



**FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS**



**UNITED NATIONS ENVIRONMENT
PROGRAMME**

**STRUCTURAL AND
INSTITUTIONAL
GUIDELINES FOR
LAND RESOURCES
MANAGEMENT
IN THE
21st
CENTURY**

NEGOTIATING A SUSTAINABLE FUTURE FOR LAND



Negotiating a sustainable future for land

structural and institutional guidelines for land resources management in the 21st century

Produced by the Land and Water Development Division
of the Food and Agriculture Organization of the United Nations (FAO)
in collaboration with the United Nations Environment Programme (UNEP)

Text: Denis Sims
Design and layout: Giulio Sansonetti

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior permission of the copyright owner. Applications for such permission, with a statement of the purpose and extent of the reproduction, should be addressed to the Director, Information Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, 00100 Rome, Italy.

The designations employed and the presentation of information in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations or the United Nations Environment Programme concerning the legal status of any country, territory, city or area or of its authorities, concerning the delimitation of its frontiers or boundaries. The designations “developed” and “developing” are intended for statistical convenience and do not necessarily express a judgement about the stage reached by a particular country, territory or area in the development process.

© FAO and UNEP 1997

Contents

Chapter 1 SETTING THE SCENE	9
Chapter 2 THE NEED FOR AN IMPROVED APPROACH	11
Chapter 3 ESTABLISHING THE CONDITIONS FOR SUSTAINABLE DEVELOPMENT	17
• Removing constraints, providing incentives, and developing improved technology	17
• Institutional arrangements for involving stakeholders in management	25
• Efficient and socially effective land resources management through a network	35
• Providing information	43
• Providing technical support for decision making	49
Chapter 4 DOUBLING PRODUCTION WHILE PRESERVING THE ENVIRONMENT: A FRAMEWORK FOR GLOBAL RESOURCES MANAGEMENT IN THE 21ST CENTURY	57

Foreword

At the end of 1993 the Food and Agriculture Organization of the United Nations (FAO) was appointed UN Task Manager for the implementation of Chapter 10 of Agenda 21, the Programme of Action for Sustainable Development which was agreed at the United Nations Conference on Environment and Development (Brazil, 1992). This chapter, entitled **Integrated Approach to Planning and Management of Land Resources**, along with four other chapters, make up the “land management cluster”.

FAO and the United Nations Environment Programme (UNEP) have jointly developed the elements of an improved approach to sustainable development. This combines the involvement of people in local area resource management with appropriate information technology and extension and a commitment to the provision of the incentives and an improved institutional and policy framework.

A report, **Planning for Sustainable Use of Land Resources: Towards a New Approach**, was published for the meeting of the United Nations Commission on Sustainable Development in April 1995. Following a number of workshops, and discussion with representatives from over 30 participating countries and the European Community (EC), UNEP, International Center for Research in

FAO and the United Nations Environment Programme have jointly developed the elements of an improved approach to sustainable development.

Agroforestry (ICRAF) and Centro Internacional de la Papa (CIP), this report has now evolved into **Negotiating a Sustainable Future for Land**.

1. Setting the scene

Readers should keep in mind that throughout the present document the words *land* and *land resources* are used in a wide sense, and imply not only the land surface and its attributes, such as climate, but also associated resources, such as water; plant, animal and human populations, settlement patterns, and the results of human activity.¹

The discussion which follows focuses on agriculture and rural development. This is not meant to imply that other issues involving land are not equally important, or that the proposals made cannot be applied equally successfully, for example, to urban land.

The publication is aimed at ministers and senior officials in government and members of non-government institutions who have responsibilities relating to natural resources, agriculture, rural development, the environment and land, together with personnel in development agencies and institutions responsible for allocation of development resources. It is believed that the problems and principles discussed here apply to all countries, and are among the most important which face the world today.

In this working document the key issues that are believed to interfere with integrated resource management are confronted. A strategy for change is also suggested.

The strategy proposed is not unique, nor in a sense is it new, since most of the components have been around for some time. What has been tried is to combine them into one integrated and logical framework. land-use, the factors which control it, and the ecological consequences, are extremely complex. The apparent simplicity of the following proposals results from years of collective development experience and months of discussion. The logic of an improved approach must be easily grasped by busy people. It is planned to follow up the present publication with a detailed implementation manual.

In order to link the community, information and policy settings to achieve integrated land management five major tasks have been identified:

- 1. removing constraints, providing incentives and developing improved technology;**
- 2. creating institutional arrangements for involving stakeholders in management;**
- 3. establishment of efficient and effective land resources management through a network of groups;**
- 4. creating information systems which are accessible to all;**
- 5. providing technical support for decision making.**

¹ For a full definition of the term "land" see FAO Land and Water Bulletin 2, *Planning for Sustainable Use of Land Resources; Towards a New Approach*, 1995.

2. The need for an improved approach

These actions provide a framework for this document. The terms *land management* and *resource management* have been used interchangeably. Environmental management terminology tends to apply the word “resource” to all manageable variables in a landscape, community or biome, from soil and water to genetic biodiversity, labour and legislation. A manager of integrated natural resource systems cannot afford to be ignorant of, or

isolated from, any of these factors. That is one of the key messages within this document.

Interested people or agencies are invited to try out the ideas presented in this work, provide feedback on their application, and join to develop more fully a working set of guidelines for future use by everyone who can see the need for change.

“

The most effective way to ensure the value of the future is to confront the present courageously and constructively.

Rollo May
British psychoanalyst

”

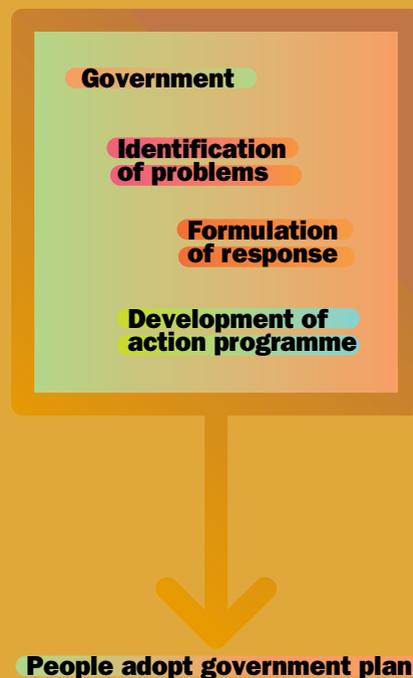
The general objectives of Chapter 10 of the United Nations Sustainable Development Agenda, entitled **Integrated Approach to the Planning and Management of Land Resources** are:

«To facilitate allocation of land to the uses that provide the greatest sustainable benefits and to promote the transition to a sustainable and integrated management of land resources. In doing so, environmental, social and economic issues should be taken into consideration. Protected areas, private property rights, the rights of indigenous peoples and their communities and other local communities and the economic role of women in agriculture and rural development, among other issues, should also be taken into account.»

Specific objectives are as follows:

- 1 develop policies which will result in the best use and sustainable management of land;**
- 2 improve and strengthen planning, management and evaluation systems;**
- 3 strengthen institutions and coordinating mechanisms;**
- 4 create mechanisms to facilitate the active involvement and participation of communities and people at local level.**

The top-down approach



While many governments are increasingly recognizing the importance of community empowerment in resource management, it is clear that nothing will change until the government institutional frameworks expand and evolve to include the community voice. At the same time it is impossible to “empower the community” with any approach, no matter how well intended, if it is “top-down”. Herein lies the conundrum. A new way for government and people to work together must be fostered which embraces this “community voice” at planning and policy-setting stages; which guarantees delivery of appropriate decision-support **information**; which provides **incentives** for cooperation at the grass roots and which commits public resources to **institutional tools** that strengthen the process and removes those that limit it.

An on-going discussion among people involved in development programmes on the multitude of “things that get in the way” of integrated resource management has yielded several that clearly illustrate the need for change.

The local community is often isolated from regional or national resource management decisions

Today development usually begins with the identification of a problem by government or a development agency. This may be followed by the design of a technical solution by outside experts and an information and extension programme, often involving demonstrations and subsidies, to persuade the people to adopt it. Results are invariably disappointing. The “perceived problem” (for exam-

ple deforestation or erosion) is usually a symptom of the real, or fundamental problem - that population pressure has increased and social and economic conditions have changed, but land management systems have remained the same, or have actually degenerated due to the breakdown of traditional social structures.

Land users employ a multitude of different coping mechanisms, and development agencies often fail to take into account the fact that new methods or practices must be seen as being in their interest before they will be adopted. If the community feels that the programme belongs to the Government rather than to them, little support or involvement is likely. To overcome this the people need to be involved from the start in the identification, creation, design and delivery of development programmes.

Failure to address all of the relevant issues

Development projects are frequently too narrow in their scope and do not address all of the essential issues, such as land tenure, lack of incentive to produce marketable surplus, lack of markets, ineligibility of land users to obtain credit, lack of infrastructure and government or landowner vested interests.

In some cases the needs are obvious from the beginning, but are ignored because they seem insoluble within the time available. Sometimes problems become apparent during implementation, but their solution is then incompatible with the design of the project and the pressure is on to deliver within time and budget. A process of resource development is only as strong as its weakest link.

Separate objectives give rise to separate programmes

Development covers a host of aims and objectives, such as eliminating poverty and raising living standards, strengthening women’s rights, increasing food production, improving the quality of human settlements, halting the spread of desertification, preventing deforestation, preserving biodiversity, and many others. Each gives rise to different and often competing programmes with different objectives, budgets and institutional aspirations.

Though land-use is extremely complex and many-faceted and therefore demands a holistic approach, it is often dealt with in a fragmented and hyper-reductionist manner. Two major problems are failure to integrate issues at the level of policy formation, programme development and implementation, and failure to integrate government and people. Most present structures produce a top-down approach in which communication between people and government is weak or non-existent.

Hierarchical institutional structures and divided responsibilities

National and international institutions are usually sectorial and hierarchical in terms of responsibilities and structure. This results in a strongly sectorial approach to analysis and planning, and a tendency to divide and subdivide areas of interest, programmes and budgets, which thus become less and less related to each other. The structure discourages horizontal linkages and exchange of

information, so that different parts of the institution are badly informed on what others are doing, and develop programmes that are based on priorities viewed in terms of their own policies and priorities. In addition, institutional responsibilities often overlap or are divided among several agencies, providing possible grounds for competition and rivalry

Absence of an integrated technical approach

Economists, physical planners, sociologists and engineers have developed different priorities and often competing approaches to problem solving. Each discipline has tended to develop separate terminologies, classifications and data needs. These are often incompatible with each other and hamper communication and the development of an integrated approach.

The many physical, social and economic factors involved in the way that land is used, and the impact of this use upon the environment, are so dissimilar, and are expressed in such different forms that they are intrinsically difficult to compare, analyse and integrate. The problems are further compounded by the number of different fora, both horizontally and vertically distributed, in which action takes place, and the difficulty of disentangling causes and effects.

“ We should all be concerned about the future because we shall have to spend the rest of our lives there ”

Charles Kettering
(1876 - 1958)
American electrical engineer

The most serious problems in resource management are institutional rather than technical

Poverty, desertification, deforestation, soil erosion, pollution, species impoverishment and other priority issues of today are actually symptoms of a fundamental underlying problem. This is that the development of management and conflict resolution mechanisms has not been keeping pace with technological advances and increasing population. Technical solutions to most of today's problems are known. It is known how to produce more food, prevent soil erosion and salinization, how to conserve forests and whales, and how to prevent pollution. The problem is the inability to create the social and economic conditions under which the necessary technical and management solutions will be applied.

At national and international levels the lasting benefits from development programmes are often meagre

in relation to the resources devoted to them. Long-term benefits are often small in relation to inputs. Current population growth forecasts indicate an approximate doubling of world population over the next fifty or sixty years, with most of the increase taking place in developing countries. This will entail enormously increased social and environmental pressures, which will have global repercussions. Today the environment, the land, the water resources, the forests and wildlife, are being destroyed and degraded at an unprecedented rate. The environment, especially in urban areas, is often polluted to the extent that there is a danger to health. In many parts of the world, especially in the larger cities, poverty is a major problem, while in many rural and urban areas the quality of life is declining. This, and competition for resources, has led to social unrest, migration and even war in some places. What will the situation be like when the population pressure is far greater than it is now?

 In Chapter 2, **The need for an improved approach**, several important barriers to integrated resource management have been described in some detail; readers can recognize them at a local level and relate them to their own circumstances. The following chapter expands on the five steps which are believed necessary to achieve integrated resource management.





3. Establishing the conditions for sustainable development

Removing constraints, providing incentives and developing improved technology

Except in centrally planned economies where all production resources are owned by the State, or in wholly State-owned enterprises, governments and development agencies do not carry out development themselves. Production and development functions are mainly carried out by ordinary people - farmers, traders, industrialists, service providers and many others.

