the species diversity which characterizes them. More generally, professional foresters in the developing world often lack both the centuries of silvicultural experimentation and experience which have led to successful regeneration efforts. Finally, relatively few of the regeneration efforts on temperate forests are presently subject to the kinds of subsistence pressure generated by land-hungry peasants or pressures for large-scale commercial felling occasioned by the need for foreign exchange.

Throughout South and Central America today, in Honduras (Jones 1982), Mexico (Nations and Nigh 1978), Panama (Bishop et al. 1981) and Brazil (Mauer 1979; Mahar 1989), a land-hungry peasantry, drawn by the promise of land and tenure, clear forests and initiate cultivation. But titling proves an onerous and prolonged process, and often soils are of poor quality and will not sustain agriculture under available and affordable technologies. Export-oriented cattle ranching operations push smallholders out or simply move in behind them as they move on to clear more land. Vast areas are titled to these large-scale operations. Not only forests are destroyed, but cultures and peoples, as in the Amazon (Mauer 1979; Grasmick 1979). Denevan (1982) examines tenure as a factor in this process and notes that while landless peasants may be the immediate agents of deforestation, the local cattle industry and multinationals are the sponsors and ultimate beneficiaries of the land policies concerned. Binswanger (1988) has recently drawn attention to the role in environmental destruction in Brazil of artificial incentives created by the public policy for the opening of new lands.

These policies are seductive, with deforestation presented as development. Ivory Coast has a land tenure regime which recognizes land rights created by demonstrated use and development, a policy blamed for deforestation on one hand (Tiffen forthcoming) and credited with the Ivoirien economic "miracle" in smallholder cocoa production on the other (Hecht 1983: 33). In 1963, the Ivoirien Parliament voted a law providing for comprehensive recording of land rights acquired by development. The prospect of a once-for-all adjudication of land rights apparently galvanized farmers. The story is told of the president being awakened in the middle of the night with the news that forests throughout the country were in flames, farmers having set fire to clear them as a prelude to making land claims. The president suppressed the law, returning it to Parliament for further consideration, where it still languishes (Rassam 1988: 30).

The inability or unwillingness of the state to perceive or acknowledge local property claims and management practices lies at the root of the

problem. The alternative "free land" policies constitute the squandering of a resource and these policies, together with other subsidies to forest clearing, drive deforestation quite as much as the land hunger of peasants. A fundamental reconsideration of such policies is required.

2. Managing Trees as Common/Community Property

Our understanding of common property management has been deepened considerably by the research of the last decade (Panel on Common Property Resource Management 1986; McCay and Acheson, 1987) and these insights need to be applied to the management of trees as common or community property. (While there is arguably a distinction between communal and community forests, there are sufficient similarities to permit them to be treated together.) The difficulty of such management will differ from case to case. Both the scale of the resource and the concentration of management decision-making are factors. Just as there is a clear contrast in the management challenges posed by a large communal forest and a village woodlot, so is there a definite distinction between management in which there are many decision makers, as in a truly communal use situation, and in the case of a commercial community forest in which the management is concentrated. But in no case is communal or community management a simple matter.

Unfortunately much that has been learned during centuries of communal/community forestry management is not readily accessible since the agendas and preconceived notions of outside observers have often kept community forestry invisible. For example, the Chinese have been concerned with forests and the effects of deforestation for centuries. But historically both Chinese and European observers provided only the most fragmentary information on forest practices of local communities, requiring a heroic effort to piece together even a minimal view of community control (Menzies 1988: 51). The Chinese case is part of a broader pattern of the state sometimes purposefully ignoring community control. As Fortmann and Bruce (1988: 107) point out:

> For their part, state and national governments have no particular reason to acknowledge the rights or competence of community foresters since historically central governments have competed with local communities and local people for control of forest land. All over the world, for centuries, peasants and the state have been slugging it out in the forest.

Despite the ambitions and the power of the state, local communities continue to play an important role in the use and management of forests and trees. However, with the advent of project-led development efforts, the nature of community involvement has often been recast. (Although there have long been natural community forests, there is little evidence that there were community tree planting schemes before the advent of modern community forestry programs (Noronha [c. 1982]). The dismal history of these more recent efforts, particularly in the form of village woodlot projects has driven development planners back to common property theory to understand why their efforts went so badly awry (Bruce and Noronha 1987: 136-139). In the process, some scholars have concluded that collective village action is simply not

feasible. Thomson (1982), writing of the Sahel, examines what he refers to as the "village woodlot fallacy," and urges clearer definition and privatization of rights in trees. He concludes that the institutional and managerial problems of afforestation on community land are so serious that a stronger emphasis on tree-planting on individual or family holdings is required, and that tenure must evolve in a manner supportive of tree-planting on those holdings. Similarly, development agencies have generally come to regard community-based forestry initiatives with great skepticism. While traditional resource management systems may be impressive, development project planners have not proved at all adept at reproducing them in the context of their projects. Opinion has swung heavily in favor of "farm-forestry."

Nonetheless, there have been some very effective community afforestation programs. The "New Community Movement" in South Korea involves community initiatives supported by national law which have compelled individual landowners to contribute their lands for reforestation. If the landowners concerned fail to reforest, the Village Forestry Association undertakes the reforestation on a cost-sharing basis. Contracts set production shares for the owners and the VFA. The program has been highly successful (Gregersen 1982). Compulsion, of course, has often failed, as in the compulsory tree-planting program in post-Mao China (Ross 1983).

The question then is what leads to successes. Ostrum (1986) has suggested that groups emerge to manage common property when the user population lives close to the resource and is relatively small, supply is moderately scarce compared to demand and is subject to multiple uses requiring management and coordination. Groups seem to survive if they have clear-cut rules that are enforced by both users and officials, internally adaptive institutional arrangements, the ability to nest into external organizations for dealing with the external environment, and different decision rules for different purposes. And their chances are better if they are subject to slow exogenous change. More recently, in an echo of Norman Uphoff's frequent call for "diversity in the face of diversity," she has further acknowledged that there is a wide variety of institutional arrangements that can result in successful management of common property (Ostrum, 1987). The remainder of this section explores the importance of two dimensions of diversity in the management of communal/community forests: the diversity of the community itself and the diversity of appropriate institutional arrangements.

