ECONOMIC ISSUES IN FORESTRY AS A DEVELOPMENT PROGRAM IN ASIA*

Daniel W. Bromley
Professor and Chair
Department of Agricultural Economics
University of Wisconsin-Madison
U.S.A.

The purpose of what follows is to present a conceptual framework for the consideration of forestry activities as they relate to the process of social and economic development in Asia. The task is made necessary by the fact that forestry is an unconventional enterprise for the development fraternity, and as such there is little common understanding of how one might define the problem, how solutions are formulated, and how evaluation might proceed. This is in contrast to conventional agricultural projects where there is not only an extensive history of activity, but also a large technical staff in place—not only in the host countries of Asia but also in the external development community.

There are several main points to be established in what follows. First, forestry is simply another possible form of land use; it is no different—in most important dimensions— from other ways in which man makes use of plants for material sustenance. Second, to the extent that forestry is different, that difference is predominantly institutional in nature rather than technical. That is, the aspect which differentiates forestry from many conventional agricultural projects is that forestry often occurs on lands over which property rights are of a different nature than they are on cultivated lands. This different institutional structure introduces an interesting dimension into the formulation, design, evaluation, implementation and operation of a forestry program.

The paper is divided into four main sections. In the next section I will discuss the "process of development." In the following section we will then explore forestry as it relates to this process. Following that there will be a discussion of the economic issues in forestry and development. Finally, I will close with the implications for international development assistance. It is here that we will explore the essence of formulating a forestry program that relates to the central needs of a larger development program.

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I. THE PROCESS OF DEVELOPMENT

In this section of the paper we will cover two main subjects: (1) the essence of development; and (2) the process of development.

The Essence of Development

The task of discussing the role of forestry in economic development is one that cannot be avoided; to proceed without this background is to fail to establish the context within which forestry programs must be conceived, formulated, and evaluated. While this is not the place for a treatise on the full range of issues encompassed under the heading of development, it is nonetheless possible to present the essential features of economic development as I interpret that concept. To facilitate the task I will draw a distinction between the essence of development at the local level, and at the national level. I will introduce a third dimension into the discussion by reminding you that many of us represent yet a third major component—the external assistance agencies that bring program and project priorities to a developing country, and that offer financial inducements to these countries to accept our particular concept of both the essence of development, and of the "appropriate" development process.

At the local level—out on the ground in the villages and cities of Asia—there is, of course, a concept of socioeconomic existence that very few of us can claim to comprehend; to deny this is the most pernicious form of imperialism. I am afraid that some economists are seriously arrogant in this regard. Many of my colleagues proceed as if ultimate truth was revealed with the public recognition of Adam Smith and that to waiver is to sin against high principles.

I do not propose to spend much time here reminding you of the socioeconomic reality of village Asia—most of you could do that better than I. What I do intend is to place that reality in my own conceptual terms so that I can proceed with the subsequent—and more important—task of discussing the opportunities that forestry activities offer to those interested in the economic problems of these villages.

At the village level—whether in Asia or France—we find economic units, be they commercial firms, households, or individuals, operating within a rather constrained economic environment. Let us refer to this environment as consisting of *choice sets*. That is, each economic agent—and every individual is an economic agent in the generic sense—is constrained by the institutional structure of the culture in which that agent lives. A caste Hindu operates in an institutional structure that is both similar to, and different from, the institutional structure within which a Muslim lives. In the same village there are institutional arrangements that operate equally on both, but there are also some institutional arrangements that are not shared.

Some of the common elements of that structure would be those conventions and rules that define civilized behavior; that is, community sanctions against murder, theft, arson, and so on. Yet another set of institutional arrangements would encompass economic exchange in the marketplace, landlord-tenant affairs, and the like. While terms of exchange (prices) might vary slightly depending upon one's religion or familial ties, the basic structure of economic exchange is set, and is known.

I refer to this set of institutional arrangements as *operating rules*. That is, the institutional structure at this level defines the environment within which individuals struggle to "make a living." These rules define their individual— as well as their collective—choice sets. Individual economic agents attempt to enhance their economic and social condition within the confines of choice sets. For the most part, the individuals have little influence over the nature of those choice sets. They must do as well as they can in an environment that has been defined for them. Indeed the essence of socializing the young is the process of teaching acceptance of those institutional arrangements—whether over "table manners," respect for the elderly, honesty, reliability, diligence, hard work, marriage arrangements, religious practices, and so on.

The acceptance of this set of operating rules at the local level is the prerequisite for accepting the notion that socioeconomic life in the village is very highly defined and structured. But more is required. We must also recognize that this structure gives rise to a unique concept of "problematic situations" and thus to the preferred solutions to those problems. Very little that is new to the village can exist without confronting some of these institutional realities. Those of us who work in development often forget that institutions are not *costlessly* malleable. Of course they can change, and some of them should change. But let us not forget that we are playing with people's lives when we blithely suggest various "interventions." While some will be aided by such interventions, there are others who will be seriously harmed.

Let me now introduce the concept of *technique*. Technique is that set of tools and knowledge that comprises the production possibilities of the individual and the collective. It is only when we introduce institutions that we have technology. Technology is a combination of technique and of institutional arrangements. When we talk of "rice technology" in Asia we are speaking not only of a set of machines, seeds, tools, and knowledge about how to combine labor, land and water with these physical objects, we are also implying a particular set of institutional arrangements that defines land use patterns, water control practices, marketing opportunities, labor opportunities and obligations, and diet of the people. This is technology.

Much of what is done in the name of development is a process of introducing new techniques—seeds, machinery, ditches—but not new technology; the hardware but not the software.

We know that new techniques are readily adopted if they fit into the existing institutional structure, and if the losses of important participants in the village are not severe. But it is the possibility of loss that creates a certain resistance at the local level to any change. That is, there is tension at the local level in terms of the advantages and disadvantages that flow from the prevailing structure of choice sets. The prospects of a new configuration of advantages creates tension within the local setting.

Of course there are not only tensions at the village level— there are concordances as well. Most all prefer a "better" life for themselves and their family, all merchants want more business, farmers all want higher yields and prices, and all want a certain harmony and stability. Everyone is interested in what we call "Pareto safe" changes—those in which everyone is made better off. Unfortunately there are few Pareto safe changes to be made; most change helps some and hurts others. This is the reason why the very prospect of change heightens tensions at the village level.

But this also explains the attraction of external assistance, whether that assistance comes from a regional or national capital, or from a foreign country. Somehow the perception exists that external assistance will be Pareto safe—all will gain, and there will be no losers. The history of development assistance belies that perception.

Mechanized agriculture in a labor surplus economy may make sense to national governments concerned about urban food supplies. It may make sense to those who deal in imported farm machinery, and those who export such equipment. And hence it should come as no surprise that it makes sense to those in the business of development assistance. Is it so obviously beneficial to the agricultural laborer? To the local blacksmith who makes small hand implements? That their interests are sacrificed for the larger "good" is a fact of life the world over; the imperative of change implies that there must always be some losers.

My purpose is not to lament the existence of losers, but to use the fact of losers to remind you of the tensions that exist at the local level—tensions that are exacerbated by the external imposition of—or opportunity for—new techniques. This is the essence of the interest in "appropriate technology," where technology is here used in its more conventional sense.