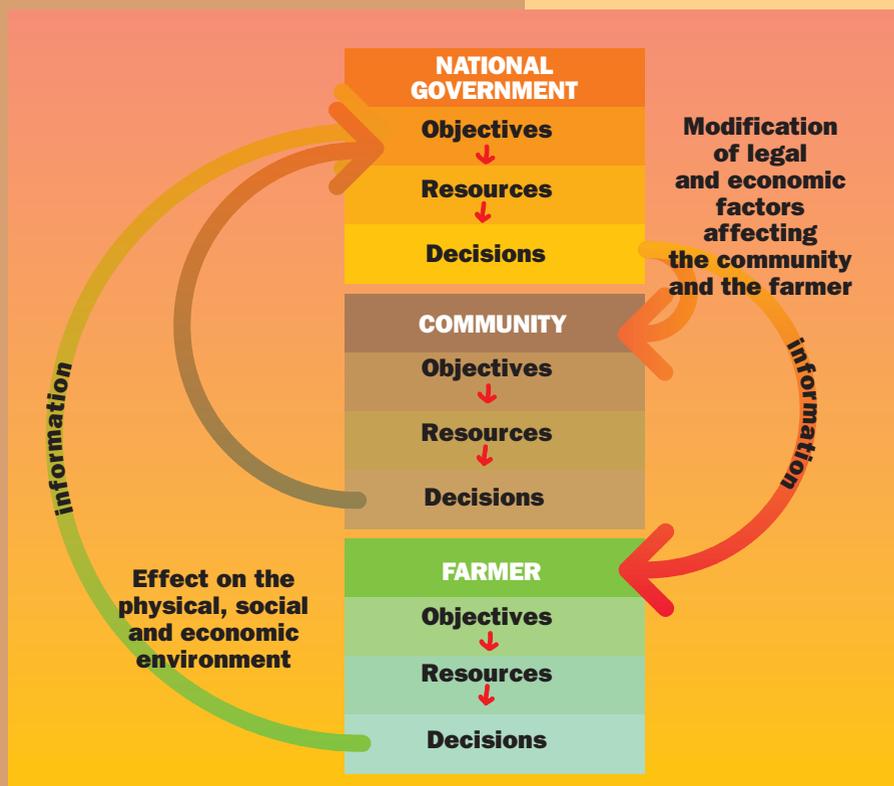
In most countries governments merely influence the environment within which development takes place. This may be favourable to rapid expansion of the economy combined with environmental protection, or may be more or less unfavourable, sometimes to the extent that the country stagnates and becomes poorer, and its natural resources become more and more degraded and exhausted.

The force which powers development is the natural human drive to provide food and shelter for the family, and then an acceptable standard of living and education for children. In support of this, land, water and all other natural resources are exploited or used to provide outputs and ben-

Key concepts:

- *Realizing that development is carried out by people, not governments*
- *Identifying and removing constraints and disincentives to increased production*
- *Building in sustainability and resource conservation*
- *Acknowledging the need for improved production technology as the key to increased production which is sustainable*

Relationships between decision-makers at different levels



efits by those who have access to them.

Land uses range from hunting and gathering to industrial undertakings, but in almost all cases decisions about how land and associated resources are used and managed are made by the immediate occupiers of the land, and are related to achieving personal objectives. Land users function within a given socio-economic environment and make decisions on the basis of the information and technology available to them and in the light of what they feel is the most efficient way of utilizing their soil, water, skill, labour and capital to achieve

their goals. They are motivated by rational self-interest. *In other words, land users do what they think is best for them and their immediate families.* This is not to say that their attitudes cannot be modified through a greater understanding of the issues involved, or as a result of the opinions of the community as a whole.

The results of past land user decisions are the land uses and land cover types which presently exist, and the impacts – direct and indirect, good and bad – which these land uses, and the activities which support them, have upon the environment.

Factors which lead to increased production

Since the number of people in the world may nearly double over the next fifty years or so, increasing food production and raising living standards are priority needs, especially in developing countries. It is also in the direct interest of developed and richer countries to assist the poorer nations in this.

The greater part of the additional production will have to come from the land. But land users will only increase production if they benefit directly by doing so, and if existing constraints are removed. Producing and selling more raises incomes and living standards and this in turn provides a basis for improved services.

Some of the most important factors which result in increased production where land is the primary resource have been identified below. Absence of one or more of them is often a fundamental constraint.

Economic and social rewards

This implies a market demand at a price which is attractive to the producer, or social rewards for high levels of production.

Clear and robust rights to land

This includes the ability of land users to control the use of their land, which may need to include the right to exclude other users. Production is also encouraged when land rights can be used as security for borrowing.

Basic physical infrastructure

This means that extra production can be taken to market and inputs can be brought in, because adequate tracks, roads and bridges exist. Necessary physical infrastructure also includes the market places themselves and basic communication networks such as telephones.

Availability of inputs and services

Free and efficient markets, availability of credit and inputs such as fertilizer, transport and information are all critical requirements.

Access to improved technology

Production can only increase if the knowledge of how this can be done exists, and is readily available and adoptable by potential producers. This means that it must be suited to the physical, social and economic environment where it is to be applied. The land users' ability and willingness to try alternative systems of resource management normally increase with overall improvement in productivity.

Factors that may stimulate or constrain production increase

Economic aspects

- Costs of inputs and sale prices for produce; profitability of production
- Availability of credit and interest rates
- Availability of inputs, including tools and machinery
- Tax structure

Land tenure issues *

- Type, duration and origin of user rights
- Type of boundary demarcation and land records system
- Whether user rights refer to one or to several parcels or areas of land
- Whether the land or the land-use rights are saleable, rentable or can be inherited
- Rights with regard to specific resources such as water, plant or tree resources and wildlife

Legal, quasi-legal and bureaucratic aspects and restrictions

- Laws affecting access to resources
- Laws affecting types of land use and land-use practices permitted
- Laws controlling degree of modification of land resources and the environment
- Laws affecting distribution and sale of products
- Laws and other conditions affecting civil liberties and the right to form groups and institutions for mutual benefit or trade
- Existence or otherwise of effective arrangements for settling disputes

Physical infrastructure and services

- Existence or otherwise of roads, bridges and the means of transport
- Market places and how they are regulated
- Amenities (schools, health facilities, etc.)
- Availability or otherwise of information of all kinds

Gender and equity aspects

- Women's access to information and education
- Women's rights in relation to owning property
- Whether women and men are equal before the law

* See for example *Land, Tenure and Sustainable Management of Agricultural Soils*, by D. Wachter and N. Norts, Centre for Development and Environment, University of Berne, 1996.

Social and economic stability

Unstable conditions tend to go hand in hand with poor maintenance of infrastructure, such as roads or irrigation and drainage schemes. In addition, many aspects of land-use are long-term in nature, for example whether to establish permanent crops or tree plantations, or whether to invest in soil improvement or additional on-farm infrastructure such as buildings or fencing. Such decisions made by the land users are strongly influenced by their expectations of future political and economic conditions. Social and economic stability is strengthened through the existence of a supportive and functioning legal framework.

In many development situations, the apparently obvious incentives listed above do not exist as far as many of the population are concerned. It is then often a waste of resources and time to try to implement specific development projects. Therefore the first activity to be carried out in any government development programme is the identification and removal of production constraints. It is not too much to say that if this is done development will happen almost by itself.

Production constraints can best be identified through discussions with the producers themselves. The most appropriate solutions are also most easily identified and applied through joint programmes in which government and people work in partnership.

Building in incentives to conserve

Resource users' decisions on whether to invest capital and labour in the improvement of the production base or in protecting the environment depend on the extent to which they feel this will be beneficial for them, either as individuals or members of the community. This might be called the benefits principle. The following are examples of how it can operate.

Ownership

Through ownership or other stable, long-term land rights, the benefits of conserving or improving the resource accrue to the user. A farmer will, for example, improve the long-term productivity of the soil, build conservation structures, or plant trees when he or she is confident of receiving the benefits at a later date, through increased yields or from the increased value of the land.

Shared benefits

Through shared benefits, each individual or family receives some form of output, such as firewood, building timber, grazing or water from a resource, such as a forest, plantation, water source, or communal land area, which is not personally owned but in which it participates. Communities will sustainably manage joint resources when each member is confident of receiving an equitable share of future benefits.

Environmental advantages

These generally refer to the quality of life, and include such factors as a healthy and aesthetically pleasing environment, and the perceived benefits of biological diversity.

Legal, economic or social sanctions which encourage sustainable land-use or penalize practices which

are inefficient, unsuited to the land type, or which degrade or pollute the environment can play an important role in sustainable resource planning. But laws are of little use unless they have the active support of the majority of the population. This implies that the population is informed and involved, and participates in management.

Resource-poor farmers may use land resources unsustainably. Poor cultivators are often settlers or squatters on government or private land. Therefore they do not have the motivation to care for the land in the same way that they would if they had continuing rights to use it. They also may not have the necessary knowledge of conservation practices and the necessary resources to apply them. Where land is owned by the farmer, even though the holdings are very small and the farm family is poor, production is often very high per unit area, and the greatest care is frequently given to conserving and improving productive potential because the land is the family's most treasured possession and means of livelihood.

Education is a key factor in conservation. Knowledge about the importance or usefulness of a resource or a plant or animal species, or how it can be harmed or degraded, will influence attitudes towards its use.

The key role of improved technology in enabling increased and sustainable production

The relationships among available land, population, food production and living standards are fundamental. As a population increases the initial response is to occupy additional land. When all the available and suitable land is used, and if the population continues to increase, two sets of possibilities occur. One is a continuously increasing food supply from the same amount of land through the invention or adoption of improved production technology. This is more likely to take

Factors which favour conservation

In general the attitudes and actions of individual land users and communities towards resource conservation are positively influenced under the following conditions:

Returns on investment in the utilized resource accrue to the land user in proportion to the land user's contribution. This also includes investment in demarcation and registration of a land holding, and freedom to transfer land use rights, or buy and sell land (and sometimes irrigation water).

The land user is aware of the benefits of conservation.

The land user enjoys security of tenure and rights over the resource which permit sufficient control over management for a long enough period of time. Also included under this heading is the ability to use land as a security to obtain development capital.

Techniques which combine conservation with enhanced productivity are available and known.

Significant benefits from exploitation or management of common resources (for example forest or wildlife) are enjoyed by the local community.

The land user participates in community or national conservation schemes.

Social and legal sanctions operate, so that penalties for non-compliance are substantially larger than anticipated private gains.

A stable policy environment and legal framework also have positive effects on the incentive to conserve the resource base.

“Farmers will respond if given the necessary incentives, if they feel they can shape their own destinies, if they are taught how to enhance their production, their land, their very lives, and if we place our trust in them.”

Jacques Diouf
FAO Director-General,
World Food Day, 1996

place where the physical environment is favourable. If introduction of improved technology occurs faster than rate of population increase, then the standard of living rises. The second possibility is that population increases but resource management systems remain essentially the same, due to lack of information or social resistance to change. In this case the production base will be degraded, standards of living will fall, and part of the population may attempt to migrate elsewhere.

In earlier times population increase was slow. Either there was sufficient time for natural invention or introduction of improved production methods, or population was itself limited by the food production technology. Today populations in many countries are expanding rapidly, and there is little additional land which is suitable for cultivation. The only possible solution therefore is identification and adoption of new resource management technologies which result in higher production, and which are sustainable. But this needs to happen many times faster than it would under the natural, gradual process of trial and error which, by definition in such a case, has already failed.

The identification or development of an appropriate technological and management solution in such a case is a formidable task, bearing in mind that the environment is likely to be sub-optimal for production and may already have been damaged, that physical and social conditions are likely to be undeveloped, and that generations of local inhabitants will already have brought to bear considerable local knowledge and experience without being able to identify or apply viable alternatives. Success is only likely to be possible through a process which employs a much wider and more powerful knowledge base

with integrative logic to identify alternative land-use options than was available previously, together with a rigorous evaluation process to identify which of these is economically, socially and ecologically viable. *Unless improved technical and management options have been identified no solution is possible.* This is the reason for the failure of many programmes which attempt to deal with problems such as desertification and other forms of environmental degradation.

For the sake of simplicity the above argument assumes a basic subsistence economy, as used to be the case in many traditional societies. Nowadays it is important to emphasize two further points which are related to each other. The first is that today agriculture alone cannot necessarily provide employment for the whole of the rural population, so that raising living standards in rural areas also depends on the establishment and fostering of other industries and services. Secondly, where the limits of food production technology have already been reached but the population continues to grow, it is necessary to finance food imports by selling other goods and services to outsiders.

“

The best way to motivate farmers and communities to take an active part in participatory and integrated watershed management initiatives is through the identification of simple and user-friendly technical interventions which enhance the efficiency, rentability, and sustainability of the local farming system.

