



**TREE RESOURCES
AND ENVIRONMENTAL
POLICY: A STAKEHOLDER
APPROACH**

NRI Socio-economic Series 7

**R J Grimble, J Aglionby and
J Quan**

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Foreword

This series is based upon work carried out under the socio-economics and related research programmes at NRI. Its purpose is to provide an easily accessible medium for current research findings. Whilst it is hoped that the series will be of interest to those concerned with development issues worldwide, it may be of particular relevance to people working in the developing countries.

The topics covered by the series are quite diverse, but principally relate to applied and adaptive research activity and findings. Some papers are largely descriptive, others concentrate on analytical issues, or relate to research methodologies.

The present study was conducted under NRI's Agronomy and Cropping Systems programme with finance from the Natural Resources Research Department of the ODA.

The aim is to present material in as straightforward a fashion as possible so that it can reach a wide audience. We are interested in the views and opinions of readers and welcome any feedback to this series.

Alan Marter
Socio-economics Research Programme

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Summary

Past attempts at environmental resource management have often failed because policy-makers have given insufficient attention to the different interests of the various groups of stakeholders. Stakeholders are defined as those who have an interest in the exploitation and management of a resource; in the case of forest resources, they may include small farmers, logging companies, government departments, institutions and conservationists.

Following a brief review of the benefits provided by tree resources, the concept of stakeholder analysis is explored in detail with specific reference to case studies carried out in Cameroon and Thailand. The conflicts of interest which may arise between stakeholder groups, and the trade-offs which may have to be made between the objectives of a particular stakeholder group, are classified and discussed. Finally, the implications of the stakeholder approach for environmental planning and future research are considered.

Introduction

In about 400 BC, Plato wrote:

“There are mountains in Attica which can now keep nothing more than bees, but which were clothed not so long ago with fine trees, producing timber suitable for roofing the largest buildings; the roofs hewn from this timber are still in existence. There were also many lofty cultivated trees, while the country produced bountiful pastures for cattle. The annual supply of rainfall was not then lost, as it is now, through being allowed to flow over a denuded surface to the sea. It was received by the country in all its abundance, stored in impervious potter’s earth, and so was able to discharge the drainage of hills into the hollows in the form of springs or rivers with an abundant volume and wide distribution (Timaeus and Critias).”

Plato’s lament is of particular interest to this paper for two reasons. First, it indicates that as long ago as 400 BC deforestation had already occurred on a wide scale, in this case in southern Greece. Secondly, it indicates that a relationship between forests and watershed protection had been established and that this was seen as having grave environmental consequences. Yet deforestation and land degradation continue unabated today, while human activity, population size and living standards have multiplied. If the consequences of this paradox are so awesome, how has degradation been able to continue for over 2000 years, and why have environmental needs been disregarded for so long by local people and other users of the resource?

This paper is about improving environmental and tree resource policy and management in developing countries. The starting point is the contention that many efforts at environmental management have failed because

inadequate consideration has been given to the various stakeholders and their respective interests. By stakeholders we mean all those who have a stake in the exploitation and management of tree resources; these include forest dwellers and local farmers, logging companies, forest and other government departments, and national and international policy-makers and planners. Each stakeholder group has a rational but different interest in the use and management of tree resources, and these differences may be fundamental. A lack of recognition by policy-makers and planners of the different and potentially conflicting interests of the various stakeholders has meant that local resistance is frequently met and policies and projects fail to meet their intended objectives.

Experience in many parts of the world suggests that tree resources and environmental issues are governed by a web of interests, conflicts and trade-offs between different sets of local people, government departments and national planners. Major differences of interest and goal exist within national and international agencies, and between different sets of professionals and advisers. For example, some believe that preservation of forests in their present form is the duty and ultimate aim of policy; others are more concerned with the continued welfare of local people, or see economic growth of the nation as the main objective. It is suggested here that the anomaly between the environmental need for tree resources and the apparent disregard for them by local people can only be fully explained by explicit reference to these different vested interests and the factors which give rise to them.

A common assumption in environmental planning is that conservation of, and investment in, tree resources is good for society, and what is in the common good must also be good for the resource-poor people directly involved in using them. This assumption needs to be questioned and the position of those most directly affected needs closer analysis. Environmental planning issues are conventionally approached either at a macro level, for example by environmental economists, or at a micro level, by social foresters and anthropologists. The link between

environmental and development issues, and the need for the participation of local people in tree resource management, has been established but more attention needs to be paid to linking the macro and micro, and utilizing each discipline's insights and approaches.

At the same time a better understanding is required of the objectives and interests of the various stakeholders managing and utilizing the environment, the trade-offs between objectives, and the costs and benefits of change and intervention at both macro and micro levels. Incorporation of these ideas into environmental planning can help predict outcomes, reduce the risk of unforeseen resistance or unwelcome outcomes, and facilitate informed policy-making.

This paper therefore has two overlapping objectives. The first is to raise awareness and promote discussion of the ideas of stakeholder and trade-off analysis initially developed in an analytical review of tree resource issues (Grimble and Quan, in press). The second is to create a framework for planning tree resource and environment management useful to policy-makers and environmentalists. This framework aims to incorporate stakeholder and trade-off ideas, which are seen as essential to policy planning where environmental issues are concerned, into Project Cycle and Environmental Impact Assessment (EIA) activities.

