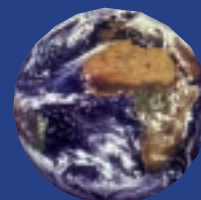


GUIDELINES FOR  
INTEGRATED  
PLANNING  
FOR SUSTAINABLE  
MANAGEMENT  
OF LAND  
RESOURCES

# The Future of Our Land

FACING THE CHALLENGE





# The Future of Our Land

F A C I N G   T H E   C H A L L E N G E



FOOD AND AGRICULTURE ORGANIZATION  
OF THE UNITED NATIONS



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## Foreword

Continuing land degradation and increasing numbers of people living in poverty are among the symptoms of the current pressure on land resources. To date, the world's response to the two challenges of satisfying human needs and maintaining the integrity of global ecosystems has been less than successful. The lack of an integrated planning framework for land has historically been compounded by poor management strategies, failure to identify stakeholders<sup>1</sup> and involve and empower them in the planning and management process, and weak institutional structures.

These problems were clearly recognized during the United Nations Conference on Environment and Development (UNCED) in 1992 in Rio de Janeiro (Brazil) which called for an integrated approach to the planning and management of land resources. In Agenda 21, the document of the Earth Summit, UNCED proposed a number of policy and strategy measures, which include integration of biophysical, social and economic issues, the active participation of local communities and the strengthening of institutions in order to achieve the objectives of sustainable development.

In collaboration with the United Nations Environment Programme (UNEP) and other national and international institutions, FAO has developed an improved framework for land resources development and management that addresses the evolving nature of integrated land management. The new concepts have been introduced through a series of three publications, starting with *Our Land, Our Future* (1995), which gives a brief introduction to the new planning approach, followed by *Negotiating a Sustainable Future for Land* (1997), which provided structural and institutional guidelines for policy and decision-makers at the national level.

This document, "*The Future of Our Land – Facing the Challenge*" is the third in the series and proposes an integrated planning approach for sustainable management of land resources based on an interactive partnership between governments and people. It is the result of a participatory process to highlight issues, experiences and challenges related to integrated land resources planning and management for the 8<sup>th</sup> session of the Commission on Sustainable Development (CSD 8) which will examine, among others, the progress in the implementation of chapter 10 of Agenda 21. The approach is centred on the concept of stakeholders and their objectives, and the role of the government in creating the conditions within which rural people can use their land resources productively and sustainably. Integration of grass-roots participation with systematic procedures for evaluation of resources and planning is the key to this approach, and a necessary factor for its success.

This document is targeted primarily at professional and technical practitioners of land-use planning and land resource management at the national, sub-national and community level who want to implement an integrated approach to land resources management. Based on experience using these guidelines, practical manuals on integrated land resources management (ILRM) should be prepared for regions or individual countries.

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1 - In the context of land resource management, a stakeholder is any individual or group with a legitimate interest in the land resource, or liable to be affected by changes in the way the resource is managed.



The present document adopts the premise that **integrated land-use planning** is:

- an essential prerequisite to the sustainable management of land resources and considers a production and conservation component. It introduces mechanisms and incentives for changes in the allocation of land to uses for which it is suitable in biophysical and socio-economic terms, and prescribes appropriate management practices and options to ensure that land resources are conserved;
- essentially a mechanism for decision support to guide the stakeholders in selecting the best sustainable land-use options which are consistent with their objectives. This approach is participatory and recognizes the rights of all stakeholders, including those such as indigenous groups or rural women who may be traditionally marginalized in some societies, to negotiate on the use and management of land resources;
- using negotiation as the basis for resolving land-use conflicts and agreeing mutually attainable objectives. Essentially, the approach embodies an interactive partnership between government and people to address their common concern to manage land sustainably for the benefit of present and future generations.

Successful integrated planning of land resources includes seven key elements:

- ✓ a clearly formulated objective and/or problem to be solved
- ✓ an enabling policy and regulatory environment
- ✓ effective institutions at local, sub-national, and national level
- ✓ an accessible knowledge base of the physical conditions including alternative land use, the socio-economic conditions and legal framework
- ✓ a recognition of stakeholders and their often differing objectives
- ✓ a platform for negotiation
- ✓ a set of planning procedures

The enabling environment comprises policy, regulatory and institutional aspects. A national land-use policy is the first and most important instrument; it controls land tenure and land use to provide an environment which is conducive to the implementation of sustainable and productive land-use practices, and to the realization of fora for free and effective negotiation among stakeholders. Planning that comes from the local or district level should provide the basis for national policy, which in turn would facilitate local initiatives.