From “Steps Towards a Participatory and Integrated Approach to Watershed Management” (FAO Field Document No. 1. GCP/INT/542/ITA, 1996)

”





Institutional arrangements for involving stakeholders in management

A “stakeholder” is anyone who has an interest in or is affected by an issue or activity or transaction and therefore has a natural right to participate in decisions relating to it. A farmer may have a “stake” in the management of irrigation water from a common source, or in decisions about grazing rights on communal land. A group, or several groups, may have an interest in the use of particular resources, such as a forest. It is even possible for stakeholders in the same issue to be located in different social systems or different countries. If deforestation in one country contributes to flooding in another, or acid rain damages the biodiversity of a neighbouring country, the stakeholders are trans-national.

The size of the stake determines the amount of interest or time which a stakeholder is willing to devote to an issue. In this sense the stake represents the potential benefits which the stakeholder expects to receive, or which she or he would have to forego. Thus for a stakeholder to have an interest in the preservation or maintenance of a water source, forest or wildlife population, she or he must expect to receive present or future benefits from them. When a population has no personal stake in a resource, as when it is owned by the State (for example State forest or wildlife), and does not receive any benefits from it (in fact often the reverse), it is logical that people will have no interest in preserving the resource, and may plunder it when possible.²

² See *Trees and Trade-offs: A Stakeholder Approach to Natural Resource Management*. International Institute for Environment and Development (IIED) Gatekeeper Series 52, 1995.

Key concepts:

- *Everyone is a stakeholder in resources*
- *Negotiation between stakeholders results in better decisions*
- *Frameworks for negotiation*
- *A forum for discussion*
- *Involving people in management*

Types of stakeholder:

- *Those having or needing access to or control of a resource*
- *Those who are affected by the use of a resource by others*
- *Those who wish to influence the decisions of others with regard to the use of a resource for scientific, ethical or other reasons*

The objectives of different stakeholder groups often conflict

Poor or subsistence farmers are very focused on their immediate needs for food and shelter. Agri-business and the larger farmer tend to be concerned with maximizing returns on capital. In both cases an important objective is to increase output or profit, often in the short term, by exploiting more land or using presently available land more intensively. Even when sustained use would be possible through better husbandry or the application of conservation practices, the inputs and capital investment required may not be available, may be more profitably employed elsewhere, or may not be considered a good investment because of the conditions under which the land is held.

Conflicts of interest may arise due to competition for access to resources or their control. There will be conflict, for example, when cultivated land encroaches on land traditionally used for grazing, when people are denied access to forests traditionally necessary to their livelihoods, or when there is competition for water for livestock or irrigation.

Conflict may also arise because of the impacts of resource use, or when one stakeholder's actions affect another party's interests. This may happen where long-term gain competes with immediate profits. Examples are where exploitation creates adverse impacts through clearance of vegetation, destruction of habitats or populations or other forms of degradation or pollution. In such cases there is conflict between the objectives of those exploiting the land and those whose livelihoods or lives are adversely affected or who wish to

conserve the environment. A conservationist group's wish to protect elephants may conflict with the local people's need to protect their crops from elephant damage in order to feed themselves.

The objectives of the government and the community as a whole are usually more long term, and typically include conservation of natural resources, including water, land, plant resources and wildlife, and protection of the environment and the quality of life for present and future generations. Thus there is conflict of interest between the objectives of the typical individual and those of the community in general. This is the root cause of much of the current concern and frustration over environmental issues.

It is frequently possible to identify groups of stakeholders whose members share broadly similar objectives, cultures and points of view. Examples are cultivators, pastoralists, landless agricultural workers, urban populations, women, a whole range of different social groups including environmental conservationists, and of course various government groups such as foresters, agriculturalists, wildlife conservationists, and so on. Conflicts over access to and use of resources can arise both within groups and between groups.

Unresolved conflict leads to inefficient use of resources, resource degradation and social problems

Conflicting human interests, though they may not always be recognized as such, lie at the root of the degradation or destruction of soils, forests, grazing lands, water sources, animal or plant populations, and areas of natural beauty, and the pollution of cities. Sometimes this process even gives rise to physical conflict between communities; at other times merely to poverty and a lowering of the quality of life for the population.

Unresolved conflict or competition leads to inefficient use of resources, and often to their degradation and destruction. An example is when many families compete for common grazing resources so that the overall production of grass is considerably less than it would be if the grazing resource was properly managed. The same thing happens when hunting or tree-felling is uncontrolled.

The way present global resources are used is not in general optimal for output or overall human needs, intentions or well-being, mainly because of the lack of effective mechanisms to resolve conflicting objectives. Effective conflict resolution involves a negotiating process, an institutional framework within which this can occur, and a common understanding of the potentials of the resource and the effects of different use alternatives.³

Negotiating agreed management solutions

The concept

It is suggested that shared resources *can* be sustainably managed when institutional arrangements exist through which all stakeholders are represented in an informed negotiating process which leads to an agreed management plan that is in the long-term interest of all of them⁴. It is contended that current environmental and resource management problems are largely due to the absence or inefficiency of current decision-making processes.

The need to involve all stakeholders

The essence of negotiation among stakeholders is that all the groups who will be affected are fairly represented in the discussions. This helps to ensure that all interests are catered for, and also that the results will be accepted by all the actors.

However there are many cases, for example the management of an entire forest or irrigation scheme, district level planning, and many national or global issues, where it is impossible for all stakeholders to participate personally in all aspects of the negotiating process. Up to the present time the only way that such situations have been handled is through some form of representation. Computer-based networking or conferencing facilities, satellite video links and electronic mail technology are being used worldwide to enable large numbers of stakeholders to negotiate together. Their use will probably continue to increase and improve the level of communication among interested parties in many countries.

A successful decision-making process can be seen as a negotiated agreement in which all stakeholders feel that they have achieved maximum possible satisfaction of their needs and objectives, and which results in resources being used in the most efficient way.

³ See for example *Born to Trade* (New Scientist, 26 October 1996) by Matt Ridley.

⁴ This is similar to the "Endogenous Development and Platform concepts". But see *Hitting a Moving Target: Endogenous Development in Marginal European Areas* by G. Remmers, IIED Gatekeeper Series 63, which describes a situation in which this is being wrongly or insensitively applied, since no real power to negotiate is devolved to the majority of the stakeholders.

The key to effective representation is that the person selected should represent an identified group of stakeholders of a particular type. Thus, the community may contain small-scale and large-scale farmers, pastoral groups, forest dwellers, traders, women, landless labourers, and others. Each of these groups, and others which may exist, has particular needs and objectives in relation to the use, apportionment and management of available natural resources, and each stakeholder group must therefore be represented in the negotiating process. This also ensures that decision making is not taken over by one particular economic or social group. When identifying groups it is important to be aware of people who belong to more than one group.

A forum for discussion

The second requirement is for some form of forum or framework within which negotiations will take place. Different forms of conflict resolution are appropriate at different levels.

In the simplest case, for example that of a community forestry management group, all the stakeholders might meet under a convenient tree, in somebody's house, or in some other customary meeting place. In such a case the necessary information can be personally collected beforehand by one or more members of the group, or individual members can inform themselves by personal inspection, and analysis and negotiation can be carried out face to face and on the spot. Usually there will be some sort of agenda, and a chairman or moderator to ensure that the discussion process is handled in a fair and logical manner, and that participants have enough opportunity to speak.

Similar arrangements may be followed for village level planning, but here some activities, such as information collection, might be delegated to particular individuals.

Information

For any form of land-use planning precise information is needed on the resource: area, climatic factors, topography, soils, present land-use, and many other aspects. In the case of a water source it would be necessary to know the amount of water available, how this amount varies over the year, and what its quality is. In the case of a forest it would be necessary to have information on the size, the number, type, age, species, etc. of the trees, and on the ecology of the forest and number of other populations living in it, and their inter-relationships. In the case of a population, such as elephants or whales, the size, dynamics and ecological requirements need to be established.

Information on the needs of all the stakeholders is needed for effective negotiation. This implies that stakeholders have to be identified in order to ascertain their needs. These might include needs for cultivated land, for grazing, for firewood and building material, and for water supplies. They might also include land requirements for settlement, industrial structures, schools and hospitals, for water catchment, for various types of raw materials, for recreation, and for many other uses.

Stakeholders need information on the institutional (economic, social and legal) framework within which they are negotiating, what their rights are, what powers of decision they have, and where they can obtain further information and assistance.

Information on improved technology of resource management pro-

vides opportunities for increased productivity, more efficient resources use and conservation. So, information on improved technology typically increases the number of options available in negotiations, as it frees parts of the resources for other purposes either at present or in the future.

The need for information has important implications in relation to the application of an improved approach to land-use planning and resources management. At present the necessary information does not always exist and, in many cases, even if it does, systems to ensure that it is disseminated to all those who need to be informed are not in place. Stakeholders can only participate effectively if they are fully informed.

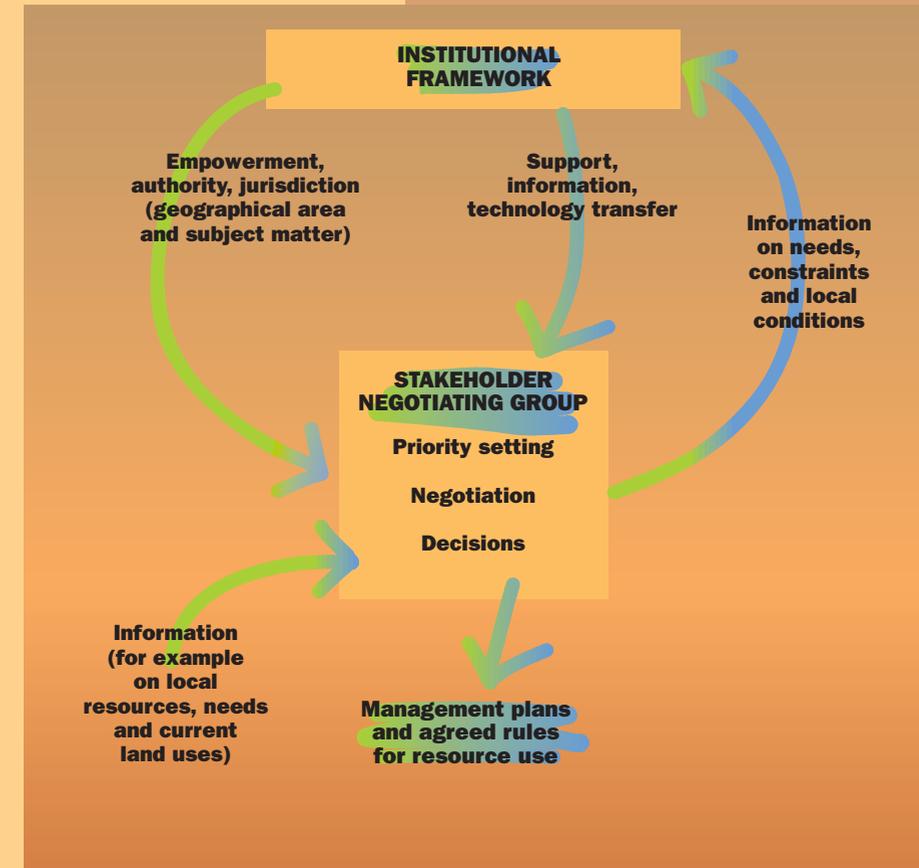
Technical support

Land-related issues can be very complex. Negotiating stakeholders may not always have the time or knowledge to be able to analyse all the possibilities, or the impacts which would result from various decisions. It is often helpful for a supporting technical group to prepare proposals for consideration by stakeholders. The technical staff usually employ tools such as databases, classification systems and models which are capable of integrating the effects of interacting factors.

The practice of delegating preparatory work to specialists becomes more and more useful at higher levels, so that at local government and certainly at national and international levels many specialists are involved in collecting and interpreting data, and in preparing and evaluating proposals. *It is then essential to distinguish between the part of the process which involves assembling data and preparing proposals, which may be done by professional staff, and*

decision making, which should be done jointly by all stakeholders – but which too often has been done by government departments or regional bureaucracies alone.

Schematic representation of activities of a stakeholders negotiating group



Educational support

Meaningful negotiation can only occur when the participants are fully informed on the issues involved. At the very least this includes information on the resource and its potential, the needs of the interested parties, and the impact which the proposed uses will have upon the physical and social environment. Factual information has to be readily available to all stakeholders, not only to government departments. This implies a very significant expansion of systems and methods for acquiring and distribut-

Forum:

1. A public place, market-place, place of assembly for judicial and other business.
2. Place of or meeting for public discussion; periodical, etc. giving opportunity for debate, etc.; court, tribunal (literally or figuratively).

The Concise Oxford Dictionary, 1989.

ing information through a wide range of different media.

Certain stakeholder groups are often gravely disadvantaged because they do not have access to information, because they may be less educated in an academic sense, and because of their weak social position. While all participating groups need access to the appropriate information, disadvantaged groups require special assistance and training to enable them to participate effectively in the negotiating process.

Education and training can be of two types – *general*, through the media (radio, newspapers), and *specific*, through training courses and workshops on specific issues or in the course of establishing stakeholder negotiating bodies. Both types are required. Through the media the whole population can be made aware of issues such as deforestation, soil erosion and the loss of biodiversity. Those who live on the land will probably already know of these problems, but may not fully understand all the causes or effects and may be motivated to change if the wider community takes an interest. The whole community, whether involved in resource management or not, can benefit from being more fully informed, understanding how land was managed in the past and why conditions and circumstances are now changing. Constructive debate and creative discussion of these problems and their solutions may arise as a result.