The paper starts by briefly reviewing the environmental and other roles of tree resources before developing a classification of stakeholders from micro to macro levels. The objectives and conceptions of value of different stakeholders towards tree resources are considered, and the trade-offs and conflicts of interest inherent in these positions are analysed. The trade-offs between conflicting macro-micro interests pertaining to the environment are of central concern. Finally, brief consideration is given to the general implications of the study for planning and policy-making. While, in essence, the paper concerns the abstract issues and concepts of stakeholder and trade-off analysis, practical examples, largely from recent experiences in Cameroon and Thailand, are also used.

Problems similar to those in tree resources exist in other areas of natural resources and the environment, particularly in relation to soil erosion and pasture degradation. Although this paper is limited to questions of tree resources on farms and in forests, the approach and methodology is applicable to other environmental areas where externalities are present, and this type of analysis needs to be expanded into them. Although the general arguments are clear, and the approach has been briefly tested at a field workshop in Thailand, much remains to be done and practical methodologies and action guidelines need to be developed. Therefore it is hoped that the paper will stimulate discussion and comments; suggestions will be gratefully received.

Tree resources

The term 'tree resources' is used in a general sense to include farmland trees, woodlands and forests and the land on which trees grow. Trees are key components of both natural and man-made landscapes and are now recognized as being multi-functional resources providing a wide range of benefits in terms of the products and services they provide (Gregersen *et al.*, 1989).

These benefits are illustrated in Figure 1. Trees and tree products are used directly as timber for construction and furniture, as fuelwood for cooking and heating, to provide latex, oil and fibres for the cottage and wider industries, and as fodder for animals; they also provide a range of edible and medicinal non-timber products. Trees can provide local services such as hedging and shade, enhancement of soil fertility, and protection against soil erosion. Forest trees provide regional and even global environmental services such as catchment protection and, arguably, climatic regulation. Forests are also important for biodiversity and the conservation of genetic resources, and as habitats for a vast range of fauna and flora. They