Legislation translates policy into a framework for decision making, and creates institutions to administer the decisions. There is a need for institutions at the local, sub-national and national level, which facilitate the integration of disciplines and the access to information required for land-use planning. The national institutions – usually ministries - must have clear mandates to solve conflicts. At national level a task force should be created as a “neutral” institution (a committee or board) composed of the relevant land-related ministries and representatives of other institutions from civil society. It should have facilitating, monitoring and conflict-resolving functions, based on technical advice. At the village or community level, local resource management groups (LRMGs), representing all local stakeholders, should be established.

Knowledge provides the basis on which to plan and negotiate. It is also the key to the empowerment of local stakeholders, particularly those disadvantaged groups which may otherwise be excluded from the negotiating process. There should be an adequate flow of information on resources, technologies, rights and regulations to the village level, but also local and traditional information and knowledge on land and land use need to be mobilized. Participatory land-use planning then becomes a mutual learning process, based on a fusion of technical knowledge from government or other agents of change and the experience and indigenous knowledge of local land users. There should also be a flow of information from the local level to the national level to ensure that any land programme or decision is formulated to reflect the needs and demands of the land users at the bottom.

The principle platform for negotiation will be the LRMGs operating at the village or community level. Decision making will be devolved as far as possible to this level, partly as a means of engendering responsibility among the villagers for the resources under their control, and partly to reduce the burden on government by mobilizing the people and their energy and enthusiasm. It is a government responsibility, however, to ensure that all stakeholder groups, including the disadvantaged, are fairly represented in the negotiating process.

The procedures used in integrated land-use planning and management comprise the identification of the problems, the stakeholders involved and their objectives, the collection of data necessary for planning, the evaluation of land resources in relation to the requirements of land use, and the ranking of options in terms of economic, social and environmental impacts through a participatory approach involving all stakeholders. These procedures should be applied by the stakeholder representatives, adapting, as far as possible, the technical procedures to a level at which they can be carried out by trained technicians at the village level. More sophisticated procedures may be appropriate at the national and sub-national level.

The approach presented here should be tried, tested and validated in several pilot areas, and the lessons learned from these studies should be used to adapt integrated land-use planning to the particular conditions of the country, and to promote and guide its widespread adoption. Sustainable management of land resources is in the interests of both the government and the people, and policies which devolve decision making and empower land users should enjoy popular support. At the same time, the interactive character of land-use planning will support the commitments made by governments to the UN Conference on Environment and Development in 1992, and to the post-summit conventions to combat desertification (UNCCD), climate change (UNFCCC) and preservation of biodiversity (UNCBD).

The attached CD-ROM is the result of a joint effort by FAO and the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) and contains a list of complementary documents related to land-use planning and land resources management. It comprises guiding documents, case studies, working papers, workshop proceedings and other publications, mainly published by FAO and GTZ.





# Contents

<b>The Challenge</b>	<b>1</b>
<b>The Approach - Facing the Challenge</b>	<b>5</b>
<b>1. Land Resources and People: Dependence and Interaction</b>	<b>7</b>
<b>Definition of Land and Land-use</b>	<b>7</b>
<b>Functions of Land</b>	<b>8</b>
<b>The Basic Relationship: Land, Population and Management Strategies</b>	<b>8</b>
<b>Land Resources under Stress</b>	<b>8</b>
Availability of Land	9
Pressure of Population	9
Symptoms of the Problem	10
<b>The Cause of the Problem</b>	<b>10</b>
<b>The Point of Intervention</b>	<b>11</b>
References and Further Recommended Literature	12
<b>2. The Need for an Integrated Approach</b>	<b>13</b>
<b>Planning and Management of Land Resources in the Rural Development Context</b>	<b>13</b>
<b>Constraints Associated with Previous Approaches</b>	<b>14</b>
<b>Needed: An Improved Approach to Integrated Planning for Sustainable Management of Land Resources</b>	<b>15</b>
References and Further Recommended Literature	16
<b>3. The Key Factors Necessary for Implementing an Integrated Approach</b>	<b>17</b>
<b>The Framework for an Integrated Approach</b>	<b>17</b>
<b>A Clearly Formulated Objective</b>	<b>19</b>
<b>Recognition of Stakeholders and Their Differing Objectives</b>	<b>19</b>
<b>An Enabling Environment and Regulatory Policy</b>	<b>20</b>
Land-use Policy	20
Regulation of Land-use and Land Tenure	21
<b>Effective Institutions</b>	<b>22</b>
<b>Platform for Negotiation</b>	<b>23</b>
<b>Efficient and Accessible Knowledge Base</b>	<b>23</b>
<b>Land-use Planning Procedures</b>	<b>24</b>
References and Further Recommended Literature	25