The problem solving sequence

The decision-making process must be transparent, and should follow a predictable course with which all stakeholders are familiar. A basic sequence is as follows:

Identification and registration of a problem or need by one or more groups of stakeholders. The stakeholder(s) must know where the problem can be addressed and how to initiate action.

Notification of all potentially interested stakeholders, provision of relevant background information and information on how stakeholders can participate in development of solutions.

Development of one or more proposed solutions or action plans, either by the stakeholders themselves or by specialists with stakeholder participation.

Mutual agreement on arrangements for implementation.

The sequence should be the same at any level, and should be followed whether the initiating stakeholder is a government department or other stakeholder or group of stakeholders. This procedure may appear elementary but in fact hardly exists in its entirety in any country.

Development of a delivery framework that combines “top-down” and “bottom-up” methodology

An effective model which brings together land users into a practical forum for debate, learning and activity at the local level is the *local resource management group*. These community groupings, already springing up throughout the world under a variety of names, coordinate their resource uses and provide the bottom-up input

to interactive land-use planning. A partnership of this kind between supportive government agencies and self-directing people-owned programmes is far more effective than the traditional approach.

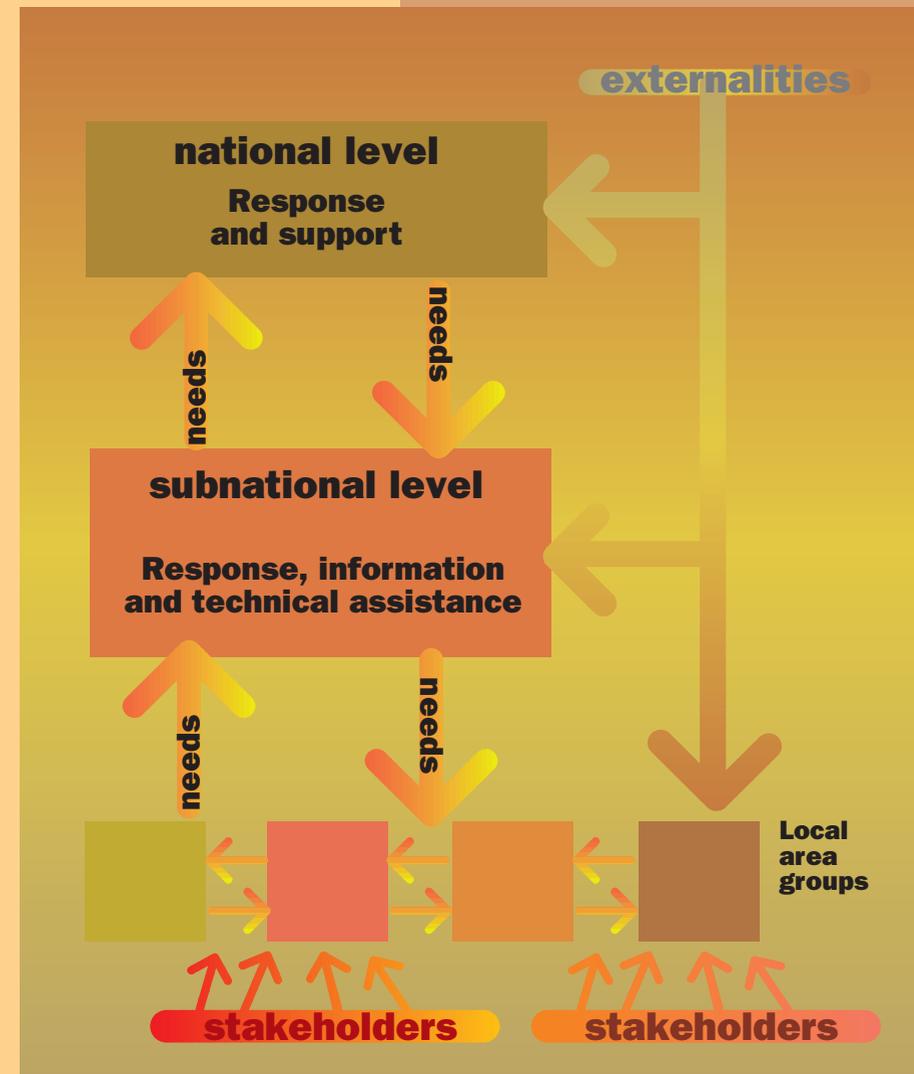
The conceptual basis for such a partnership is illustrated on the facing page. The existing government programme is complemented and strengthened by the activities of the groups of stakeholders at grassroots level. These groups would function as illustrated on page 29. It is not suggested that all governments should forthwith establish local resource management groups on a uniform basis. Such groups should be established slowly and with care over a period of time, developing the model and the methodology which best suits local conditions. Since local groups would have certain management powers for a defined area, for an ecosystem, or for specified populations of plants or animals, the groups themselves will interact with each other.

A group would consist of actual stakeholders, or stakeholder representatives. At grass-roots level it would collect the necessary information for decision making and negotiate its own management plan. At the same time it would be able to pass information upwards, either to the appropriate government institution, or to the next higher group. Where the group finds that it faces constraints or problems due to lack of information or due to the existing social or legal framework, the difficulty, indicating the need for change, is passed upwards to the next institutional level. The figure on page 29 illustrates the information flows and the basic functions of a group at any management level, not only at grass-roots level.

A checklist for the successful establishment of sustainable local group management

✿ Do local stakeholders have a stake in the group? Do they see it as carrying out a useful task? Do they support it? The effective stake may be of different kinds. In the case of the village forestry group the stake is the direct benefits which the members expect to receive. This may also be the case when different groups of stakeholders are represented, as in

A framework for interactive development



“ Rural women have a major role to play in community-level natural resource management. However, social empowerment (through functional literacy, income generation and provision of facilities decreasing household workload) is a precondition for developing women’s participation in relevant activities. From “Steps Towards a Participatory and Integrated Approach to Watershed Management”

A local resource management group is an efficient and practical way for land users in the community to:

the management of forest resources or catchment areas. But stakes may also be non-economic, as when a group or constituency is willing to put effort into the conservation of an ecosystem or an endangered plant or animal species, or the protection of a local environment.

✿ Does the group "belong" to the stakeholders; are they really involved; do they have any real power to decide on anything, or have any real impact? Or is the group in reality a meeting periodically called to hear about government proposals and programmes?

✿ Does the group represent all the stakeholders (including socially disadvantaged groups), and do all the stakeholders have an equal opportunity to be heard, negotiate and partake in decision making? Is particular attention given to who may who may be resource users but have no formal user rights?

✿ Is the group fully informed of its purpose and terms of reference, powers and rights? Does it have access to all information required to make informed decisions?

Involve local people

In many countries, local people are not consulted and do not have a stake in management of the local environment and resources. They see these as the responsibility of government or belonging to nobody. They may therefore view such resources as something to be plundered if possible; or they may be aware that the environment is being degraded but feel unable to do anything about it. It has been demonstrated innumerable times that if people are encouraged and mandated to deal with local issues, they will respond and contribute their knowledge, enthusiasm, time and resources. Apathy, frustration and antisocial behaviour can be replaced by satisfaction and increased happiness when people feel they are contributing something worthwhile and are part of, and valued by, society.

Ensure more rapid and more appropriate response to needs

Local people know what their needs are. Local people know their neighbours and their local conditions better than most government officials. Under local management response to many needs can be more precise and more rapid. Information on those needs and constraints which cannot be immediately provided at local level is more quickly reported to higher levels in the network.

Achieve more effective implementation

When local people have a stake in an agreed programme they are more enthusiastic for its implementation. Society can, in such circumstances, be the most effective means of preventing the breaking of agreed management rules, such as the illegal cutting of trees, killing of animals or degradation of the environment.

Take full account of local capabilities, attitudes and customs

Thus ensuring that management plans are consistent with them and feasible in the local context.

Coordinate individual decisions within the group

Thus foreseeing and forestalling resource use conflicts and the resource degradation they entail.

Address and resolve existing resource use conflicts

Within the community that would otherwise lead to further resource degradation or unsustainable use patterns.

Enable the community to organize itself

So that it can participate in negotiations to resolve conflicts with other communities or entities outside the community (central government, conservation groups, industrial enterprises, etc.).

Empower people who are traditionally excluded

From management structures and decision-making processes, thereby combating a mentality of dependency that perpetuates poverty and resource degradation.

Create a sense of community

That holds individual ambitions of immediate gain in check and puts sustainable resource use, for the good of the group and future generations, at the top of the agenda.

Encourage a greater understanding of land interactions and environmental factors

Make more efficient use of resources

Local management is much less costly in government salaries, and probably also overall.

Empowerment of decision-making procedures

The negotiating functions described above can only be effective if all stakeholders accept them as legitimate, or if the process and the institutional structure which support it are legitimized by them collectively or by law or custom. This implies that management structures may either be established by the stakeholders themselves or by government agencies on their behalf.

Empowerment (giving a group power to decide) ensures that debate and decision-making are felt to be processes which are "owned" by the group of stakeholders concerned. This helps to make the group institutional structure more popular and sustainable as it gives people more control over their own affairs.

Decision-making bodies function within a set of rules, for example provincial, national or international law. Where they are newly established, weak, inexperienced or no longer appropriate because of social or economic change (as in the case of some communal grazing systems), empowerment may be incomplete. An example of this would be where an institution at a higher level retains certain powers of management with regard to the resource. This might be the case in the early stages of involving local people in the management of a forest or water source. But, in all cases where stakeholders do not derive significant advantages from participation, such arrangements will be unsustainable in the long run. It will therefore be necessary to provide support and training so that empowerment can be effective.

In the right environment, groups may form spontaneously in response to local needs. In other cases the ini-

tiative may come from government. But in all cases the government has the responsibility to ensure that social aims are met; that is that the rights of weaker groups and of the community as a whole are not endangered. This may mean that certain types of groups have to be recognized by government and that in return for this recognition government has to ensure that their objectives and working procedures conform to certain norms.

Local institutions flourish where social conditions are favourable, where legal conditions permit and where information is readily available. In some ways the last of these, information (or information and communication) is the most important. For collaboration to take root, individuals must be able to identify and communicate with other stakeholders, and potential groups must be able to obtain information on factors affecting them, such as rights and availability of resources.

This implies a well developed system of information dissemination through the media, but also public access to resource information and to policy and legal information. In its simplest form this requires that information on a very wide range of subjects is available to any enquirer at local government or village level. But it also means that governments need to make practical arrangements to establish information databases at all levels which are accessible to everyone.

GUIDELINES FOR ACTION

1 Analyse conflicting resource needs

- Have the land users and the community identified their resource management priorities?
- Has there been a full review and cataloguing of available resources (land, labour and capital)?
- Are all the possible land-use options and their relative costs and benefits identified?
- Have all the options been reviewed in terms of social, economic, environmental and political priorities?

3 Establish a forum for negotiation

- Are community members involved at all stages in community processes?
- Is it possible to provide a venue which is relatively free of institutional or political or other vested influences?
- Have the rules and procedures of the debate been negotiated?
- Are all participants aware of the costs and benefits of participation?
- Do all understand their rights and responsibilities?

2 Identify stakeholders

- Have all members of the community with a stake in resource management been invited to contribute information and to participate?
- Are women's needs being heard through adequate representation?
- Have contributions been sought from the minority groups or other quieter resource users who are not actively involved in management?

4 Raise awareness and understanding of issues

- Are all parties aware of the details and technicalities of the issue to be debated?
- Has information on the resource issues at hand been widely distributed and in a form that is readily understood or interpreted by trained workers?
- Do all participants have access to the same information and associated information services?
- Has some training in communication and negotiation been provided?



*Efficient
and socially
effective land
resources
management
through
a network
of groups*

The figure on page 31 in the previous section illustrates a simple three-level structure in which the lowest layer is a strong and active network of resource management groups composed of local stakeholders and their representatives. These receive support in the form of information and technical assistance from government and from each other, in response to the priority needs which they identify. The groups negotiate solutions among local stakeholders, and manage local resources and ecosystems, sometimes in collaboration with government and sometimes alone, or in collaboration with other groups. They also furnish information to government on local priorities and activities, local resources and the state of the environment.

This combined bottom-up and top-down institutional structure embodies the following:

✿ A strong and dynamic stakeholder-driven set of activities at grass-roots level which can effectively respond to and resolve many local problems, act as an engine for development and conservation, and carry out local programmes more cheaply and effectively than central government.

✿ A controlled but built-in demand-driven dynamic which effectively informs government of felt needs and priorities, drives resource allocation and, through this, modifies government institutional structures and programmes towards more efficient and task-oriented forms. It has been noted that very many of the activities of governments and international organizations are initiated and driven more by the forces of internal politics or professional career interests than by the actual needs and requirements of the population. This is at least partly due to the weak links between institutions and people.

