PN-AAQ-619
ISN=35904

FUELWOOD, AGRO-FORESTRY, AND NATURAL RESOURCE MANAGEMENT: THE DEVELOPMENT SIGNIFICANCE OF LAND TENURE AND OTHER RESOURCE MANAGEMENT/UTILIZATION SYSTEMS

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Prepared for AID/PPC/PDPR under Purchase Order OTR-0000-0-00-3441-00, April 1984

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TITLE: "Fuelwood, Agro-Forestry, and Natural Resource Management: the Development Significance of Land Tenure and other Resource Management/Utilization Systems."

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I. INTRODUCTION:

"Natural Resources" cannot logically be considered except in relationship to their specific social setting. They are part of a complex system of relationships and institutions: the emphasis is on system, which forces us to regard a wide array of relevant factors.

We also stress that the relative significance of many of the factors is location specific, which creates a dilemma: on the one hand, attempts at global generalizations seldom attain a universal validity and, on the other hand, it is clearly impossible to make a comprehensive survey, analysis and prescription for action for each locality where an intervention is proposed.

In our presentation, we indicate what sorts of generalizations are possible, and where there needs to be a consideration on a national, regional or district base. We will be paying particular emphasis to problem areas, and also to resource competition.

II. SIGNIFICANT RESOURCES AND RELATIONSHIPS FOR TREE MANAGEMENT AND WOOD FUEL USE.

What major technical factors have to be considered in assessing the suitability of social forestry projects in a given area? We do not provide

a check list of biophysical features, but rather draw attention to resources and ecological relationships that are integral parts of tree management and fuelwood use systems. We contend that "technical" factors are not elements that can be isolated and analyzed separately from other resources or from processes and structures, whether ecological, economic or cultural, with which they are involved. Instead, these features have to be understood within the context of the ecosystems of which they are a part. We stress that human activities are essential components of ecosystems and need to be accounted for in analyzing resources and resource-use relationships.

(A) Ecosystems and Ecozones

We suggest that a useful way for examining resources and resource-interlinkage is through an ecosystem approach. Though several definitions are possible, we begin with Reddy's (1983:30): ecosystem is " . . . any area of nature that includes living organisms and non-living substances interacting to produce an exchange of materials between the living and non-living parts." This approach seeks to identify the entities involved in an ecosystem's operation, " . . . their interactions, the flows of materials, nutrients and energy, and above all, the environmental constraints on economic activities as well as the impact of these activities upon the environment" (Reddy 1983:30). Although this definition is good as a beginning, it is too imprecise to have much operational value, so we refine it further, according to particular circumstances, so that it is a more bounded concept. Thus we prefer to use ecosystem in relation to an area such as a river basin, or a watershed, or a coastal or mountainous area, to provide a sharper definition.

Closely related to the ecosystem approach is the concept of ecozones. An ecozone is a landscape unit which is classified according to climate, soil, topography and vegetation. These defining characteristics can be seen as forming an ecosystem. Hence, an ecozone refers to an ecosystem with specific spatial or geographic bounds. Thus, resources and resource flows are not seen as isolated elements, but as material entities that can be analyzed in their environmental, economic and socio-cultural contexts.

Many Third World countries have devised formal classifications of their land and forests into various ecozones with varying degrees of accuracy and helpfulness (for example, see the case studies for India, Indonesia, Malaysia, Mexico, Pakistan, New Guinea, the Philippines, Sri Lanka and other countries presented in Carpenter, 1981). Such classifications are useful in that they help identify the range of development potential for a given area, allowing for some assessment of how suitable it is for particular uses.

When considering a specific locale within a geographical region, the locality will often have characteristics that render its broadly-based ecozone classification less meaningful for planning purposes. The importance of micro-environments needs to be taken into account. Two nearby places, both sharing certain broad environmental features, may have differences in soil type, topography, amount of annual rainfall received, or other physical elements, that makes their development potential quite distinct (for example, see Wilken 1972; Haugerud 1981; Morauta, et al. 1982; Castro 1983). Resource use practices, innovations, or programs that are suitable in one site may not be transferable to the other in spite of their proximity and general similarity. Therefore, careful attention has to be given to the minimal "area of nature" or land unit that will have technical significance.

(B) Problem Ecozones

Several ecozones present special problems for tree management and reforestation efforts, because they have intrinsic characteristics that set relatively narrow constraints on the types or extent of development interventions possible. Included are arid and semi-arid lands, where lack of water (whether rainfall, surface, or groundwater) and high temperatures can pose formidable difficulties (see Burley 1982; Hoskins 1979; Thomson 1980b). Mountainous environments, especially near the Himalayas in Nepal and India, are sensitive and easily degraded because of excessive slope and erosion hazard (see Bochet 1983; Bharat Dogra 1983; Guillet 1983).

By saying that a particular ecozone is a problem area, this is not to imply that social forestry development is likely to fail. Instead, it denotes that ecological constraints will probably be stronger than in other areas, thus requiring particularly careful assessment of technical feasibility. Intrinsic physical features alone, however, are not the only defining features of a problem ecozone. Densely populated, agricultural ecozones with relatively small landholding units are likely to be problem areas for reforestation efforts, regardless of other ecological factors, given competing demands for land and other resources (this is discussed in detail later on).

(C) Natural and Cultural Landscapes: People in Ecozones

Though the intrinsic physical factors of an ecozone and ecosystem are important, they have to be understood in relationship to past and current forms of human resource use and systems of management. Humans, as living

organisms, are integral parts of ecosystems and ecozones. Human activities have been critical in reshaping or creating new ecosystems and ecozones (see Thomas et al. 1956; Ford 1971; Kjekshus 1977). While natural landscapes are to be found, much of the world has been converted to cultural landscapes, modified in varying degrees by humans. Even the apparently natural landscapes are probably influenced to some extent, whether directly or indirectly, by human activities.

Human activities have changed natural landscapes so much that in some areas, such as around parts of the Mediterranean (Thurgood 1981), what the original vegetation cover used to be is now a matter of conjecture. Activities such as deforestation, overgrazing, and poor farming techniques have converted large tracts of countryside into desert (Dalby and Church 1973; Glantz 1977; Heathcote 1980; Gonzales 1978). Forests have been turned into farmland and pasture (Darby 1956; Parsons 1976; Geertz 1968; Nations and Nigh 1978; DeWalt 1982; Tucker and Richards 1983). Urban environments have replaced rural ones, and surface and underground water supplies have been tapped, diverted, destroyed, or otherwise modified(Price 1971). The deliberate or unintentional transfer of plants, trees, animals, insects, and other life forms (Thomas et al. 1956), the rise or decline of various commercial agricultural (Knight 1974; Griffin 1974; deAlcuntura 1976; Feder 1971; 1978; Franke and Chasin 1980), pastoral (Swift 1977; Munger 1981), mining, industrial, and other types of activities, various population movements and demographic fluctuations (Boserup 1965; Brown 1978; Cook 1948), and other human-related activities and processes have played a crucial role in changing the face of the earth (see Wolf 1982; Thomas et al. 1956; Eckholm 1976). Human activities and ecology are inseparable.

(D) Agricultural Ecosystems and Resource Competition

The inter-linkages among human activities, ecology, trees, and their uses become clearer if we examine certain relationships within a particular case study: an agricultural ecosystem. Our presentation will be simple, concentrating on the conflicting demands for, and uses of, resources. Let us emphasize that our goal is not ecological modeling or ethnographic exactness, but to point out the ecological and economic context in which tree management and wood use problems are embedded.

Because of its central position in the production process, land is obviously a critical resource in agrarian ecosystems. There are additional demands for land as well: for housing and other structures, pasture, paths and roads, and trees for fuel and other uses. In many respects these and other demands for land may be complementary as long as arable land is not used. However, when arable land is involved the demand for farm land (because of market or subsistence pressures) might cause trees to become restricted to marginal farm areas, such as along borders or near buildings. The desirability of trees along borders might be reduced, as it was among some small holders in Kirinyaga district, Kenya, because of fear that shade will hurt crops. In the competition for land between trees and agriculture, the former are almost always the losers (exceptions would include areaswhere governments have banned farming in certain forests).

Land must be considered in relation to other factors, particularly population growth, technology and markets. Obviously population density is a key variable in considering land use and in examining "carrying capacity." We do not need here to consider all the questions that this concept, carrying capacity, raises, other than to stress the immediate questions,

"How many trees can be grown within this present ecosystem? What modifications are possible/desirable? Who will benefit from the tree planting?"

Technological changes are another major factor, for as new technology is introduced, so do the local social and economic relationships change, with very often a corresponding shift in land distribution. Studies have been made of the introduction of such diverse technological innovations as the plow (Manners 1967), tractors, tube-wells and others, especially of some Green Revolution associated technologies. In all cases, land use is affected, sometimes by changes in land values which may lead to greater concentration of land among fewer land holders. In other cases, as in India, it may become more profitable for a land-owner to farm his land himself, rather than letting it to a share-cropper or other tenant.