Let us now turn to the concerns at the national level. Here we find a structure of institutional arrangements that defines choice sets, but the agents are engaged in a slightly different endeavor.

Here the task is to search constantly for a structure of operating rules that will induce individual economic agents—those individuals, firms and households in the villages—to operate in such a manner that certain collective goals are attained. After all there are people who must be fed, goods that must be produced, armies that must be maintained, imports that must be financed with exports, and so on. We cannot dwell too long on this level, except to point out that here choice sets are both adhered to, and changed. Those in government must abide by certain institutional strictures, but they are also in a position to influence the choice sets of a large number of economic agents at the village level.

If cotton becomes an important source of foreign exchange with which to acquire necessary (or desired) imports, then there is interest in enhancing the production of cotton. This might take several forms. The price of cotton might be influenced to make it more attractive vis-a-vis other crops. Certain subsidies might be offered to cotton- related inputs or marketing requirements; cotton seeds might be sold at a bargain, cotton gins might be constructed at government expense, or rail lines might be constructed to transport the crop. Also, entire irrigation projects might be created.

There is another side to this however. If cotton suddenly becomes a desired commodity at the national level then it is possible that some other crop will become less desired; those who had been producing that particular crop might be hurt by the "policy change." It is this prospect that epitomizes the second important tension in economic policy; the tension that results from a divergence between what is necessary or desired from the perspective of the national government, and what is necessary or desired from the perspective of the individual economic agent.

We do not need to accuse either participant of being misguided or incompetent; it is the simple fact that individuals in a society have different objectives, and the interests of certain individuals are not always consonant with the interests—or needs—of the collective.

Let us now introduce the third component of our system—the external development community. The activity within this component is also constrained by a set of institutional arrangements; which countries are to be helped, how much money is to be spent, the terms of that spending (loans, grants), the purposes for which it can be spent, and even the manner in which it can be spent. These institutional arrangements define—in a very specific way—what shall constitute "development" as seen in the eyes of the external community.

This institutionalized definition of what constitutes development imposes important constraints on the national governments, and on those at the village level. We have seen that at the local level, a Pareto-safe situation is seemingly enhanced if there is external assistance that will make everyone better off. The same concept often holds at the national level where external assistance is seen as a mechanism for achieving certain national goals without having to sacrifice others. Just as the local level is greatly influenced by the objectives of the national level, so is the national level greatly influenced by the objectives of the external participants in the development process. This influence is, for the most part, unidirectional. After all, the party with the funds usually defines the nature of the enterprise—even within some narrow strictures.

The availability of money and the control over project design and evaluation means that the external level can essentially define the nature of the problem for both the national and the local levels. And if the problem is so defined, the solution set is similarly constrained.

This should not be taken to mean that there are not areas of concordance between the external component, the national component, and the local component. Each participant shares the goal of improving life at the village level, and of solving important problems there. But, as with the national-local link, there are disagreements over the specifics of what will be done. And these disagreements imply that the external level imposes choice sets on the national level, and these in turn impose choice sets on the local level.

Consider the problems of the pastoralists in Africa. A variety of institutional constraints have been imposed as a result of colonial administration; such constraints—or new and imposed choice sets—have eliminated a number of traditional responses to climatic variation. Hence, adaptations that were formerly made are no longer possible [13,14]. The "development community" is often prone to define this problem as one of inappropriate technique in that fences, tubewells, irrigation, and so on are perceived as the "solution" to a misspecified problem definition [1]. These are the things that the external level is able and willing to finance— and it is this aspect that permits both the external level and the national level to avoid the basic institutional problems that created the current crisis.

In summarizing this discussion, we operate in a setting where tensions exist within each of the three levels, and among the three levels. Because the external level interacts with the local level through the intermediation of the national level, we can generally talk of a linear pattern in which the external level imposes choice sets on the national level, which in turn imposes choice sets on the local level. It is not an overstatement to argue here that this structure defines what the development "problems" are, and what the appropriate solutions are. It is for this reason that development assistance usually functions on projects—for projects embody precise responses to perceived problems, and projects allow one to obligate funds. These two aspects—projects and money—symbolize the essence of development as it has been practiced.

Recognizing the foregoing as the structure within which development activity will continue to operate is not to deny the chance for some improvements in how the process works so as to achieve the goals of all three of the participants. For that I propose that we focus on development as "problem solving."

Some will object that development has always been such. Farm- to-market roads solve a problem for those wishing to transport goods to market; irrigation projects solve a problem for those who wish to grow a second rice crop; cooperatives solve a problem for those who are being mistreated by a single large buyer of their produce; rural credit solves a problem for those who were forced to pay exorbitant interest to a powerful moneylender.

While this is often appropriate, we must not forget that our earlier discussion emphasized the extent to which "problems" can be defined in terms that suit the external or national levels. For instance, few would question that a second rice crop can significantly enhance the income of a farm family, or secure a more even diet throughout the year. But this should not blind us to the reality that there are a number of other policy instruments that might also achieve these policy objectives. By not pursuing these other policy instruments the national level is able to secure increased rice production with which to feed the urban population—or with which to obtain foreign exchange—while the rice farmer spends more of his time bent over in the paddy. It is not immediately obvious that both participants, the national policy makers and the farmers, gain equally in this. Of course no one says that each must gain equally. But the question still remains one of whose problem is really being solved?

One cannot help but speculate that one important reason why village forestry projects have so far been of little interest to external and national participants is that they provide little food for urban markets, and there is scant export demand for their products. To be less kind, we may be observing a pattern of domestic colonialism wherein the national governments—aided by external development assistance agencies—view the village economy as a source of products for the "colonial power." This hypothesis is consistent with the long interest in commercial forestry activities. It is also consistent with the fact that urban areas are increasingly plagued with shortages of fuelwood, and suddenly many governments have become interested in village forestry projects.

Let us return, for the moment, to our discussion of development as problem solving. Let us also turn our attention to the problems that tend to arise at the village level. By doing so I can

illustrate the ways in which forestry activities can be an integral part of what we all hope to achieve in the name of "development."

The Development Process

If we agree that development should be concerned with problem solving, then the process of development ought to be concerned with a careful definition of problems at both the local and national levels, with the formulation of possible solutions to those problems, with the detailed evaluation of those solutions, with the careful implementation of the chosen solutions (which may be projects in the classic sense, but need not), and with the monitoring of the results of those solutions. But what is the nature of these "solutions"?

In essence these solutions are incremental modifications in both technique and institutions that define—give shape to— the socioeconomic situation in both a local and national dimension. The presumption being, of course, that the problem will have been solved. But we never solve *the* problem, we only solve *a* problem. That is, when the current problem is solved, there will be yet another that commands our attention. It is easier to think of the process as a continual effort to relax—one at a time—the binding constraints that inhibit the attainment of certain objectives.