<b>4. The Methodology</b>	<b>27</b>
<b>The Decision Sequence</b>	<b>27</b>
<b>Problem Identification and Formulation of the Objective</b>	<b>29</b>
<b>Identifying Stakeholders and their Goals, Needs and Stakes</b>	<b>30</b>
Identifying Stakeholders	30
Defining Goals, Needs and Stakes	30
<b>Establishment of Multidisciplinary Task Forces</b>	<b>32</b>
Basic Principles	32
Task Force at the Community Level: LOCAL RESOURCE MANAGEMENT GROUPS	32
Task Force at Sub-national Level: LAND-USE PLANNING GROUPS	34
Task Force at National Level: NATIONAL LAND-USE COMMITTEE	35
<b>Collecting Data and Information</b>	<b>36</b>
Basic Principles	36
Nature and Scale of Data and Information	36
Data on Land Resources	37
Land-use Related Data and Information	38
Socio-Economic Data and Information	41
How to Collect the Data and Information	41
Data and Information Storage, Retrieval and Accessibility	42
<b>Preliminary Identification and Screening of Options</b>	<b>43</b>
<b>Evaluating Resources for the Identified Options</b>	<b>45</b>
Basic Principles	45
Land Evaluation Procedure	46
Presenting Evaluation Results	47
<b>Appraisal of Identified Options</b>	<b>48</b>
Financial and Economic Viability	48
Social Impact	50
Environmental Impact	50
<b>Negotiating and Deciding upon Options - Set Up the Plan</b>	<b>51</b>
The Negotiation Process	51
Supporting Tools in Assisting the Selection of Options	53
Conflicts between Stakeholders and Conflict Resolution	53
Setting up the Plan	54
<b>Legislation and Enforcement for the Plan</b>	<b>55</b>
Incentives	55
Legislation	56
<b>Monitoring and Evaluation (M&amp;E)</b>	<b>61</b>
References and Further Recommended Literature	62

<b>5. How to Get Started</b>	<b>65</b>
<b>Initiating the Approach</b>	<b>65</b>
Time frame	66
Introductory Workshops	66
A Campaign of Information and Education	67
Select Pilot Area	68
<b>Countrywide Application</b>	<b>70</b>
References and Further Recommended Literature	71

## Boxes

<b>Box 1</b>	Buthanese Definition of Land-use Planning	13
<b>Box 2</b>	Some Reasons for Less than Successful Outcomes of Previous Rural Development Programmes	14
<b>Box 3</b>	Characteristics of Stakeholders	20
<b>Box 4</b>	Typologies of Participation	20
<b>Box 5</b>	National Goal of Land-use Policy	21
<b>Box 6</b>	The Eritrean Land Proclamation	21
<b>Box 7</b>	Civic Action Groups: Armenia	22
<b>Box 8</b>	Objectives of the Doon-Valley Watershed Management Project	29
<b>Box 9</b>	Types of Stakeholders	30
<b>Box 10</b>	Common RRA/PRA Techniques	31
<b>Box 11</b>	A Meso-level group: the Guelderlan Commission	34
<b>Box 12</b>	The Agricultural Resources Board, Botswana	35
<b>Box 13</b>	Nature of Data and Information	36
<b>Box 14</b>	Data Requirements on Land Resources for Land Evaluation	38
<b>Box 15</b>	Example of a Land Utilization Types Definition	39
<b>Box 16</b>	Example of a Production System	40
<b>Box 17</b>	Checklist of Requirements for Crop Based Production System	40
<b>Box 18</b>	Socio-economic Data and Information Requirements	41
<b>Box 19</b>	Physiographic Approach to Land Resource Survey: The SOTER Example	42
<b>Box 20</b>	Selected FAO Databases and Programs	42
<b>Box 21</b>	FAO Guidelines on Land Evaluation	46
<b>Box 22</b>	Possible Origins of Land Conflicts	53
<b>Box 23</b>	Extract from Community Action Plan	55
<b>Box 24</b>	Conceptual Goals of SARD	55
<b>Box 25</b>	Role of Law in Water Management	57
<b>Box 26</b>	Regulations Governing the Use of Fire on the Rangelands for Mbume Silalanda Committee	59
<b>Box 27</b>	Local and Provincial Groups Working Together in the Philippines	60
<b>Box 28</b>	Land Consolidation and Land Readjustment	60
<b>Box 29</b>	Learning by Doing	65
<b>Box 30</b>	Formulating National Strategies for Production	69
<b>Box 31</b>	Guidelines for Action	70