Market pressures also influence land use, as farmers respond to favorable or unfavorable changes in prices of commodities.

Water is another vital factor of production. Water limitations arise because of several reasons, such as the seasonality or insufficiency of rainfall and restricted availability of ground and surface water supplies. Where trees can rely on rainfall, the possibilities of competition are much reduced, although not inconsequential. Particular tree species can be seen as competing with crops for ground water. In Kenya eucalyptus species are frequently called <u>munyua mai</u>, roughly, "he that drinks much water." This saying implies an awareness of the demand that eucalyptus will make on any available water, and how this will possibly put it in competition with the farmer's crops. However, if tree planting requires irrigation, then conflicts can ensue. Farmers complain that water needed for agriculture will have to be diverted to trees. Where, for example, no irrigation system

exists for farming, but a water-transfer is set up as part of a reforestation project, then local anger and resentment might become a factor. This resentment is likely where farming is viewed as a higher priority activity than tree planting, a common situation.

A number of complications may arise from the keeping of livestock. Cattle, goats, water-buffaloes, and other animals can supply a number of useful products and services: milk, meat, hides, manure, and draft power. Their presence also implies a number of other relationships. Land must be set aside for pasture or for growing fodder crops. Trees may be viewed mainly as a source of fodder, and the regeneration of cut trees and other vegetation may be slowed or halted by grazing. Unless protected by fences or other means, tree seedlings may be consumed by livestock. If planted trees require manuring, then competition for nutrients required for farming is created.

Even trees can be the source of competition over end uses. Trees, depending of course upon species, generally serve multiple purposes: firewood, fodder, timber, poles, food, fencing, medicines, utensils, sources of twine and dye and myriad other uses. Different parts of the same tree may have several uses. There may be competition among different users for the same tree. Moreover, when a forestry project tries to introduce one or several exotic species to a local population unfamiliar with their uses, skepticism might develop as to the new trees' worth. People may feel that the introduced trees are inferior because they cannot supply as many needs as the local trees did.

To summarize, we have not mentioned these possible resource conflicts to demonstrate how difficult reforestation can be. Nor have we attempted to outline every resource conflict one is likely to encounter. Instead, we

have tried to show that reforestation and tree management must be viewed within a context of competing uses of resources. We do not mean to imply that this context is fixed, as different sorts of cultures and economies make different uses of the same resources; furthermore, the same society may make different uses of the same resource at different periods. We must look at resource use and resource competition in a dynamic way, recognizing that the flow of nutrients and resources is determined by the culture, but that alternative resource-use systems are possible. The use of land, water, nutrients, sunshine, and other resources may come into conflict with other activities in an agricultural ecosystem. We emphasize that the examples presented were highly simplified and did not take into account variables such as resource distribution, market pressures and other incentivies, or constraints on labor allocation. In certain circumstances, as in many phases of tropical agriculture, especially weeding crops, labor itself can be a potentially constraining resource, which underlines the need to use a broad socio-economic and bio-physical framework. Seasons of peak agricultural labor demand are likely to occur at the same time when labor for tree planting is most needed. Where labor is hired, alternative employment opportunities and prevailing rates must be considered. The point that emerged has been that so-called technical factors, such as land, water and so forth, need to be analyzed in their wider ecological and economic contexts.

(E) The Inter-Linkage of Ecosystems and Ecozones

We have stressed the need for understanding particular ecozones and ecosystems. Detailed knowledge about any particular system or zone, is

insufficient without considering how it is linked to other zones and systems. Linkages between ecological areas has been studied in mountainous environments (see Gilbert 1983 for a review) and between highland and lowland areas (for example, see Wasserstrom 1978). These linkages occur through a variety of means. People may own property in various ecological zones as a risk diversification strategy. Different systems and zones are linked through transfers of commodities, labor and wealth as well as by common administration. As Wallerstein (1974), Wolf (1982), and others have long argued, in many respects the proper unit for analysis of the relationship between political economy, history and ecology is the world economy. Historical case studies presented in Tucker and Richards (1983), for example, convincingly demonstrate the need for seeing deforestation as being related to changes and forces within the world economy. There are many examples throughout history of how the demand for wood from faraway places has led to local deforestation. Trees have been cut to build boats, in England and in parts of the Mediterranean; the old wood-burning boats on the Nile, or the wood-consuming locomotives in Tanganyika (Tanzania) created high local demands; mangroves have been cut from Kenya's coastal areas for export to Arabia as building poles. Even if deforestation does not occur, we still need to know something about internal and external markets for wood, so that we can understand the likely competing demands. On a more local level, there are examples of scarcity of fuel in one ecozone leading to deforestation in another ecozone. Haugerud (1981) details this for an area in Embu District, Kenya, where tree scarcity in one better-endowed, higher altitude ecozone, led to its residents "raiding" a neighboring ecozone to buy fuelwood, thus contributing to an increase in deforestation.

(F) Uses of Trees and Forest Products

At the outset of this paper, we emphasized the need to see fuelwood and tree planting in a total social context. This is especially crucial in considering uses and perceptions of trees. It is not uncommon for the intervening agency (whether host country or external donor) to concentrate on fuelwood, while to the local people, trees are often seen as providers of many products, of which the most important is seldom fuelwood. For example, at least until very recently, trees have seldom been planted for fuelwood. They have been planted as a source of fruit (often citrus) or of shade, for construction timber or for many uses, such as the well-known Acacia Albida and Neem (Azadirachta Indica).

We need to emphasize that even today many peoples in different parts of the world still rely on trees and forest products for a great deal of their material culture - for timber, poles, pestles and mortars, canoes, agricultural implements, housing materials, fodder, famine foods, dyes, medicines, perfumes, etc. (See, e.g., the comprehensive lists of plant uses in Irvine, 1961). Not only are there many uses, but many different parts of the tree - trunk, twigs, bark, roots, seeds, leaves - are used for the different purposes. While the greatest surviving repositories of ethnobotanical knowledge are probably to be found among "tribals", yet it is surprising how much of this knowledge remains with agricultural peoples. Because it is such an important part of their folk knowledge, and because it defines their attitudes to trees and tree-planting, it should be taken into account in all forestry projects.

Again and again, people who have made intensive studies stress the need to, "analyze patterns of peasant forest use in order to plan a rational

exploitation of forest resources," (Jones 1982:8). The local perceptions of, and attitudes toward trees vary greatly. Brokensha (in Berry and Thomas 1983:99-103) provides a brief summary of traditional attitudes in African societies, showing that these varied from reverence and reluctance to fell big trees (Kikuyu, Chaga, Ashanti) to regarding trees as unwelcome because they harbor seed-eating birds (Sukuma) or because they belong properly in the wild domain, and have no place near the domestic compound (Anafo, N. Ghana). Traditional attitudes are by no means rigid, they often change with changing circumstances as instanced by contemporary Sukuma participating actively in tree planting near their houses in the Ujamaa villages. But it is still important, obviously, to understand the past in order to make sense of the present.

In nearly all areas we have to consider commercial uses of forest products, also. What is the local and the external market for fuelwood, charcoal, construction timber and other forest products? How many trees are grown explicitly to meet market needs (for example, fuelwood or poles) and what happens if supply exceeds demand?

To understand the place of fuelwood in any one social setting, we should be aware of the total rural energy picture (see Reddy 1983). This involves determining the basic patterns of fuelwood production, distribution and consumption, as well as the uses of other fuels. For example, one study from West Bengal estimated that domestic fuels consumed included 55% fuelwood and charcoal, 20% crop wastes and 25% dung cakes. There was also a marked variation between households both in terms of types of fuel used, and of total consumption of fuel. It is important to have this basic energy consumption picture, as it aids planning to know how much of each fuel is consumed, and by whom. It helps to establish at least some general idea of

what the demand for different fuels is likely to be. Also, the household variations are significant in indicating relative degrees of poverty, and in helping to plan so as to meet different household needs. If this is not done, there is always the danger that the richer (or "less poor") members of the community will capture the major share of any benefits.

In Bangladesh "the Hindus obtain most of their fuel from outside sources, collecting rice straw and trees and branches from char lands and buying firewood from the bazaar. The Moslems get their fuel from crop residues, trees and animals of Ulipur," (Briscoe 1979:4).

Douglas (1982:670) reports as follows:

> In Bangladesh, the other traditional fuels are animal dung and the residues of various types from the major and minor crops: rice, jute, wheat, sugar and so on. Naturally occurring reeds and other plant material such as water hyacinth are also burnt as fuel, as are significant amounts of bamboo.

Sometimes different fuels are used for different purposes (boiling water, cooking beans) but often scarcity causes such ranked preferences to be a disappearing luxury. Again, households - as in rural East Africa - often prefer to use kerosene for night lamps, but the frequent kerosene shortages force many families to revert to the use of fuelwood.