Because of the central role of both techniques and institutions in this conception of development it seems appropriate to elaborate somewhat. Technique, as intimated earlier, represents the physical capital of a society. The technical structure of an economy consists of the machines, the physical inputs, and the knowledge that reveals how those physical objects are to be combined and utilized. Some will tend to think of this as the "technological base" of an economy, but technology—as will become clear below—goes beyond mere physical and mental objects. Technique will here be taken to represent the specific manner by which humans interact with their physical surroundings to create objects of utility—whether food or music, clothing or crafts, shelter or stories. The bullock cart and the scythe are tools but they are also technique in that they are used in particular ways to accomplish particular tasks.

High yielding varieties of rice—as well as traditional varieties—represent technique. Irrigated agriculture is technique, just as planting corn on steep hillsides in such a way that serious erosion results is technique. Gathering firewood and dungcakes for home energy use is also technique.

I wish to emphasize that technique is the barest physical aspect of man's daily existence. What transforms technique into technology is the institutional structure. Institutions are created by collective action in restraint and in liberation of individual action; institutions indicate what individuals can and cannot do, what they can expect others to do or refrain from doing, and what they can expect the sovereign to do in their behalf, or to their detriment [5].

Institutions represent those conventions, norms, rules, and habits that define individuals vis-a-vis others in the polity, and individuals with respect to the sovereign. Property arrangements with respect to tools, land, and livestock are institutions, but so are conventions regarding marriage, childbirth, diet, clothing, and burial. Institutions give shape to the myriad individual actions in a society. Institutions create order out of chaos; predictability out of uncertainty respecting the actions of others [11].

It is when institutions combine with technique that we finally comprehend technology. For technique without institutions is inanimate and useless. Who, after all, would pick up a hoe to plant seeds without knowledge of ownership of the hoe, and without assurance that she can reap where she has sown? Institutions define technique in a social setting and motivate its use to privately and socially beneficial ends. Irrigation mentioned briefly above is technique when discussing ditches, dams, and control structures. But when combined with the institutional arrangements that define how water is to be allocated along an irrigation canal we then have technology—irrigation technology that includes the cultural practices, and the technique.

Institutions define the technological structure of a society and as such the perpetual question

as to whether institutions lag behind technology, or vice-versa, is without meaning. Institutional arrangements will define the relative attractiveness of "traditional" versus "modern" agricultural practices and hence certain techniques will be favored by certain institutional structures. But institutional arrangements will also look differentially attractive depending upon the particular techniques available and so one might equally argue that technique is a constraint on institutional innovation.

There are two general schools of thought regarding ways in which to spur economic development. The conventional wisdom in agricultural development—indeed the raison d'etre of the scientific revolution in agriculture—is that farmers need to have access to the improved techniques and to foreswear their traditional practices. The basis of this approach to economic development is the quality of the productive factors at the disposal of the farmer—the seeds, the fertilizer, the land, the water control, the pest control, and so on. There is another view, less accepted to be sure, which might be depicted as follows. Under any given technical structure, it is the institutional arrangements that will foster economic change and development. Consider the problem of inertia in a rural economy. The traditional farmer is resistant to change for the simple reason that it represents a new choice set.

There is clearly nothing intrinsically bad about being confronted with a new choice set; the problem arises when the farmer is faced with the uncertainty that such a set implies, and the prospect of failure from a new production configuration. This is the reason why peer demonstration efforts in developing countries are so much more compelling than the results from government demonstration plots. But the costs of change are partially moderated by an institutional environment that permits the individual economic agent to acquire a small surplus—a cushion above and beyond subsistence needs—to insure survival against the uncertainty of the new environment.

Those of us who work in development must be ever mindful of the reality facing those living close to the margin of survival. This reality influences the way in which they will define problems, and their preferred solution to those problems. It will also influence their interest in the solutions that are imposed by both national and external actors in the development process.

The development process therefore, to be successful, must be designed in such a manner that the problems of those at the village level take precedence over those defined by national or foreign participants. The process must be such that the needs of the local participants (usually referred to as "beneficiaries" in a rather presumptuous statement) are met. And the process must be consonant with the larger part of the existing technical and institutional structure at the local—village—level.

These conditions are obvious to anyone who has spent time in the development business, but their relevance to the task at hand justifies their emphasis. And their immediate pertinence for a discussion of the role of forestry in development compounds that justification. Let us now turn to a more specific discussion of forestry and economic development.

II. FORESTRY AND THE DEVELOPMENT PROCESS

In this section I will present a three-part treatment of several important issues that dominate the role of forestry in development. The first of these concerns the role of forestry in the economic life of the typical Asian village. The second concerns forestry as it relates to our earlier discussion of technique and institutions. Finally we will explore the relationships between forestry activities and conventional rural development programs.

Forestry and the Village Economy

We must start by recognizing that forestry represents but another possible use of the land—a

use that is usually at the "extensive" margin with respect to labor applied per unit of land. To those of us engaged in development work, the usual focus of our concern and analysis is the private land that is used "intensively," and the social infrastructure that contributes to the economic value of that land—infrastructure such as extension advice, input supply operations, irrigation systems, marketing cooperatives, farm-to-market roads, and the like. I want to emphasize this point before moving on.

We must recognize the obvious fact that much agricultural land is only relatively more valuable in agricultural production because of the combination of private and social capital that has been added to enhance that value. While there are, to be sure, large areas of agricultural land that are naturally very productive—and hence are most suited to crop agriculture rather than to grazing or to forestry—there are also many acres that are only cultivated because social investments have made them suitable for that purpose. Hence, one must pause before making bold statements about the "unprofitability" of forestry projects, or of extensive land uses such as grazing and forestry. The economic value of land is often as much influenced by what auxiliary investments have been made to complement that land as any inherent quality. In the terms of our earlier discussion, it is the institutional structure—of which social capital is a part—that largely determines economic values.

This implies, inter alia, that the relative "profitability" of conventional agricultural projects vis-a-vis forestry projects is simply an artifact of the institutional environment in which those two alternatives are being compared. Indeed, the essence of a forestry program—in contrast to forestry projects—is to bring into balance this disparity in social overhead capital and institutional arrangements. More will be said on this below.

Turning now to a more specific discussion of forestry at the village level,let us start by considering the proposition that one central problem with the economy of many Asian villages is that the vast majority of the land on which their existence depends is under an uncertain institutional structure, or if not uncertain in nature, indifferent in terms of administration. This does not, of course, refer to the crop land that is so intensively managed, and that provides the bulk of human sustenance. But it does refer to the large areas of South and Southeast Asia that were at one time forested and that now provide livestock forage, forest produce, and so on.

Put somewhat differently, crop agriculture takes place on land where property rights are secure, known, and usually respected. By way of contrast, animal agriculture—and certain other uses of non-crop land—occur on lands over which a complex arrangement of property relations exist, these are often unknown, and they are only indifferently enforced. Or, as with some national "forest" lands, access is absolutely prohibited.

The economy of the village, therefore, is dependent upon some lands (often a relatively small quantity) that are held in private ownership by a subset of the population, and the remainder of the lands are off limits to everyone—just as are the private lands to the majority—or are of unclear institutional nature or administration such that their full economic potential is suppressed. It is this fact, rather than the fact that one type of land produces labor intensive crops while the other yields extensive produce, that differentiates crop agriculture from "forestry" broadly defined. The difference is not technical but institutional; nor does it have anything to do with the frequency with which the respective yields can be harvested.