Community Diversity. Afforestation or conservation efforts have often proceeded as if a village or a community were homogeneous, as if all members had an equally strong interest in the use and husbandry of tree resources. Far from being homogeneous, many communities are divided by class, caste, religion, ethnicity, gender, geographical origin, length of settlement and even household cycle considerations. This diversity combined with the multiple and sometimes mutually exclusive uses that can be made of trees (trees cut for timber cannot continue to be used for fodder or human food) complicates the equitable distribution of rights to access.

Land tenure systems offer a variety of alternative tenure "niches." Different strata of the community, different members of a household, and households in different stages of their life cycle differ in their needs and tend to concentrate their use of resources in different tenure niches or make

different uses of the same niche. The poor in dry regions of India are more likely to use common pool resources including village forest for fuel and fodder while the rich use them as a supply of timber (Jodha 1986). Similarly, we have already noted that women's activities tend to be concentrated in specific niches, often common property. Thus, the selection of a particular area of land for tree-planting can, by virtue of the tenure niche in which the land falls, determine who in the community will benefit from the trees. Planting trees on the village commons, for instance, may permit the village landless to benefit from the project along with property owners (Mukhoti 1986). (However, caution must be exercised lest intensification displace the poor from other subsistence uses (Sarin 1980).)

Although community management of resources is likely to reflect community struggles and cleavages, the myth of the homogeneous community may lead the unwary into simplistic plans that fail to take community diversity into account. It is of course possible to set aside particular parts of a forest resource for use by sub-sets of the community with consistent interests, though this rapidly becomes complicated. But careless exclusion has serious results. Molnar (1985b: 8) describes a Nepalese village in which the men decided to protect their village forest from degradation by closing the forest "to all grazing and cutting, only allowing villagers a few days per year to enter the forest and cut small wood and leaf fodder." The result was that the women, who had not been consulted in the decision, were forced to steal wood from the forest of the adjacent panchayat. The women of that panchayat, whose forest had been placed under similar system, did the same in the forest of yet another panchayat. This domino-effect was a direct result of decision-making without consulting the full range of village users.

Institutional Diversity. The range of institutional forms of communal/ community forest management and control is also diverse. A community does not have to own forest land in order to exercise de facto control over it (Moench 1988). Nor does community ownership of a resource automatically lead to community control over it. Community control requires the ability to control the behavior of community members as well as the ability to exclude outsiders. Neither follows automatically from statutory or customary ownership. For example, Eastman and Gray (1987: 57) report concern among local residents about over-cutting on community lands in New Mexico. Similarly, a community organized during the sixties in California has been unable to persuade the membership to observe its own tree cutting ban (Don Flickinger 1987, personal communication). The question for those who would institute or strengthen community management of resources is what institutions are necessary and sufficient to initiate and sustain community control of the resource. Three options, not necessarily mutually exclusive, are explored here: control by a professional state forester, control by a private professional forester, and control by non-professional local institutions.

Experience with community woodlots in Lesotho highlights a continuing dilemma: should communities rely on professional state forestry personnel or on traditional chiefs to ensure the survival of newly planted seedlings? The former often have little local presence and less authority, while the latter may abuse their authority, cutting the trees for their own use. Only a small fraction of the trees planted in the Lesotho woodlot program have survived (Turner 1984: 12). While combining the advantage of community control and

professional expertise, control by a professional forester (or even a barefoot forester) on behalf of the community as described by Hosmer (1922) requires that the value of the off-take be sufficient to pay a salary. Thus higher degrees of control by professional foresters (whether state foresters or foresters hired by the community itself) may be more acceptable and more effective in conjection with commercial community forestry than with subsistence use of a common property forest.

Another option is community control through indigenous institutions, which can take numerous forms. Willan (1967:5), for example, describes traditional forest management by the Sherpa of Nepal:

> Certain members of the community were designated . . . whose function was to report any person who cut trees without permission having been obtained from the village council. Fines were imposed for wrong-doing and were paid in the form of beer.

Traditional authorities have not been indifferent to the destruction of the resources upon whose continued productivity the livelihood of their subjects depend. While their efforts at conservation have most often been overwhelmed by the great weight of economic forces, it is important to note that they have sometimes used their powers as traditional land managers in attempts to conserve trees. These efforts have only rarely been recorded, but a few examples include legislation by Tswana chiefs in the interest of conservation of trees in early twentieth-century Botswana (Schapera 1943: 416), similar restrictions on tree cutting in the Law of Lerotholi in Lesotho (Duncan 1960: 95), and village regulation of the Japanese forested commons (McKean, 1986). In some traditional systems, chiefs or even private landholders, in the case of the Kikuyu of Kenya, could establish tree reserves (Leakey 1977).

A notable advantage of control through indigenous institutions is that users and enforcers are in daily interaction. Such control takes a variety of forms. In 1639 in Hampton, New Hampshire, three men were appointed woods wards to control forest use and to assign a cutting quota to each household (Pennsylvania Department of Forests and Waters 1932). Various communities in Mali control tree cutting, at least one to the extent that obtaining official permission from the forest department is merely a formality (Montagne 1985/1986). Community councils in Swiss villages marked trees to be cut for fuelwood and allotted timber shares by the drawing of lots (Netting 1981: 189). Leaves for fodder are auctioned and the proceeds used for community projects in India (Brara 1987).

Where such systems fail, it is often because government or new economic forces have undermined the authority of traditional managers. This has occurred in the Sudan's gum arabic producing region of Kordofan, where desertification has been initiated by fuelwood cutting. There, 1970 legislation claimed title to most rural land for the government, and the powers of the village sheikhs to control tree cutting went into decline. The breakdown of social control of land use was also a consequence of the replacement of traditional "native authorities" with less effective "people's councils" by the post-independence governments (El-Arifi 1978). In the face

of a growing market for charcoal and a declining market for gum arabic, social control of tree cutting largely collapsed. Vast areas of gum trees were cut for fuelwood. Even where Acacia senegal survived, population pressure forced the telescoping of the traditional cultivation cycle from seventeen to nine years, resulting in declining fertility and increasing wind erosion (Digernes 1977: 107). In a parallel case, when the Sherpa system described above was abolished with the nationalization of the forest in Nepal, deforestation of centuries-old village forests began. The new system was inconvenient for users and there was no local monitoring of use (Thompson and Warburton 1985a: 122 and b: 205-206).