There are also significant seasonal variations to be considered, for example Briscoe (1979:20) says that, "crop residues provide over 70% of the fuel used by the study population," also in Bangladesh, "and therefore the cropping pattern is the primary determinant of the temporal distribution of the fuel supply." Seasonal variations in fuel supply are also caused by climatic changes. In many areas, fuelwood is difficult to collect in the rainy season as paths are slippery, and also, the wood is wet and needs drying out. (See Chambers, 1983, for a summary of wet season difficulties).Storage is also important: "fuelwood and rice hulls are dense,

and do not rot, while nava is bulky and susceptible to rotting. Poor people are often further constrained by the lack of storage space," (Douglas 1982).

(G) Tree Planting

Traditions of tree planting vary. Some societies saw no need to plant any trees, others planted a few for fruit, shade or poles, a few others had elaborate agro-forestry systems, making effective use of many species. In nearly all societies, people knew a great deal about trees and their properties, as demonstrated by the many detailed ethnobotanical studies (see e.g. Berlin, et al. 1977).

All social forestry programs have as one of their aims the encouraging of local people to grow trees, so before any plans are made, we need to know what the present state of tree planting and tree care is, in any particular area. Basic questions to be answered include: "Who does - and who does not - plant trees? What species? For what purposes? What are the survival rates? Where are trees planted?" For an example of a comparative study that sought answers to these questions, we summarize Brokensha, Riley and Castro (1983), which looked at tree planting in two areas in Kenya. This study showed, that "many people are planting trees, although it is much easier for a richer farmer, with more land, to plant. Trees are planted for timber and poles, shade, fruits, fodder and fuelwood (in that order) - which underlines the need to think in terms of multi-purpose trees . . .; land reform has usually be a powerful encouragement to plant trees." For people who do not plant trees, the overwhelming reason is that they have no land, or not enough land.

The role of size of land holding is crucial, and must be considered in relation to ecological and socio-economic relationships. For example, in this study, a farmer with a relatively large land parcel probably has more area available for tree planting, depending on household size. Also, a larger holding may mean that the household has the extra wealth to be able to afford to plant trees on land that could be used for other shorter-term purposes.

In Kirinyaga, people with education (e.g., school teachers, public servants) tended to plant more trees than their less educated neighbors. The educated folks also usually had higher incomes.

In terms of ecological zones, certain areas may be more favorable for tree planting because of better soil, ample and consistent (i.e. less drought prone) rainfall, and lack of pests (e.g. white ants). However, there is some possible conflict because the most favorable area may also be where the greatest pressures are to use land for agricultural purposes.

Another tree planting factor is seedling supply. In Kirinyaga it seemed that people who lived nearest to tree nurseries tended to plant more trees e.g., in Ngariama location near the Njukini tree nursery. This study provided some specific recommendations including strengthening and extending tree nurseries, and paying particular attention to extension activities to show that agro-forestry <u>is</u> possible. There was also emphasis on an integrated approach, as tree planting was clearly linked to other activities, including flourishing women's groups, adult literary classes, and improvements in education, health and rural development generally.

Another study that is worth summarising here is the well-known <u>Why People Don't Plant Trees</u>, by Margaret Skutsch (1983). Based on the author's work in Tanzania, this is a systematic, comparative study of success and

failure in village woodlots. While villagers appreciate the need to plant trees, there were many failures. "The key to success of village communal woodlots is leadership, not climate and physical obstacles. Where villagers have no conflicts with their village government, woodlot projects seem to start and to thrive . . . . villages where more women were involved generally did slightly better . . . . transport was lacking to take seedlings to the villages at the crucial planting time . . . . decentralization of seed nurseries is desirable but needs a reliable and sufficient supply of water at the villages . . . . extension work is needed on methods of sequential planting and rotational cutting . . . . generally, plantations owned privately or by a group such as a church or school did better than village communal woodlots" (Skutsch, 1983:54-55).

These two examples indicate that there is a range of factors that need to be considered for each area, although regional - and even national - generalizations are often quite valid. It is not necessary to undertake detailed micro-studies for each different area.

As well as looking at who plants, we need to consider <u>what</u> is planted. The Kenya study (Brokensha et al., 1983) stresses the importance of species type. In Kirinyaga many people planted <u>Grevillea robusta</u>, <u>Croton megaloarpus</u>, and <u>eucalyptus</u> species because these trees seed prolifically, and they are easy to germinate. This is also true for the black wattle, though it was found only in the upper zone (another consideration - certain species for certain areas). The grevilleu was favored because it is multiple purpose: firewood and timber. Wattle makes good firewood <u>and</u> charcoal, as well being used as poles; also, the bark can be sold.

There is a vast range in species that are planted, as indicated by this list of trees planted in different parts of Africa, taken from the Riddell and Fortmann survey (1983):

Cocoa, clove, coconuts, cashew, coffee.

Oil-palm, Raffia palm, Agor palm, Ronivea palm.

Rubber, barkcloth, bamboo, mahogany.

Citrus, mango, papaya, banana, plantain, Kigelia Aethiopicum.

Chloraphora excelsa (iroko)

Azadirachta indica

Eucalyptus, wattle

Cassia Siamea

Gum arabic (Acacia verek and A. seyal)

Mangrove

Locust Bean (Parkis filicoidea)

Melia volkensii

Tamarindus indica

Acacia albida, A. tortilis, A. senegal, A. seyal, A. verek (gum arabic)

Aucomea klainiana

Dacroydes edulis

"Dawadawa"

After considering locally initiated planting, the next question is the extent and degree of success of tree planting organized from outside the local community. Special attention needs to be paid to village (or "communal") woodlots, which have been introduced in many countries, though seldom with much success, apart from the special case of Korea.

Problems of village communal woodlots in Tanzania have already been mentioned. One aspect of the Korean success story is that, at least in

recent years, many Korean villagers have access to electricity or other alternate fuels, so that the demands for fuelwood are not as high as in areas where no alternate fuels are available.

Generally, communities lack the necessary cohesion, homogeneity and tradition of co-operation that make communal woodlots likely to succeed. Individual planting of trees also runs into problems, such as the protection of young trees against livestock, or of more mature trees from thieves. Household or compound planting may provide a better chance of protection.

III. RESOURCE MANAGEMENT STRATEGIES, LAND TENURE, AND MODES OF LIVELIHOOD

(A) Rural People as Resource Managers

In this section, we summarize some main aspects of resource management at the local level, or rather, levels. It may be useful to put forward a series of levels at which resource management takes place, and four of the most important are concerned with the household; the community; the local governmental agency; and the state. Often, of course, we find different perceptions at different levels.

A good beginning for an overview is provided by Klee (1980) in his survey of World Systems of Traditional Resource Management. This presents for the major world regions the types of resource use and conservation strategies used by various cultures with various types of economies. At the 'cultural' or 'social' unit of analysis, therefore, one can generalize that most societies had methods of managing resources, though these were dynamic and varied over time. It is important to consider the overall resource

management, not just that of trees and forest resources, as the whole picture gives us a better idea of the priorities of any particular society.

The image of rural Third World people as resource managers has changed considerably during the last thirty years. In general, rural people had a negative image as resource managers. The most extreme view depicted peasants and other rural types as "tradition-bound," superstitious and economically irrational. At its best, rural people were seen as having economies and economic behavior that made sense under "traditional" conditions of sparse population densities and subsistence orientation, but which proved to be ecological and economic nightmares under "modern" conditions.

Of course there were exceptions. For example, Conklin's work on ethnobotany in the Philippines showed the tremendous indigenous technical knowledge to be found among so-called "backward" people. Tax's study of "penny capitalism" among Guatemalan Indians revealed that peasants could be very rational and astute economic actors. Though Tax's and Conklin's seminal works, both published in the 1950's, were influential, (Conklin, 1954; Tax, 1953) as late as 1970, Hill (1970) issued a plea for a study of "indigenous economics."

During the 1970's and 1980's numerous works have been issued that address the issue of resource use and "indigenous economics." From anthropologists there have been detailed studies of indigenous technical knowledge systems (for example, see Brokensha et al. 1981). Olofson (1983) is excellent on indigenous agroforestry systems in Southeast Asia. These studies have not only shown the tremendous knowledge of resources and resource husbandry that exist among many cultures and individuals within a

culture, but also that these knowledge and resource use systems constitute in their own right alternatives to western ideals and models.

A second type of approach taken by anthropologists has been to examine the cultural, ecological, socio-economic, and political factors that influence individual decisions about resource allocation (for example, see Barlett 1980). Once again, rural people have been shown to be quite rational in their decisions concerning their use of resources. Furthermore, this research reveals the complexity of factors involved in decision-making. Though there is disagreement about the degree of risk-taking or security-first strategies taken by rural folk, the consensus is that peasants, small traders, rural wage laborers, fishermen and others are rational decision-makers and resource users.