## Figures

<b>Figure 1</b>	Trends in Rural and Urban Population	9
<b>Figure 2</b>	Symptoms of the Problem on Pressure on Land Resources	10
<b>Figure 3</b>	Cause - Problem - Symptom Relationship	10
<b>Figure 4</b>	The Spiral: Land Resources and Peoples Activities	11
<b>Figure 5</b>	Interactive Rural Development	18
<b>Figure 6</b>	Key Factors in Integrated Planning for Sustainable Management of Land Resources	19
<b>Figure 7</b>	Institutional Framework of Local Management Groups	22
<b>Figure 8</b>	The Planning Method	28
<b>Figure 9</b>	Preliminary Identification and Screening of Options	44
<b>Figure 10</b>	Land Evaluation Rationale	45
<b>Figure 11</b>	Applications of Agro-Ecological Zoning (AEZ)	47
<b>Figure 12</b>	Appraisal of Sustainability Factors of Land Use Options	48
<b>Figure 13</b>	The Negotiation Process	52
<b>Figure 14</b>	Introducing Integrated Planning	66
<b>Figure 15</b>	Timeframe for Planning and Implementation	67

## Tables

<b>Table 1</b>	An Example of Stakeholders and Their Objectives	31
<b>Table 2</b>	Planning Levels and Recommended Map Scales	37
<b>Table 3</b>	Extract of Land Evaluation Based on Qualitative Matching	48

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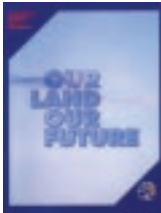
## Acronyms / Abbreviations

<b>AEZ</b>	Agro-ecological Zoning
<b>ALES</b>	Automated Land Evaluation System
<b>CAG</b>	Civic Action Group
<b>CSD</b>	Commission for Sustainable Development
<b>CYSLAMB</b>	Crop Yield Simulation and Land Assessment Model for Botswana
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>GIS</b>	Geographic Information System
<b>GO</b>	Government Organization
<b>GTZ</b>	Deutsche Gesellschaft für Technische Zusammenarbeit
<b>IIED</b>	International Institute for Environment and Development
<b>ILRM</b>	Integrated Land Resources Management
<b>IPSMRLR</b>	Integrated Approach to Planning for Sustainable Management of Land Resources
<b>LRMG</b>	Land Resources Management Group
<b>LMU</b>	Land Management Unit
<b>LUD</b>	Land Use Database
<b>LUP</b>	Land-use Planning
<b>LUT</b>	Land Utilization Type
<b>M&amp;E</b>	Monitoring and Evaluation
<b>NGO</b>	Non-governmental Organization
<b>PRA</b>	Participatory Rural Appraisal
<b>RRA</b>	Rapid Rural Appraisal
<b>SARD</b>	Sustainable Agriculture and Rural Development
<b>SDBm</b>	Multilingual Soil Database
<b>SEAGA</b>	Socio-Economic and Gender Analysis
<b>SOTER</b>	Global and National Soils and Terrain Digital Database
<b>UNCBD</b>	United Nations Convention on Biological Diversity
<b>UNCCD</b>	United Nations Convention to Combat Desertification
<b>UNCED</b>	United Nations Conference on Environment and Development
<b>UNEP</b>	United Nations Environment Programme
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>WB</b>	World Bank



## The Challenge

**About this document.** In collaboration with UNEP, FAO has developed an improved framework for land resources development and management that addresses the evolving nature of integrated land resources management (ILRM). The new concepts have been introduced through a series of three publications.



**Our Land, Our Future,**  
published in 1995,  
which briefly introduces  
the new planning approach



**Negotiating a Sustainable Future for Land**  
(Structural and Institutional Guidelines for  
Land Resources Management in the 21<sup>st</sup> Century)  
published in 1997, which is aimed primarily at  
policy- and decision-makers at the national level

This document, **“The Future of Our Land – Facing the Challenge”** is the third in the series and proposes an integrated planning approach for sustainable management of land resources based on an interactive partnership between governments and people. The approach is centred on the concept of stakeholders and their objectives, and the role of the government in creating the conditions within which rural people can use their land resources productively and sustainably. Integration of grass-roots participation with systematic procedures for evaluation of resources and planning is the key to this approach, and is necessary for its success.