Key concepts:

- *Diversity at grass-roots level*
- *Accountability at subnational level*
- *A joint approach at national level*
- *A strictly logical approach to the location of professional land-use planning staff*

Identifying land-use options

Physically suitable

Economically viable

Socially acceptable

Environmentally sustainable

Land-use option

The more demand-driven structure will also result in research programmes on land and agriculture which are more oriented to needs of land users than many present government research programmes.

The institutionalization of a bottom-up component results in a system which is neither top-down or bottom-up but a balanced partnership, and which is much more effective than either.

Local area management groups

The structure and organization of individual groups at grass-roots level should be appropriate to the customs and cultural norms of the country and the area. It is essential to allow local people the freedom to organize themselves, to debate and to contribute. The most appropriate local structure will emerge and evolve over time. There are many levels and interactive links within local communities. These relate to particular interests or the exploitation of specific resources. The aim should be to give the most directly involved of these groups the power to manage specific resources within a policy framework or set of guidelines defined by the next higher decision-making level. Thus in a particular village one group of stakeholders or their representatives might manage a lake which is used for fishing, another might look after communal grazing areas, and a third might take care of the forest land. The powers and terms of reference of all three groups would be delegated by a village level management group. That group would, in turn, have been empowered under national law or by the district or local government.

Examples of local management groups

An example of a local level resource management body is a village community forestry group. This might be formed by a number of individuals interested in planting and managing trees on a patch of unused or under-utilized wasteland. The land might even be an area officially gazetted as forest land, which is largely denuded of trees due to earlier illegal exploitation for fuelwood and overgrazing. Agreement would need to be reached on eligibility for membership, work inputs for establishment and management of the plantation, and apportionment of benefits. The group would then have to apply for permission to use the land from the authority owning it, which might be the traditional leadership structure or the government, and for recognition as a legal entity existing for the purpose of joint management of a community forest. The government, or the institution which owns the land, may wish to retain ultimate control by defining what the requesting group may or may not do with the land. The government also has a duty to ensure that the group functions in an equitable manner and not for the sole benefit of one social class and to the disadvantage of others. The benefits of such an arrangement would be, on the one hand, that a previously unproductive area becomes productive and its resources are augmented and benefits conserved and, on the other, that a group of local stakeholders receives benefits. Both sets of objectives would be achieved at little or no cost to the government.

A second example might be where government and local stakeholders together establish a group to manage a forested catchment containing, say, a lake and a strip of coastline. Stakeholder groups might

include fisherfolk, a logging industry, a tourist industry, cultivators and conservationists. The government might establish the management group by agreeing on terms of reference, devolving certain powers to the group to regulate land-use within the area, and establishing a legal framework for election of group members and the functioning of the group. In this case, apart from the conservation benefits and the lack of cost to the government or taxpayer, the arrangement should harmonize the conflicting objectives of stakeholders within the area and optimize achievement of their objectives.

An important example of an area management group is the village or local community resources management team. Its terms of reference will refer to a defined geographical area, it will probably receive regular technical support from government sources, and its procedures and the selection of its membership are likely to be more formalized, since it actually constitutes the lowest level of local government in an area.

Provincial or district land use planning or development groups

It is suggested that the subnational level (corresponding to local government or district in many existing government structures) of land-use planning should be organized in terms of an elected and representative decision-making body, which might be called a district land-use planning group, with defined powers and responsibilities. Membership may be drawn partly from the community and partly from government. Expertise can be provided by a cadre of directly employed staff, or through subject-matter specialists who are members of government departments, delegated to assist the local land-use planning group and operationally under its control.

Basic functions at this level are to identify priorities, allocate resources, make or approve plans, monitor implementation and make local regulations. The group should also be responsible for establishment of long-term development plans and zoning proposals for the area.

Activities can be summarized as follows:

- * Carry out district-level land-use planning activities in collaboration with local groups, and develop and maintain district level infrastructure.
- * Provide a rapid response to grass-roots needs in subject matter areas where it is competent to do so, such as the provision of all types of information and technical support.
- * Report to national level on district-level priority needs which can only be met at national level, such

as required changes in the legal or policy framework.

The district (or provincial) land-use planning group should maintain close links with the corresponding national body, providing it with information and receiving information and technical assistance from it.

When strong emphasis is laid upon the distinction between decision making by elected representatives, and activities required to support and implement these decisions carried out by paid professionals, government at subnational level becomes accountable to the local electorate. The elected representatives are not re-elected if they do not respond to the needs and priorities of the local stakeholders. Two additional requirements are that district level government staff and consultants (the paid professionals mentioned above) are accountable to district level decision makers, not to national level ministries, and that either a large proportion of the district's share of national tax revenues is spendable at the discretion of the district or that the district may raise taxes of its own.

National level: institutions as stakeholders

At national level there are generally several government ministries, departments, institutes, universities, non-governmental organizations and other institutional bodies, each of which is trying to solve one or more land-related problems often in virtual isolation. Each of these stakeholders has different priorities, goals, terms of reference, resources and programmes. Whereas a simple stakeholder group (such as a village agroforestry group) consists of individual stakeholders who negotiate together, an **extended group**⁵ consists of institutions which

function as stakeholders. The absence or weakness of conflict resolution or integrating mechanisms is one of the main reasons for the current problems of government as they relate to land - separate and sometimes conflicting policies and programmes, inefficiency in terms of national objectives and use of resources, and failure to address and resolve problems effectively. Specifically, what is missing are negotiating fora to which information can be brought, where land-related problems can be addressed in their entirety, and where rational decisions and programmes can be formulated.

It may be argued that what is really required is not a negotiating forum but a coordinating body. This may be a theoretical solution, but can rarely be achieved. Coordination by one institution implies loss of power by those institutions whose activities are being coordinated, and this is fiercely resisted, either openly or otherwise. In some cases a type of coordinating function is exercised by a Planning Ministry (through statutory powers) or Finance Ministry (through the budget), but this tends to have a negative rather than a positive effect since it negates negotiation and is analogous, in the wider sense, to top-down government rather than involvement of people and interactive management.

National land resources working group

What is required is an inter-departmental negotiating forum for land-related issues. This might be called the national land resources management working group, or some other suitable title. It might establish ad hoc temporary subgroups to deal with specific issues as required. Membership of this national group should represent all the institutions at national level which have anything to do with land, though some will be more active than others.

It may not be necessary to establish a new group to carry out the necessary functions. In many countries administrative arrangements already exist, which could be adapted or modified to provide the necessary conditions for such a group to function. For example it might do so within the ambit of a national environmental action plan or national land-use or conservation policy.

The functions of the group should be to investigate and facilitate the exchange of information, and to support and enable a holistic and integrated approach to land related issues. Some of the more important subjects to be addressed are the following:

- * Development of information systems on land resources, land-use and its effects on the environment.
- * Prediction and tracking of land-use needs and priorities.
- * A coordinated approach to formulation, implementation and monitoring of development and management plans.

Because membership includes staff from all institutions concerned with land and its associated resources, the national land resources working

group will be aware of all available information and activities in these fields. One of its additional functions is therefore to advise on how this information can be made available to all who need it, including grass-roots land users. This implies that the members of the group make themselves aware of available information and ongoing activities in their parent institutions, and also keep their parent institutions informed of the activities of the parent bodies of other group members. The minutes of the group meeting also need to be widely circulated for information, especially to district level land-use planning groups, and even grass-roots resource management groups.

Membership of national level land resources working group

When a national land-use planning group is established it is often mistakenly assumed that because it will discuss issues relating to development, there is a need for the ministries or departments to be represented by high level managerial staff such as permanent secretaries or directors, in order to ensure that institutional objectives are adequately defended. If this happens the group will not be able carry out its proper functions, since technical rather than managerial inputs are required. The group will not normally have the power to allocate resources or formulate binding work programmes or instructions, so no threat to represented institutions is involved, and there is no need for extremely high level representation.

The group should be able to co-opt or request additional expertise as and when required, including expertise available in non-governmental organizations or special interest groups.



Participatory and integrated watershed management requires a wide range of technical expertise, which is unlikely to be available within a single line agency. The ideal counterpart of such a project would thus be a multisectoral body, in which relevant line agencies are represented or to whom their services could be made available.

From "Steps Towards a Participatory and Integrated Approach to Watershed Management"



⁵ With acknowledgements to Richard Dawkins (Reader in Zoology and Fellow of New College, University of Oxford), author of *The Selfish Gene*, *The Extended Phenotype*, etc.

The success of any form of group or task force approach depends on the selection of individuals who are interested, enthusiastic and hard working, rather than on their social or institutional rank. Means should be found to replace those who are not contributing.

Appropriate host institution for national level land resources working group

This will vary from country to country. The group should be seen as an independent technical body, and not as representing an attempt by an ambitious institution to create for itself a position of special influence with regard to land related issues, thus giving rise to alarm or hostility in other institutions responsible for land, resources or the environment. One solution is for the chairmanship and venue to rotate among the institutions represented. Another is for the group to be sponsored by the office of the President or of the Prime Minister, or of some appropriate high level body or council. It has also been suggested that in some countries the group might function as a parliamentary standing committee.

An independent body representing community interests ?

Governments are not always fully independent stewards of their country's resources, particularly in relation to the interests of future generations. Governments may, for example, permit or encourage exploitation of the natural resources of countries in ways which are unsustainable, in order to maintain or raise present-day standards of living. Some governments may fail, or even be unable, to prosecute individuals or companies causing pollution or destroying scarce national land or biological resources. In such cases there is often no body which can take government departments to court.

Therefore there is often a need for a legally independent body charged with monitoring, enforcement and advisory functions in regard to environment, land and water and other natural resources. Such bodies, which are often called boards, commissions, councils or some similar name, need to be established by law, with defined terms of reference and powers, including the power to bring court cases.

An institution of this type can also be a focus for non-governmental organizations dedicated to the preservation of the environment and receive support from them.

The functions and responsibilities of this body should be as follows:

-  to ensure enforcement of existing laws and policies designed to conserve or properly manage national resources;
-  to propose new laws and policies where needed;
-  to monitor relevant environmental conditions within the country, including atmospheric pollution, pollution of water bodies, veg-

etation and animal resources, and land resources degradation.

Such a body should have legal status and responsibilities, one of which should be to initiate legal action against individuals, companies or government bodies breaking the laws governing the use of land and other natural resources. The members should be elected, and should not be able to be removed at the whim of government. The body should be able to employ a limited number of technical staff. Its functions cannot be properly carried out by the national level land-use planning group, which is subject to political and other pressures, and whose proper work would suffer if it undertook such additional functions.

Location of technical support for land-use planning

The business of the professional land-use planner is to predict accurately the benefits and impacts which would result from the use of particular pieces of land for defined purposes, and to advise on how to optimize achievement of objectives in relation to land and its associated resources. Land-use planners must be neutral in a sectorial sense, since they must give unbiased advice on how to allocate or use land in accordance with the objectives and priorities of the stakeholders to whom the advice is being given. Their function is to identify the range of possible land-use options, and to provide factual information on the advantages and disadvantages of each.

A group of land-use planners located in a strongly sector-oriented body such as a ministry or department of forestry will necessarily be committed to the aims and objectives of their institution and will be unable

to provide unbiased advice to stakeholder management groups. They might, for example, assume the role of advocates for tree planting. Stakeholders should have access to technical support on sectorial issues, but professional land-use planning support should be institutionally located in such a way that it is effectively non-sectorial or neutral in a sectorial sense. This does not imply that the land-use planning support group itself should not contain expertise on the various fields and sectors which are of importance in the country.

It is suggested that the national land resources working group should be supported by a group of professional land-use planners which are either part of the permanent secretariat of the group, or whose institutional home is an independent commission, the office of the Prime Minister or President, or a ministry of lands or its equivalent. It is suggested that subnational land-use planning groups should be similarly supported by professional land-use planners who are in addition able to provide assistance to grass-roots groups as required.

GUIDELINES FOR ACTION

1 Are the institutional and organizational frameworks of the country, region or locale supporting the integration of resource management?

- Are there currently any government laws or administrative policies which prevent or diminish effective and integrated resource management? It is important to identify and name them either to be able to work around the problem or to have it changed or removed.
- Is there conflict between administrative arrangements for resource management at different tiers of government or within development agencies? Can these be overcome or changed?
- Is there unnecessary duplication where administrative resources could be saved and redirected into useful work? Are there areas of resource policy or control which "fall between the cracks" of agencies or government responsibility because of historical, political or economic factors?
- Are economic, social and resource management aspects occurring collaboratively or in isolation in land-use related policies?

2 Is there evidence of meaningful cooperation and team action among the various government, non-governmental, international or community agencies?

- Do local, regional or national task or project management groups exist

that can be tapped into or provided with information?

- Do project management and task management teams draw on the best expertise available regardless of organizational or governmental divisions? Is there community representation and is it fully acknowledged and involved?
- Do common fora for debate and collaboration and common languages (both language as such and technical) exist among the various participating specialists and other representatives?