Both these studies examine decision-making concerning resources, and knowledge of resources, at the individual level (sometimes at the household level). They demonstrate the importance of viewing economic rationality from a cultural and ecological context. Moreover, these studies, along with works such as by Popkin (1979) and Pearse (1980), underscored the need to consider the political economy in which decision-making occurs. However, we should caution that some writers, in their zeal to prove that peasants are knowledgeable and rational, have distorted or romanticized reality, because in fact many decisions that are made today are made from desperation, for short-term needs, and often have ecologically negative consequences. There is no point in ignoring this sad fact. Because in the past, planners tended to belittle indigenous technical knowledge, we must now take care not to make exaggerated claims. In many cases, people have, within a single generation, lost much of their folk botanical knowledge.

Another approach to peasant resource use is that of a "moral economy, a concept originated by E. P. Thompson in his studies of the English Working Class (1963) and later applied to case studies in Southeast Asia (Scott, 1976), and Northern Nigeria (Watt, 1983). According to the idea of "moral economy," peasants follow a "safety" or "survivial first" strategy in resource use in order to ensure household survival/reproduction. Farming techniques and resource allocation are oriented towards 'long-term sustainable income' instead of short-term maximization; people also use social relations (kinship-, friendship-, neighborly-, patron-client ties) in order to ensure household survival. "Moral economy" is said to be disrupted by capitalism (commondity production, individualization of social relations and households, etc).

Other, related, contributions to the theory of peasant resource use include the notion of "rational utility maximisers," stressing that peasant society is composed of "gamblers, free-riders and investors," and that individuals are maximisers according to their own preferences and values (Watt 1983:107, and cf., Popkin, 1979). Many studies of peasant resource underline Polly Hill's often made point that there is no "amorphous peasantry," but rather that individual, household and even community actions show much variation. It is important to remember this, and to avoid generalizations that might imply that all peasants are the same.

Watt (1983:420) and others have also stressed the idea of "sequential adjustments," that decision-making on resource allocation is done on a daily basis by farmers in drought-prone areas, who must constantly be sensitive to changes in climatic conditions.

An important issue, then, is what changes indigenous technical knowledge and strategies based on it undergo when modes of resource use

change. For example, it was observed in Kirinyaga district, Kenya, that many secondary school students were unable to identify local trees and shrubs, although the students had lived in the area all their life. Many boys remarked that they used patent medicines instead of relying on local trees and plants for cures. They also said that they had learned the names of most of their local trees and shrubs when they were very young and herded their family's livestock, but now they were concerned with formal education. In many of their areas, the clearing of land for cash and food crops had made certain trees and plants locally rare, so that they hardly had any contact with them. Finally, as one of the young students said, "We are adopting your culture." That is, Western ideas, beliefs and knowledge are replacing (or displacing) indigenous ones.

The point is that we need to examine contemporary resource management bearing in mind both past patterns, and also present pressures, so that planning programs and projects can be based realistically on what people do, and why they do it.

(B) The State as Resource Manager

There are many examples of the state managing resources, including forest plantations, forest reserves, game reserves, state agricultural farms and so on. Hart (1983) summarizes the situation in West Africa where many states, both in colonial and independent periods, have been active as Agricultural Entrepreneurs: there have been many large-scale agricultural projects (often irrigated) where the requirements of large-scale capital planning, water control and managerial supervision have led, inexorably, to

complete government control. Such projects are usually plagued by bad management, poor labor commitment and technical deficiencies.

States are also able to influence agriculture, and other resource use, through state marketing boards, pricing and transportation policies, credit facilities and many other aspects of development policy.

We do not need, here, to go into all aspects of resource management at the state level, other than to point out their great importance, and to the need of understanding state policy and practice before making any project decisions.

(C) Political Economy of Resource Strategies

Another approach to the analysis of rural resource strategies and resource use centers on political economy. This approach, which has become popular within the last 15 years, considers how resource distribution, political policies, and market forces influence the allocation and use of resources. Political economy approaches have been used by a spectrum of analysists, from anthropologists, economists, historians and ecologists, to political scientists and sociologists.

Like the new approaches found in anthropology, the political economy perspective is rooted in an increased awareness of conditions within the Third World. The phenomenon which has attracted considerable attention has been the growing gulf between rich and poor in most Third World rural areas. This has been documented extensively for all areas: see for example Castro, Hakansson and Brokensha, 1981; the publications of the World Employment Programme of The International Labour Organisation, such as Poverty and Landlessness in Rural Asia, 1977, which provide comprehensive evidence for

the growing inequality. It is more and more common for there to be stark contrasts between the top one or two deciles of population, and those at the lower end in terms of land owned or worked, income, wealth, nutrition and general quality of life. In some countries the position is extreme: "within the last decade or so, millions of Javanese have moved from mere poverty towards the perilous state of indigence, in which there is little or no access to work or food," (I.L.O. 1977:231). This I.L.O. report also emphasizes the need for active participation of the people in rural development, which "cannot be said to have begun without land reform," (p. 34) and these topics are treated elsewhere.

For in Asia, the I.L.O. report cited above makes the following points:

> The most outstanding facts to be noted are the worsening distribution of income and the declining real income of the rural poor . . . ,(p. 9).
> "One structural feature common to all the countries studied is a high degree of inequality." The countries include Bangladesh, India, Indonesia, Malaysia, Pakistan, Philippines and Sri Lanka where, "The richest 20% of households receive about half the income, whereas the poorest 40% receive between 12% and 18% of total income. The bottom 20% fare even worse, receiving between 3.8% and 7% of the income," (pp. 19-20).

We have so far been writing of inequalities especially in such material terms as land, wealth, and possessions. Such inequalities are tending, in many parts of the world, to become more and more institutionalized, being associated with an ever more rigid form of social stratification. When this happens, there is also a sharp difference in <u>opportunity</u>, between the rich and the poor, not just differential performance.

Given these inequalities, what implications exist in terms of resource allocation and use strategies? Studies by Feder (1971), Griffith (1979), Pearse (1980) and others, have argued that skewed resource ownership or control actually leads to the misapplication or inefficient use of

resources. They suggest that resource use could be more efficient and productive, as well as more socially just, if land and other factors of production were redistributed. These same studies also contend that rural elites, through their inequal access to economic and political resources are able to capture the benefits of development efforts. Instead of a trickle-down, benefits of technological and other innovations remain frozen at the upper and, at times, middle layers of society. According to some of these analysts, rural development efforts often work against the pooerer sectors of society. Though the elites may be resource inefficient compared to other sectors of the population, their overwhelming control of economic and political resources allows them to remain in power.

We have described the elites as resource inefficient; we should add that those at the bottom end of the scale are also often poor resource managers. We have seen (in Mbeere, Kenya) how poverty drives men to cut down all their trees to make charcoal, a short-term solution to the need for cash, but environmentally, and in longer economic terms, an undesirable action. And Polly Hill has, as usual, some trenchant observations on this point. In looking at the relationship between farm size and yield (is it direct? or inverse?) in Indian agriculture, she states that "The belief that the poor farmers cultivate their farmland with more care, because they have little better to do, has taken a grip on the world." (Hill, 1980:168). To the contrary, Hill maintains that the smallest dry grain cultivators (i.e., the poorest) obtain far lower yields per acre than the average, because they lack resources (fertilizer, other inputs, capital). They have marginal land, they can seldom interplant, the households have low morale, etc. Robert Chambers (1983) has other explanations of why poor families are

inefficient: they are more susceptible to the seasonal cycle of hunger and illness; they are vulnerable to the "ratchet" effect, when one minor happening can lead to an irrevocable tightening of the ratchet; and they are caught up in the web of powerlessness.

(D) Land Tenure and Land Rights

> It is probable that no single topic has exercised so many students and men of affairs concerned with Africa as has that of land. It is equally probable that no single topic concerning Africa has produced so large a poor literature. We are still abysmally ignorant of African land practices. That ignorance derives less from want of 'facts' than that we do not know what to do with 'facts' or how to interpret them. The reason for this state of affairs is close at hand: there exists no good analysis of the concepts habitually used in land-tenure studies, and certainly no detailed critique of their applicability to cross-cultural study (Bohannan, in Biebuyck 1963:101).

> The analysis of the clusters of rights and claims, privileges and liabilities which are related to the ways in which Africans hold and work the land, live on it and use its products, is complex, on the one hand, because of the difficulties in evaluating the exact nature of the rights and claims, and on the other hand, because of the imbrication of economic and social, political and religious factors. It is, therefore, difficult to characterize African systems of land-tenure in terms of familiar legal and linguistic concepts (Biebuyck, 1963).

An even greater complexity than those envisaged by Bohannan, and by Biebuyck, is that land tenure must also be considered at various levels, of the housheold (or the individual), the community, local government agency and the state, and, as was the case with resource management, all levels are important, and all interact on the other.

The discussion of inequalities in land ownership underscores the importance of understanding how rights to land are defined. Most societies have a variety of ways in which private and public rights of access and use of land are defined. The recent AID/ICRAF/LTC Bibliography on Land Tenure

(Riddell and Fortman, 1983) provides comprehensive overviews of the literature in the major regions, and we will refer to this useful report. In their introduction, the compilers make some important points: "The collection of practices, rules and sociological and institutional relationships are specific to each socio-cultural envrionment," pointing out again the dangers of attempting global generalizations. They state further that, "many forestry projects fail if they are viewed as a threat to existing land tenure rights," implying that these rights, which are "expressions of social relationships," have not been properly studied, understood and taken into account in designing the projects.