This document is targeted primarily at professional and technical practitioners of land-use planning and land resource management at the national, sub-national and community level who want to implement an integrated approach to land resources management. Using these guidelines as a basis will facilitate the preparation of practical manuals on ILRM adapted to specific regions or individual countries.

**What is next for land resources management in preparation for the 21<sup>st</sup> Century?** Planning approaches must now evolve to meet the issues, trends and threats that are being faced, to take advantage of opportunities and build upon experience of what has worked in the past. There is an immediate need to understand better the interactions among different land uses and land users, to address issues of conflicting stakeholder objectives, and to capitalize on and improve linkages of information flow within and across political hierarchies through participatory mechanisms.

**What is the current situation?** Over the last ten years, major international fora such as the UNCED in Rio de Janeiro, Brazil (1992) and the World Food Summit in Rome, Italy (1996) have clearly established the need to alleviate poverty, ensure food security and maintain natural resources for future generations. In spite of being conceptually well prepared, the world continues to face the challenge of implementation. To reach the identified goals related to natural resources management, it must be recognized that there are interrelationships among natural resources, land use and people. Therefore implementing sustainable land management will be an integral part of achieving these goals.

The future trends associated with factors which greatly influence sustainable land management look somewhat less than promising. The world population will reach 8 thousand million by 2020. Population movements are increasing, from poorer to richer countries, from rural areas to urban centres, and from peripheral regions of low investment and growth to more dynamic ones. Half of the world population will be living in urban areas and vast numbers will be living in poverty. Rural populations will continue to be significant and will remain vulnerable and subject to a decline in social capital (education and institutional or social networks).

As a result, there will be far greater demand on land, water and biological resources, many of which are already degraded (16 percent of the total arable land area), with the degraded proportion tending to increase. Globally, conflicts over access and rights to resources are expected to be exacerbated. There will be increasingly severe environmental pressure from efforts to increase the use of land resources, water resources, animal and labour productivity. The dominant trend will be intensification of use of natural resources and the emergence of new intensifying technologies will expose social, ethical, cultural and environmental issues. Differences in access to and use of resources, technology and information will become greater.

Trade liberalization and globalization of markets may be the most important challenge for attempts to make land use sustainable. Reforms in agricultural support policies worldwide will have a profound impact on rural areas. Higher efficiency and economic growth of market-based agriculture will not eliminate rural poverty in marginal areas. Changes in trade regimes will influence incentives to produce sustainably, while globalization of markets and uniformity of consumption patterns will tend to reduce the diversity of agricultural systems and their adaptation to varied land conditions.

The resilience of land is further threatened by an increased incidence of human-made and natural disasters. Global conventions including the UN Convention to Combat Desertification (UNCCD) and the UN Convention on Biological Diversity (UNCBD) as well as a growing array of regulatory frameworks will be of increasing importance in directing use of land resources. Governments, farmer organizations and other stakeholder groups will need to engage in dialogue to understand their implications and respond accordingly. Decentralization and privatization will modify how and at what levels well-informed decisions will be taken.

**What are the necessary consequences for which preparations should be made?** It is necessary that a process be put in place for achieving an environment (of policies, incentives, regulations, etc.) enabling a move from the current state toward the perceived goals of the UNCED with regard to planning and management of land resources. Within this context, information exchange mechanisms (including networking and international fora), guidelines, tools and policy recommendations are needed for more broadly informed decision making about land resources.

An integrated approach requires improved coordination of planning and management of land and other resources. Agenda 21, Chapter 10, calls for reorganizing and, where necessary, strengthening decision-making structures, including policy, planning and management procedures. This approach recognizes the need for participation of all stakeholders in land-use decision making, and bridges the gap between the production and income objectives of land users and society's long-term objective of preserving natural resources. Of crucial importance are economic and legal conditions that encourage and reward sustainable land-use practices - inappropriate land tenure systems are one of the chief disincentives. Linkages are needed between, on the one hand, traditional land management systems and, on the other, the application of new technologies.

**What is proposed in this document?** In 1997, the Commission for Sustainable Development (CSD), in a special session convened to assess progress towards sustainable development (Earth Summit + 5), reiterated the needs and recommended that, at the international level, priority should go to developing and disseminating a new approach to land resources conservation and development. It specified that this approach should create social, economic and legal conditions that encourage sustainable development, meet the information needs of governments and land users, and involve all relevant institutions.