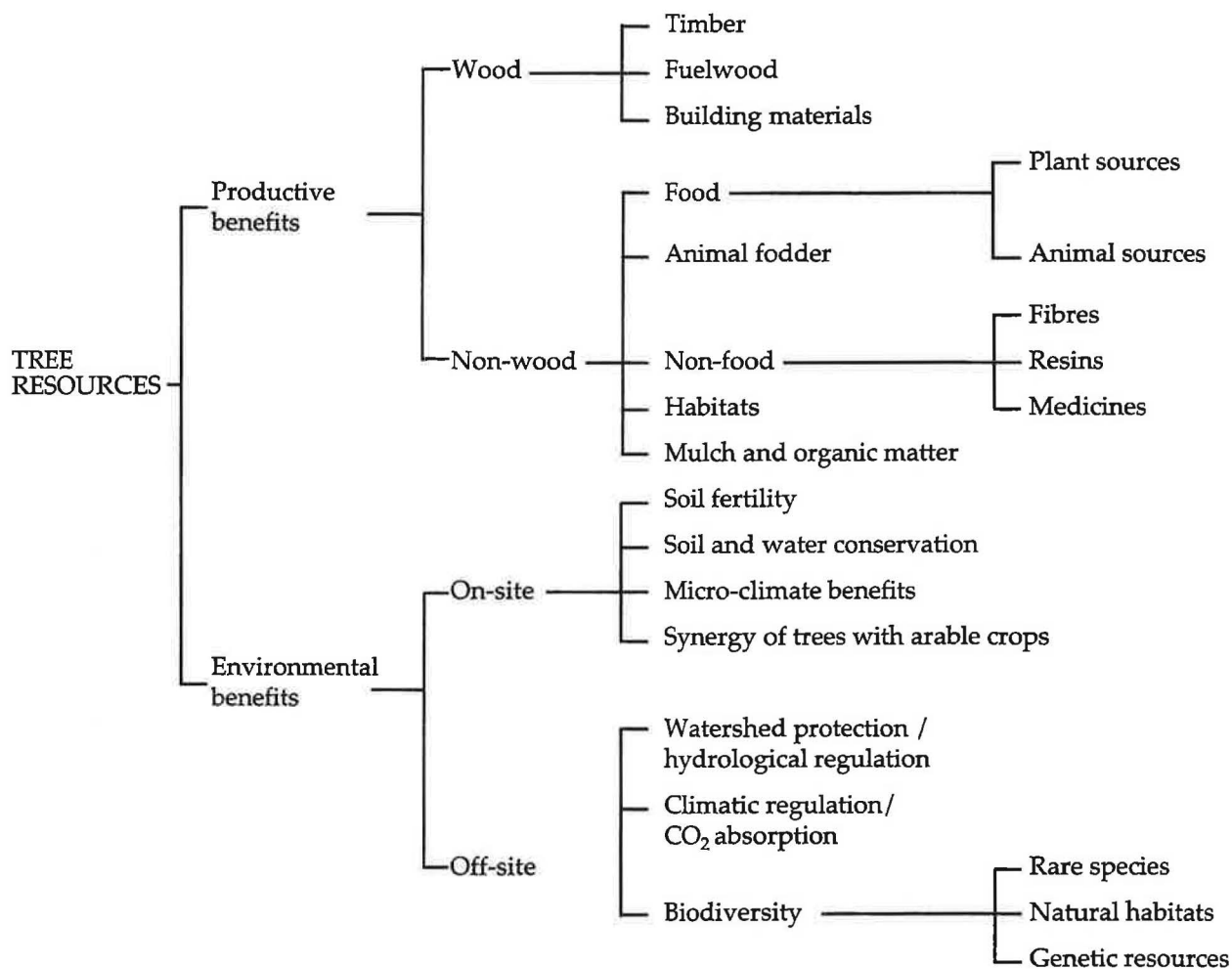


Figure 1 Multiple benefits provided by trees

maintain a renewable reservoir of agricultural land, provided they are not used so intensively as to lead to irreversible ecological change, and they can provide supplementary income sources and flexible assets which may be harvested by rural people when the need arises.

While no tree species provides the range of benefits indicated, and the costs of growing trees are too easily ignored, it is clear that there are very considerable potential benefits of tree resources for both rural development and environmental management. For these reasons on-farm

tree planting, agroforestry, reforestation and forest conservation are almost universally (and too often uncritically) promoted in development projects and natural resources policy. Forests, especially tropical rainforests, are a core concern of the environmental movement worldwide. It is not the intention of this paper to examine these notions but rather to point out that the development, protection and continued economic exploitation of tree resources is fraught with difficulties because of the range of interests involved. Tree resources thus represent a model of the interlocking and often conflicting interests which society has in environmental resources and requires closer examination.

Stakeholders in tree resources

Society is composed, locally and nationally of different social or interest groups here called stakeholders. Stakeholders are defined as groups of people with common objectives and sets of interests with regard to the resource in question and the environment. Stakeholders in tree resources range from forest dwellers and forest-fringe farmers to national policy-makers and planners; they also include a host of industrial, commercial, institutional and conservationist interests, and the rather nebulous conglomerations called 'future generations', the 'national interest', and 'wider society'.

The concept of a macro to micro continuum is useful for classifying stakeholders at different levels and the type of resource interests they have (Table 1). Micro-level stakeholders are those local and small-scale groups and institutions who are the immediate users and *de facto* managers of tree resources; as part of their farming or livelihood system, they regularly make decisions about the particular gains and losses sustained when using, conserving and investing in trees. Macro-level stakeholders are groups such as government departments and macro

planners concerned with regional or national natural resource and development issues. In principle, the ultimate macro-stakeholder is the global society, including future generations, though for most purposes the limit is set by national sovereignty represented by governments and politicians. In practice, all stakeholders lie somewhere along the macro to micro continuum, according to the scope of their interests in the resource.

Stakeholders may further be divided into those who make decisions, directly or indirectly, governing tree resource exploitation and management, and those who use tree resources and are affected by the decisions made. These two groups, however, are not mutually exclusive. For example, local farmers and forest dwellers may be affected by a forest department's decision to designate their traditional homelands as a forest reserve: conversely, farmers' actions in clearing forest for cultivation may affect downstream water and land users as well as government departments and conservation groups with a wider interest in the area.

Each broad stakeholder group can be thought of as a *black box* which can, when required, be broken down into sub-groups. For example, it would usually be necessary to differentiate between government departments, particularly between forest and agricultural departments, and sometimes also between national and local officials, because their interests and agendas are likely to differ. Similarly, a community is not likely to be fully represented by a single individual or committee and may be best broken down into wealth and gender divisions, and perhaps to the level of households and individuals. While this level of disaggregation is required in local planning for reasons of practicality, disaggregation should be kept to a minimum. As the present paper is designed for illustrative purposes, it is concerned only with those broad groupings where significantly different sets of interest must always be expected. An example of a set of principal stakeholders is presented in Box 1 using data from Cameroon.

Table 1 A typeology of tree resource stakeholders on a macro to micro continuum

Continuum level	Example stakeholders	Environmental interest
Global and international wider society	International agencies, foreign governments, environmental lobbies, future generations	Biodiversity conservation, climatic regulation
National	National governments, macro planners, urban pressure groups NGOs	Timber extraction, tourism development, resource and catchment protection
Regional	Forest departments, regional authorities, downstream communities	Forest productivity, water supply protection, soil depletion
Local off-site	Downstream communities, logging companies and sawmills, local officials	Protected water supply, access to timber supply, conflict avoidance
Local on-site	Forest dwellers, forest-fringe farmers, livestock keepers, cottage industry	Land for cultivation, timber and non-timber forest products, cultural sites

Stakeholder perceptions and valuations of tree resources

Although trees and forests can, in aggregate, provide all the benefits illustrated earlier, these products and services will be perceived and valued differently according to the stakeholder group. The perceptions of value will largely depend on the economic and political interest in the resource, and on the particular circumstances of the group

in question. These costs and benefits are assessed both in the financial sense and in terms of the wider implications of change on the livelihood or value system of the group.

