



FOREST AND UPLAND RESOURCES MANAGEMENT: A POLICY FRAMEWORK*

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I. Introduction

The policy issues in forestry and upland resource management will be viewed in this paper in terms of the inter-related problems of (a) excessive logging and forest destruction and (b) the continuing conversion of forestlands into land uses that are prone to soil erosion. A separate set of closely related issues pertain to processing of forestry and upland primary products and their role in international trade. These are discussed in detail by Delos Angeles (1982) and by Power and Tumaneng (1983). While these are clearly important areas for policy reform, they comprise a separate set of management issues which merit separate treatment and are therefore not addressed here.

In what way is forestland conversion excessive? Although there are varying estimates, it is still clear that the rate of forest destruction, measured in hectares, has been substantial in the past decade or so. On the low end, the Bureau of Forestry Development or BFD (this agency has been reorganized as the Forest Management Bureau of the new Department of Environment and Natural Resources) has estimated that in the last decade and a half up to the mid-1980s, about 85,000 hectares per year of forestland were converted to other uses (BFD, 1985).

Other estimates are available. Researchers from the Development Academy of the Philippines, the Philippine Institute for Development Studies and the University of the Philippines College of Forestry estimate that as much as 200,000 hectares per year were lost in the mid-1960s to mid-1970s (PREPF, 1977). The United Nations Food and Agriculture Organiza-

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tion puts the figure at about 95,000 hectares per year from 1976 to 1980, with increases expected up to the mid-1980s (FAO, 1983).

By itself, the conversion is not always undesirable. Part of the requirements of development and population growth after all is for lands previously devoted to forests to be increasingly converted to agriculture, greatly increasing land productivity. The environmental problem arises when productive agricultural use is achieved in the short-term at the cost of large environmental losses. These take the form of losses in soil fertility, additional losses from sedimentation of irrigation and hydro-power reservoirs, as well as increased flooding in the lowlands. The worst-case scenario is when forestlands are converted into open and degraded grasslands. These produce no agricultural output while causing excessive soil erosion.

This situation in the forest and upland resource sector has been the result of a long and complex process, involving the activities of various claimants to the benefits of using forest and upland resources. Part II identifies these resource users and focuses on their different perspective and conflicting objectives in resource use. Part III summarizes the fundamental problem of resource management from society's perspective, and Part IV presents the general directions for policy reform in the sector.

II. Resource Users and Competing Perspectives on Resource Use

The uplands have various resources associated with them, including the soil and the existing or potential vegetative cover. The uplands are therefore potentially useful for a large number of economic activities and for various types of users. For this reason, society needs to recognize several perspectives in evaluating competing resource uses. Conflicting perspectives need to be coordinated to allow the development of sustainable upland-based production systems.

Figure 1 is meant to characterize the three major users of upland and watershed resources, namely, the commercial sector (composed mainly of logging firms), the informal forestry users or upland farmers (made up of households or communities whose livelihood is significantly dependent on some form of forest exploitation), and the government (which is presumed to represent the social interest).

The commercial forestry sector is primarily composed of logging firms — about 130 — with large logging concessions. The administrative limit for concessions is 100,000 hectares, but the average size is about 40,000. These concessions are leased for up to 50 years including renewals, and the logging concessionaire is required to follow what is known as the *selective logging system* for timber management. This system includes the determination of an annual allowable harvest as well as a timber-stand

Figure 1
UPLAND RESOURCE POLICY FRAMEWORK

<i>Resource User</i>	<i>Resource Use/ Objective</i>	<i>Constraints/ Management Perspective</i>	<i>Result</i>	<i>Policy Reform Needed</i>
	(1)	(2)	(3)	(4)
Large scale: Timber conces- sionaire	Timber harvesting	Investment capital is constraint; forest is undervalued	Too much/ too early cutting of trees; off- site erosion damages	Increase value of forest with correct fee; penalty for erosion
Pasture licensee	Grazing	Investment capital constraint; land is under- valued with low fees	Excessive grazing; on- site land degradation with off-site erosion	Increase land value with correct charges; review land rights to reduce on- site degra- dation; penalize off- site damage
Small scale: Upland farmers	Agriculture with some forestry	Household labor cons- traint; with no tenure land has low value	Extensive or shifting cultivation; on-site land degradation with off-site erosion	Increase land value with owner- ship; con- servation subsidy for off-site benefit
Society (Government)	Promote optimal use of all upland resources	Scarcity of uplands and forests		

improvement phase to assure sustainable timber management. A cutting charge of ₱30 per cubic meter is levied on concessionaires. It has been argued that this charge substantially undervalues the true worth of the resource since the market price of timber is several times the value of the cutting charge (Delos Angeles, 1982; Power and Tumaneng, 1983; Cruz *et al.*, 1987). In 1985, more than 6.5 million hectares of the public domain were allotted to concessionaires (BFD, 1985).