These then are key insights into common property management. First, holding forests and trees as common property is a rational and sometimes necessary tenurial arrangement. Second, it must be recognized from the outset that there are differences in interests among members of the community, in degree or in kind. Policies and programs involving common property need to take into careful account the diversity of common property users their needs and the claims they press. Third, the creation or modification of management institutions should avoid cookie cutter approaches. Instead, both the diversity of possible institutional arrangements and the amount of time (generally more than is initially recognized) that is necessary for an institution to get up and running should be considered with care. For example, one approach might be to organize discrete units for more intensive management with narrower participation. In analyzing this option, one would consider that on one hand, creation of new management institutions is extremely ambitious. On the other, traditional institutions should not be overloaded with multiple tasks or over-idealized (many traditions, it should be remembered, have been invented). Their tasks were simpler when there was less pressure on resources and a variety of factors saps their vitality and authority in our time. There is a need to take a leaf from recent thinking on non-forest commons and to consider how local institutions can participate in decision-making on commons management but also enjoy the services of technically competent staff and receive rule enforcement and other backstopping from government (Lawry 1987, 1988: 277-300). These very basic considerations are frequently ignored in practice.

C. The State and Forest Reserves

The management of forest reserves is a broad topic. While local households may utilize the forest to some extent, exploitation may be by concessionaires who contract with government and their relations with local people can be those of employer-employee and co-user of forest resources at the same time (Colfer 1980, 1982) or outright conflict (Kunstadter 1980). In other circumstances, where local groups are recognized as having rights in forests, concessionaires may contract with them directly (Yauieb 1979; Williams 1979). But our concern here is with agroforestry, with trees as part of farming systems, and so we are concerned with interactions between farmers and state forest reserves.

1. The State as Forest Guard

There is a long tradition of conflict between the state and local communities over the control of forests. It was one of the matters at issue

in the Magna Carta (Cox 1905: 6, 12; Hinde 1985: 28), and one of Karl Marx's early writings concerned the struggle between national and local powers over the right to use forest land in the Rhineland (Linebaugh 1976). In the 1870s the Klamath Indians in northern California had to resort to various subterfuges in order to cut and sell timber that the courts held was under trust status and therefore property of the United States government (Stern 1965: 62). Similar struggles continue to the present day (Fernandes and Kulkarni 1983; Fortmann, 1988) and leave their mark on forestry efforts.

A recurrent theme of colonial forestry, especially salient in the former British colonies in South Asia and Africa, is that forests must be shielded from growing use driven by demographic pressure. The major tenurial initiative of this period was the establishment of forest reserves. Private and communal tenure of forests were thought to pose a serious danger to preservation and sound exploitation, and it was considered that the state must take over control of the forests and carefully regulate their use. The forests became resources to be protected by the state against their former users. In India, this process has been chronicled by Kaul (1979) and Stebbing (1922). The process of reservation has taken place more recently in some Asian countries, in this generation in Nepal. It has generated insecurity on the part of traditional users and--because the state has not been able to police reserves effectively--led to increasingly abusive exploitation by users who no longer see themselves as having a long-term interest in the resource (Fleming 1983). The opposition and incendiarism which forest reservation provoked among peasants in Kumaun in the Central Himalaya at the turn of the century, initiated a tradition of protest of exploitation of forests by outside agencies which endures today in the Chipko movement (Guha 1985). Fortmann and Fairfax (1987: 7) have argued that American forestry professionals (and those whom they train) bring to their work in the Third World a strong predilection for large-scale comprehensive government resource management, a Progressive Era tenet which perpetuates colonial forest policy legacy and is not necessarily appropriate in the conditions of some developing countries.

The state has appeared to win most of these arguments. But the state is sometimes an inefficient forest manager and "soft states" sometimes cannot get their acts together to protect their forests. They may lack the will to do so, or their authority may simply collapse. When the Ugandan state collapsed in chaos, forest guards' salaries were no longer paid and the former guards were directly implicated in the encroachment on the reserves (Makerere Institute of Social Research and the Land Tenure Center 1988). This section of the paper examines the tradition of state control, then explores alternatives born out of that experience and asks whether it may not be more viable to create proprietary interests--rights to limited use of forests--which give local communities an interest in the preservation of the forests.

2. Alternatives: Taungya and Proprietary Solutions

Under a system developed in Asia and known as taungya, limited numbers of traditional cultivators were allocated areas to be reforested, where they could provide labor for tree-planting and at the same time cultivate their subsistence crops among the young trees. Once the canopy closed, they would move on to another area to be reforested (Goswami 1982). The tenurial basis

of taungya was a contract between the Forestry Department and the participant (King 1968). While taungya provided cultivators access to land scheduled for afforestation, the system provided only the most temporary tenure in a particular piece of land, and access to land for only so long as there was land to be reforested. The current trend in Thailand is to provide cultivators with more secure tenure within the forests (Goswami 1982; Boonkird 1978; Boonkird et al. 1984). Where this is not the case, inefficiencies result. In Indonesia there is a tendency for those employed in the taungya system to damage the young trees, in order to prolong their access to the forest land for their crops (Soerianegara 1982).

As population pressure around forest reserves has increased, there has been a growing interest in ways to provide at least partial livelihoods for some citizens from the reserves, consistent with sound management. Since 1983, in the Guesselbodi Forest Reserve in Niger, a management plan has been in place whereby the Forestry Service licenses individual woodcutters from the area to cut wood in sustainable amounts to sell to a local marketing cooperative. All income from the sale of wood by the cooperative is distributed on an equal share basis among resident villages. The Forestry Service controls grazing and illegal harvesting. The Guesselbodi model appears to be working well and is promising because it casts local people and the state in a collaborative mode (Lawry 1989).

Reforestation of denuded "forest reserves" can sometimes be accomplished through the introduction of agroforestry systems with appropriate incentives for individual households. At Betagi in Bangladesh, the local forest reserve had been completely deforested through encroachment and timber theft, sometimes with the collusion of officials of the Revenue Department and the Forestry Department. Landless laborers were later settled on a group leasehold basis and replanted the land. Now, after years of struggle against local elites who sought to take the land from them, the households have been given twenty-five year leaseholds. The level of conflict which has accompanied this process makes an important point: rights are easily lost and, in the words of Bangladeshi sociologist Zillur Rahman, "must be reestablished every day" by their exercise (Fortmann and Bruce 1988: 338-341).