3 What steps have been taken to facilitate and support land users to come together into collaborative groups or teams?

- Are there land user or other community groups in existence which could initiate and stimulate the community debate and sharing of views, ideas, needs, concerns and aspirations?
- Can funding and administrative or other support be found to act as an incentive to land users to form local resource management groups?
- Can resources and services in the area of research, extension, communication and skills development or local capacity building be redirected towards groups (in favour of individuals) to provide incentive and empowerment for local and regional integration?



Providing Information

Information and the decision-making process

Actions are consequences of objectives. An objective is formulated, the various ways in which it might be achieved are reviewed, and a decision is taken as to which is the best course to follow. This is usually followed by the development of an action plan. An essential part of the process is the evaluation of information; information on alternatives, information on the potential benefits and effects of various courses of action, information on available resources, and on a range of associated issues. Information is an essential input to efficient use of resources, to mutual agreement, and to sustainable management of the environment.

Farmers, for example, need information about climate and soil to know what crops can be grown, what varieties are available and what yields can be expected under alternative production systems and levels of fertilizer application. They also need to know what products could be sold where, and at what prices, what the necessary production inputs would cost, and how much would have to be paid for transport. Farmers are best served by the broadest possible array of information sources.⁶

A community, district or national land-use planning team requires information in order to make rational decisions to support policies and objectives. Achieving objectives means choosing between alternatives. Good decisions, at whatever level, cannot be made without information.

Information, in the form of statistics and maps, can be used to identify present and future needs for land, water, grazing, fuel and many other requirements. Regularly updated

Key concepts:

- *The role of information for allocation and management of land resources*
- *Types of information*
- *Collecting and storing information*
- *Information systems*

⁶In: "Poverty, Pluralism and Extension Practice" by I. Christopoulos, IIED Gatekeeper Series 64, 1996.

Basic information needs

Base Maps

- Topography
- Settlements
- Communications
- Administrative boundaries

Climatic data

- Rainfall
- Temperature
- Light intensity and day length
- Humidity
- Wind
- Climate zones and length of growing period

Land

- Soil (description, classification, mapping, suitability evaluation)
- Topography (slope classes, physiographic units)
- Land units/land mapping units
- Land ownership records

Water resources

- Surface water (rivers, streams, springs, wells, dams, lakes)
- Subsurface water (extent, yield and quality of aquifers)

Land cover and land use

- Land cover
- Land use
- Environmental requirements of crops and land uses (for matching purposes)

Population (numbers and location)

- Human
- Farm animals
- Wild life

Social information

- Groups (description and classification)
- Objectives (land user, community, government)
- Resources
- Constraints

Economic data

- Input costs
- Sale prices
- Transport costs

Physical infrastructure

- Markets
- Processing plants

Institutional and legal aspects

- Information on relevant institutions and their responsibilities
- Copies of laws applying to relevant aspects of land

information on plant, animal and human populations, and on land-use and the state of the environment, permits identification of emerging issues and problems.

Different types of information

Many different types of information are needed to make land-use decisions. This has important implications in terms of how it is collected, by whom, and how frequently.

Information collection, management and dissemination

The spread of computers has revolutionized data storage and analysis. It is now easy for anyone with a minimum knowledge of computers to construct an electronic database to store millions of pieces of easily accessible data. On the one hand this makes it much easier to access and integrate all relevant information in land-use decisions. But on the other hand it increases the danger that a large number of different and incompatible data sets will be established.

Vast amounts of information already exist but are not accessible because they are buried in reports or maps in libraries or filing cabinets, or because they are in a form which is incompatible with the standard selected for the database or information system in use. Information is expensive to collect but is of no use unless it is in a form which is accessible by any potential user. It is therefore becoming extremely important to agree on a common terminology, common classification systems and common protocols for data exchange.

At present even such basic terms as “agriculture” or “forest” are often defined differently by different groups or institutions, and the data resulting from information gathering exercises at different times are often incompatible.

Because it is expensive and time consuming to enter data manually into a computerized database, it is also important that data resulting from surveys carried out from now on should always be recorded and analysed in electronic format.

For practical purposes there are three major sources of information

Existing publications. This type of information may be fairly easy to access and use in so far as it is quantitative and in the form of tables which can be transformed into electronic form by scanning. But frequently such information exists in qualitative and narrative form and needs to be interpreted and manually entered. Often there is no time for this to be done or this would be too expensive and the value of the information, carefully and laboriously collected over years, is lost. Therefore, wherever there is an opportunity because staff are available or funds exist to pay for outside contracts, consideration should be given to capturing key data, such as previous survey results, in electronic form.

Field surveys or ground surveys where people go to the field to collect physical or socio-economic information. There has been a strong tendency in the past to collect information which it is thought will be useful, publish it in reports, and then not know how to make use of it. It is therefore extremely important to effectively reverse the sequence - to have a very clear idea of the basic development process, and collect

only the specific information which is needed. The information collection process can also serve the purpose of involving the people in the development process. In other words, it can be interactive.

Remote sensing. Generally this means information gathered through air photography or from satellites. The most important limitation of satellite data in the past has been the generally small scale or coarse resolution of the data, but this is now improving and is likely to improve still further. Satellite information is also more readily available and cheaper than in the past. It is very suited to the production of national and sometimes district level maps, and it is already the basis for regular monitoring of crop and vegetation patterns.

Georeferencing information

In the past it was often a difficult matter to identify accurately the point on the ground where data was collected. In the case of physical surveys this often meant referring to local features such as paths, buildings or vegetation which later changed or disappeared, rendering the information useless. It is now possible to buy geographical positioning systems (GPS), which are small, easy to use and quite cheap. Unfortunately these are not yet universally used, so much of the data now being collected will also become worthless.

Different decision levels - the significance of scale

Decisions on the use and management of land are taken at many levels. Some of the most important of these are the farm, the local community, the various levels of local government, and the national and international levels. The need to be able to move up

FAO, in collaboration with partner institutions, has developed land-cover and land-use classification systems which are suited to universal application.

Rapid Rural Appraisal (RRA) is an information gathering process conducted in the field and workshop by a multidisciplinary or multisectorial team. In Participatory Rural Appraisal (PRA), the emphasis shifts from the investigatory team to the land users. The role of the team is to facilitate identification of solutions by the land users themselves. Information provided by PRA exercises is necessary but not sufficient for identifying and implementing adequate measures for improved natural resource management. Complementary technical studies should be carried out to create a solid information base for decision making.

From “Steps Towards a Participatory and Integrated Approach to Watershed Management”

At national level a map scale of 1:1 000 000 or 1:500 000 may be appropriate, whereas at provincial or district level 1:250 000 or 1:50 000 is more suitable.

When working at farm level much larger, more detailed map scales are needed.

and down between very different levels of detail has an important implication in terms of the systematic arrangement of information, both with regard to land and with regard to use. At farm level one is working with comparatively small areas of land which are described in great detail. At district level the land units are much larger and the information about each is more generalized. At national and international levels this is even more the case. *Thus the description or classification of data of different types must be done on the basis of a hierarchical framework, so that small units of a similar type can be grouped into more generalized classes at higher levels.*

Information systems

The amount of information needed to make informed decisions about the use of land resources is so large that the only practical way to store, manipulate and access it is through the use of computerized databases.

Information management in governments and other large organizations

Every country needs to establish a land resources information system (LRIS), as a basis for decision making. The information must be accessible to every department with responsibilities relating to land, anywhere in the country and at any level. Except for a small proportion which needs to remain classified in the national interests, government databases, which after all are ultimately paid for by the people, should be accessible by all stakeholders, that is by anyone.

Typically a wide range of organizations and government departments collect information on different

aspects of land and the environment. But stakeholders may require access to all of it. *Thus an effective information system must work on the principle of separate but identified responsibility for the creation and maintenance of individual subject matter databases, but universal access by government and non-government stakeholders alike to all systems through local area networks or the Internet. This implies the establishment of an information systems working group to negotiate agreement on information standards and maintain the network.*

Distribution of information to non-government stakeholders

Information is essential for development, for informed negotiation, and as a basis for a better understanding of everyday issues. But today millions of people do not have access to relevant information because they are not “connected” to existing systems. To date the importance of information as a basis for development has been largely underestimated. It is possible to argue that if information is available development will happen.

Radio and television are probably the cheapest and most universal means of disseminating information and knowledge in most countries. Where populations are widely scattered and communications are poor, cheap radio sets are effectively the only means through which the population can receive outside information. Special programmes for farmers are already broadcast in many countries. There is immense scope for extending the subject matter coverage of these programmes to provide educational support to local management groups and individual land users.

In more densely populated areas newspapers and magazines offer vast possibilities for disseminating information immediately needed by land users and groups to identify opportunities and manage their resources sustainably. People will pay the costs of information distribution (in other words they are willing to buy newspapers), if that information is useful to them. But newspaper publishers themselves need information, and must be able to access national and international sources, and publish freely.

The world is currently at the beginning of an explosion of on-line digitized information available through computers linked via modems to telephone or communication satellite networks. A very few years ago it would have seemed idle to suggest that this would have been of much use to many of the developing countries, due to a general lack of computers and networks. This is rapidly changing, and by the turn of the century large numbers of institutions and individuals in such countries will be connected to the global information network.

Information products

Copies of reports, maps, air photographs, satellite images and digital material are all of use to individual land users, commercial enterprises and land-use planning groups and should be made readily available. Nowadays it is counterproductive to classify such information as secret. Doing so only places a constraint on national development and conservation planning, since the information is in most cases already available to professional intelligence organizations, or easy for them to obtain.

Ownership of information

There are strong arguments for contending that information itself should be free, though it is fair that those wishing to have access to it should pay any incidental costs such as postage. This certainly applies to information produced by government or other publicly funded institutions. But those individuals and companies in the private sector who collect and publish information cannot be expected to do so unless they receive adequate reimbursement. The level of charges should be set through competition with other suppliers in a free market. It is therefore in the public interest that such a market should develop. This will be facilitated if knowledge is available on available sources of information, both public and private.

In relation to copyright or ownership of information products there are two issues. One relates to modification and possible distortion of data, so that corrupted or misleading versions might be in circulation. The other concerns the rights of the original creator to the proceeds of sales. Governments need to ensure that legal safeguards exist to cover both aspects.



Providing technical support for decision making

The term “land-use planning” has often been loosely used to mean a number of different things, some of which are identified below.

✿ Land capability or suitability classification. This involves classifying land in relation to its relative suitability for a range of possible uses. The output usually includes a map and a report.

✿ Watershed management (planning) has usually implied development of integrated conservation plans to mitigate the effects of runoff or other forms of degradation in individual watersheds. The term tends to be used by foresters and soil conservation specialists.

✿ Area development planning usually implies the preparation of a set of more or less detailed proposals for the future development of a geographical area, which take into account the estimated future needs of the population.

✿ Physical planning refers to the siting and development of physical infrastructure (such as roads, railways, airports, harbours), storage, processing, and industrial plants, mining and power generation, and the many types of facilities required in towns and other human settlements - in anticipation of population increase and socio-economic development. Physical planning usually follows land suitability zoning and economic development planning. It has both rural and urban development aspects, the latter often predominating.

The FAO Guidelines for Land-Use Planning published in 1993 defines land-use planning as “*the systematic assessment of land and water potential, alternatives for land-use, and economic and social conditions, in order to select and adopt the best land-*

Key concepts:

- *What “land-use planning” means*
- *Basic elements of land-use planning*
- *land-use planning tools*

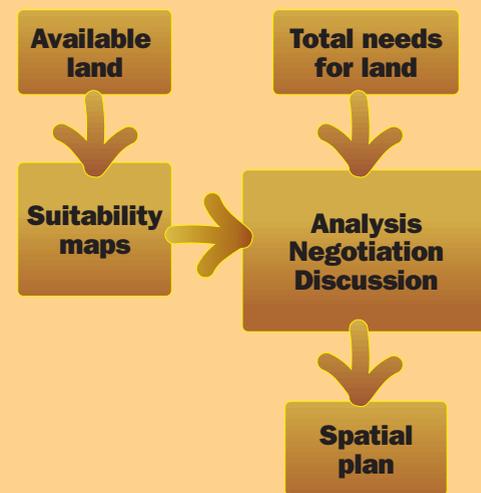
use options. Its purpose is to select and put into practice those land uses that will best meet the needs of the people, while safeguarding resources for the future. The driving force in planning is the need for change, the need for improved management, or the need for a quite different pattern of land-use dictated by changing circumstances.”

In the past land-use planning has usually been carried out by the state or by local government organizations for the general good of the community. The purpose has been to take a more holistic or overall view of the development of an area than can, or would be taken by individuals. One of the objectives is therefore to restrain the excesses of individual stakeholders in the interests of the community as a whole. This latter function usually leads to physical

planning being associated with a system of rules and regulations. Because land-use planning is carried out by central governments and local authorities, and because very often the general public has not been sufficiently involved or informed, it has been generally seen as a “top-down” process. In addition, “planning”, and “implementation” have often been seen as separate processes, with the responsibility of the planner ending once the plan has been drawn up or presented.