To illustrate the complex nature of land rights, we take an example from Mbeere, Kenya, where local people recognize a wide spectrum of rights, which are rapidly changing and contradicting with the granting of individual titles to land, a process that began in the 1970's. At one end of the spectrum we find land owners who explicitly state that no-one has any rights on their land. They emphasize this attitude with unfriendly barbed-wire fences, locked gates and notices saying mbwa kali-hapana ruhusa kuingia ("Fierce Dog-No Permission to Enter," a colonial legacy, as this sort of sign was widely used by white residents in colonial Kenya). Such an intransigent attitude is deplored by neighbors, though they have to accept the prohibition, which is backed by law if not by custom.

It is more common for land-owners to allow others on their land after requesting permission, for a specific purpose, and possibly on payment of a fee. Frequently, differential policies will be applied, regarding permission and/or fees, to distinguish close kin, affines or neighbors who are in some sort of reciprocal relationship, from those more distant, who will not be

treated as generously as the first category. The purposes for which permission is granted include:

A. Crossing the land (e.g. to reach a well or spring and collect water).

B. Grazing livestock.
Collecting wild fruits or edible plants.
Gathering medicinal plants.
Collecting thatching grass, fodder, clay, salt, wild honey, beeswax.
Gathering fuelwood, usually only dead wood and for the collectors' domestic use only, not for commercial purposes.
Placing bee hives.

C. Cutting timber for construction poles, furniture, fences, utensils, tools, etc., or to burn for charcoal. (A fee would almost certainly be charged for this category and for those following).

D. Planting annual crops.
Erecting a temporary dwelling house.

E. Planting perennial crops.
Planting treés.

We have ranked the various land rights into a series of categories, starting from the easiest to obtain (walking across the land) and becoming increasingly difficult to receive, unless there are considerations of payment, or past obligation, or future expectation of reciprocal favor. Note that the right to plant trees is at the far end of the spectrum and it is a right not casually granted, as it implies some sort of permanent rights over the land, whereas all the others apply to a finite time period. Here, as in many other cultures, land is separated from the things on it.

In the Mbeere case, the crucial element was the Land Reform of the 1970's which precipitated a significant series of changes (ref. Brokensha and Glazier 1974; Brokensha and Njeru 1977). We need to know something about the history of land rights before analysing contemporary patterns. In Bangladesh, as Jannuzi and Peach illustrate, "The agrarian structure is defined by a complex set of arrangements governing the relationship of people to the land." These arrangements have been little altered for

decades, and landlordism persists strongly, with landlords still determining the nature of rural Bangladesh's political economy. "Their control of land determines the structure of power (and) who will benefit from rural development programs and who will not --(and)--is the critical variable in determining what is produced for whom, and for whose benefit. As long as this system of relationships persists, the prospects for economic progress are dim," (Januzzi and Peach 1980:79-80).

There are by now many reliable and detailed studies, both at local and national levels, that provide details of land-ownership, often giving the relative proportions of land owned by the top and bottom one or two deciles in terms of land, income or wealth. Sometimes (often in Indian studies) farmers are grouped into high, medium and low in terms of acreage owned or farmed. Sometimes it is necessary to refine categories further to indicate what proportion of land is irrigated, or otherwise superior.

We need first to know how prevailing rights were established and who benefits - and who does not - from the system. This leads again to the question of the landless. According to Jannuzi and Peach, in Bangladesh, 59% of households own 8.33% of the land, (from zero to 2 acres); 29% own 35.35% of the land (2.01 to 4 acres) and 12% own 56% of the land (more than 4 acres each), (p. 19). Other Asian figures have been cited earlier. Brokensha, Riley and Hunt (19), provide figures for Mbeere, Kenya, with comparative figures being available for other regions. In Honduras, Jeffrey Jones (1982:2) reports that: 20% of the households own land; 40% have no access to land, and 40% rents land or squacs.

What is the significance for fuelwood projects? As we have already stated, access to adequate land is a prime factor in determining who plants trees - the landless, and near landless, (who constitute such significant

proportions of the rural population in most Asian countries) can seldom participate in fuelwood projects, because they have no land. Sometimes they are not only excluded as beneficiaries, but they may even end up worse than they were before, as a result of social forestry projects. So in the interests both of equity, and of making a real contribution to the fuelwood problem, we should be aware of land distribution and landlessness. Then we can consider ways of providing for the landless, either by employment in planting trees, or, preferably, participating in planting for themselves, wherever there is any "waste" or commons land, or road verges, available.

(E) Tenancy and Sharecropping

Each area has evolved its own patterns of organising access to land, with different types of tenancy and share-cropping being widely found in Asia. Sharecroppers in Bangladesh, for example, "have primary responsibility for producing crops on the landowners lands . . . they must assume the full risks of production; they are responsible for all labor . . . they cannot acquire credit except from noninstitutional sources and uxurious rates of interest," (Jannuzi and Peach, 1980:82). Sharecroppers are forced to accept the land on the landlord's terms, as they have a low bargaining position. They, "can expect to give at least 50% of a crop to landowners," (p. 82), and sometimes as high as two-thirds of the crop is given depending on what the landlord supplies. Bardhan and Rudra (1980), have provided a good analysis of "Terms and Conditions of Sharecropping Contracts" in northern and eastern India. They confirm that most tenancies consist of sharecropping, mostly on a 50:50 basis, though the tenants share is often less, e.g. in 19% of the cases in West Bengal.

Mahmood Hasan Khan reports on the agrarian structure in Pakistan, which is marked by an almost feudal system of large landlords, who parcel out part of their lands to haris (sharecroppers) for cultivation. Not only do the haris give their landlords between 50 and 60 percent of the gross produce, but the landlords exacted from their tenants abwab and haboob (levies and perquisites) and also begar (free labor). In addition, "The large landowners (over 100 acres) constituted 2% of all owners in the Punjab, but owned 41% of the land. The really large land-owners, with holdings of over 500 acres, constituted 0.5 percent of all owners in the Punjab, but owned 25% of the area," (1981: 131-2).

Nakamura, in his study of paddy agriculture in South India, reports that the amount paid by sharecroppers to landlords is about one-third of the gross yield, (1972:155). Mencher, who studied land reform in Tamil Nadu says that landowners are interested only in short-term tenancies, and are not prepared to permit any tree planting by tenants. In Tamil Nadu, the common system of share-cropping, perpedi-varam, is simply 50:50, but the tenant pays taxes on the land. And if there is a tube-well that irrigates the land, the tenant keeps only one third of his produce, one third each going to the landlord and to the pump-owner. A number of different types of tenancy are described in this major study.

Because of their precarious positions, and the resentment that is often felt toward the landowner, tenants will seldom be interested in tree-planting - as they have no assurance that they will still have any rights on the land by the time the trees reach a useful age. So why should they water, weed, protect and nurture trees for someone else's benefit? In some areas it might be possible to encourage secure, long-term tenancies,

but there is a clear strong correlation between actual land ownership and willingness to plant trees.

(F) State, Corporate, Institutional and Other Group or Public Landholders.

Rights to land are not only vested in individuals, but also in various organizations. The State, which in some countries has full or ultimate rights to land, may have set aside land for forests, military purposes, schools, parks and other uses. National and multinational business firms can own land or hold rights to it through contract. Land rights are sometimes held by kinship-based groups, such as clans or families. Other locally important land owners include temples, religious groups, co-operative societies, women's groups and others. These may have a significant role to play in tree-planting, especially in acting as models for local farmers.

For example, schools can be very significant in encouraging tree-planting, by having school- children actively involved in planting trees at the school compound, as often happens in East Africa as well as in India. Schools may also serve as distribution centers for seedlings, to aid the desirable decentralization of government nurseries. Non-governmental organizations may also be locally important: we need to know who is involved, and could become involved, in forestry projects, as it is often a mistake to assume that the formal governmental agencies, such as department of forestry, can effectively manage everything. What is needed is a wide mobilization of resources and agencies, as was achieved in Kenya by KENGO,

the coalition of local and national non-governmental organizations that are interested, in any way, in promoting fuelwood solutions.

In most developing countries, the State is increasing, rather than decreasing, its activities and scope, which include land ownership, and control of land use, so that it is essential to know what the present legistlation, policies and practices are.

(G) Acquisition and Transfer of Land.

Most areas have witnessed dramatic recent change in the concepts of land, especially regarding its acquisition and transfer as the state usually has exercised more and more control, and more rules and regulations have been promulgated. It is important not only to analyse the formal rules, but also to investigate actual behaviors, and to determine the extent that these deviate from the formal laws and regulations. For example, many nations have attempted to impose a ceiling or a minimum sized holding on the amount of land that any individual may own, but usually there have been many ingenious and successful ways to circumvent the rules.