In the case of natural forest reserves, which sometimes have limited commercial potential because of their mix of species, policies of exclusion of traditional users have been increasingly questioned. At certain population levels and ecologically sound use levels, these forests provided a livelihood or part of the livelihood for traditional cultivators and herders. Why can they not continue to do so? In this vein, Grandstaff (1980) examines the land tenure and land use practices of Thai and other ethnic swidden cultivators in northern Thailand, whose incursions into forested areas have been a source of growing concern to government and other observers. He makes an important distinction between "established" and "pioneer" swiddeners, in terms of their impact on the environment. He argues for the establishment of systems of sustainable, integral swidden cultivation, and for the granting of tenure over discrete territories including forest to villages as a key element in this process. The proposal represents a new and attractive angle of approach, which argues not for state protection but for providing local communities with secure tenure in forest resources and therefore the incentive to manage them soundly.

The advocates of such an approach sometimes characterize it as "integral" (rather than "partial") taungya, the former being described by one author as "a more complete and culturally integrated approach to rural development; not merely the temporary use of a piece of land and a poverty level wage of labor, but a chance to participate equitably in a diversified and sustainable agroforestry economy" (Raintree 1987: 54). The distinction was developed by Conklin (1957). Nations and Nigh (1978) have argued for a Lacandon Maya alternative to current patterns of overexploitation in Central America. Fernandes and Kulkarni (1983) and Commander (1986) have called for a new forestry policy for India based on a more integral approach to forestry planning. For Borneo, Weinstock (1983) has stressed the need to maintain the traditional use and tenure patterns and ecological balance in the rain forest, and Dove (1986) has recently produced a searching analysis of the mis-perception by development officials of the interests at stake in traditional use systems in the Riam Kanan valley in South Kalimantan.

The need for and viability of local control over resources is the central message of these authors. While traditional institutions may sometimes provide the best basis for such control, non-traditional institutions may also be successful. Protection restrictions have been effective in the case of the Maria Tecum Forest in Guatemala because it is the property of the local municipality, governed by a respected council of elders (Budowski 1982). In the Ikalahan area of Luzon, the Philippine Bureau of Forest Development in 1974 "released" 14,730 hectares on a 25-year lease to the Kalahan Educational Foundation, to be managed under an agroforestry plan for the watershed by a local board of trustees. An evaluation conducted in the seventh year of the project indicated substantial acceptance of some elements in the land use control plan and a marked decline in tenure insecurity (Aguilar 1982). Peluso and Poffenberger (forthcoming) describe a process of diagnostic research involving both universities and the forestry department in Indonesia.

Here we have come full cycle, moving from the state protection of forest reserves to proposals for sustainable use of forests as common property. Such proposals will be less viable where the value of the forest is as a source of genetic diversity. In these situations protection by the state may have to be the central strategy for preservation, though tenure adjustments in surrounding areas may relieve pressure on the reserve. In the case of genetic resources to be protected by the state, the question becomes whether the state has any proprietary interest in those resources from which it can derive a return for the costs of protection.

D. Assessing Tenure Issues in Project Design

To summarize: tenure affects incentives to plant and husband trees. Because it is a factor, it must be taken into account in project planning. Sometimes, it can be utilized as a tool, and altered to increase incentives. This more activist strategy must be approached with caution; tenure serves many purposes other than the planting and conservation of trees and tenure policy must take all these purposes into account. We do not suggest that proprietary dimensions are commonly the key constraint, the "bottleneck." The importance of tenure will vary dramatically from case to case and elimination of tenure constraints will accomplish little if other incentive elements are

not present. Tenure, as either tenure reform or as accommodation of existing tenure patterns, is no "silver bullet." It is an important factor, one deserving special attention because it is the factor most often neglected in planning forestry projects.

How do mistakes about tenure create problems for projects? Project design may neglect social and institutional constraints which prevent farmers from responding to the tree-planting opportunities provided by the project. The International Livestock Center for Africa's Small Ruminants Program in Nigeria found that in on-farm trials in the south-east of the country, existing use and tenure patterns created community oppposition to tree-planting. The planting would have interfered community control of land use. Households had been assumed to have more exclusive control of their holdings than was in fact the case (Francis 1987).

Where customary tenure rules permit tree planting, the tenure system may still have an impact on incentives for tree planting. When farmers cannot have the use of the trees they plant, they are not likely to do a good job, even if short-term incentives are provided. Thomas (1964) found that peasants employed with "food-for-work" to plant trees in land where they had no rights responded by planting the trees upside down, roots in the air. A miscalculation of incentives may also occur when there is too narrow a focus on the particular land area on which the project encourages the farmer to plant trees. For instance, a project design will overestimate farmer incentives to introduce trees into the pattern of cultivation on the holding if it overlooks household rights of access to free wood from commons and reserve areas.

In addition, project design sometimes misidentifies beneficiaries of tree planting or may even lead to their displacement due to misunderstanding of tenure situations. A community forestry project in Pakistan which had aimed to plant on the commons as a means of spreading benefits throughout the community discovered that in fact influential families in the community had established effective control over large areas of the commons and were the ones who benefited from the project (Cernea 1981). Planting trees may increase dangers of displacement because a powerful neighbor or a traditional land administrator may seek to take the trees and the land with them. In Swaziland, for instance, fruit trees may attract the wrong kind of attention threatening tenure (Flory 1987).

There are also situations in which tree planting will work to the disadvantage of some residents. There are often losers as well as winners in these projects. While such side-effects may not affect the cost-benefit analysis of a project which focuses only on the participant-beneficiaries, from a broader societal point of view that analysis is affected. Tree planting is generally an intensification of use which, in a situation of serial or simultaneous uses by different users, may exclude the other users of the land. Women are often particularly vulnerable, as are very poor or peripetatic users. After the main uses of particular land and trees have been established, the question must be asked: "Is there anyone else who uses this land or these trees, even occasionally?"

Whether certain facets of the tenure system are seen as posing problems or opportunities tends to depend upon how far the process of project planning

has proceeded and how committed the planners are to a particular technology and a mode of introducing it. (One never introduces a technology alone; technologies carry with them a great deal of baggage in terms of institutional needs for their introduction and maintenance.) If the project idea is still relatively flexible, it can be reworked to mesh with the local tenure situation. But a mismatch between the project idea and the local situation is often not noted until the project is underway. Then there is said to be a "tenure problem," though it might better be characterized as bad project design.