The present publication presents concepts which go beyond the conventional approach to land-use planning. The aim is to provide an institutional framework for decision making which will ensure that human objectives with regard to land are achieved to a greater extent, and more successfully than at present.

Spatial planning



Procedures which support decision making

Planning

Planning is the process of identifying and making provision for future needs and conflicts. Planning is required to a greater or lesser extent at all levels. Planning is based on the use of information on present situations to anticipate and provide for the future. Once again, there should be a clear distinction between the provision and analysis of information to identify options and the making of decisions. Very frequently in the past, future needs, solutions considered appropriate and action programmes to put them into effect have all been identified and developed by government institutions, often without much consultation with people.

At village level and above, land-use decisions are rarely made by one group or authority in isolation. Negotiations take place within a framework which consists of several groups of stakeholders and other planning institutions and specialists, on the same level and at other levels. In order to relate to each other successfully, these different groups need the following:

- * a common technical **language**, the terms of which are understood by all partners in a similar way;
- * a common **information base**, including land and water resources, vegetation and crop resources, marketing of produce and inputs, technology, infrastructure (roads, markets) and initial indications of the main objectives of the different partners;
- * a “what-if engine”, a **land-use scenario programme**, that will provide a succession of maps of land-

use distribution and other interpreted information on the basis of objectives and specifications stipulated by participants at various points during the negotiations.

Land, water and other natural resources are available at national, subnational and other levels, down to farm and plot level. At each of these levels there is need to make decisions about their use or allocation. The task is facilitated through the use of a number of relatively simple procedures.

Land suitability classification – a tool for evaluating land resources

Land capability⁷ and land suitability⁸ maps are a useful preliminary basis for land-use planning or zoning, since they show which areas are most suited to which purposes, and so facilitate the task of matching needs in terms of land type with available land resources.

Spatial allocation of land

Which land and how much of it to allocate for a given purpose depends upon social and economic factors, and is the result of the negotiating and decision-making process. To a large extent the quality of the land resources available dictates its most appropriate primary use. But depending on economic and management factors, the immediate suitability of land can be modified, for example by terracing, drainage or irrigation.

Land for housing is usually the first consideration. If settlements already exist, land required for future expansion, or for new settlements, needs to be considered. Roads and other infrastructure usually come next. The use of the bulk of the land is then decided (usually by market forces) on the basis of need and suit-

⁷ The land capability classification system was developed by the US Department of Agriculture in the mid-fifties. The concept has since been introduced in many other countries. Land is classified according to the type of use it could be put to without becoming degraded.

⁸ Land evaluation is concerned with the assessment of land performance when used for specified purposes. The concept was developed by FAO in the mid-seventies and involves rating the suitability of land for a range of potential uses by matching their qualities and characteristics. See FAO Soils Bulletins 32 (A Framework for Land Evaluation), 52 (Guidelines: Land Evaluation for Rainfed Agriculture), 55 (Guidelines: Land Evaluation for Irrigated Agriculture), 58 (Guidelines: Land Evaluation for Extensive Grazing).

ability. The result is a proposed land-use plan which reflects present policies and objectives. If the exercise is carried out at district or village level, for example, the plan would consist of one or more maps accompanied by reports which describe what is proposed and why. At farm level the spatial plan would cover the physical layout of the available area, the farm buildings, roads or tracks between fields or plots, water supplies, conservation works and field boundaries based as far as possible on homogeneous management units. The plan should also cater for future needs, so that suitable land can be allocated to them as they arise. All planning is an iterative and continuously ongoing process, and the proposed land-use plan will need to be brought up to date as conditions change over time.

Optimizing achievement of objectives when land is used as a resource

The figure on page 53 illustrates how a group or an individual land user might combine different types of information to support a decision as to the “best” use for a given land area. In a generic sense the sequence involves identification of a range of possible alternative crops or land uses which are suited to the existing (or modifiable) physical environment, deciding which of them would be possible and profitable to produce and could be sold, and finally which of these would best support the objectives of the land user. Basically the same method can be used at village, district or even national level by entering the appropriate information. When this approach is combined with the use of a geographical information system (GIS) to store, combine, view and print maps, it becomes a powerful and versatile tool.

Databases and geographical information systems

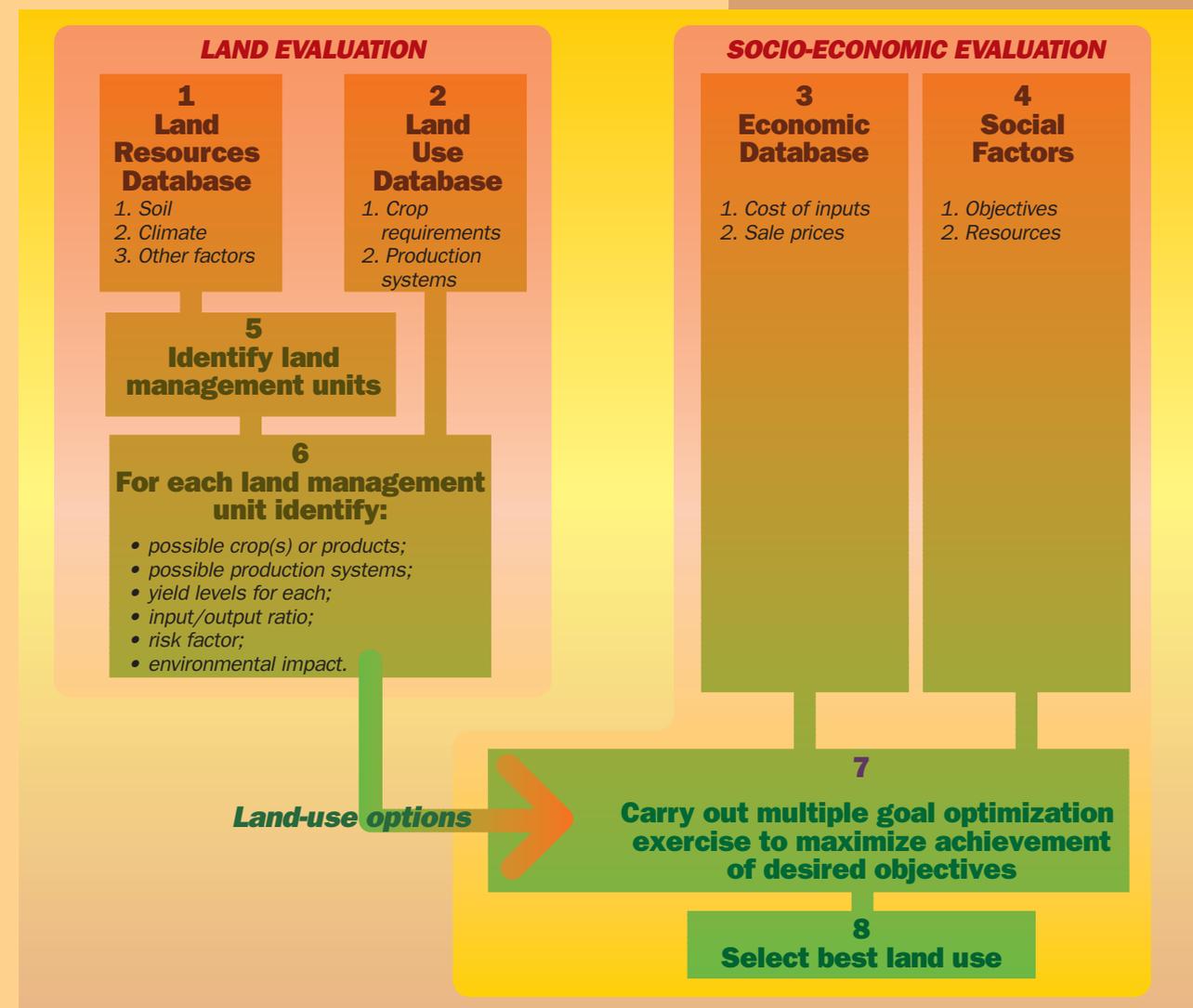
Definition of land units or land types

Land resources are defined on the basis of climate, soil and other factors which affect their potential and suitability for use. The amount of data which needs to be accessed, analysed and integrated is usually quite large, especially when dealing with district, national or global level issues. Previously information was presented to the user in the form of maps. Nowadays it is possible, and far more convenient, to use digitized databases and computer-based geographical information systems. FAO has developed and has available a multilingual (English, French and Spanish) soils database which stores, manipulates and prints basic soils data. The database can also be directly accessed from a GIS. FAO has also developed databases for climatic data.

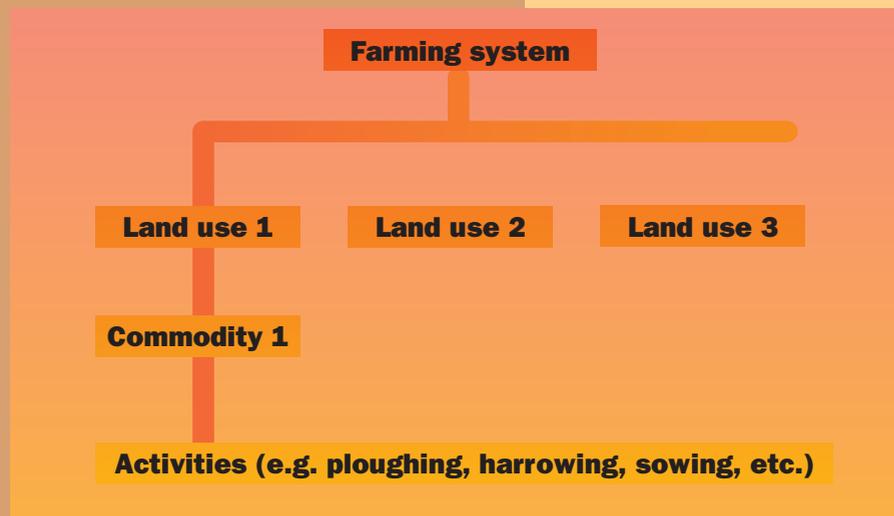
Land-use and production systems database

All decisions about land-use involve estimating the potential benefits and likely impacts from using a given land unit for a particular purpose. But up to now it has been difficult or almost impossible to define land uses precisely enough to do this. The simple act of defining a land-use in terms of a sequence of activities undertaken to produce goods or services creates a very powerful tool in this respect. By arranging the activities in tabular form, together with their associated inputs, it becomes a simple matter to define any land-use or production system quantitatively, carry out an economic analysis or an assessment of management and capital requirements, model environmen-

Making decisions about land use

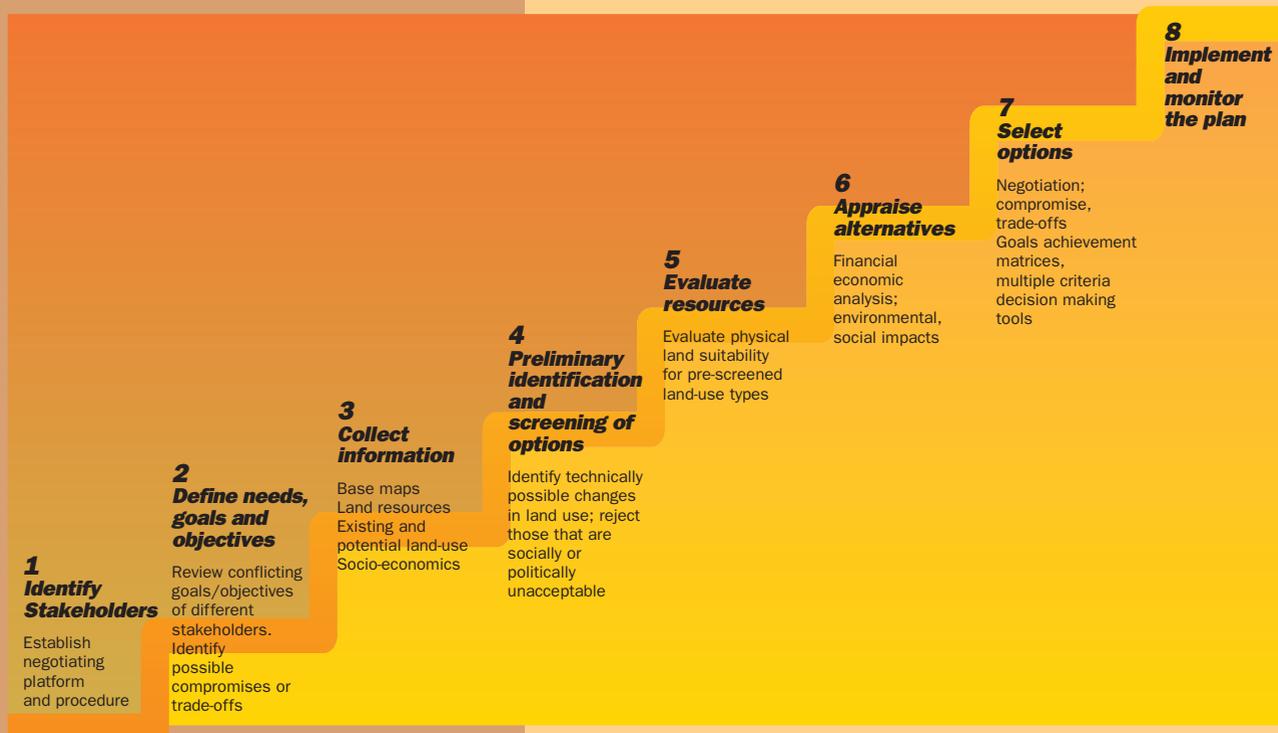


Production system, land-use and activities



A land use can be defined as a series of activities carried out on a tract of land to produce commodities or benefits for consumption or sale

Steps in interactive land-use planning



tal impact or map land-use. It also provides a framework for modelling alternatives and improvements to the production system and land-use.