It is this difference in institutional arrangements over land that explains the ravaging of existing (and former) forests. And it is this aspect that dominates the prospects that forestry projects will succeed in any particular location.

Considering these two broad classes of land—"cropland" and the other "agricultural" land—will facilitate our further discussion of the role of forestry in the village economy. I want to proceed by arguing that forestry is but one particular class of use for the agricultural land (non-cropland). Of course forestry occurs on private lands, just as does crop production. But for now let us confine

the discussion to the non-private aspects.

The point that must be stressed is that the village depends upon both classes of land, and that without each of them the local economy would be seriously affected. Consider first the issue of sequential uses of the land—or what the economist would refer to as "time" utility. The village economic system consists of a carefully balanced land use pattern both within a particular season, and across seasons. Non-private land provides time utility by making available other lands that can accommodate various uses when private lands are not usable. While rice paddies are flooded livestock must be kept elsewhere. When labor is in short supply, the non-private lands may provide a convenient place to maintain livestock. These attributes would represent time utility. If we calculated the contribution of these lands averaged over the course of the full year their economic contribution would not be very significant. On the other hand, if one considers the value of these lands during a specific time of the year their value to the individual or to the village may be extremely high; in the absence of those lands the alternative may be quite expensive.

The concept of space utility—as with the concept of form utility— is closely related to the above discussion. Space utility is the simple existence of spatial options to villagers regarding the location of certain activities. Form utility encompasses the idea that different types of land provide different attributes throughout the course of the year—open range provides sustenance of livestock when they cannot be on cultivated lands, the forest land provides a different bundle of products than what is available from private lands, and so on.

The point to be emphasized here is that forestry is but a particular type of activity that occurs on those lands which are not currently suited for intensive crop production. But the village economy requires a mix of products—not all of which are available from cropped areas. As examples we have livestock forage, small timber, poles, fruit, and some large timber.

Forestry as Technique and Institutions

Let us now consider forestry as it relates to technique and to institutions. As discussed earlier the combination of technique and institutions defines what we mean by technology; forestry technology is nothing more than the particular configuration of plant life and institutional arrangements that control access to the produce from the land. Forests have been devastated in Asia because of institutional problems not because of technical problems. Similarly, forests will be restored because the institutional arrangements are conducive to that outcome. However, the best-suited species in the world cannot survive the continual abuse by man or livestock.

It is this problem that confronts us in development work. The institutional structure—the choice sets—must be conducive to control of resource use on lands where control has been missing. There is no doubt that private land can be controlled. The tradition is well ingrained in all residents of the village to defer to the private property rights of those lucky enough to own agricultural land. The existence of fences often reinforces this cultural reality.

But what of the non-private land? The missing element is the universal recognition of the need for *common property* institutions that protect the interests of the residents of the village. I draw a distinction between common property resources and open access resources. Although the former term has been indiscriminantly applied to all resources where private rights do not exist, this is fallacious. Property is a claim to an income stream, and in open access situations there is no claim on the part of the user. There is a claim to *use* the resource for grazing, and the like, but there surely is no claim to the benefits of that resource. This arises for the simple reason that when all comers have a claim to use something, none has a claim on a secure income stream [8,4,12].

A claim to use is *not* a secure claim to benefit since others may have exercised their co-equal claim first; when you arrive there is no vegetation left. This has been distorted in the economics literature to the aphorism "everybody's property is nobody's property" but of course this is wrong. What should be noted is that "everybody's access is nobody's property."

There are obvious examples of successful common property situations in natural resource use, with the summer pastures of Switzerland and Norway the most widely known [9,10]. But most of the non-private lands in Asia are not common property but open access. Instead of all members of a village having a co-equal property claim in a benefit stream, what they have is co-equal use claims. In the absence of any control over use rates—that is in the face of increased pressure from more livestock using the land—the resource is driven to depletion.

This set of co-equal rights among members of a political unit (say a panchayat) requires information, contracting, and enforcement. These are the components of what the economist refers to as *transaction costs*. Information costs are incurred to obtain data about the condition of the resource, the nature and extent of the upcoming claims to be made against it, and the consequences of different possible claims being acted upon. By contracting costs we mean the process of negotiating among possible claimants regarding anticipated use rates, the dealings with those who are to be considered part of the legitimate group of users (us versus them), and the agreement on sanctions for those who violate the terms of the understanding. Enforcement costs are those that are incurred to make sure that the "contract" is followed. These costs might entail the hiring of a guard, fencing, the necessary apparatus to arbitrate disputes, and the ultimate enforcement act should more pleasant options be found insufficient.

Of course a logically prior question to consider is the one of why not establish private property rights over those lands amenable to forestry projects and programs? The immediate response would be that this result would be inconsistent with the cultural history of most of the countries in Asia. Some would not be persuaded by this—indeed many western economists constantly advocate private property rights in these countries—and so we must seek a more scientifically compelling rationale for resisting the privatization of much of this land [1].

Our research into the institutional structure of a number of economic systems throughout the world reveals a continuum of property rights from those objects held individually to those held communally. When searching for an explanation we seem to find that those valuable objects (or resources) that hold the group together at the extensive margin are communally owned. By being at the extensive margin in terms of a low ratio of labor to the resource the group has determined that privatization is not worth it. The summer alps are too poor relative to the valley bottoms to support the social investment in private property, fences, separate watering facilities, and so on;the polity could not afford to invest the same level of social infrastructure in these relatively poor lands. The same holds for the open access lands of Asia.

This is not to say that these lands are not absolutely vital to the survival of the group; all of these resources are essential to group security and this contributes to the prohibition of individual choice over their use and possible alienation. These resources have a very high time,form, and space utility. But they are relatively poor compared to other resources and by being poorer they do not lend themselves to privatization. Holding these resources in common precludes the possibility that one or a few clever entrepreneurs will be able to acquire a concentration of them and so exclude others. It is one thing for cropland to be concentrated in the hands of a few; it is quite another for all of the land to be so controlled. Hence we see a combination of efficiency and equity reasons for the absence of ubiquitous privatization of essential resources [6].

In this socioeconomic context forestry must be seen as adding economic value to these common property lands. Or, if they are currently open access lands, as altering the institutional arrangements such that when they become more valuable in the sense of more productive, they will remain viable for all members of the local economy. If managed properly forestry can be seen as contributing to the provision of a Pareto-safe outcome in that all members of the village can be made better off.

Forestry development in Asia must be seen as institutional development first, and then as changes in technique. That is, the decision as to whether one plants eucalyptus, gmelina, or acacia

is really quite trivial in the larger picture of long-run success.

This introduces important difficulties. Foresters do not know much about institutional arrangements—but then no one else involved in development does either. Secondly, it is not easy to bring about institutional change at the local level even if we knew for certain what to do. This is especially hard when that change is forced on the village by national or foreign "experts."

However difficult this may be, to proceed with the technique of forestry without the institutional arrangements in place is to doom the vast majority of forestry projects to certain failure.