The different views of some stakeholders towards tree resources are illustrated in Table 2. For most purposes, the driving forces can be portrayed quite simply. The central concern of the macro-economic planners, for example, is likely to be the contribution which forest resources make (or could make) to national economic growth; equity considerations may also be important. The concern of forest authorities will be, essentially, the composition and productivity of forests, although forest

Box 1 Principal stakeholders in forest resources in the Cameroon

Cameroon has the largest remaining expanse of tropical rainforest in Africa with 17.5 million ha of moist forest occupying one third of the country, and containing an estimated 1.5 billion m³ of timber in over 300 different tree species. Although much of the forest is populated and subject to shifting cultivation, vast areas are only sparsely inhabited and are utilized for hunting and gathering. As well as being of great importance to rural peoples as the livelihood base, Cameroon's forests are of great significance economically to the concessionaires and timber processors, the nation itself, and the international timber trade. They also have a number of unique ecosystems of importance to wildlife and genetic conservation.

- The state is a broad stakeholder in the sense that timber resources constitute a principal source of export revenue. Also effective forest conservation policies attract international support and protect valuable biological resources, including forest products previously unexploited.
- Within the state apparatus, the Ministry of Environment and Forests (MINEF), the Department of Forests and the State Plantation Development Company (ONADEF) all have direct interests in managing and utilizing forest resources.
- Forest and forest margin dwellers comprise another major set of stakeholders with a direct interest in tree resources. The majority of people in the southern and eastern parts of the country depend on the forest for their livelihoods. Farming peoples extract from the forest a wide variety of products, and practise shifting agriculture based on a system of rotating fallows through which forest cover is allowed to regenerate prior to clearance. Hunter gatherers, such as the Baka in eastern Cameroon, subsist almost entirely on the plant and animal resources provided by the forest.
- Commercial logging companies, both national and foreign, exploit the forest through logging concessions. French companies have long had major interests and, lately, Far Eastern companies are looking towards Cameroon as a source of timber.
- Internationally, the parent companies of logging concerns, and foreign governments are less direct stakeholders in Cameroon's forests. Also, a number of official development agencies are stakeholders in the sense that they are concerned with promoting 'good management' of forest resources for the multiple goals of conservation, timber production and environmental protection.
- A wide variety of national and foreign secondary industries, including sawmills, timber processors and haulage companies, have interests in forest resources.
- Indirectly, the state apparatus as a whole, its employees, its politicians, and its professional and business élites, all benefit from the revenue earning capacity of the nation's forests. They all have an interest in maintaining the forests as forests rather than in converting them to agriculture.
- Various international conservation groups such as the World Wide Fund for Nature (WWF) and Birdlife International, are supporting projects to protect and manage particular areas of rainforest.
- A range of research bodies engaged in agroforestry, silvicultural, biological and environmental research, also have established interests in using particular areas of forest land.

departments have become increasingly concerned with catchment protection and the conservation of biodiversity. Other government authorities, particularly agricultural and livestock departments, are likely to have different attitudes towards tree resources. The greatest danger to young trees in developing countries is often the grazing and trampling of animals, and the forest department will typically be anxious to prohibit access by livestock. Trees grown on farms have traditionally been neglected, and where they have been considered they have tended to fall under the prerogative of the horticulture, rather than the forestry department.

Environmental lobby groups give central importance to conservation objectives. They can be expected to emphasize the functions of forests as storehouses for diverse and endangered species and for the long-term sustainability of ecological systems. Logging companies, on the other hand, see forests primarily as sources of financial gain, though international and marketing pressures have recently encouraged a less overtly short-term and profit-seeking approach. In tropical forests, forest departments and, particularly concessionaires, will be interested in the management and utilization of the few most valuable timber species; and loggers may regard non-marketable species as a source of inconvenience.

The objectives of forest dwellers and forest farmers will be diverse. A wide range of tree species and habitats will be valued, depending on their contribution to domestic and farming needs; these contributions may include use as food, fuel, gums and latex, medicines, material for shelter and habitats for game. The range of species valued by these groups will be much wider than that valued by loggers and international traders, and differences in valuation will be heightened when some species are exploited by others outside the community. Furthermore, as land becomes more scarce, agricultural considerations will loom ever larger as farming takes over as a more intensive use of resources than hunting and gathering. Increasingly, therefore, the maintenance of

fallows, which form an integral part of their livelihood system, will be of overriding importance to most forest dwellers.

It should be emphasized that the above examples do not indicate the full complexity of stakeholder valuations, or represent the views of all people within a group or institution. In reality, some institutions will have hidden, as well as overt, agendas. For example, a forest department may be concerned with maintaining its power base and budget or the numbers of vehicles and staff under its control, and these hidden objectives may sometimes take precedence over the authority's overt objectives. Also, stakeholder objectives can be expected to change, over time, with changes in prosperity, resource scarcity and political perspective. For example, in Thailand there has been a tendency to blame deforestation for all the country's environmental problems in the last decade and as a consequence, forests, remote watersheds and recently cleared land, which used to be only of peripheral interest to élites, have become issues of public concern in a remarkably short space of time (Lohmann 1991).