1. Identifying Tenure Issues

How does one avoid the neglect of tenure as a factor from the start, at the beginning of planning for a forestry project? Much project planning begins with a rapid appraisal. Getting a quick fix on tenure issues is inherently difficult because in grappling with tenure one moves beyond the readily observable into the realm of values and norms. The approach adopted here is to first consider existing farmer practice concerning trees within three broad tenure types (the holding, the commons and the reserve) and then examine, from the point of view of the household and field managers within the household, the opportunities for tree planting and use under each of the three types of tenure.

It is possible to attain a meaningful if modest understanding of tenure in rapid appraisal only because in most customary tenure systems in Third World countries, different land tenures reflect different land uses. Different tenures exist to accommodate and organize those different uses. Where a different land use is visible, such as pasture or house gardens, pursue the question of whether there is a special tenure regime for land under that use. This will usually be the case. As suggested earlier, it will usually be possible to identify agricultural holdings, commons and possible reserve areas in the early stages of the rapid appraisal. This is the starting point: getting the land areas organized into tenure categories into which one can then sort more detailed information.

It is best to begin with a few key informant and small group interviews. The early questioning should steer clear of questions such as, "Who owns the land?" or "Can land here be sold?" These questions incorporate too many assumptions. Rather it should begin with questions about people's use of trees, working from behavior to tenure. Inquiring about land and tree use as a way into tenure provides a line of questioning which fits in more comfortably with the interests of the rest of the assessment team, who likely are foresters and farming systems analysts. It is important that the social scientist not regularly do his or her questioning alone, apart from the rest of the team, but instead help the other team members appreciate how people in the area think and behave about trees.

Even at this stage of the interviewing, a vocabulary in the local language for land and tree tenure must be developed. The "what is it called" question is key. There may at times be a single term for a land use and a land tenure, and it is essential to get these definitions sorted out early on. There are also terms such as "parcel" (a unit of ownership) and "field" (a management unit), as well as "plot," "panel" and others which in English

are often used interchangeably, with the meaning clear (if at all) only from the context. Similar difficulties in the local language can seriously mislead the interviewer. There may be only one term for several different land units. It is almost impossible to clarify the use of these terms in abstract discussion.

It is important to remember that communities are far from homogeneous. There has been continuing concern over whether agroforestry and community forestry generally are adequately addressing the needs of the poor. The poor must be consulted in the appraisal, whether these be those who gather twigs and sticks on others' lands or tenants who farm others' land. Where a project involves substantial intensification of use with trees it may destroy rights of other users of the land and trees on it. Gathering rights may be lost. Women are often neglected in project design exercises and whose situation often requires particular attention (Hoskins 1980: 30-31). The integration of trees into a farming system requires that women be consulted. Moreover, women are often in a distinctive tenure position regarding trees and rights in trees. They may or may not have the same rights in land and trees as do men, and may in fact not be allowed to grow certain species of trees or grow trees in certain tenure niches within the holding (Rocheleau 1987a, 1987b).

The assessment must then shift to the viewpoint of the household, the typical unit of production and use. It is the household and its members who make the decisions about trees and tree products and it is their behavior which projects seek to alter. If trees are to be planted, they will have to plant them. Since we usually cannot force them to plant trees, we need to ensure that they have the necessary incentives. Incentives may arise from immediate household needs for wood or other tree products or the opportunity to market tree products, but they are influenced by tenure. Land, the very opportunity to produce, comes subject to certain tenure terms which affect incentives. No farmer, for instance, will plant seedlings in an area over which he does not have sufficient rights to exclude to prevent their being devoured by others' livestock. We need to understand better how tenure influences household and individual decision-making. As pointed out earlier in this paper, tenure and thus incentives can differ even for different field managers within the household.

To do this, we need to think of the household's holding. The holding will often consist of several pieces of land, sometimes widely dispersed. The holding is quite likely to be a multi-tenure holding. Multiple parcel holdings may have the advantage of providing a variety of land types each suited to a different use. Those different uses are likely to have different tenure implications, and so the several parcels of the holding are likely to be found in several different tenure niches in the landscape. The effect is that the household has tenure of a different nature on the several different parcels in the holding. It also has tenure which extends beyond the holding. The "holding" consists of parcels of land in which the household has rights to relatively exclusive use, but the household will have rights in other lands as well, such as rights to use trees in a communal forest or rights to gather firewood on someone else's land.

At the household level, the need is for a long interview (2-3 hours) with several members of the household, including women, present. The opportunity

to return for subsequent interviews or to interview different household members separately may or may not materialize in the rapid appraisal context, though of course it is advantageous. The objective is to get a dozen or more thoughtful, probing household case studies. One must often rely on guidance from a local contact, possibly a local leader who meets the appraisal team, to identify the households to be interviewed. How can you communicate what you want? There should be several "typical" households, households that fall somewhere near the mean in the community in terms of landholding, farming system and wealth. But it is also important to cover a certain range; the mean can be misleading in a society in which distribution of resources is bimodal. One should also have a list of special characteristics which one wants to include. Some categories are fairly universal: female-headed households, poor households, wealthy households, labor-rich and labor-poor households. And if a few local people grow trees while most do not, interview some of that minority of households and try to figure out what makes them different.

One of the tools in the interview and an important means of recording information is a sketch map of the household's holding and tenure. This is similar to the sketch map used in agricultural censuses. Labelling the areas of land according to local tenure classifications can turn it into a tenure map. It is a communication tool, and because few farmers will have pictured their holding in this way before, creating a sketch map of it can generate considerable interest. Such a map requires a walk around the holding, possibly going up onto a hill from which you can see several areas in which the household has tenure. Such a map is indispensable when working with households which have more than two or three parcels in their holding.

This sketch map approach can also be used to explore interhousehold dynamics. Men and women in a household often have very different rights and responsibilities for land and trees. Rocheleau (1987b) has prepared holding maps from the Dominican Republic, India and Zambia which use the terms "responsibility," "control," and "labor" to describe rights and responsibilities of male and female household members for trees on each parcel.