Forestry and Rural Development

The very great interest in integrated rural development and in the problems of the "poorest of the poor" have reminded us that development is not simply factories to produce import substitutes, nor is it a new variety of wheat or rice. If we are not careful the income streams that are created from new techniques will end up in the hands of the few influential people at the local level who already have a significant advantage over their neighbors. To the extent that traditional agricultural projects augment the economic value of currently owned assets then the relatively comfortable position of the well-to-do is further enhanced.

The major attraction of forestry programs to those who worry about the skewed economic gains arising from conventional agricultural projects—and thus who worry about true rural development—is that forestry adds to the economic value of those lands on which the poor depend. Indeed, these are often the only lands to which the poor have access.

If private crop land is to be manipulated by national governments to provide cheap food for the urban poor (or to provide exports) then let us turn our development skills and programs to that resource which only the poor can use. This is the open access regions of Asia from whence comes sustenance for livestock, fuelwood, and small timbers. Let us have as a "forestry policy" not the enhancement of the commercial timber lands of the wealthy or of the state, but rather the public domain lands upon which the so-called "poorest of the poor" depend for their most meager livelihood.

Forestry—if it is conceived as a combination of technique and institutions—can provide this economic opportunity.

III. ECONOMIC ISSUES IN FORESTRY AND DEVELOPMENT

We want to cover two issues in this discussion of the economic issues in forestry and development. The first of these concerns the important distinction between programs and projects. The second of these concerns issues in economic evaluation.

Forestry Projects versus a Forestry Program

The point was made previously that development planning has been dominated by the notion of projects; not only do projects lend themselves to the appearance of manageability and attribution of effects, but projects also allow an agency to manage grant and loan funds in a manner that pleases legislative interests in the donor country. From the perspective of the host countries projects are also attractive. The opportunity to receive relatively large sums of money for physical objects such as irrigation systems, roads, schools and the like is one not easy to refuse. Of greater importance, perhaps, is the fact that most projects can be "fit in" to the prevailing institutional structure without the appearance of causing anyone to lose; in earlier terms such projects appear to be Pareto safe.

Unfortunately, the fact that they do "fit in" also means that their potential for contributing to the enhancement of village life is reduced. This will happen because the social overhead capital

that gives value to traditional agricultural investments is missing. The socioeconomic value of a small village woodlot is absolutely dependent upon the institutional arrangements that will assure its proper management, its careful utilization, and its survival.

Let us consider a few of the problems in rural areas that relate to forestry activities. The first of these would be lack of employment opportunities. The second would be a shortage of specialized products that arise from forestry land uses. Here we have in mind fuelwood, poles and small timber, fruits, fodder, and miscellaneous products that have important medicinal and ceremonial value. The third would be degradation of the land base that has two types of implications—those for local inhabitants who now are without the above-mentioned products, and the off-site effects that results from downstream siltation, filling up of reservoirs, and so on.

When we turn our attention from the above problems to ways in which they might be alleviated, we must concentrate on the essence of projects versus programs. I will make that distinction on two grounds—the time horizon over which the problems are addressed, and the nature and scope of the attendant institutional changes. Projects are sporadic activities that are designed to "fit in"; programs are long-range and comprehensive in scope, and imply institutional modifications along with technical changes (plantings, fencing, nurseries, and so on).

Projects are simply additive in their beneficial effects, while programs consist of projects where the aggregate of beneficial effects exceeds the mere sum of their individual parts. There is a complementarity among the projects that arises because of the accompanying institutional changes that go along with a program, and because of the coordinated manner in which the separate parts are conceived, formulated, evaluated, implemented, and operated.

It would be a mistake to assume that a forestry program is competitive with a more traditional agricultural program, except insofar as they both compete for the same external assistance funds. But "on the ground" it is important to establish the fact of complementarity between programs. If forestry in its broad sense is considered to be another land use that occurs beyond the confines of private lands then it can properly be seen as a logical adjunct to a full rural development program.

As mentioned above, most of the current rural development efforts have focused on agriculture and the social infrastructure that adds to the economic value of privately owned cropland. At the same time these programs have ignored—for the most part— non-private (and non-crop) lands.

Recognition of the important role of these lands in the village economy requires that we integrate their use and management into development assistance efforts. We must begin to recognize the economic value of these lands in terms of time, space, and form utility. More importantly, we must recognize the low opportunity cost of developing these lands for forestry purposes—broadly defined. We are not in a situation—for the most part—where there will be direct competition with cropland. Extensive lands uses must carry their share in the eyes of the village, and in the eyes of the nation. A comprehensive program will allow that; scattered projects will not. Let us now turn to the issue of evaluation.

The Economic Evaluation of Programs and Projects

When one begins to conceptualize the implications of a development project it is necessary to have a clear understanding of the nature of the geographic scope over which those implications are to be reckoned. For instance, if a particular project is beneficial for the residents of village A, but harms the residents of village B, how does the balance look for the nation? That is, does the gain to village A exceed the loss to village B? If so we might conclude that the nation is better off, even though there have been inter-village transfers of economic advantage.

The notion of the *accounting stance* for project and program evaluation captures the problem of inter-village—or inter- regional—shifts in advantage. The accounting stance represents the perception on the part of the decision makers concerning the geographic scope over which benefits and costs will be tallied. The importance of the accounting stance as an explicit part of benefit-

cost analysis is to preclude the possibility that the gains to a particular village (or region) become confused with the gains to the nation as a whole. That is to say, the national perspective is necessary in order that the government understand the implications of a particular program or project. There is, of course, nothing to preclude the acceptance of an undertaking that enhances the economic position of one region—even at the expense of another region. However, no national government can proceed with such an undertaking without fully recognizing this shift in regional comparative advantage. The explicit recognition of a particular accounting stance is an assurance that these transfers of advantage among regions will be made known to all decision makers.

By way of illustration, consider the example of a large-scale forestry program that enhances the non-private land—and hence the economic vitality—of region A. If this causes harm to another region—an unlikely prospect by the way—then the government would certainly wish to know this. A more likely event would be that both regions gain. This might occur if region B had been the recipient of substantial in-migration from region A owing to the absence of economic opportunity in the latter region. Alternatively it is possible that region B had been the recipient of large quantities of sediment from the devastated watersheds of region A. Finally, it is likely that region B would benefit from the increased access to forest-related products now available from region A.

Hence, the notion of an accounting stance—and the acceptance of a particular formulation of regions for benefit-cost analysis— is the first step in a correct assessment of a forestry program.

The second step is to be clear about the difference between policy objectives and policy instruments. In the technical sense a policy objective is held to be something that ought to be accomplished in the eyes of the decision maker(s). On the other hand a policy instrument is simply a means of attaining that objective. An economist would say that policy objectives are arguments in the utility function of the decision maker while policy instruments are not; the decision maker is indifferent to the instruments (means) but is not indifferent to the objectives (ends).

An example might emphasize the essential difference. Two decision makers may agree on the policy objective of linking villages A and B with a new road—they may even agree on the nature of that road in terms of its width, its surface material (gravel versus asphalt), and the drainage provisions that will define its seasonal character. Let us assume that one decision maker is indifferent as to how it is to be constructed—she wants only that it be constructed by the cheapest possible combination of labor and capital (even if that capital must be imported). On the other hand, another decision maker—concerned about rural unemployment—may insist that foreign equipment not be used but rather that the road be constructed with local labor.