A smaller component of the commercial sector is involved in the grazing of cattle. Pasture permits and leases covered 470,000 hectares in 1985, with 1,084 lessors and permit-holders being allocated about 430 hectares of land each. Pasture resources are also apparently underpriced, since permits and leases are issued on the basis of low official charges.

The informal sector is composed mostly of upland farmers who practice some form of agriculture on hilly lands. The role of this sector has previously been greatly underestimated, and determining its magnitude and characteristics was a major concern of the Upland Resource Policy Research Program. (See C. J. Cruz, this volume). The BFD census of forest occupants lists only 279 thousand families, with dependents of 974 thousand in 1985. They occupied only about 891 thousand hectares of forestlands.

As presented in C. J. Cruz (this volume), however, the actual upland population of the Philippines is in the order of 17 million persons in 1987, with about 8 million occupying forestlands. In addition to the large numbers involved, the majority of these are migrants from the lowlands. Unlike the tribal groups who often practice sustainable forms of upland cultivation, these migrant communities are more prone to excessive exploitation of the land. This leads to problems of soil erosion and their detrimental environmental impact — both on upland cultivation and on downstream activities such as irrigation and power generation. With respect to undervaluation of this form of resource use, Cruz *et al.* (this volume) have argued that the absence of *secure tenure* for the millions of upland cultivators has led to an extreme underpricing of land in the decisionmaking perspective of these users.

Clearly, the perspectives and decision criteria differ among the three sectors mentioned and lead to varying decisions regarding the harvesting of trees and land-use practices.

In addition, however, there are characteristics peculiar to forests and forestlands which affect any decisions regarding their optimal use. *First* is the importance of timber production itself: standing timber is a form of capital resource in the sense that it requires a considerable amount of time before it can be harvested. The production of trees for timber differs distinctly from agricultural crop production. For example, the timing of the harvest — normally predetermined for most agricultural crops — is a major optimiza-

tion problem in timber production. On the one hand, postponing harvest will not necessarily reduce the current value of the product itself, since postponing harvest now allows future timber growth although, it means postponing the realization of the gains from the resource. On the other, while harvesting sooner yields proximate benefits, it also results in the liquidation of the capital resource with a substantial lapse of time required before the next harvest.

Second, the forest resource also contains a considerable amount of biomass which, for some types of users such as upland cultivators, may be readily convertible into non-timber production. Important alternative products from this biomass include fuelwood for household use and ashes to augment soil nutrients for agricultural production.

Third, forests are aggregative by nature. This implies that their value lies not only with the individual tree components but also on the whole community of trees and their interdependent biological components, all growing within a given ecological environment. This implies various options in the management of forested lands. As earlier indicated, there may be options regarding the timing and technique of the timber harvest. Exercising one or the other option will have corresponding effects on the dependent flora, fauna, and environmental systems. In addition, there are also multiple flexibilities or options in forest management in terms of the ability to extract multiple products from forests and trees and the possibility of producing those forest-related goods and services without actually cutting trees.

Fourth, the aggregative nature of forests assumes special relevance for the Philippines, where forests are located in steeply sloped lands. For here they fulfill the important additional role of minimizing soil erosion under tropical rainfall conditions.

Objectives and Constraints of Various User Groups

If all resource users attach similar relative importance to these various peculiarities and roles of forests, conflicts in the use of forest resources in the uplands would be minimal. However, it is precisely the existence of differences in the criteria for decisionmaking among the various users which makes conflict inevitable. Such variations in criteria arise from the nature of the users themselves as well as the decision rules which govern their behavior.

Column 2 highlights the *constraints perceived by the different upland resource users. The limiting factor in the upland resource sector of production, for a country such as the Philippines, is the amount of land that is available for production. Among the various types of forest/upland resource users, the government, as the representative of society, may be viewed as*

the one which will be concerned with both the off-site environmental effects and the on-site future effects of production in addition to the direct benefits and costs associated with various forms of upland production. The public decisionmaker therefore completely recognizes all the peculiarities of production dependent on upland resources. Thus social decisionmaking involves assessing competing land uses and focuses on the maximization of returns to land with all the three costs or effects mentioned above included in the decisionmaking process.