2. The Holding

The concept of a "niche" has been used here to break up the landscape into a set of different areas of opportunity for forestry. Different opportunities are offered because different land use and management systems are employed in different ecological niches. Because these niches exhibit broadly characteristic tenure patterns, they have been referred to here as types of tenure niche: the holding, the commons and the reserve.

In this section we deal with the holding as a tenure niche. The majority of farming units in most countries are household farms operating a "holding," an area in which a household and its members generally have exclusive rights--the right to exclude others from use of the land. Tree planting on the holding takes a variety of forms, e.g., commercial monocropping of trees, alley-cropping, or windbreaks. While the household management pattern implicit in the notion of a holding has fundamental tenure implications, there is also considerable diversity among the tenures which households have over land, trees and other resources in their holding.

The holding for a particular household will commonly consist of several parcels of land, and some of the parcels may have different uses; for instance, a home garden with fruit trees on one parcel and more distant maize fields under shifting cultivation on other parcels. These parcels may well be under different tenures, first, because different uses have different tenure requirements--the home garden with perennials calls for more durable tenure than the maize field under shifting cultivation. Second, society sometimes assigns to certain land support roles for various institutions in the society--the shrine, the mosque, or perhaps the chief--and these support roles are enshrined in the tenure rules for that land. Its use will be conditioned on such support roles. The rights of the institution in the land serves to produce revenue for the institution which another society might obtain through a more generalized method of taxation. Third, particular members of a household will often have specific tenure rights in particular parcels and in fields within parcels. This is often particularly pronounced in situations where the production unit includes a number of households or in the case of polygamous households where wives are assigned separate individual fields. Fourth, at any point in time certain parcels in the holding may be held under tenure acquired by contract, such as leasehold, while other parcels which belong to the household may be encumbered with such contractual obligations. Such transactions in effect pass some of the household's "bundle of rights" in land to others for a period of time.

To deal meaningfully with tenure one must deal with it at the parcel or field level, because important tenure distinctions commonly exist even within the household's holding. While most variability in tenure can be captured at the parcel level, it is only at the field level that one can be certain of capturing variations in tenure by field managers within the household and so explore what may be important gender-based issues. On the other hand, most particular situations will be simpler than the potential for diversity indicated here. Only some of these distinctions will exist on holdings in any given tenure system. Moreover, because differences in tenure are often based on differences in land and tree use, these distinctions can be approached initially through the same progression from observed use to tenure that has been suggested throughout this section.

This paper has already indicated the need for detailed interviews with at least a half dozen or perhaps a dozen households. Because we wish to deal with tenure and tenure can vary down to the field level, this interviewing must deal with use at a field level. There is no way to design a form or question schedule which will accommodate all situations. A sample question schedule is given on the next two pages, but it has its limitations. It is designed to bring out distinctions in use between owner and manager of the land and between husband and wife or wives within the household. It would work fairly well in a mixed farming system, and gives considerable attention to trees if these constitute a part of the system. It would capture less adequately, however, the different uses of family members in a biologically diverse and highly integrated tropical garden, or where one parcel was cultivated communally for general homestead or compound needs. The field question schedule given here is only a starting point in drafting a more locally relevant instrument.

From completed tables on a number of fields, some consistent relationships will begin to stand out, for example, clusters of specific uses vested in

particular classes of users, including men and women, and relationships between land tenure and tree tenure. For each species and class of users (men or women, owners or tenants, whatever may be relevant in the locale), the interviewer should ask:

1. Are tree planters and users viewed as having a right to plant and use trees or could someone bar them from use? If the latter, who and why?

2. If it is a right, do they have it because of their rights in the land on which the tree stands? If so, are the rights in the land and trees the same?

3. Or is it a right which exists because of some other factor, such as the act of planting or provision of the seedling?

4. Do such rights last for the life of the tree or are they limited in time?

5. Can such rights be transferred by: Sale? Gift? Loan? With the land? Separately from the land?

6. Can such rights be inherited? If so, by whom? If not, whose rights do they become and why? Can such rights be willed? If so, to anyone? If not to anyone, to whom?

7. Can the right-holder exclude other uses of the tree or are there others who have a right to use the tree?

3. The Commons

Why do we care about trees on the commons? Wouldn't it be possible to focus exclusively on the holding to meet forestry needs? In fact there is a variety of situations when communal forestry continues to meet important needs: (1) in situations where intended beneficiaries are landless or for other reasons cannot plant on their holdings, forestry on the commons may be the only option for reaching them; (2) where the trees are of species that require frequent and complex care, perhaps involving special equipment, they may be more easily planted and managed on the common woodlot by a few trained individuals representing the community; or (3) where it is specifically desired to generate through tree-growing the income to fund needed community activities. Even where trees are grown on individual holdings, the nursery may well be on a commons area.

How do we set about examining tenure in trees on the commons? Commons management has a community dimension which cannot be captured through household interviewing alone. It must be approached initially through the small group and key informant interviews suggested earlier. As a household may have a multi-tenure holding consisting of several parcels, so a community may have more than one commons. It may have two pieces of commons with the same tenure regime, or it may have several commons under different uses and subject to different tenure rules. It may, for instance, have a communal forest; a common pasture on which trees grow; as well as uncultivated interstices between parcels and holdings. These commons areas must be

Sample Field Question Schedule

Interview no. _____ Date: _____

Locale: _____

Field identification: _____

HH tenure in field: _____

Manager tenure field: _____

Approximate size field: _____ Distance from residence: _____

Positions in Relation to Household Holding Field	Husband	Wife	Other HH	Non-HH
Interviewee is:				
HH head is:				
Field owner is:				
Field manager is:				

Go to table on next page and complete. Then continue:

Explanations and comments, including "other" responses, by column in Table:

Column	Comment:
	[In practice, more space would be needed.]

Sample Field Question Schedule - cont.