This document proposes an integrated approach to planning for sustainable management of land resources (IPSMLR). This is in accordance with FAO's responsibility as Task Manager for Chapter 10 of Agenda 21, which resulted from UNCED. Production of the document is financed by the United Nations Environment Programme (UNEP).

In relation to land resources, Agenda 21 states:

The broad objective is 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. 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 be taken into account.

The following specific needs are identified:

- ✓ The need to develop policies which will result in the best use and sustainable management of land.
- ✓ The need to improve and strengthen planning, management monitoring and evaluation systems.
- ✓ The need to strengthen institutions and coordinating mechanisms.
- ✓ The need to create mechanisms to facilitate the active involvement and participation of communities and people at local level.





# The Approach - Facing the Challenge





**SUMMARY**

This chapter provides land-related definitions, identifies future trends related to land resources and gives an overview of the cause-problem-symptom relationship. Finally it identifies the point of intervention which is addressed by these guidelines.

## 1 - Land Resources and People: Dependence and Interaction

Land is an essential natural resource, both for the survival and prosperity of humanity, and for the maintenance of all terrestrial ecosystems. Over millennia, people have become progressively more expert in exploiting land resources for their own ends. The limits on these resources are finite while human demands on them are not. Increased demand, or pressure on land resources, shows up as declining crop production, degradation of land quality and quantity, and competition for land. Attention should now be focused on the role of humankind as stewards rather than exploiters, charged with the responsibility of safeguarding the rights of unborn generations and of conserving land as the basis of the global ecosystem.

**KEYWORDS**

- ✓ land and land use
- ✓ function of land
- ✓ pressure on land
- ✓ cause – problem – symptoms
- ✓ point of intervention: the approach

### Definition of Land and Land Use

Land is not regarded simply in terms of soils and surface topography, but encompasses such features as underlying superficial deposits, climate and water resources, and also the plant and animal communities which have developed as a result of the interaction of these physical conditions. The results of human activities, reflected by changes in vegetative cover or by structures, are also regarded as features of the land. Changing one of the factors, such as land use, has potential impacts on other factors, such as flora and fauna, soils, surface water distribution and climate. Changes in these factors can be readily explained by ecosystem dynamics and the importance of their relationships in planning and management of land resources has become increasingly evident.

**DEFINITIONS**

**Land and Land Resources** refer to a delineable area of the earth's terrestrial surface, encompassing all attributes of the biosphere immediately above or below this surface, including those of the near-surface climate, the soil and terrain forms, the surface hydrology (including shallow lakes, rivers, marshes and swamps), the near-surface sedimentary layers and associated groundwater and geohydrological reserve, the plant and animal populations, the human settlement pattern and physical results of past and present human activity (terracing, water storage or drainage structures, roads, buildings, etc.) (FAO/UNEP, 1997).

**Land Use** is characterized by the arrangements, activities and inputs by people to produce, change or maintain a certain land cover type. (Di Gregorio and Jansen, 1998). Land use defined in this way establishes a direct link between land cover and the actions of people in their environment.

**Land Cover** is the observed (bio)physical cover on the earth's surface (Di Gregorio and Jansen, 1998)



## Functions of Land

The basic functions of land in supporting human and other terrestrial ecosystems can be summarized as follows:

- ✓ a store of wealth for individuals, groups, or a community
- ✓ production of food, fibre, fuel or other biotic materials for human use
- ✓ provision of biological habitats for plants, animals and micro-organisms
- ✓ co-determinant in the global energy balance and the global hydrological cycle, which provides both a source and a sink for greenhouse gases
- ✓ regulation of the storage and flow of surface water and groundwater
- ✓ storehouse of minerals and raw materials for human use
- ✓ a buffer, filter or modifier for chemical pollutants
- ✓ provision of physical space for settlements, industry and recreation
- ✓ storage and protection of evidence from the historical or pre-historical record (fossils, evidence of past climates, archaeological remains, etc.)
- ✓ enabling or hampering movement of animals, plants and people between one area and another