Conflicts and trade-offs

In this section, conflicts of interest and trade-offs are examined with reference to different types of stakeholder using the macro-micro classification discussed earlier. Trade-offs and conflicts* are interlinked concepts so the distinction between them can become blurred. In this paper the following definitions are used.

Conflicts are situations of competition and/or disagreement between two or more stakeholder groups over the use of scarce resources (in this case, trees and the land on which they grow). They arise for different reasons. They may result from two groups with similar objectives wanting to use the same resource for similar

* The terms conflicts and conflicts of interest are here used interchangeably.

Table 2 Objectives and perceptions of value of forest resources

Stakeholders	Central objectives	Perceptions of value
Macro-economic planner	Contribution of forest resources to GNP	(a) Source of timber and other economically measurable products (b) Land resources available for conservation (c) Forests as national capital assets
Forest department	Forest maintenance and improvement Possible hidden agenda	(a) Source of commercial timber (b) Watershed protection and other income generating products
Environmental lobby group	Long-term sustainability of system	(a) Watershed protection (b) Source of biodiversity and endangered species (c) Climate regulation
Logging company	Financial gain from sale of processed timber	(a) Source of timber for exploitation (b) Only marketable species valued; others may be inconvenient
Resource-poor farmer	Contribution to livelihood system (income and security)	(a) Source of agricultural land and creation of fertility (b) Timber and non-timber products for domestic use, sale or exchange (c) Contributions to farming system, such as grazing, fodder or mulch

purposes (for example, two villages competing for use of a public forest area to gather minor forest products), or between two groups with very different objectives, such as an environmental lobby group (with interest in the long-term conservation of forest) and a commercial logging company (with interest in extracting the short-term commercial value of timber from the forest).

A trade-off is the process of balancing conflicting objectives. A trade-off therefore arises when a stakeholder or stakeholder group faces several objectives towards tree

resources which cannot simultaneously be achieved. Trade-offs thus imply a sacrifice or opportunity cost in terms of benefits foregone.

Conflicts and trade-offs are interlinked and often occur together; the likelihood and intensity of both tends to increase with increasing scarcity of the resource. However, there is an important conceptual distinction. Whereas conflicts are situations between two or more stakeholder groups, trade-offs relate to a single decision-maker or decision-making group.

In Table 3, conflicts and trade-offs are classified into four types according to the level at which the stakeholders and their objectives are placed on the macro-micro continuum. The discussion of conflicts and trade-offs is supported by two case studies, one from the tropical forest of southern Cameroon and the other from the dipterocarp forest in northeast Thailand.

CONFLICTS

Conflict situations can occur at both micro and macro levels, and between levels (Table 3). Local level conflicts may arise between different on-site stakeholders, such as settled farmers and migrant livestock herders, or between on-site and off-site stakeholders. Micro or local level conflicts

frequently originate from breakdowns in common property management systems, under pressure from population growth, economic activity and sometimes, incursion by outside interests. An example of micro-micro conflict is given in Box 3 where shifting cultivators' activities are perceived to conflict with water consumers in Phu Wiang municipality, northeast Thailand.

Macro-macro conflicts may occur between different stakeholders at national level, and between stakeholders at national and international levels. In the first case, differences may arise when a Ministry of Environment disagrees with a Ministry of Trade and Industry over the scale and extent of permitted forest exploitation. In the second case, international and national concerns may conflict when the interests of developed nations in preserving

Table 3 A classification of trade-offs and conflicts

Level	Trade-off*	Conflicts of interest
Macro - macro	Between policy objectives (e.g. environment <i>vs</i> economic growth <i>vs</i> equity)	Between national institutions or line departments (e.g. a forestry <i>vs</i> agriculture department)
Macro - micro	Between national and local interest (e.g. ban on forest clearance affects local cassava production)	Between national institutions and local people (e.g. a forestry department <i>vs</i> farmers)
Micro - macro	Between internalities and externalities (e.g. a farmer uses pesticides which affect biodiversity)	Between local people and 'society at large', or farmers and environmental lobby groups
Micro - micro	On-farm resource allocation (e.g. short-term <i>vs</i> long-term, or forest products <i>vs</i> cash crops)	Between different sets of local people (e.g. farmers <i>vs</i> pastoralists over use of forest land)

* In both the macro-macro and macro-micro cases, the decision-maker making the trade-off could be a government or national planner. In the micro-macro and micro-micro cases the decision-maker could be a resource-poor farmer.

biodiversity, climatic regulation and global forest resources differ from the interests of developing countries who have to bear the costs of conservation. An example of this was provided at the 1992 Earth Summit at Rio where the interest of developing countries in exploiting timber to earn foreign exchange prevented (understandably) the agreement of a global forest convention. Although global society, including the developing world, may eventually benefit from such an agreement, the gains are uncertain and uncosted, and the costs of agreement are unequally distributed.