In the case of the timber concessionaire, however, the low timber cutting charges required of him induces him to undervalue the true worth of the forest as a renewable resource. He thus worries only about maximizing the return to his investment for harvesting the resource (e.g., the infrastructure that he must construct and the equipment that he must purchase), and this is usually measured in terms of maximizing net present value or the benefit-cost ratio of private capital. *Thus capital, and not land, is the concessionaire's binding constraint.*

This perspective leads him to harvest more of the forest, than if he were made to appreciate the much greater (and increasing) value of the forest. This appreciation would be possible only if both the market and environmental value of trees were charged to him and if a long enough planning horizon were provided to allow him to benefit from the long-term returns to forest management. Therefore, given the structure of the current incentive system, the concessionaire ends up (a) viewing the on-site future effects of his logging activities myopically and (b) also disregarding the off-site, environmental effects as well. As indicated in Column 3, the private logger harvests considerably more trees and harvests them earlier than is appropriate from a social decisionmaking perspective.

Many problems also arise after the trees are cut, which are also associated with the myopic and narrow perspective of the individual logger. These include inadequate reforestation and timber stand improvement. The logger's disinterest in protecting his logged-over areas from encroachment by lowland migrants may also be part of a strategy to avoid the costs of replanting and managing such lands.

For the farmer, the absence of secure claims to his upland plot creates a decisionmaking perspective which disregards the long-term value of the land. Instead, his goal is to grow and harvest as much as possible in the short-term. As indicated in Column 2, the *primary economic constraint the upland farmer perceives is not land itself but the amount of labor his household can generate to exploit the land.* At the same time, except for the few who practice sustainable shifting cultivation, most forest farmers are not concerned with the externalities involved in upland farming, such as the off-site, environmental effects. The results (in Column 3) are on-site land resource degradation and off-site damages through soil erosion.

III. The Root of the Upland Resource Management Problem and the Need for Basic Pricing Reform

Resource Undervaluation as the Basic Problem

For the various users of forest and upland resources, the traditional official resource pricing system (in the case of logging concessionaires and the pasture lessors) or the *de facto* land access or use charges (in the case of upland cultivators) underestimates the true value of natural resources, both in terms of their development contribution as well as conservation role. This undervaluation of resources leads to fundamental problems of resource management, including the creation of excessive rents, promotion of over-exploitation, and the institutionalization of rent-seeking as the main mode of economic behavior.

As in any other economic activity, the private sector's use of natural resources responds to price signals. For example, with respect to upland resources, if the price of access to logging concessions is low, then more individuals will be interested in exploiting forests than if the price were higher.

However, since there is a general social perception that we are in fact over-exploiting our natural resources, then clearly the price signals that the economy is sending to private users cannot be correct, at least from the social point of view. In commercial forestry, these signals may be incorrect in terms of (a) the timber market value, as well as (b) the value of the environmental protection services that forests provide. We have already pointed out above that the administrative price of ₱30 per cubic meter of wood grossly underestimates the market price of timber. With respect to the undervaluation of the environmental protection services of forest resources, economists have long recognized that even if prices reflected the true market worth of timber, price signals would still be misleading if an individual's economic activity generates physical effects which impose costs or losses on others for which the individual is not held economically accountable. Thus, for example, cutting trees may be fine for individual concessionaires because they are not charged for the effects of excessive soil erosion on hydro-electric plants and irrigation reservoirs.

The recognition that the exploitation of upland natural resource systems generates substantial non-price effects on other individuals in society is the basic justification for government intervention in their use. The role of government in managing resources on behalf of society should be *to defend a social price for the exploitation of resources*. Our expectation therefore would be that *the prices administered by the government for access to upland resource exploitation would be substantially higher than the market prices that would otherwise prevail* for access to the same resources.

However, any casual survey of the charges, fees, and licenses as the administrative prices for resource exploitation will show that, contrary to expectation, these are much too low to properly reflect social valuations. Indeed, in some instances they are even much lower than what would prevail if the rights to use resources were simply put on the auction table and prices were determined by the market. The cutting charge for timber is close to becoming a classic example of this undervaluation: we charge ₱30 per cubic meter of wood for cutting down our forests vs. a market price (depending on the type of wood) beyond ₱1,000 or ₱3,000 per cubic meter.