Mencher discusses the attempt to impose a ceiling on land holdings in Gujurat of 15 "standard acres" (this depends on land revenue assessment, and varies between .2 and 60 acres). Land which was planted with trees for fuelwood was exempt from this ceiling. Trees were supposed to have been planted by the date of the act, 1972, but apparently there is some room for owners to avoid the ceiling. The importance of this is that it was an attempt (even though only partially successful) to impose a ceiling on land holdings, while allowing land-owners who had planted their lands with trees to continue to hold their tree plantations. It suggests that such

legislation should include innovative and flexible provisions that encourage supplementary aims - in this case the provision of fuelwood trees. Of course, there may be many reasons (such as land scarcity) why such "solutions" would be unacceptable, but new ways should at least be considered.

For any specific area, we need to know details of land prices and markets; of the degree of land speculation; of transfers by sale, gift, loan or inheritance; of whether loans are redeemable; the position of women when they are divorced or widowed; of the possibilities of acquiring land by marriage, or labor, as well as by inheritance or purchase; of the land courts and what types of litigations are locally common such as boundary disputes, ownership of land, of trees, or squatters' rights; and of the land records. In most cases neither customary nor modern law will prove to be an adequate guide, and what will be needed is a study of what people actually do in specific situations.

It is important to know not only who owns the land, e.g. proportion owned and/or farmed by the top and bottom two deciles, but also what attempts there have been at land reform. In many countries legislation has been passed, designed to bring about a greater equality, but the rich and powerful landlords often find a way to circumvent the regulations on ceilings, or other matters.

(H) "Common" and "Waste" Lands

These terms are used in quotes as they are often ambiguous and should be treated with great caution. Detailed studies usually show that in fact there is little land that strictly can be classified in either category, as

in practice some person or group often has some rights over almost every piece of land. Conversely, other individuals or groups may specifically be excluded from exercising any rights over the land. It is especially important when setting up village or communal woodlots to ascertain that the land selected is unencumbered. Waste lands, have, of course, other alternative uses - agriculture, grazing, residential, forestry might all be potential uses, according to location. We should bear in mind that there are always competing uses of land.

(I) Land Quality and Value

The size of a landholding is in itself insufficient for understanding its value. A number of other factors, including soil type, water availability, fertility, and ecological setting are important. These influence the types of crops that can be grown and the intensity of cultivation possible. This is particularly significant where a range of ecological zones are within close proximity. For example, on the southern slopes of Mount Kenya in Kirinyaga district, the landholdings in the upper zone tend to be smaller than in the lower areas. But the upper zone plots are considered more valuable because they can grow highly remunerative crops such as coffee or tea. In contrast, the lower zone is too dry to grow these crops (Castro 1983). Other factors influencing land values are nearness to roads, urban centers, and markets, access to farm inputs (credit, fertilizer, technical advice) and ownership of capital equipment (draft animals, tractors, ploughs, irrigation or wells, etc.). In terms of inequality, very often the critical distinction is ownership of the best quality land-as well as differential as to inputs and marketing channels.

What is needed is a knowledge of the values not only of some representative land holdings, but, more important, a good grasp of the range (in quality and value), and of the reasons for whatever variation exists. Then it will be possible to enter into any land use planning with some confidence.

(J) Irregularities and Social Forestry

The presence of inequalities in land, including all its facets, has a direct bearing on access to trees. Briscoe's case study in Bangladesh has documented this. He found that 16 percent of the families owned 80% of the trees, 55% of the cropped land and 45% of the cattle, so that the ownership of the assets which produce fuel is highly concentrated (Briscoe 1979:2). Briscoe highlights the growth in inequality: in the decade since the mid 1960's, about 15% of the households increased their income while the percentage of landless to total households increased from 18% to 38%, and the percentage of families consuming less than 80% of their required calorie intake rose from 5% to 41%.

Given this picture of rising inequality, it is important to ask who will benefit from any social forestry program, and how the poor and landless can be brought in.

Sometimes there are possibilities for employing the latter on forestry programs, but this is usually a short-term expedient. In other areas, it might be possible to arrange for the poor and landless to receive some of their fuel needs from trees planted in villge woodlots (in situations where these have a chance to be successful) or from plantings on waste-lands, or along canals, roads or railways. But it is a pressing problem. Noronha and

Spears (p. 31) report that, "reservation of a percentage of the produce for the landless is to be tried out in the proposed Karnataka (India) social forestry project."

In considering marginal or unlikely beneficiaries, we should include other at-risk groups, including women and tribals. Marilyn Hoskins has prepared for FAO a comprehensive report on women (1983/84) which details the many ways in which women may fail to receive benefits from social forestry programs, or how they might even end up in a relatively worse position. In designing most agricultural and forestry development programs in West Africa, women's use of land is neither considered nor protected, according to Hoskins. "Though women in rural areas are directly dependent on forestry related resources, many forestry projects are designed without a mention of women and without any recognition of the impact the proposed activity will have on them." Hoskins recommends specific ways for ensuring that women do participate in projects, at design and implementation stages, and also in monitoring.

The World Bank Report, Tribal Peoples and Economic Development: Human Ecologic Considerations, provides a good overview of the problems involved in any sort of development involving "Tribals." Annex 1, "Operational Steps for the Project Cycle," is particularly relevant, stressing the need for "an appropriate tribal component" in the project, and outlining ways in which such a component can be designed, preferably by "the tribal agency" if this exists. Noronha and Spears (forthcoming:20-1) also deal with forestry projects and tribal groups, making the same sorts of recommendations. They suggest that tribals' rights in land should be legally reorganized, and that special programs be set up to help them cope with changes.

In considering the position of the disadvantaged, we need to know what their prospects are, what chances they have for improving their lot in life,

and what stake they can possibly have in social forestry, whether from employment or from tree-planting.

We need to know, then, something about the distribution of wealth, power and influence in any region, in order to design an appropriate social forestry program. A profile could be on a national scale, like the useful series of A.I.D. sponsored S.I.P.'s (Social and Institutional Profiles) or on a regional or district scale. But it should provide information on the levels and sources of income, on , the distribution of purchasing power, the extent of local participation in important decisions, the extent of division into classes and the degree of mobility. (See Poverty and Landlessness in Rural Asia). This information is needed so that appropriate project divisions can be made, and so that the beneficiaries can be properly identified, and their needs addressed. Otherwise there is the old danger that all benefits will go to those who have more power, influence and wealth. Recent good analyses of development and the poor include Blaikie et al., who conclude that deprivation in Nepal is caused by - non-participation in selection of priorities; restricted access to the means of production (including land, of course); exclusion for many from the fruits of production. They stress that no projects can succeed "unless they assist the Nepalese disadvantaged to combat the crucial constraints on economic and social development" (1979:96). Forestry projects are subject to this same proviso.

A related volume is Robert Chambers', in which he critically analyses the inter-relatedness of poverty. Chambers writes on "integrated rural poverty", and making the point that the poor have clusters of disadvantages, being not only poor but physically weak, isolated, vulnerable and powerless (1983:chapter 5). This analysis is useful for underlining the fact that

poverty cannot be tackled as an isolated event, but must be viewed in context.

IV. GOVERNMENT INTERVENTIONS IN FOREST, TREE AND LAND MANAGEMENT

This section examines issues and problems related to government interventions in the forestry and land sectors. Our argument is that governments are increasingly involved in forest, tree and land management. We stress that the nature of government interventions is complex. There are different degrees of official involvement in the land and forestry sectors. "Government" interventions will entail a multiplicity of administrative divisions and levels, and will involve a number of complementary, cooperating, and conflicting interests among these organizations, agencies, and other official bodies, as well as between the various government interests and those of different individuals, social groups, and classes. Also emphasized is the need for analyzing government involvement in an historical context since past actions, such as in colonial times, may have influenced existing resource use patterns and local attitudes concerning official interventions. Finally, throughout this discussion we argue that the analysis of government interventions cannot be separated from the political economy and the socio-cultural contexts in which they occur.

(A) The Policy Framework

The first step in considering government forestry, tree, and land management is reviewing policy statements, legislation, and other pronouncements that set forth official rights to, and responsibility for,

resources. This is in order to establish the potential sphere of government control and influence. The word "potential" must be stressed, as these official statements and laws only relate what the government has the power to do. What the government and its various branches are actually doing - and what they have done - are other questions to be answered.

Official rights to resources will vary from country to country. In some countries all rights to resources will be vested in the nation-state, though other public and private rights to land will be respected. Governments may be actual owners or exclusive right-holders to certain resources, such as forests or surface water. Rights of private ownership to land or forests may be restricted. In some countries, such as Mexico or Pakistan, ceilings are set on the amount of land one can own. On the other hand, central governments may delegate responsibility for resource control or rights to regional, district, or other local administrative units. Or resource control may largely be left to the private sector, including landholding by corporate kinship groups.