Micro-macro conflicts arise where the actions of local stakeholders conflict with those of macro-level stakeholders representing themselves or the interests of wider society. This may occur, for example, when activities such as local wholesale timber logging, or colonization of a forest, conflict with the interests of national or global environmentalist lobbies seeking to conserve that forest. Conversely, macro-micro conflicts may also arise when stakeholders responsible for forest or wider environmental management at national or regional levels, or donor and development agencies, have an adverse impact on the livelihoods of micro-level stakeholders. Governments may opt for the wider or national level interest by outlawing an activity, such as shifting cultivation in forests seen as harmful to conservation. While intended to be in the interest of society such policies may merely reflect the interests of powerful stakeholders. All too often, evidence regarding the environmental harm of an activity is not measured or costed, and sanctions result in local people losing their livelihoods.

TRADE-OFFS

Of central concern in this paper are the trade-offs which have to be made by stakeholders between different objectives. At micro level they often reflect questions of local resource allocation between different activities which, to a greater or lesser degree, are mutually exclusive. For instance, a farmer makes trade-offs between different cropping patterns and planting times according to rainfall,

labour availability and other factors. Village heads or councils make trade-offs between the net benefits of different land use options when deciding whether to allocate portions of common land for cultivation, or whether to maintain them as grazing or forest land. Individuals and families make trade-offs amongst a range of livelihood objectives; these may include meeting basic needs such as food and shelter, and accumulating capital for payment of school fees, bridewealth, or the purchase of a land lease.

Of further concern are the trade-offs which are made between conflicting macro objectives when policy and planning decisions pertaining to the environment are taken. When making policies, efficiency and equity have to be considered as well as environmental objectives and goals. Politicians and senior figures in government are frequently required to make important trade-offs amongst these objectives, although the trade-offs may not be recognized.

The fact that trade-offs are made implies a cost which often goes unrecognized and is typically difficult to measure. For example, the land occupied by the famous deodar cedars and temperate forests of Himachal Pradesh in the Indian Himalayas is increasingly being eaten into by local farmers for apple and other fruit orchards. In economic terms, the replacement of forests with orchards is probably fully justified but the long-term and wider implications, including the aesthetic effects, of this process are difficult to understand. Implicit in such trade-offs is the concept of a time preference, of whether to opt for activities which bring immediate benefits or to invest in activities which will ensure a continued flow of income or some future benefit. Actual practice often reflects security of tenure. If local people have no rights over tree resources, they are unlikely to have an interest in preserving them. Similarly, loggers with short-term concessions may have little incentive to exploit timber resources sustainably.

At national level, the main debate concerns the use of forests for conservation or their exploitation and conversion to other forms of land use. The curve in

Box 2 A case study from the forest of southern Cameroon

The management objectives of the state, logging companies and local farmers, as the principal direct stakeholders, can be quite distinct, and in some areas, their interests are mutually incompatible. Forest policy should balance the interests of the different stakeholders and apportion access to, and use of, forest resources. In Cameroon, a new forest law is being implemented which prescribes the rights and responsibilities of stakeholders. A forest land-use plan is also being developed which will zone the forest estate into different categories with different management options.

Forest reserves are to be managed directly by the state forest authorities. Until recently, the customary rights of local people were overridden as the authorities sought to preclude farming from land intended for plantation development and forestry research. In the Mbalmayo Forest Reserve, this conflict of interest has recently been recognized and consultation with local people has begun to reconcile the farmers' objectives with those of the forest authorities. As some farmers had expressed an interest in planting trees, outside experts formulated an extension project for harmonizing the official objectives of facilitating regeneration of high forest, with local peoples' objectives of managing forest as farm-fallow. The idea was to develop and disseminate agroforestry methods for raising the productivity of forest farms so as to stabilize shifting cultivation and leave more land available for forest regeneration.

However, participatory enquiries into villagers preferences and priorities throughout the surrounding area showed that the extension scheme would be unlikely to succeed. Aggregated results of ranking sessions held with groups of villagers showed that there was very little interest in planting trees other than exotic fruit trees, which were already widely grown, because of the abundance of timber and non-timber products from forest fallows and the remaining high forest. Although forest products were important for livelihood maintenance, especially for medicine, house-building, and providing occasional income supplements, farming and cocoa production were likely to remain the principal subsistence and income sources. Existing management systems were found to make very effective use of forest land by providing secure livelihoods; people would be reluctant to give up tried and tested farming methods in favour of new ones without demonstrable results or guaranteed markets. Under the new law, however, there will be some scope for villagers to manage timber trees, and perhaps encourage their regeneration, if the designation of certain areas as community forests gives them the rights to control the timber harvest and direct access to timber revenues. Even then, the problem of managing different stakeholder groups within the community will not be easily overcome. Until recently, however, villagers' customary rights have had no formal recognition, and local people have had neither access to timber revenues, nor incentives to participate in sustainable timber management (although under present low population densities, agricultural systems have been sustainable).