This production system framework is equally important in providing a common basis to integrate the inputs of agronomists, plant protection specialists, agricultural engineers, conservationists and other production systems specialists on the one hand, and agricultural economists, farming systems experts and sociologists on the other. All are able to integrate their respective inputs within one common, but simple, production systems framework.

Definition and classification of land uses and production systems are also necessary in order to be able to monitor land-use and land cover changes from the point of view of their impact on the environment. Up to now there has been no standard method of doing

this which is suitable for global application. UNEP and FAO, in association with the Institute of Terrestrial Ecology and the World Wildlife Monitoring Centre in the UK, and the International Institute for Aerospace Survey and Earth Science in the Netherlands, have collaborated in the development of a land-use database and a land-use classification system suited to worldwide application which are currently available.

Identification of suitable crop or plant species

A recurring problem in land-use planning is the identification of suitable alternative land uses, either because the existing land-use pattern currently provides an unacceptably low standard of living, or because it is damaging some aspect of the environment. Since any potential crop or land-use has certain specific soil and climate requirements it has been possible to create a crop environmental requirements database which is designed either to identify candidate species and varieties for environments defined in terms of climatic and soil factors, or to provide information on the soil and climate requirements of selected plant species. This database is currently available from FAO, and contains information for more than 1600 plant species.

Matching of land and use and quantification of options

A range of yield models is used to predict average potential levels of outputs from particular crops grown under specified production systems. FAO has pioneered the agro-ecological zones methodology to predict potential yields from specified soil/climate units for application down to province or district level. A range of crop growth models is available for the prediction of yield at farm or plot level.

Various checklist procedures are employed to assess the environmental impact of possible land uses. Specific forms of degradation, such as erosion, salinization or pollution, can be predicted through the use of models such as the Universal Soil Loss Equation.

Selection of best mix of options

In many cases land-use options which are best from the point of view of stakeholders emerge from the negotiating process. But in some cases, and especially at national or subnational level so many different factors are involved that a formal analysis is needed. A methodology for multiple criteria land-use analysis was developed and published by FAO in 1996, in association with the Institute for Applied Systems Analysis at Laxenburg in Austria.

GUIDELINES FOR ACTION

1 What scale will be used?

- The different levels of decision making need to work with different levels of detail. At national level a map scale of 1:1 000 000 or 1:500 000 may be appropriate. At district level a scale of 1:250 000 or 1:50 000 is more suitable. Much larger, more detailed scales are needed at farm level.

- The data describing land resources, land uses and all the other relevant social and economic information needed for land-use planning at different levels must be arranged in hierarchical frameworks so that the larger amount of detail required at lower planning levels can be aggregated into larger units at higher levels.

- It is important to attempt to standardize the formats of data sets and of database structures so that access and interpretation are simplified and brought within reach of land users new to the technology.

2 Who is responsible for data collection?

- Government agencies have a high proportion of the responsibility for data collection and storage, so start there.

- Identify and note the broad array of data available through specialized research institutes, non-governmental organizations and a range of community-based field groups and local area management groups.
- Make use of community watch projects and other data collection and monitoring carried out by specialist interest groups such as wildlife rangers or amateur naturalists.

3 How will information be managed and disseminated?

- Establish and maintain a meta-database listing what information is available, and where, for the sector which is being studied.

- Keep an inventory of the individual databases held by contributing organizations.

- Ideally databases will be linked through a computer network and this network should be accessible through terminals in government agencies, at national and subnational level, and in public libraries or similar sites accessible to communities and land users.

- Extension managers and field officers remain the primary conduit for transfer and interpretation of information and also for feedback from the land users to the data bank and to each other.



4. Doubling production while preserving the environment

A framework for global resources management in the 21st century

What should governments be doing ?

With regard to the use of land and associated primary resources, governments have two primary responsibilities:

1. To identify constraints and ensure the existence of incentives to produce and to conserve. An alternative way of putting this is to say that governments need to respond to the needs and problems of resource users. In both cases governments have to be informed on what these constraints and needs are on a continuous basis. *This implies the need for a close relationship, or partnership, between government and people.* It also implies a holistic and integrated response by government to what will inevitably be a diverse range of issues.

2. To create and maintain an institutional framework which ensures that all stakeholders (including the many government organizations which have, or represent, specific interests) can effectively participate at each decision-making level (community, local government, national government and international), and that in each case discussion is supported by relevant information.

An effort to fulfil these two responsibilities will help transform government policies and programmes, which will become less top-down and more coordinated. It will also help create negotiation forums and flows of information, so that effective negotiation among stakeholders can expand in scope.

If the argument set out in this publication is seen as basically correct, how could its conclusions be put into practice? It is suggested that it can be done through the following actions:

Key concepts:

- *The role of government*
- *Creating the institutional basis for a partnership between government and people*
- *Transforming the bureaucratic process; institutions are stakeholders too*
- *Strengthening technical support for land-use planning*
- *Use of a national land-use plan*

The functions and responsibilities of government can probably be summarized under only four headings: to create an environment and an infrastructural framework which facilitates and supports sustainable production, to provide certain public services, to ensure security and equal rights for all sectors of the population, and to provide special support and assistance to the disadvantaged.

A policy decision to identify and address all relevant factors in order of importance when designing development programmes or projects

This has the following implications:

* Programmes need to be designed to address the underlying constraints to sustainable development, of whatever kind and in any sector. This may have significant effects on the allocation of institutional budgets and resources.

* The design of a development programme must be preceded by a phase of information gathering and analysis which is sector-neutral, to identify and rank existing constraints.

* A mechanism such as a national land-use planning committee which transcends sectorial interests must exist to identify priorities, coordinate activities and allocate resources.

Identification and removal of constraints

This should begin with a survey to identify constraints interactively with land users. The results of this should then be used to:

* develop practical programmes to remove constraints and ensure that adequate incentives exist, both to produce and to conserve;

* identify opportunities, land-use options and management patterns which may provide a technical basis for more profitable but at the same time sustainable land-use.

Creation of a bottom tier of institutional infrastructure at grass-roots level in the form of local area management groups, as advocated here, should ensure that any constraints which arise in the future will be addressed.

Creation of a demand-driven research and technology development programme

To more than double food supplies sustainably when most land suited to agriculture is already under cultivation implies a great deal of improvement in the genetic potential of crops, much higher levels of management and inputs, and identification of alternative and additional crops. As indicated earlier, no solutions to environmental or productivity problems are possible unless the technological basis for them exists. Therefore research and technology development are obvious priorities.

Common faults in agricultural research programmes are that they do not reflect the needs of the majority of the land users, and that knowledge about applicable results does not reach the majority of potential users. This can be rectified by identifying stakeholders and including their representatives in the groups or committees which develop and approve research programmes.

Fostering the development of information systems

* Establish an inter-institutional technical working group on information systems charged with establishing and maintaining the necessary local area networks and standardizing and rationalizing provision of information throughout government, within ministries, or within departments.

* On the recommendations of this group, assign responsibilities within government for the development and maintenance of individual thematic information bases.

* Ensure that as much government data as possible is placed on the Internet.

* Unless these are already adequately provided by the private sector, establish a wide range of information programmes on radio and television.

* Create an economic and legal environment which favours the establishment of private suppliers of information and a wide range of knowledge and educational programmes.

Provision of the missing elements in the management process at grass-roots level

* Establish and legally empower local level management groups. This may be a process which takes place over time, and may begin in one or more pilot areas initially. The way the groups are established, and their form and structure, should depend on local customs and traditional social structures. It is best to discuss these aspects, together with the powers and exact functions of the groups, with the local people in a series of meetings and workshops. But whatever the arrangements agreed it is essential that aspects such as membership, representation, purposes, powers and procedures, including procedures for appeal to higher authority against decisions of the group, be very clearly set out and understood. Provision will also have to be made to support the newly-established groups with information and technical assistance, at least in the early stages.

* Problems should be solved as close as possible to their origin; that is to say locally. Some of the advantages of empowering people to manage their local resources within an overall policy and legal framework have already been noted. Grass-roots organizations have already demonstrated their value in many parts of the world.

Integrated groups at subnational and national levels

* Establish an inter-institutional, national land resources planning group with a clear mandate and terms of reference. This group should have the power to establish additional inter-disciplinary working or advisory groups, which may have a temporary duration, on specific issues.

* Examine and rationalize or clarify the responsibilities and terms of reference of existing institutions with activities relating in any way to land or land-related resources.

* Devolve powers to make decisions on local issues to local government or district levels, and establish the necessary institutional framework for this at those levels. It is important that the staff of line ministries and departments working at local level should be made responsible to the local government organization, though still obtaining technical support from national level and probably, though not necessarily, being members of the national civil service for administrative purposes. Careful consideration needs to be given to the extent to which the budgets of national ministries should come under the control of local authorities. Unless this is done they may have very little real power.

Supporting local communities in self-organizing for natural resource management is a long, difficult and sensitive task, requiring long-term project commitment. Durable results cannot be expected in the short term.

From "Steps Towards a participatory and Integrated Approach to Watershed Management"

GUIDELINES FOR ACTION

1 Involve the community in its own resource management

- Maintain an active and participatory programme of awareness-raising.
- Provide well resourced and innovative education, extension and regional skills development or capacity building.
- Strengthen and feed a culture of participatory planning, debate, feedback and decision making.
- Encourage, support, resource and facilitate the activities of local resource management groups.

2 Support good decision making with good information

- Establish continuing data collection, management and dissemination systems.
- Initiate programmes for monitoring, evaluation, discussion and change.

3 Provide incentives for local integrated resource management

- Aim for the development of institutional frameworks that feed and strengthen integration.
- Record, recognize and reward progress.
- Remove disincentives from legislature or administrative bureaucracies.

4 Develop a long-term integrated policy and institutional framework

- Campaign for, establish and maintain a supportive institutional, policy and legislative environment.
- Work towards building a long-term whole-of-government policy framework.
- Identify a suitable departmental or agency host or collaborating institutions at national level to foster and support the development of local resource management groups, regional resource planning groups and the national resource advisory group.
- Identify stakeholders at local, regional and national levels who have responsibility for resource management, decision making or policy setting and invite representation from all groups at all levels.

Possible need for an independent monitoring body responsible for the environment

* If serious environmental problems exist, and it has not been possible for government to rectify these over a long period of years, if it appears likely that government priorities may not permit the necessary consideration to be given to these issues in the near future, or if it is simply more efficient for them to be dealt with by a separate body with no other distracting responsibilities, then consideration should be given to the establishment of a natural resources commission or similar body, with defined powers, membership and legal standing.

Establishment of land-use planning technical support at national and subnational levels

* As stated earlier, the function of technical land-use planning staff is to provide support to stakeholders, who should be the decision makers, at each level of the decision-making process. This means at least at national, subnational and grass-roots level. Therefore professional support on land-use planning should be made available to the national level land-use planning group and to the local planning groups. Non-agricultural land users will often find it most appropriate to apply to local government offices for any land-use planning advice which they may need, and provision of such advice should be part of the duties of land-use professionals at this level. Farmers and other primary producers will require special-

ized technical support on land-use related issues and land-use planning, and this may be better supplied by a group of agricultural land-use planners based administratively in the Ministry of Agriculture or its equivalent. But it is important that all land-use planning personnel should be technically integrated, so that they use the same procedures, classification systems and tools. This is essential since they are all providing advice and information about the *same land*, though at different levels of detail. Thus, for example, land-use planners at subnational level need to know what national policies and programmes apply to land they have responsibility for, and rural or urban land-use planners need to know what zoning schemes or plans exist in relation to land they happen to be working on. Information and data systems in use at any particular level must be applicable at any other.

Environmental action plan or national land-use policy

It may be found useful to establish the framework for effective management of land resources proposed in this publication as a major element of an environmental action plan or national land-use policy. This may conveniently supply the necessary legal and administrative basis⁹ and focus for change and improvement, and may also include additional legal instruments to protect or manage specific resources.

⁹ See for example the proposed National Land-Use Act presented to the Tenth Congress of the House of Representatives of the Philippines and numerous national Environmental Action Plans