A second set of statements, policies, legislation, and regulations to be examined are those relating to resource use. This includes policies, etc. concerning taxation, payment of royalties, exports, price controls, incentives for production or consumption, and other aspects that influence the exploitation, distribution, and consumption of forest products. For example, as a conservation measure both Somalia and Kenya banned charcoal exports. In Kenya, in the early 1970's, thousands of tons of charcoal were being exported, at a great profit to the few who controlled the trade, to Arabian gulf countries, where demand for charcoal was brisk. The resulting devastation was quite visible, as trees were disappearing in a hugh area, up to three hundred kilometers from the coastal port of Mombasa. As long as

this trade was permitted, no forestry projects had little chance of success, as the chances were that the trees would be converted to charcoal and sold abroad. But, once the ban was made - and enforced - forest production was much facilitated.

There are a number of questions related to the official policy framework:

> (1) When were these policies established? Many policies and policy statements will probably have been made within the last few years, often reflecting an official lack of awareness or concern about deforestation until recently. On the other hand, many may date back to colonial times, and may be based on conditions that are no longer appropriate.
>
> (2) Related questions are how and why these policies were established, and by whom? To what extent are local needs and concerns incorporated in them?

In many countries, policies concerning forestry management are likely to be uneven. That is, some aspects of forest management will be mentioned while others are excluded. For example, commercial timber exploitation may be covered in depth, including regulations about types of trees that can be cut, where they can be cut, the payment of permits or royalties, export taxes, and tariffs on imported wood. At the same time tree cutting for firewood use may receive scant attention other than the need to purchase a permit. Or else regulation of firewood use may be left to local governments.

(B) The Administrative Framework

Who has responsibility for administrating and implementing official policy concerning forest management? To some extent responsibility may be concentrated in a single agency, such as a forestry department, however, it is more likely that overall responsibility will be diffused among a number

of ministries and agencies - for example, ministries of land, natural resources, water, planning, etc.

Important issues include:

1) Who has responsibility for what? E.g., Management of state forests? Price control of forest products? Enforcement of regulations? Exports?

2) What are the inter-linkages between different agencies? Are there rivalries?

3) What are the sizes and resources of the various agencies? Budget sizes?

4) What are the existing programs?

5) What field operations exist? What are the logistical problems?

6) What are local attitudes towards these agencies?

Let us provide another example from Kenya, where several ministries are involved, and are often competitive (and thus counter-productive) in promoting social forestry. First, within the Ministry of Environment and Natural Resources is the Department of Forestry, which regards all tree-related activities as falling properly within their jusridiction. But Forestry is not very well staffed, whereas Agriculture (the Ministry of Agriculture) has an impressive coverage of the whole country, with over 5,000 agricultural extension officials, who combine good local knowledge with reasonable training. Surely the normal course of their duties should include providing advice and direction on agro-forestry, and just on tree planting? Then there is also the new and small ministry of Energy, which has been given the responsibility to develop new and existing sources of renewable energy, as well as dealing with conventional energy matters. This would include fuelwood, as the single most widespread renewable. The Ministry has a small staff, but does have some funds for its mandate. It is

a confusing picture, and one that is repeated in many other countries. Often the administrative picture is further clouded by the position and power of the donor agencies, which in certain countries can and do wield enormous power. Because of the wide international support that social forestry projects have received - with, apart from USAID, The World Bank, FAO, EEC, SIDA and many other agencies being very heavily involved - the role of donors in this sector is often crucial, on many economic political and administrative levels.

(C) The Local Framework

How are trees, forests, and land governed at the local level? And by whom?

In some cases regulation will be vested in agents of the central government: forest guards, foresters, agricultural extension agents, and other similar personnel. In other situations local officials, including village councillors, headmen, and police, will be in charge of enforcing rules. Where customary management prevails, informal or formal groups of elders, neighbors, and kinsmen may be involved.

What aspects of management and use are governed? These can be broad or narrow in scope, but may include:

(1) Soil and tree conservation, including use of hillsides, contours, terraces, burning, grazing (and number of livestock), cultivation along stream banks and roads, and protection of certain tree species. The cutting of trees itself, even on private property, may require official permits or permissions.

(2) Tree planting.

(3) Charcoal making.

(4) Pest control, including the disposal of crop residues, participation in anti-pest campaigns, and regulation of wildlife that can be killed as "vermin."

(5) Maximum and minimum farm size, particularly in areas that have had land "reform," including land redistribution, land consolidation, and land adjudication.

(6) The planting of crops for famine reserve.

(7) Farm layouts, including advice or regulation concerning placement of home sites, fields, the planting of living fence-rows or placing of fencing, tree planting and use of slopes.

(8) Taxes, cesses, and subsidies on or for certain crops, sale of wood, charcoal and other farm produce.

(9) Loans for farm improvements.

10) Marketing and transport controls on farm and forest produce, particularly during certain seasons or times of shortages.

11) Contracts between farmers, traders, farm employees, and others.

Though regulations may exist about all of the above, this implies nothing about enforcement. What needs investigation is the extent to which local resources are adequate for enforcing regulations, and the extent to which these regulations have popular support. Sometime these regulations were promulgated in colonial times, and local officials may be accused of being "coloniolists" when they try to enforce them. Regulation enforcement may be cyclical, "campaigns" will be launched, public interest and enforcement raised, then the issue will slowly fade from view, wating until the next campaign.

Corruption is another important aspect of regulation. Ceilings on land ownership are frequently overcome by having property titles held in the name of various kinsmen or allies. Black-markets and smuggling of forest products are sometimes allowed to thrive because officials are bribed or are themselves involved in illicit business.

To summarize the local framework, we need to separate several factors. First there are the formal controls, which are often weakly enforced - or may be applied selectively, giving preference to provisions that are easy to enforce, or that generate revenue. Then there is a series of local informal arrangements, which often originate in local culture, and which may or may not have any recognition from formal bodies.

(D) Public Forests

Entire forests may be under some sort of direct government management. For example, in Kenya large tracts of forest are managed by the forest department, though actual rights to the forest may belong to the central government or to local country councils. Specific rules will govern forest access and the extraction of forest produce, which involves a system of permits and royalties. State reforestation and timber programs can be quite sophisticated and involve use of techniques such as the taungya system. This system, which originated in Burma and was first described over a century ago, consisted of planting annual food crops in the teak forests, to the benefit of both crops. This is regarded as the best example of indigenous agro-forestry, and has been used as a model by many governments.

V. PROBLEMS OF SOCIAL FORESTRY

(A) Communal Woodlots

Many reports describe the failure - or at least a gulf between expectations and achievement - of the communal woodlots. Failure is

indicated mainly by low survival rates of seedlings planted, because of inadequate provision for looking after the seedlings. Trees have not been properly weeded, watered, guarded and generally cared for. The reasons are basically those presented by Charles Erasmus, 1977. Rural Third World people are reluctant to work for "The Common Good" when the rewards are so imprecise and uncertain: they lack incentives to participate. Thomson (1979) has made a similar point with specific reference to fuelwood projects in the Sahel; local people were reluctant to participate when the link between their efforts and their potential rewards was unclear. Rather than attempting to create such incentives, it will often be more appropriate to encourage individual tree-planting (but see problems of the landless, below).

(B) Distribution of Benefits

In India, particularly, fears have arisen that social forestry, like the Green Revolution, will be "captured" by the richer farmers, who have the resources (land, capital, labor, credit, network, accessible farms, confidence, skills) to benefit most. The result, say the critics, will lead to increased social stratification, the classic "Matthew Principle" where the rich get richer and the poor get poorer. (See for example Shiva et al., 1982; Alvares, 1983).

While social forestry in India is explicitly aimed at "the creation of forest for the benefit of the community," critics claim that the poor have not benefitted. They say that an inappropriate species, Eucalyptus, was promoted, and because this tree fetches a relatively high price as pulp

wood, food-producing land is being transformed to forests, to benefit industry and richer farmers, with the support of the government.

(C) Use of "Waste Lands"

Despite the variation between different areas, there are often opportunities for using waste lands to grow trees for the benefit of the landless and near landless. Douglas (1982:675) estimates that 80-90,000 ha. of government land is available in the deltaic plain of Bangladesh, as well as "considerable areas of roadside, railside, embankment and other fallow lands." Douglas advocates that the government use this land for fuelwood plantations which would locate the resource in a heavily populated area, where it is needed, and avoid the transportation of fuelwood from remote hill areas. He stresses that the poor and landless would need to participate, not only as laborers, but, "as financial participants in the scheme."

(D) Participation

Despite all the calls for local participation in social forestry, this has been as difficult to achieve as it has been, generally, in all rural development projects. Because of the problems involved, it is worth examining the relative success of non-governmental agencies. Chowdhry (1983:87) reports that "Anandniketan Ashram, a Gandhian voluntary agency, has succeeded in a massive program of social and agro-forestry involving popular participation. In 1982, tribals planted 1.25 million saplings on their lands and wastelands with a survival rate of about 90 percent." It is

noteworthy that, "the Ashram assists in integrated development of villages, with special emphasis on lift irrigation, agriculture, hybrid cotton, education, health and family planning, resolution of social conflicts, and now social forestry and development of wastelands . . . . The scope of non-governmental agencies for social forestry is indeed enormous."