Only by the conscious appraisal of stakeholder views was it possible to identify the principal trade-offs amongst stakeholder objectives, particularly between macro and micro levels. It is now recognized that plantation development and silvicultural research are impossible on forest land which is already managed under customary tenure, unless the occupants are to be forcibly excluded or persuaded of a genuinely more worthwhile economic alternative to the existing farming system. Unfettered commercial logging and effective management of forest resources by farmers, is also impossible on the same land unless a mutually acceptable management plan can be negotiated whereby farmers are paid for timber trees felled, and compensated for damage to cultivated land and fallows. Although all the stakeholders – the state, forest authorities, local people, forest officials, loggers and donor agencies – may join in a shared rhetoric of sustainable forest management, no real progress can be made unless their different perceptions of value and sets of economic interest are understood and addressed.

Figure 2 illustrates the trade-offs between the benefits of forest exploitation and forest conservation at macro-level. Conservation and exploitation both have associated costs and benefits and compromises have to be made between them. Although, in theory, compromise is reached by rational consideration of the balance required, it will frequently depend, in practice, on the political or bargaining power of the various stakeholders involved.

Even where objectivity rules, decision-making is frequently performed in ignorance of the issue in question, and of the biological and socio-economic costs and impacts. Objectives commonly pre-eminent in policy-making are rapid economic growth and reduced debt liability; the fact

that gains and losses in natural capital do not generally figure in national accounts means that in developing countries, environmental objectives and long-term sustainability are often downplayed.

In other situations, policy decisions are made which favour the environment but do not fully consider the implications or costs for local people. In the Cameroon for example, a donor-assisted project which was concerned about the loss of virgin forest attempted to replace forest fallow with plantations, unaware of customary rights and the implications for local farmers (see Box 2). Similarly, in the Phu Wiang watershed in northeast Thailand (Box 3), project planners thought that the forest and catchment area

Box 3 A case study from northeast Thailand: Phu Wiang watershed

Phu Wiang is a small watershed which has been the subject of much attention because it is one of the last remaining well-preserved forested areas in the central parts of northeast Thailand. The relationships between different stakeholders, and the impact of environmental policy on them, were investigated during a workshop on stakeholder analysis held at Phu Wiang in January 1994.

Recent significant policy changes in the area have been the establishment of the Phu Wiang Integrated Watershed Development Project (PWIWDP) in 1985, the national ban on logging in 1990, and in 1992, the designation of Phu Wiang as a National Park. The local people were most affected by the strict prohibition of shifting agriculture under National Park status. Many people depended on being able to use the forest for the growing of cash crops, particularly cassava, so the ban on shifting agriculture affected farmers incomes, especially the poor farmers who had little or no paddy land. Though some of these have found employment with the Royal Forestry Department (RFD) on plantations started under the PWIWDP, many have been forced to leave the area to find employment elsewhere, on sugar-cane plantations for example, and in Bangkok.

Under the logging ban, the withdrawal of concessions had serious consequences for the local sawmill; the threat to its future was reduced only by using farm trees and timber imported from Laos. Loopholes in the laws, and weakness in enforcement, have allowed local villagers to continue cutting and selling of forest timber on a diminished scale, mostly at night.

A matrix was used at the workshop to identify the stakeholders and the conflicts and complementarities which exist; this helped to highlight what trade-offs between objectives were, or have to be made. The matrix is illustrated opposite, a (-) is used to indicate a conflict, and a (+) to indicate a complementarity. Those interactions of particular interest are shaded. It is worth noting that little conflict was observed between different groups of local people, a fact which contrasts with other forested situations. In the other shaded areas, tensions exist and trade-offs are of particular importance.

Matrix	Farmers, labourers, pitsawers	Downstream water users	Sawmill merchants	RFD/PWIWDP officials	FAO/UNDP consultants	Macro-planners	National politicians
Farmers, labourers, pitsawers		--	- +	--	-	-- +	-
Downstream water users				+	+	+	
Sawmill merchants				--	-	-	
RFD/PWIWDP officials				--		-	
FAO/UNDP consultants							
Macro-planners						--	
National politicians							

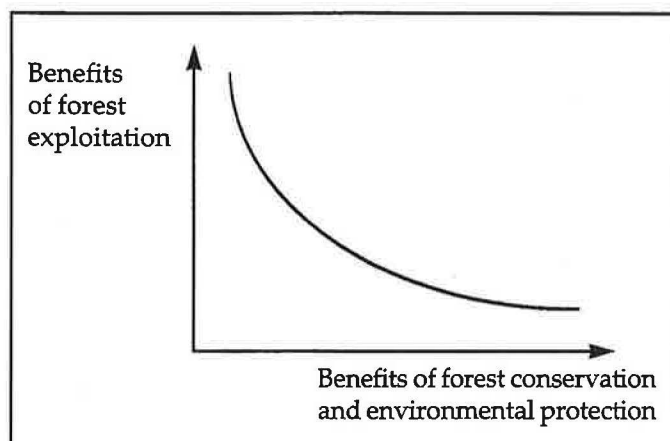


Figure 2 Trade-off between forest clearance and conservation

were threatened by shifting cultivation of cassava in reserved areas, so the practice was banned. Alternative income projects were introduced but they failed to compensate those farmers who relied on cash from cassava, and many were forced to leave the locality, to look for paid work elsewhere. The lack of formal tenure over forest land meant that local stakeholders had little scope for influencing the decision, or for claiming redress.