	CROPS AND TREES			TREES ONLY:															
FIELD CROPS AND TREES, TREES BY SPECIES	(A) Economic Value HH	(B) Economic Value Mgr.	(C) Labor Requirements	(D) Land Prep.	(E) Provide Seeds/ Seedlings	(F) Plants	(G) Waters/ Tends	(H) Lops Leaves/ Branches	(I) Sells Fodder	(J) Spends Fodder Income	(K) Harvests Fruit	(L) Sells Fruit	(M) Spends Fruit Income	(N) Cuts Down Tree	(O) Sells Wood	(P) Spends Wood Revenue	(Q) Who Owns Tree?	(R) Other Users	(S) Other Uses

A - C

1: Highest
2: Major
3: Significant
4: Minor
5: None

D - Q

1: Manager
2: Manager's spouse
3: Owner if not manager or manager's spouse
4: Shared by (combined numbers: 2/3)
5: Other
6: Not applicable

R

1: Neighbors
2: Other local
3: Itinerant users
4: Other
5: Not applicable

S

1: Browsing by animals
2: Gather fallen wood
3: Lop leaves/branches
4: Pick fruit
5: Other
6: Not applicable

identified and their various uses assessed. The managing group must be identified, its membership clearly understood, its institutional nature and potentials gauged, and its various mechanisms for control of member behavior evaluated.

How does one gather information which defines the community in relation to the commons? In the group and key informant interviews one could begin with a set of questions such as:

1. Are there areas of land which are not held by households, but used by all of you or by a group? Suggest observed land areas which appear to lie outside households' landholdings. Then in each case ask:

2. How large is it?

3. How far away?

4. Is the use seasonal, or year round?

5. What uses are made of it, in order of importance?

6. Are there trees on it?

7. What species?

8. Are the trees self-sown or planted (by species)?

9. If planted, by whom (by species)?

10. Who has a right to use the commons?

11. Is use limited by one or more factors?

12. Is the group defined to include automatically everyone with certain characteristics or is membership voluntary? If the former, what are those characteristics? Specify them clearly in each case.

    a. Location of residence?
    b. Descent?
    c. Political allegiance?
    d. Contract?
    e. Other?

13. If group membership is voluntary, what portion of the local residential community is included? What portion of members do they constitute?

14. If voluntary, why do some join and not others? What are the characteristics of those who have joined?

15. Does everyone in the group in fact use the commons? If not, who does not use it?

16. Does everyone in the group use all parts of the commons equally, or is use localized or otherwise limited to a sub-group of the community in some way? If it is localized, how is it done?

17. If localized or limited, is this a matter of right, or just proximity and convenience?

18. If the former, what is the basis of the right?

Although the commons areas tend to be some distance from villages, it is essential to visit the commons. A tour of the commons is often informative about the level and effectiveness of community control of the commons. For instance, does everyone seem reasonably sure of the location of the boundaries of the commons, or does it take quite a lot of discussion to establish them?

How are controls on use formulated? There are two broad categories of strategies for community control: exclusion of non-members of the group and control over use by members. The former must rely to some extent on policing, but it is reciprocity which ultimately determines the effectiveness of such arrangements. The latter may be through impositions of limits on individual or household use. One way of implementing such use is by assigning tree tenure--that is, assigning rights to use particular trees or types of trees on the commons to particular households or individuals. A second approach is to monitor off-take, which is difficult except in the case of a very small, closely managed commons. Third, the community may arrange for the trees or wood products to be harvested and distribute them or proceeds from their sale among the members. Fourth, reserves may be created which are removed from community use until tree cover has renewed itself, or matured after planting, as in the case of the village woodlot.

How can we structure inquiries concerning organization form and mechanisms of control? In small group and key informant interviews a series of initial inquiries along the lines set out below is suggested, in the case of each type (by use) of commons area.

1. Are non-members prevented from using the commons? What institution does this, and how?

2. From where does its authority to do this derive?

3. How is the institution constituted? For instance, is it hierarchical, as with the office of chief, or elected, as might be the case with a committee of elders?

4. How does the institution make decisions? Does it make rules? Does it execute them? Are there others responsible for executing its decisions? If so, who are they, and how are they chosen?

5. Does this or some other institution plant trees on the commons? Do individuals do so? If so, who actually does this work and how are they compensated? Where do seeds and seedlings come from and who bears their costs, if any? Is there a nursery?

6. Does the institution or some other institution create reserves which are closed to cutting to recover? If so, how large a portion of the whole area is currently in reserve?

7. Does the institution or some other institution directly cut branches, leaves, or trees? If so, does it distribute these, and by what system? Or does it market them, in which case how are revenues distributed? Do members feel assurance that they will receive this benefit? Why or why not?

8. Does the institution seek to regulate levels of member use? If so, does it do this through tree tenure or by setting and monitoring use levels? If the latter, how is this done?

9. What sanctions can the institution mobilize against members when its rules or orders are disobeyed? Can it cut off use rights, temporarily or permanently? Can it fine or imprison? Are there other sanctions used, such as corporal punishment? For what offenses are particular penalties characteristically imposed? Are they effective?

10. What sanctions can the institution mobilize against non-members?

11. Is a particular ministry or government agency responsible for institutions of this type? If so, what is the nature of the relationship?

12. Are government officials or the courts ever asked to enforce a decision made by the institution?

13. How are disputes concerning use of the commons settled? Disputes among members? Disputes between members and non-members?

A commons is community-administered, but its existence ultimately depends upon whether the members of the community consider that its benefits to them outweigh its costs. A common property tenure arrangement provides for effective management of a forest to the extent that it mobilizes those incentives. The ability to enforce rules is often so modest that a substantial degree of consensus, and hence self-enforcement, is necessary. This is not easily obtained because communities are diverse. Their members have different degrees of interest in both trees in general and in the various uses of trees. The fact that trees are multi-purpose plants creates the possibility of a heterogeneity in the community concerning the relative priority to be given to the different uses of trees. For instance, a household with livestock will have a more substantial interest in trees as fodder-producers than a household which has no livestock.

Our objective here should be to first understand what rights households and individuals have and how these are defined and assured, and also how different uses of trees on the commons by different households and individuals create somewhat different interests in the survival and husbandry of those trees. For small group and key informant interviews about a community forest or trees on grazing commons, an initial line of questioning might go something like this:

1. Who uses the trees in the commons?

2. Do particular households or individuals have rights in particular trees?

3. Do these rights vary with species?

4. What is the basis of such rights?

5. What uses can the right-holders make of trees in which such rights exist?

6. Do women have the same rights as men? If they are different, specify.

7. If no such individual rights exist, what are the rights to use which community members have in the trees?

8. Do women have the same rights as men?

9. Do these rights vary with species?

10. Do all users use trees for the same purposes, or are particular uses more important to some households than others? To what groups within the community are particular uses especially important?