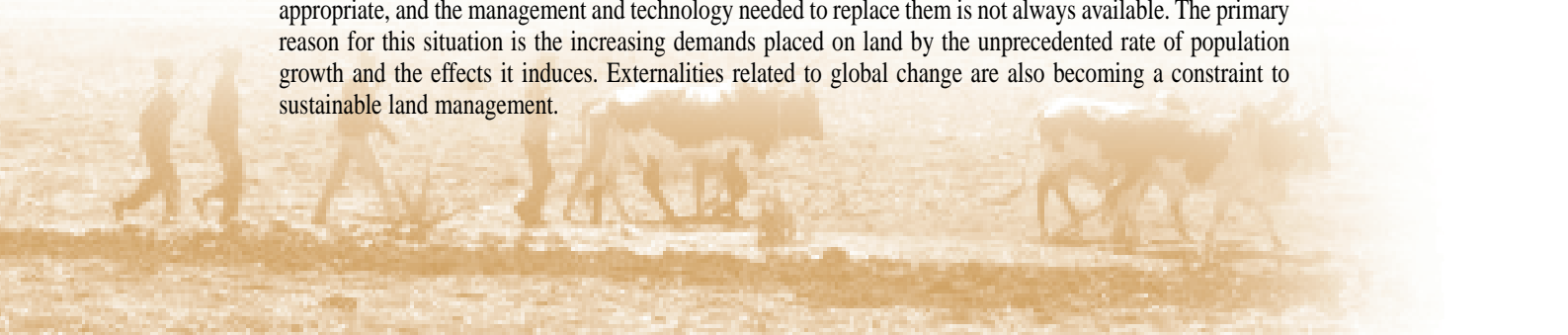
In the terminology of environmental economics, land can be regarded as a stock renewable resource. Land resources do not easily fit into the categories of *renewable* or *non-renewable*. In general, they are slowly renewable; however, their rate of degradation far exceeds their natural rate of regeneration. In practical terms, this means that land that is lost to degradation is not naturally replaced within a human time frame, resulting in a loss of opportunities for the next generation.

## The Basic Relationship: Land, Population and Management Strategies

The potential production of arable land and its susceptibility to degradation are dependent on the management strategies employed and on inherent soil and other characteristics. In agriculture-dependant societies this combination of factors determines potentially the population that can be supported and the standard of living. When population increases in a given area, the increased demand on production can induce stress and consequent degradation of the land resource. If no other source of income can be tapped (e.g. by migration to urban areas) people's standards of living decrease. However, if improved management strategies (including technologies) are available, either the standard of living may rise or more people can be supported at the same standard of living without deterioration of the natural resource base. It follows that an ample supply of land of suitable quality and appropriate production technologies are essential if the increasing demands of a growing population are to be met.

## Land Resources under Stress

Currently, land resources are clearly under stress; 16 percent of arable land is degraded and the percentage is increasing (FAO, 1997). Traditional systems of land management are either breaking down or are no longer appropriate, and the management and technology needed to replace them is not always available. The primary reason for this situation is the increasing demands placed on land by the unprecedented rate of population growth and the effects it induces. Externalities related to global change are also becoming a constraint to sustainable land management.



### Availability of Land

Notwithstanding the role of technology in increasing the number of people that can be supported by the terrestrial biosphere, there are finite limits to the supply of land resources. FAO estimates that a gross area of approximately 2.5 thousand million ha of land in the developing world<sup>2</sup> has some potential for rainfed agriculture, although two-thirds of the land are rated as having significant constraints due to topography or soil conditions, while not all of this land is available for agricultural production (Alexandratos, 1995). However, land is not evenly distributed either between countries or within countries, and the difference in access to land relative to population need is more significant than global totals. Based on an assessment of the potential production from available land, and projected population growth in 117 countries in the developing world, FAO concluded that by the year 2000, 64 countries (55 percent) would not be able to support their populations from land resources alone using production systems based on low inputs (FAO, 1982).

Land is becoming more and more scarce as a resource, and this is particularly true of land available for primary production of biomass or for conservation related purposes. Competition for land among different uses is becoming acute and conflicts related to this competition more frequent and more complex. This competition is often most apparent on the peri-urban fringe, where the continuing pressures of urban expansion compete with agricultural enterprises, and with recreational demands. Such situations frequently lead to rapid increases in the economic value of land, and land tenure becomes an important political issue.