A special case: future generations The advocates of sustainable development argue that future generations hold a stake in the present day management of resources, although they cannot represent their own interests in the same way as present generation stakeholders. This does not mean that they are unrepresented, as people may incorporate their unborn children into their planning horizons, just as

they may prepare for old age. This is illustrated by their defence of customary resource rights, over forest land under fallow for example, and by their planting of slow-growing trees unlikely to be used by their own generation. The difficulty here is that one individual or stakeholder group may have conflicting time horizons, and the question of providing for future generations may just be an extension of the issues discussed under micro-micro trade-offs. Again, questions of risk and security play an important role in determining how stakeholders balance their options and make decisions.

Conclusions and policy implications

Cost-benefit analysis (CBA) is the traditional tool of economists for assessing whether or not a project will lead to net welfare gain for society as a whole. CBA allows projects to be compared, accepted or rejected, according to a single figure, normally their Net Present Value. In recent years, the techniques of CBA have been extended by environmental economists to place values on, and incorporate, environmental costs and benefits (Winpenny, 1991). In the case of tree resources, these might include the direct and indirect use values of non-timber forest products, and the hydrology-regulating and biodiversity-conserving services provided by forests which had previously escaped economic reckoning because they do not generate monetary values. The concept of Total Economic Value (TEV) allows the whole range of benefits which derive from such resources to be considered, including their direct and indirect use values, the value of options on their future use, and their intrinsic or 'existence' value (Pearce and Turner, 1990; Barbier, 1991).

In spite of these developments, reliance on CBA may not be adequate for tree resource and environmental

planning as it does not take account of local reality in the sense of how the environment is managed, in particular who makes the decisions and how they are made. In practice, most environmental decisions are made by individuals rather than by public projects, and it is private net benefits, with no regard for TEV or externalities, which guide these decisions. Private stakeholders, whether farmers, community leaders or businessmen, consider the nebulous concept of the environment and what may be good for the nation or future generations; they act in their own or their family's interests, livelihoods and security. Thus, the actions of different sets of local people may impinge, often negatively, on society or stakeholders over a much wider geographical area. Conversely, where public projects are important, they can be expected to have particular and divergent impacts on different stakeholder groups, and do not act simply on society or a nation as a whole.

Tree and other natural resource conservation initiatives commonly face the paradox that the cost bearers are local people who receive a disproportionately small share of the benefits of conservation; incentives for co-operation and the maintenance of initiatives over the long-term are thus diminished. This is probably the reason why many environmental initiatives fail and why so little has changed since the time of Plato. This situation, in which environmental resources are valued differently between stakeholders, and the benefits of conservation and the costs of degradation are borne by different sets of people, makes the prospect bleak.

A stakeholder approach addresses this problem through disaggregation of the costs, benefits and risks of different policies and strategies, as well as projects. In any developmental matter it is important to consider the interests of critical stakeholders, not just for equity reasons but also because successful implementation may depend on it. However, disaggregation of costs and benefits is particularly important when dealing with tree resources and environment matters. This is because of the potential conflicts of interest between stakeholders, and the fact that

many of the costs of degradation, or benefits of conservation, are external to the decision-makers themselves. Where externalities exist, and where hidden agendas differ from written ones as in the case of institutions, differences between sets of stakeholder interest, or between stakeholders and society, may be considerable.

The desire to safeguard the environment or forests is a northern concern which policy-makers in developing countries may not fully appreciate. Practical policy must be designed and implemented with an explicit awareness of how it will affect, and be perceived by, institutional and commercial stakeholders and different sets of local people. The approach discussed here is pragmatic and problem-centred, drawing on a range of disciplines including ecology, economics, sociology and political science. Crucially, it incorporates macro perspectives obtained from welfare and environmental economics, and micro perspectives obtained from farming systems analysis and linear programming; it also utilizes Rapid Rural Appraisal and other participatory data-gathering techniques. In so doing, it highlights the conflicts which are likely to occur at all levels, but in particular, between local people and wider society (micro and macro). If a stakeholder approach is adopted, decision-makers can make practical trade-offs with a clear understanding of their likely consequences. Identifying and understanding conflicts of interest can thus be a positive force in planning, leading to more

acceptable trade-offs and a better understanding of any mitigatory or compensatory measures needed.

Further research which takes account of political and institutional reality is imperative. Practical guidelines for planners and policy-makers need to be developed. Micro level and multi-disciplinary research is required to determine the way in which macro policy has impacted both on the physical and biological environment itself, and on different stakeholders. This research must include political scientists and other institutional specialists. Macro level research is required for a better understanding of the wider effects of the actions of local stakeholders, both ecologically and economically. A better understanding is also needed of how specific environmental policies are perceived by different stakeholders, and how the stakeholders have reacted to them. The reasons why particular stakeholders in tree resources have made particular resource management decisions and the ways in which they perceive and react to structural and policy change needs to be determined. Finally, the questions of how much divergence or compatibility exists between micro and macro perspectives, what opportunities are present for internalizing externalities how can interventions be prioritized where resources are limited, and how can a stakeholder approach best be incorporated into Project Cycle and Environmental Impact Assessment activities, need to be addressed.

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