The two individuals disagree in this instance because they have a divergence in their notion of the relevant policy objective; the first decision maker wants only to accomplish a road, the second decision maker wishes to accomplish a road and to alleviate rural unemployment. This matters greatly for the process of evaluation for the simple reason that the two hold different objectives in mind, and benefits and costs only have meaning with respect to a particular objective; a benefit is a movement in the direction of attaining that objective, a cost is a movement away from attaining that objective. The second individual—favoring rural employment—will consider the undertaking to be a mistake because it does not result in the employment of rural people. The first decision-maker would consider the labor-intensive plan a great waste since it could have been built much quicker using heavy machinery instead of with shovels and baskets.

If those in a position to decide do not agree on the essence of the problem to be solved, simply the absence of a road or rather the absence of a road and the existence of rural unemployment, then evaluation is doomed to produce unsatisfactory results; unsatisfactory in the sense that the two decision makers will hold different notions of the benefits and the costs from moving ahead, or from failing to move ahead.

Traditional benefit-cost analysis in its most narrow incarnation is concerned with the efficiency

of various alternatives. In this situation, the objective is considered to be concerned with designing projects so that the monetary benefits exceed the monetary costs. The choice problem—deciding which projects to undertake—is then one of selecting for implementation those projects with positive present valued net benefits. If more than one objective is introduced, such as achieving the road, and putting rural people to work, the choice problem becomes slightly more complex. It could be cast in a multiobjective framework, or it could be considered as a problem in maximizing rural employment subject to the constraint that a road linking two points—and of predetermined width and quality—is built. By way of general comment then, multiple objectives can be considered simultaneously, or all but one of them can be established as constraints and then the attainment of the remaining objective becomes the maximand. We will discuss multiobjective evaluation momentarily. First the subject of uncertainty must be explored.

Let us consider a situation in which we undertake to plant a particular non-native species in an area with known weather conditions. Once the trees become established—if they do—the nature of the management regime over that investment is still to be defined; and, once defined, we have no guarantee that all of the members of the local jurisdiction will abide by the rules set down. This illustration is, I emphasize, the very situation in most forestry projects. We must now go back and explore three different types of uncertainty in this typical situation.

When one has an empirical basis for estimating a probability distribution we are able to determine the likelihood of certain outcomes. Insurance companies, lotteries, and gambling casinos thrive on this type of situation, which has come to be called *risk*. A risk is when one can determine beforehand the probability of certain outcomes. I know that when I board an airplane, or drive a car, or cross the street there is a certain probability that I will come to grief. This is not a situation of uncertainty but of risk. In the above example, we have an empirical basis for computing the probability of certain moisture and temperature regimes in which the trees are to be planted. Hence the mere planting of a certain type of tree (which requires a specific microenvironment) involves risk, not uncertainty.

When we lack the empirical base for estimating a probability distribution covering future events in nature we have a situation of pure uncertainty. The recent eruption of Mt. St. Helens in the U. S. is an example of *pure uncertainty*; just as uncertainty describes the situation when an individual makes a souffle for the first time. There is no empirical basis for estimating the probability that the event will actually occur (or that the souffle will be a success). In the forestry example we have pure uncertainty because that particular species has never been planted in that site.

Pure uncertainty of the above sort is the result of our lack of knowledge about—and our inability to control—possible future "states of nature." We know the probabilities of certain moisture and temperature regimes (the risk part) but we have never attempted to grow that particular tree in that site under those conditions. Moreover, the high probability of the necessary moisture and temperature conditions is obviously no guarantee that those exact conditions will always prevail; the probabilities on which we determined "risk" are averages over a long period of time. We could quite easily plant those trees in the first year of a three-year drought.

Finally assume that all goes well and that the trees become established. We now introduce the final category of uncertainty— *strategic uncertainty*. Those who depend upon the produce from the new plantation may well be foiled by a few villagers who make excessive demands on the vegetation and so reduce its vigor that it becomes depleted. Our inability to anticipate the actions of others is referred to as strategic uncertainty.

This risky and uncertain environment that describes many forestry projects is no more serious than that facing us in traditional agricultural projects. The only difference would be the small degree to which extensive research activities have reduced what was at one time pure uncertainty to risk. The extent of strategic uncertainty may appear to be lessened since traditional agricultural activities

largely occur on private lands. However, this impression is only partially correct. Irrigation systems link a number of farmers together on an irrigation channel where those at the head of the watercourse are able to exert inordinate influence on the water receipts of those downstream. To the extent that those along the middle and tail sections of the water course are at the mercy of those at the head then irrigation projects—that activity that has held the attention of so many development economists and planners—epitomize strategic uncertainty [3].

There is another sense in which traditional agricultural projects possess strategic uncertainty. Much of our assistance effort over the past 20 years has concentrated on social overhead capital in the form of market channels, government procurement, storage and pricing arrangements, cooperatives, and so on. These are, unfortunately, not activities that are totally devoid of uncertain outcomes in the sense of sterling performance—including the complete absence of fraud and mismanagement, not to mention incompetence. I remain to be convinced that the strategic uncertainty in conventional agricultural projects is very much less than what we find in forestry projects and programs.

Forestry, because it takes place on non-private lands, may be subject to a different type of strategic uncertainty. That is, while the institutional arrangements over the non-private lands will be quite specific, enforcement may be problematic in some instances. And, while we might expect that some of the support activities would be free of fraud and mismanagement, this is by no means assured.

Let us now turn our attention to the matter of multiple objectives to be achieved by forestry projects, and the multiple purposes that a forestry project can serve. This distinction is important in that it may appear, at first glance, that there is scant difference between objectives and purposes. In fact they are quite distinct concepts. Recall that objectives are rather more general things to be sought— increase per capita income in the village, enhance employment opportunities during the slack season, protect watersheds, stabilize the local livestock sector, and so on. By way of contrast, purposes are more specific and are the means whereby the objectives are attained. If an objective is to stabilize a watershed, then increased grass cover is a means to achieve that objective. The grass will obviously contribute fodder for livestock and hence meet an objective of that nature as well. Rarely would grass production be expressed as an objective of a forestry undertaking. Similarly the production of small timber and poles is an unlikely objective. It is more reasonable to state an objective as providing materials for farm implements, furniture, and small building construction. With these objectives there are a number of ways to achieve them, including importation from a neighboring region. If the forestry project can achieve those objectives at a lower social cost then it is obviously to be preferred over the import alternative.

If a general objective in the village or region is to provide employment then a forestry project becomes one possible candidate. But if the specific purpose of a forestry project is employment then we ignore the possibility that there are other more preferred ways in which employment might be provided.

The multiobjective aspect of forestry programs and projects requires that we understand analytic techniques for considering multiple objectives. One common approach is to employ multiattribute utility analysis. In this approach there are four basic elements: (1) activities; (2) outcomes; (3) probabilities; and (4) preference orderings. Activities consist of those actions or choices available—think of these as projects that will comprise a program (a portfolio). Outcomes are the results of activities, and outcomes contribute to the attainment of objectives. Probabilities are the likelihood that a given activity—or a set of activities—will result in a particular outcome. Preference orderings are rankings of all possible outcomes in their order of desirability. These rankings may be based on extensive interaction with a number of local and national participants, or they may simply be imposed.