In fairness to our present resource administrators, it must be pointed out that many of these prices are really inherited ones, and probably, resources in the past were so abundant and the demands of a much smaller population were so limited that such low fees were reasonable. However in the current context of our problems of resource over-exploitation and degradation, the continued use of such prices should be recognized for what they now represent: not social preferences but anti-social negligence.

The Results of Undervaluation: Over-Exploitation, Excessive Rents, and Inequity

The economic activities associated with the exploitation of natural resources are characterized by an over-dependence on formal or discretionary pricing of key resources (such as standing timber) or licensing of access to other (as in the case of coastal fishery resources). Because the prices assigned to such resources do not even start to approximate their true market values (much less their true social values, which may include beneficial environmental effects), the tendency is to create excess demand for the exploitation of these resources.

In commercial forestry the rents earned by firms that gain the right to exploit these resources are unusually large. It is well known that the effect of such unearned surpluses is to motivate widespread rent-seeking behavior since these rents, by definition, represent returns above those actually required to attract or keep firms in an industry. Over time, the persistence of such rents leads to overexploitation of the resource as private interests scramble to partake of the windfall.

Indeed, the widely recognized problem of inequity in the social sharing of the benefits from the use of natural resources is also ultimately related to this institutionalization of excessive rents. The reason is that the existence of discretionary resource administration, plus the competition to squeeze through bureaucratic red-tape and fulfill difficult requirements to capture those elusive licenses, concessions, and claims almost ensure that small-time operators or community interests are squeezed out by the big and influential concerns.

In addition to the unrealistic discretionary pricing in the case of commercial forestry, for upland farming, proper valuation is constrained by the property rights context within which the small upland farmer makes decisions. In the first place, rational economic behavior dictates that processes and effects that are not circumscribed within the physical boundary of one's farm are ignored. Thus the conservation services of environmentally appropriate agro-forestry systems are not incorporated in the individual farmer's decision-making calculus. This means that off-site environmental effects of upland agriculture (through soil erosion) are not viewed as relevant and are therefore unpriced.

On top of this, the property rights situation is such that the farmer, because he has no secure and permanent claim on the land that he cultivates, has no stake in ensuring the sustainability of land beyond what limited cropping time frame he perceives to be reasonable. This indicates that while he may respond to attempts to promote conservation whose pay-offs are fairly short-term in nature, he will normally shirk from undertaking investment or land improvements (such as terracing) that are permanent in nature.

The question now is what should be the direction for policy reform. It has been argued that the task of reforming our resource administration will necessarily take much time because of the many problems of the resource sector. Because these are many and complex, the immediate challenge is to locate the systematic source of these problems. Otherwise, they will be viewed as disjoint phenomena without any systematic solution when, in fact, the response requires — more basic than anything else — a change in the structure of incentives for exploiting forest and upland resources.

IV. Directions for Policy Reform

The Need for Changes in the Incentive Structure

The necessary changes in management approach follow logically from this analysis. In general, when we talk of how to manage resources, there are really only two basic tools available to effect changes in resource use: *rules* and *prices*. Rules refer to formal or informal regulation aimed at structuring the behavior of individuals, with compliance achieved through the use of sanctions or enforcement. Management by prices, on the other hand, refers to the use of both market prices or non-market valuations to change the incentive system on which individual decisionmaking is based.

Both approaches have the objective of re-directing individual actions toward socially beneficial results. While rule-making has, of course, always been the concern of government, natural resource management through price intervention has had a much shorter history in public administration.

Indeed, the tradition of public administration of Philippine forest and upland resources has generally been rule-oriented, and our current discussion of the upland resource management problem shows the need for integrating pricing policy or restructuring of systems with the traditional rule-oriented approach. With the great expanse of the public uplands to be managed and the many dispersed users of upland resources, integrating the proper incentives for harnessing local management potential may be the only practical approach to resource management.

Two Basic Recommendations

In this last section, we highlight two recommendations that have direct relevance to the need for reform of the incentive structure previously analyzed. There are other recommendations, especially on requirements for technical or demographic assessment and on implementation aspects, that are discussed in the other papers in this volume. These make up a separate set and are therefore not directly included here.

1. *Price Reform for the Environmental Services and Commercial Value of Forest Resources*

The potential contribution of valuation methodologies for the environmental effects of soil erosion to benefit-cost analysis (BCA) is apparent. Valuation methodologies, as developed in the program, have the purpose of determining proper shadow prices for project outputs that have significant environmental effects.