We stress the need to involve local people. Here, for example, is a statement from a description of a Thai forest project (Northeast Thailand, n.d.), "Fortification of forest management within the ambit of forest estates and forest laws has led to the neglect of opinions of rural people who also use forest produce and forest land, with disastrous results which are now beyond the control of the forester."

A novel form of participation has been reported from Nepal, by Messerschmidt (1983). Known as "Gaun Sallah" (lit., village discussion), it is "an attempt by the agency to formalize an effective and efficient system of panchayat-level Resource Development Planning in Nepal . . . . The goal is to encourage the commitment of village organisations and groups in the implementation and long-range management of project field activities and inputs." Messerschmidt emphasizes the importance of: early involvement of local people; the analysis, in printed form, of a data base; bringing together officials and local people to create a "minimum standard dialogue," and to help local people articulate and present their wishes. This particular method may not be universally applicable, but it is an example of an innovative approach to improving participation. The work of Norman Uphoff and his colleagues at Cornell University is also relevant here. (See Uphoff, et al., 1979).

It is also advisable to extend the reach of projects beyond the planting of trees. "Forestry projects which are not linked with other land

and resource use objectives tend to run into difficulties," (Berry and Thomas, 1983:28).

(E) Variation

This cannot be over-emphasized, both variation between regions and also between communities in the same area, in terms of: population density, settlement patterns, social stratification, physical endowment, past development history, homogeneity of cultures, land availability, government presence, external links, patterns of debt and expenditure, labor demand and supply. Similar patterns of variation are to be found between households, as well as between individuals. Polly Hill (1982:XI) has rightly stressed that any one country has many agrarian systems: there is never one prevailing system. And each one has different implications for poverty, and for public policy.

Seasonality must also be taken into account, as fuelwood supply and demand are subject to seasonal variations, as noted above. For many, especially the poor, the wet season before the harvest is a time of shortage (of both food and fuel) and of illness.

(F) Conflicts

Another broad social factor, possibly affecting social forestry projects, arises from conflicts. Whether these are international, or intra-national, they limit possibilities because the losers - whether refugees,or despised minorities, or defeated rebels - obviously lose whatever control they had over natural resources. Clearly, in areas where

there is, or recently has been, tense inter-group conflict, the whole pattern of natural resource management will be distrubed. We think of Uganda in the mid 1970's, parts of Assam or Sri Lanka during 1983, or much of contemporary El Salvador, or parts of Ethiopia or Sudan, today. These are distrubed areas, and the disturbance inevitably spreads to natural resources.

VI. EMERGING ISSUES

Here we provide brief summaries of what seem to us to be the most important issues that emerge from our discussion of resource management systems and fuelwood/agro-forestry projects.

1) Eco-system: We need to see fuelwood as part of a socio-economic-ecological system, and to understand the other parts of the system. Also the need to consider peoples' perceptions of the system, and their behavior, especially their production systems and other livelihood strategies. Fuelwood and resource use need to be understood within an historical framework as well. This takes into account factors such as demographic growth or fluctuation, changes in technology and production goals, changes in consumption and culturally-defined needs, political interventions, and other forces and events that influence resource use. Hence, any eco-system has its historical as well as contemporary dimensions.

2) Relationship between Indigenous Knowledge systems and Envrionmental Deterioration: Indigenous Knowledge is variously despised as irrelevant, supersitious and environmentally disastrous, or revered as being marvellously balanced with the environment. Detailed studies suggest that

there was a great variety of local natural resource management practices, ranging from conservative (occasionally even expressing an almost mystical harmony between all living beings) to a wanton destruction, often done in the belief in the inexhaustibility of the resource. In many instances, previously conservative practices have been abandoned, modified or distorted so that the result today is to create pressure on the environment. Such changes usually arise from rapid population increase, and increased pressure on land; or from the introduction of new technology, or from other traumatic changes caused by modernization.

It is important to understand indigenous belief and perceptions, even if they are discovered to have undesirable consequences in the long-term, as any successful development project must take these into account.

Attention ought to be given to the range of indigenous knowledge found in a given population. How are new production inputs and government policy measures concerning resource use incorporated (if indeed they are), into indigenous knowledge systems? Can indigenous knowledge be incorporated into existing agricultural or other rural extension programs?

3) The role of governmental and quasi-governmental agencies and the role of the state in resource management. The relationship of foresters and extension workers to local people. We need to look at the Policies of government towards resources. The extent to which local governing bodies have - or ought to have - a say in the management of resources.

4) How inequality affects different social groups regarding fuelwood and other natural resources. How different economic interests produce different ideas about resource management strategies: e.g., land-owners, tenants, landless; herders and farmers; men and women; rural and urban dwellers.

The role of informal networks (eg. kinship, friendship, patron-clients) in governing access to resources needs to be given more attention. It is important to establish whether these networks are becoming less important as commercialization of resources and production increases. Also, we need to look at the incentives and goals that are guiding resource use in a particular situation. Are resources being used to ensure household long-term survival, or are the goals of production short-term income maximization? Are either of those two goals more conducive to resource destruction or conservation? These relationships, which ought to appear obvious, remain unclear in many situations.

5) The question of the appropriate species to be used may be of great importance. Reservations about eucalyptus have been expressed from the Sahel to India, (Thomson 1981, Subramanian 1983). What indigenous species are being under-utilized? (Thomson 1980b; World Bank FY 1982). We should consider also what are the best ways to distribute seedlings to farmers: centralized government nurseries, or individual, or group private efforts? Should seedling production be subsidized?

6) We should examine the position of all groups who might not benefit (or whose position might be made more difficult) by reforestation projects. The overall position of women needs ought to be carefully examined, (see Hoskins 1983; Williams 1983). What are the effects of projects on women's roles and rights?

7) Before making any policy or project examinations, examine carefully what people do, which trees they plant, what the rural energy picture is, what are the basic divisions in society. What is the appropriate strategy for reafforestation? Private landowners? Use of public land? "Communal" or kinship-based public land? Should reafforestation be based on small

units (eg., farmers, small areas along paths, roads, canals, etc.) or a relatively large-scale plantation approach.

VII. Policy Recommendations

We believe that further literature searches without complementary action would not yield substantial benefits. This is not to say that we assume that we have covered all the relevant literature. We realise that there are still many agency (USAID, World Bank, FAO, SIDA) documents that contain useful information. However, the law of diminishing returns would certainly apply to an intensive examination of these documents, as the main problems are by now well-known.

If further extensive literature search is not to be recommended, what other avenues are open? Before answering that, let us review some of the urgent questions. During the past five to ten years, countless projects in fuelwood/agro-forestry have been set up, by numerous governmental and international agencies, in nearly a hundred countries. There is a general feeling, only partly documented, that many of the projects have been failures, or at least that they have failed to reach many of their basic goals - especially goals concerned with local people's participation, involvement, and benefits. What is desirable is a careful cost/benefit analysis of a large representative sample, such as Development Alternatives Inc., did, with diligence and effectiveness, when they made their 1976 study "Strategies of Small Farmer Development," for AID. This study concluded that, "success in terms of increases in small farmers' incomes, agricultural knowledge, self-help capability, and the likelihood of the project becoming self-sustaining were most affected by the local action taken by small

farmers - community involvement in decision-making and resource commitment in labor and cash were particularly important, together with the involvement of local organizations. This local action accounted for 49 per cent of the variation in overall success rankings."

It would be rewarding to commission a similar sort of survey for fuelwood projects, but it is unlikely that an adequate data base exists, to compare many different projects and to arrive at valid comparative conclusions.

So what is needed, really, is a balance of carefully chosen field visits, combined with a selective use of appropriate documents. AID's Office of Evaluation, after all, pioneered this approach and has wide experience of evaluating projects in other sectors - agricultural research, water, irrigation etc., - so the Office should now have a developed capacity to undertake (or to commission) a comprehensive evaluation. We recommend that the following procedures be followed:

1) Choose three or four representative regions for detailed study. These might include: Africa-Sahel; India-Gujurat and Uttar Pradesh; Pakistan-Gujurat.

2) Arrange for a small field team to visit projects in the areas chosen, after they have analyzed all available reports.

3) If practicable, the studies should extend beyond AID projects to include those sponsored by World Bank, SIDA, FAO or other governmental agencies and NGO's. This is most desirable and would give a much more balanced picture.

4) The evaluations should attempt to assess the significance of the factors we have emphasized in terms of success or failure of the projects.

5) The teams should make specific policy recommendations to correct distortions and to improve future projects.

6) Projects should be balanced in terms of including emphasis on total eco-system, not just trees.

7) The importance of systematic monitoring and evaluation should be spelled out, together with specific suggestions of how these should be done, and by whom, and when.

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