The steps in carrying out a full multiattribute utility analysis would be first to identify the

objectives that are to be achieved by the forestry program. Let us assume that there are six objectives: (1) employment during the project implementation stage; (2) employment during operation of the various projects; (3) provision of livestock feed; (4) stabilization of erosion; (5) provision of poles and small timber for the local economy; and (6) provision of fuelwood for households. Each objective must be transformed into an attribute so that outcomes can be determined. That is, activities result in outcomes, and these outcomes are measured by attributes. In the current example we would have:

OBJECTIVES	**ATTRIBUTES**
project employment	work days on project
general employment	annual work days
livestock feed	annual production (kgs.)
watershed protection	constraint attribute
small timber	poles and timber (cubic m)
fuelwood	cubic meters

Notice that one of the attributes is a constraint attribute. This means that we would not measure it in the same way as the others but would instead have this reflected in the planting stage so that a certain portion of the bare ground was covered by grass from the beginning.

Following identification of the objectives and the attributes it is necessary to set the ranges of the attributes that are reasonably expected from each of the projects in the program. This step in multiattribute utility analysis is essentially what would occur in more conventional benefit-cost analysis.

For instance, with respect to project employment, it would be necessary to set ranges over the number of workdays that would be created by each of the activities (projects). Perhaps the most that we might expect from project A would be 1,000 work days, while the very least that could be expected would be 250. As for project B it might have a range of 300–850. Project C will be assumed to be very labor intensive and have a range of employment of 1,500–2,200.

This is also a convenient place to introduce another constraint attribute—seasonality of employment. It is important that project employment not compete with normal agricultural employment cycles. To avoid this we could enter our second constraint attribute in the form of a restriction that no more than 20 percent of project employment could occur during the period of July-August when planting is at its peak.

The attribute ranges for general employment—that is after the projects become operational—would be determined in a similar fashion. Assume that the three hypothetical projects are rather similar in terms of jobs established. The attribute ranges for livestock feed, small timber yields, and fuelwood production must be established as well.

What we have then is an estimate for each of the three projects (A,B,C) of the best and the worst possible outcomes in terms of the five attributes: project employment, general employment, livestock feed, small timber production, and fuelwood production. That is, we have a maximum and a minimum for each of these five attributes. We also have two constraint attributes: (1) 30 percent of the ground must be covered by grass at all times in each of the projects; and (2) no project may require more than 20 percent of its total labor needs during the July-August period.

The next step is to establish weights for the respective attributes—that is, the "decision makers" are asked independently to rank the five attributes in terms of their importance. These independent rankings are then reconciled and normalized such that their total weight adds up to some arbitrary number (100, 1,000). For instance we might end up with the following weights:

project employment	80
general employment	220
livestock feed	100
small timber	300
fuelwood	300
	1000

These weights would indicate that small timber production and fuelwood supplies are the two most important attributes among the decision makers, followed by general employment, livestock feed, and project employment.

The next step is to determine the single attribute utility functions for each of the attributes. While there are several ways in which this might be done, we will skip over the technicalities here (see references 2 and 7).

These single attribute utility functions map the satisfaction to be attained by the decision maker(s) over the full range of possible outcomes for each of the attributes. The utility range is arbitrarily defined to be 0–1.00, and the particular shape of each function reflects the views of the decision maker(s) with respect to each attribute. For instance, the utility functions for general employment, small timber, and fuelwood might indicate a great level of utility that arises from quite small increments in each of these, and then a diminishing level of satisfaction for higher levels of attainment. On the other hand, project employment and livestock feed might be considered equally valuable across the full range; no more satisfaction attaches to the first unit than to the last.

The final step is to employ a linear programming algorithm to solve the maximization problem which is to maximize the utility of the decision maker(s) by selecting projects (or parts of projects if they are divisible) that meet the constraint attributes, and that are consistent with an imposed budget constraint.

The obvious advantage of multiattribute utility analysis is that it allows the simultaneous consideration of a number of important aspects of a development program. It is not simply net monetary benefits as would be the case with conventional benefit-cost analysis. The difficulty with the approach is that it may require a considerable degree of sophistication on the part of the group doing the evaluation, and it also requires a considerable amount of time from both local and national decision makers. For this reason, coupled with the fact that most external development agencies still require the more conventional approach to evaluation, it is unlikely that benefit-cost analysis in its traditional form will be replaced soon.

The benefit-cost evaluation of a forestry program and its constituent parts would need to reflect the concepts mentioned earlier in this section—accounting stance, pure uncertainty, risk, and strategic uncertainty. But it must also be more concerned with the process of *shadow pricing*—the problem of assigning prices to a number of effects of a forestry program so that it can be evaluated in conventional terms.

In traditional agricultural projects we undertake to determine the economic value of the produce per unit of land area, and the costs per unit of land area to decide if the investment is worthwhile. If the project involves a road or a processing facility then we attempt to ascertain if the benefits—both direct and indirect—in the area exceed the costs. We are also concerned with the benefits and costs to the nation as a whole.

In considering forestry projects vis-a-vis alternative uses of the land we must first be cognizant of the values that might be lost if the land were to be devoted to forestry rather than to some other use. For this we must know the current annualized value attributable to that particular use. Let us assume that the current use is for grazing by animals from the village; this is a reasonable assumption

in that most areas that can support crop agriculture would not be placed under forestry—forestry competes with other extensive land uses, not with intensive land uses.

The current use of the land results in the realization of an annual net return to those who use the land. If a forestry project cannot earn at least this same level of annual value (called an annuity value), then there is partial evidence that the land should stay in its current use. However, this is only partial because there may be social costs arising from the current use—erosion because it is overgrazed—which means that there is a divergence between the private benefits of use to the current users and others in the economy. Forestry projects may thus have a smaller annuity value on the immediate unit of land, but such projects may result in greater positive benefits beyond the immediate boundaries. Yet another example of this might be the prospect of larger employment benefits from a forestry project as compared to its current use.

The choice problem is then multifaceted. On one level of analysis we must conduct a careful assessment of the net economic return per unit of land devoted to one activity versus some other possible activity. At another level we must compare the social values that arise from those respective land uses— where value here is taken to mean the net of social benefits over social costs. This assessment would likely be complex in that it would need to consider monetary and non-monetary impacts. It is here that multiattribute utility analysis would probably be most helpful. These two levels of analysis should provide the bulk of the necessary information at both the local and the national levels.

The third level of concern will be the external participant that— most likely—provides a good portion of the technical and financial help. At this level, the previous two types of analysis would be pertinent, coupled with the more conventional analysis that focuses on net present values, internal rates of return, and possibly even cost-effectiveness analysis.

Let us now conclude by exploring the implications of the foregoing as they affect those agencies and individuals engaged in development assistance.

IV. IMPLICATIONS FOR INTERNATIONAL DEVELOPMENT ASSISTANCE

The formulation of a forestry program that is consistent with local and national perspectives, and that contributes to perceived needs at both of these levels, must occur in an atmosphere where forestry is not conceived as a separate and distinct form of land use. Rather, the devotion of land to forestry activities must be considered as a continuum in which man utilizes the land to make a living in a variety of ways. At the intensive pole, vegetables are grown in a small home garden; at the extensive level livestock are grazed, fuelwood is grown, and small timber is produced. Under each of these activities, proper care of the land is implied.