Beyond and more important than this shadow-pricing objective, however, is the more basic goal of generally improving resource-pricing in the formulation of resource policy. The impact of government projects (which are the objects of BCA valuation), though individually large and expensive, are restricted to specific sites so that their contribution can only be limited compared with the effect of general policies. Examples of the latter are policies that govern input pricing, such as timber cutting charges and incentives for soil conservation to upland farmers. This means that, while government should not abandon the use of projects in its upland management program, it must recognize that the most substantial and immediate impact that may be made on resource exploitation and conservation will be through proper input and output pricing, resource taxation, and conservation subsidies — all of which require proper resource valuation.

With respect to general conservation subsidies, the research program has shown that it will be useful to establish a subsidy for erosion abatement programs which could be worth about ₱29 per ton of erosion abatement in cultivated lands in watersheds similar to Pantabangan. A related implication

is that it may not be fruitful to even attempt to establish soil erosion abatement standards in terms of physical quantities of allowable erosion. What may be more effective is for government to establish a basic conservation subsidy, and it would subsequently be the challenge to upland soil conservation projects to design the most effective conservation approach that will be funded by the given abatement subsidy.

In the case of the commercial valuation of timber resources, the cutting charge, which is ₱30 per cubic meter when the market value of wood may be 30 to 50 times greater, should immediately be adjusted. In addition, forests provide various environmental services to society, the most important of which is the prevention of soil erosion and the downstream irrigation and hydro-electricity losses associated with accelerated sedimentation of reservoirs. The charge that should be placed on the cutting of timber must therefore reflect both the market value of the wood and the cost of compensating society for increased soil erosion losses.

The proper social pricing of natural forests will also put the potential for an aggressive tree plantation program in proper perspective. In the past, these programs could not be generally competitive simply because the economics of the timber sector did not recognize the value of the forest resource itself. Proper timber stand valuation will allow the industry to view plantation establishment and management in its proper perspective — as investment in an increasingly valuable asset.

2. *Property Rights Change for Upland Conservation and Its Potential Impact on the Land Reform Program*

Beyond the contribution of the uplands toward providing commercial timber resources is their role in providing livelihoods to a large proportion of rural communities, many of which are located in forestlands and dependent on some form of upland resource exploitation. On the one hand, there is heavy population pressure compelling farmers to eke out a living even from marginal lands; on the other hand, government capability is inadequate to exclude migrants to public lands. The incentive is clear therefore for upland farmers to exploit the land without regard to the need for soil conservation.

Soil conservation practices are, after all not costless. At the same time, it is important to recognize that soil erosion does not necessarily impose current costs on the individual land user as long as the topsoil layers are not completely depleted. Only when the topsoil is removed will the nutrient loss have a direct impact on the current productivity of the land. Since the upland farmer has no right to the land anyway and therefore no stake in ensuring its long-term productivity, the potential gain from reducing soil erosion cannot be captured by the farmers themselves.

It is therefore not surprising that upland farmers exploit the land until

its productivity declines then move on to a new plot. This practice will not substantially change unless the basic incentive structure is reformed: the necessary condition for the adoption of conservation practices in upland farming is the allocation of *secure claims over the land*.

This has been the basis for the government's social forestry program that was initiated early in this decade. The program's goal is to provide upland farmers with secure tenure on the lands that they cultivate through the awarding of certificates of stewardship. The stewardship contract essentially allows farmers a 25-year (renewable and "inheritable") term over a plot of land. The program is certainly a step in the right direction, and in the future, full ownership should be granted once sustainable use of the land is demonstrated. However, the current coverage of the program does not even reach five percent of moderately sloped lands that can probably be subject to some form of cultivation.

The coverage and conduct of the program therefore needs serious evaluation. The trends in population growth and migration indicate that the problem of population pressure needs to be addressed directly. Proposals that do not recognize this factor have no chance of succeeding, so that detailed studies should now be initiated that will assess the prospects for a broad program of controlling migration through property rights change in the uplands. Indeed, this effort should not be viewed merely as a conservation program; instead, it should properly be promoted as part of the government's land reform thrust. The importance of this cannot be over-emphasized; government actually has available to it a potentially powerful resource-conservation tool—the granting of secure rights to upland farmers—which at the same time can make one of the biggest contributions to the government's land reform program.

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