11. Can any member use the trees at any time or is use seasonal or otherwise limited?

12. Is there any limitation on the amount of tree resources used?

13. Can the tree resources be used for commercial sale or only for home consumption?

14. Can trees on the commons be cut down, and in what circumstances?

Tenure in trees or the commons must therefore also be examined from the viewpoint of the household. Households' tenure extends to the commons: households which are members of the group have rights to use the commons and may even have specific rights in certain trees on the commons under a system of tree tenure. One must evaluate the extent to which those rights provide effective incentives for households and individuals to support and observe the rules which control the use of the commons.

Two sample question schedule sections which get at use of trees on the commons are provided on the following pages.

4. The Forest Reserve

Our concern here is the interaction between communities, farmers and forest reserves. The classic idea of a reserve is of course to prevent or minimize these interactions. The reserve is a tenure regime designed to exclude community use. The earlier section of this paper on reserves has

Rights to Use Trees on a Commons, by Species

Household no. _____ Commons name: _____ Distance from residence: _____

Commons is used for: _____ Communal forest: _____ hunting
_____ firewood collection
_____ tree cutting
_____ grazing

_____ Pasture: _____ seasonal, localized
_____ seasonal, transhumant
_____ year-round

Trees on Commons, by Species	(A) Land Prep.	(B) Provide Seeds/ Seed-lings	(C) Plants	(D) Waters/ Tends	(E) Lops Leaves/ Branches	(F) Sells Fodder	(G) Spends Fodder Income	(H) Har-vests Fruit	(I) Sells Fruit	(J) Spends Fruit Income	(K) Cuts Down Tree	(L) Sells Wood	(M) Spends Wood Rev-enue	(N) Who Owns Tree?	(O) Other Users	(P) Other Uses

A - N
1: Managing institution/community
2: Husband
3: Wife
4: Shared by (combined numbers: 2/3)
5: Other household member
6: Not applicable

O
1: Community members
2: Other local
3: Itinerant users
4: Other
5: None

P
1: Browsing by animals
2: Gather fallen wood
3: Lop leaves/branches
4: Pick fruit
5: Cut down
6: Other
7: None

Relative Labor Requirements and Benefits for Species on a Commons

Species on the Commons	Labor and Other Costs			Benefits		
	Men	Women	Non-HH Labor	Men	Women	Non-HH Labor

1: High for this group in relation to this species.

2: Significant for this group in relation to this species.

3: Minor for this group in relation to this species.

4: None for this group in relation to this species.

HH = Household

suggested alternative, more interactive tenure models. Farmers do in fact utilize reserves, legally or illegally, and to ignore this fact is to risk miscalculating costs and benefits of new tree planting initiatives.

The interactive situation upon which the appraisal team is most likely to happen is in fact that of illegal use of a forest reserve. It is possible, however, that arrangements can be made to legitimize sustainable use of the forest reserve. Such arrangements can establish a local constituency for good husbandry and create a buffer against encroachment on the reserve. Alternatively, access to wood products from the reserve must be taken into account in planning community forestry initiatives outside the reserve. It will, for instance, be difficult to get local communities to incur costs to grow trees--as where they forego food crops which might otherwise have been produced on the land--when wood products are available for free (if illegally) from the reserve. On the other hand, more plentiful wood production outside the reserve can decrease pressure on the reserve.

But how do we assess tenure as a factor in this situation? We can assess use, but how can tenure be a dimension of illegal use, when the concept of tenure implies a right to use a resource? The answer lies in the multiplicity of legal regimes noted early in this paper. The "reserve" of national law may be the "commons" of customary law. There are reserves in Africa the gazetting of which local users are hardly aware. Use of this "commons" may be subject to rules which can provide a basis for sustainable use of a forest reserve.

In small groups and key informant interviews, use and perceived rights to use can be explored. A line of questions along these lines might be tried, utilizing a traditional designation for the locale of the reserve rather than some term which implies "reserve":

1. Do you use trees there?

2. Is use seasonal, or year round? If seasonal, specify.

3. What are the uses, in order of importance?

4. Does everyone use the whole area, or a particular portion? If the latter, is this a matter of right or just proximity and convenience?

5. If it is a matter of right, what is its basis?

6. Do particular households or individuals have rights in particular trees?

7. Do these rights vary with species?

8. What is the basis of these rights?

9. What uses can the right-holders make of trees in which such rights exist?

10. Do women have the same rights as men? If they are different, specify.

11. If no such individual rights exist, what are general use rights?

12. Who exactly has such use rights?

13. Do women have the same rights as men?

14. Do these rights vary with species?

In household interviewing, questioning should as usual proceed on a species basis. The form provided for the commons earlier in this paper can be used here, with allowances for the extent to which the community recognizes that its rights to use the trees have been rendered ambiguous by state declaration of a reserve.

5. Conclusion

How far can one understand these tenure issues in a brief pre-project assessment? As noted earlier, it will vary with the length of time in the field, the previous experience of team members in the locale, the available literature on local tenure, and the ability of team members in the local language. The procedures suggested are not very demanding in terms of time: several small group and key informant interviews at the outset, a half-dozen or a dozen household interviews, and a return to key informants for clarification. At a minimun, a team can identify opportunities and potential problems related to tenure. However, the team will usually be less able to gauge with confidence whether a given tenure factor will have a minor or major impact on the initiative. It will be possible to sketch out hypothetical strategies for dealing with the issues but these will need further study before implementation. Longer, more in-depth research may be needed to flesh out such strategies and explore their viability.

It must be emphasized in conclusion, however, that a hurried assessment is not an appropriate vehicle for the development of strategies for tenure change. This is social engineering and as such, needs to be approached with humility and caution. The existing tenure arrangements have many vital functions other than promotion of the objectives of the projected agroforestry project. The critical task is rather to design a forestry technology appropriate to the community and its tenure patterns. By technology design here is meant not just species selection, but species use projections and integration into the farming system. This is an interactive process between potential groups of beneficiaries, their tenure and other incentives and opportunities, and the candidate forestry technologies. There are important value-laden decisions about the distribution of costs and benefits involved in this process. They can be difficult even with the best of information. Ultimately, this is an interactive process between the project and farmers that proceeds over the life of the project. Farmers will ultimately decide how they will employ the forestry technologies concerned.

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