This means that forestry cannot be conceived in isolation from other economic activity at the local level. There can be no such thing as a "forestry sector assessment" for the simple reason that there is no such thing as a forestry sector apart from the daily economic life of the villager. What is necessary is an economic assessment of distinct regions of each country wherein the full range of land uses are considered. The problem in designing forestry programs as they might contribute to development is that we have traditionally engaged in assessments of the agricultural "sector" and have ignored forestry as a land use. Small wonder that forestry is not seen to "fit in."

The formulation of a development plan of which forestry is a part would proceed by paying particular attention to land- use practices in each region, land-use potentials, the institutional arrangements that define control and use of those lands, and the current incidence of benefits and costs from existing land uses. This perspective relates to our earlier discussion of choice sets,

technique, and the tensions (and concordances) that exist at the local level, and between the local and national levels.

Once this careful assessment has been conducted, it is possible to identify—in conjunction with local and national decision makers—the particular types of new activities that seem most consistent with perceived needs and priorities. These would likely include a mixture of conventional agricultural activities, and of other land-use options—of which forestry would be a part. But these projects need not resemble the more traditional activities of development assistance. For example, it is most probable that an undertaking of great significance would be the design of new institutional arrangements at the local level to define who controls land use, who can use the non-private land, who benefits from that use, and who will pay the costs from that use (not only the cash costs, but also the external costs in the form of erosion, resource depletion, and so on).

We must be emphatic here that this activity may do as much to bring about "forestry" as any number of seedlings being planted. If the landscape is capable of producing products that we would identify as "forest" in nature, yet is prevented from doing so by an institutional structure that fails to internalize social costs, then the most helpful forestry project is to modify those institutional arrangements.

This of course reminds us of the appeal of more traditional projects—forestry as well as conventional agricultural. That appeal derives from the fact that the costs appear to be only those involving cash outlays, while the benefits seem to be nicely spread; in our earlier discussion these projects are considered Pareto-safe. But the essence of resource depletion in Asia—and hence the explanation for depletion of fuelwood, commercial timber, and livestock forage—is institutional in nature.

In formulating and designing projects then, the first claim on our attention *must* be the institutional environment at the local level. This does not mean that we cannot suggest the planting of trees. But that planting of trees must be seen as an adjunct to the institutional change rather than as the main activity. Perhaps the planting will comprise a side payment (a bribe in less polite terms) to convince the various decision makers of the necessity of the institutional changes that are needed. If the presence of trees and so on is an inducement to the necessary institutional change then so be it.

When we turn to implementation of projects, forest-related activities do not differ greatly from the more conventional activities. That is, we must be certain that technical assistance is present, that the physical inputs are available, and that the operational skills exist at the local level to carry out the necessary functions at the proper time. This is important for the simple reason that a program (consisting of several projects) that is to be implemented over two years is distinctly different from a program with exactly the same projects that is to be implemented over five years; the sequencing will differ, the disruption at the local level will be different, and the time-path of benefits and costs will differ.

I leave you with several issues to ponder. The institutional imperative of forestry projects implies that we must pay particular attention to the rules at the local level that define control over use rates of various products. Secondly, it is a mistake to undertake a forestry sector assessment; what must be done is an assessment of the general economic problems at the local level. Those problems will be found to arise from difficulties associated with private (or individually cultivated) lands, and with collectively used lands. Some of these problems can be alleviated by assistance—of both an investment and a rule-making nature— on the lands in question. Other problems will require changes in the social infrastructure that supports and gives economic value to those particular land uses. We have a long history of both types of assistance on private agricultural lands and the related infrastructure. We have much less experience in dealing with collectively used lands and the necessary infrastructure.

This new dimension opens up exciting possibilities for those genuinely concerned with the problems of the rural village. It will require a fresh look at how we conceive, formulate, design, evaluate, and implement development programs. It will alter our normal bureaucratic procedures. It will mean opening up the process to new participants at the local, national, and international levels. It will mean more negotiation as institutional arrangements become the center of attention rather than apparently Pareto-safe physical structures. It will mean that labor may be substituted for capital in the development community as we spend more time to work with local and national participants, and spend less time merely "pushing funds."

For all of these changes we must recognize the logical appeal of a forestry program as outlined here; its obvious relation to the daily life of the villager. I trust you share my view that this relation is sufficiently compelling. Let us then get on with the job at hand.

BIBLIOGRAPHY

1. Ault, David E. and Gilbert L. Rutman, "The Development of Individual Rights to Property in Tribal Africa," *Journal of Law and Economics* 22:163–182, April 1979.
2. Bell, David E., Ralph L. Keeney, and Howard Raiffa, *Conflicting Objectives in Decisions* (New York: John Wiley, 1977).
3. Bromley, Daniel W., Donald C. Taylor, and Donald E. Parker, "Water Reform and Economic Development: Institutional Aspects of Water Management in the Developing Countries," *Economic Development and Cultural Change* 28:365–387, January, 1980.
4. Ciriacy-Wantrup, S. V., and Richard C. Bishop, "Common Property as a Concept in Natural Resources Policy," *Natural Resources Journal* 15:713–727, October 1975.
5. Commons, John R., *Institutional Economics* (Madison: University of Wisconsin Press, 1961).
6. Dahlman, Carl J., *The Open Field System and Beyond* (Cambridge: Cambridge University Press, 1980).
7. Keeney, Ralph L. and Howard Raiffa, *Decisions with Multiple Objectives* (New York: John Wiley, 1976).
8. Macpherson, C. B., "A Political Theory of Property," in *Democratic Theory* (Oxford: Clarendon Press, 1973), Essay VI.
9. Messerschmidt, Donald A., "Ecological Change and Adaptation Among the Gurungs of the Nepal Himalayas," *Human Ecology* 4:176–185, April 1976.
10. Netting, Robert, "What Alpine Peasants Have in Common: Observations on Communal Tenure in a Swiss Village," *Human Ecology* 4:135–146, April 1976.
11. Runge, Carlisle F., "Common Property Externalities: Isolation, Assurance, and Resource Depletion in a Traditional Grazing Context," *American Journal of Agricultural Economics* 63:595–607, November 1981.
12. Runge, Carlisle F. and Daniel W. Bromley, *Property Rights and the First Economic Revolution: The Origins of Agriculture Reconsidered*, University of Wisconsin-Madison, Center for Resource Policy Studies, Working Paper No. 13, January 1979.
13. Swift, Jeremy, "Pastoral Development in Somalia: Herding Cooperatives as a Strategy Against Desertification and Famine," in *Desertification: Environmental Degradation in and Around Arid Lands*, ed. by Michael Glantz (Boulder, Colorado: Westview Press, 1977), Chapter 11.
14. Thomson, James T., "Ecological Deterioration: Local-Level Rule Making Enforcement Problems in Niger," in *Desertification: Environmental Degradation in and Around Arid Lands*, ed. by Michael Glantz (Boulder, Colorado: Westview Press, 1977), Chapter 4.