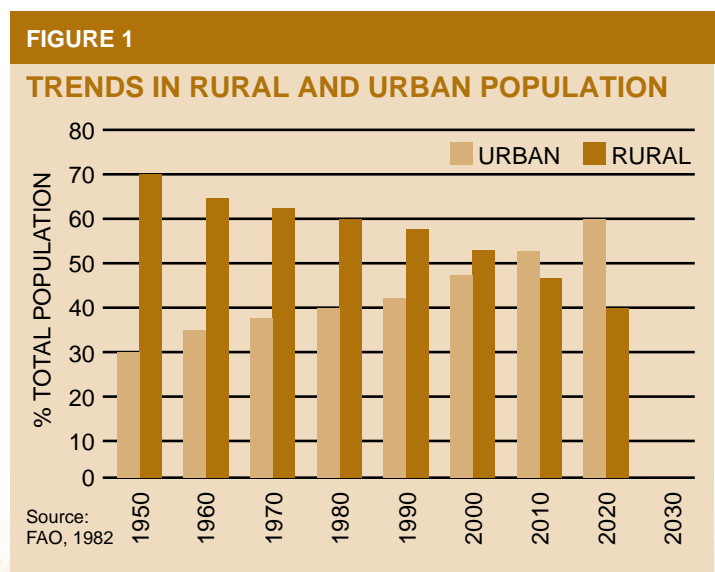
Many factors associated with global change directly or indirectly influence how land is used. These include biophysical influences, such as changes in climate or natural or human-induced disasters, as well as socio-economic aspects such as trade liberalization, the globalization of markets, decentralization of decision making, privatization, and the widening gap between the “haves” and the “have-nots”.

### Pressure of Population

Although the rate at which population is increasing has slowed since 1980, the increase in actual numbers is currently higher than at any time in the world’s history. Additions will average 97 million per year until the end of the century and 90 million per year until AD 2025. Ninety-five percent of this increase is expected to take place in developing countries. Present figures indicate that by the year 2050 Africa’s population will be three and a half times its present level, and by the year 2150, almost five times.

The previous hundred years has seen great advances in the technology of production, such as the development of more productive crop varieties and the extension of irrigation and fertilizer use. Nevertheless, it is becoming more difficult for technological progress to keep up with the rising demands generated by population growth. This is partly a result of the extension of cropping to more marginal areas where physical factors limit potential productivity and the risks of failure are higher. The success of technology in meeting these demands has been geographically uneven, being most successful in areas of low recent population growth, such as Europe and North America, meeting with varied success in Asia and Latin America, and generally being least successful in sub-Saharan Africa, where food production per caput has actually declined by almost 20 percent since 1960.

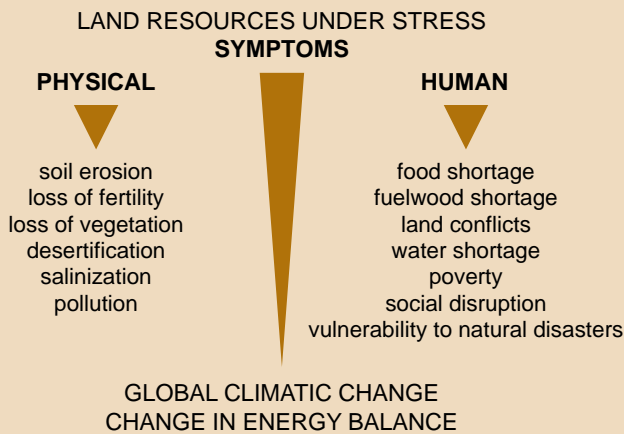
Growth in total population over the past 50 years has been matched by a relative increase in the urban population at the expense of the rural population (**Figure 1**). The impact of this trend is two-fold. On the one



2 - Available data excluding China and the countries of the former Soviet Union.

FIGURE 2

### SYMPTOMS OF THE PROBLEM OF PRESSURE ON LAND RESOURCES



hand, movement of people to the cities may reduce the absolute pressure on land for agriculture while stimulating the market for producers. On the other hand, production of primary products such as food, fibre and fuel must be produced from a diminishing land area by a diminishing relative population, while urban expansion reduces the total land available for agriculture. A further factor is the disproportionate migration of economically active males to the towns, leaving women, children and the aged to shoulder the burdens of agriculture. The situation is frequently exacerbated by government policies of urban bias, such as cheap food prices which favour the urban dwellers and their employers, but often penalize the food producers, who are commonly a less organized and less vociferous political constituency. Urbanization due to population growth and migration effects has also promoted a growth in per caput consumerism which has further increased the demands on land resources.

### Symptoms of the Problem

The symptoms of the problem of pressure on land resources are manifested both in terms of impacts on people, and in terms of deterioration in the condition of land or impacts on other natural resources (Figure 2). The deterioration in land condition may be reflected by an impaired ability to carry out any functions of the land listed above, some of which, such as reduced capacity to produce biomass, also, in turn, affect population support or quality of life.

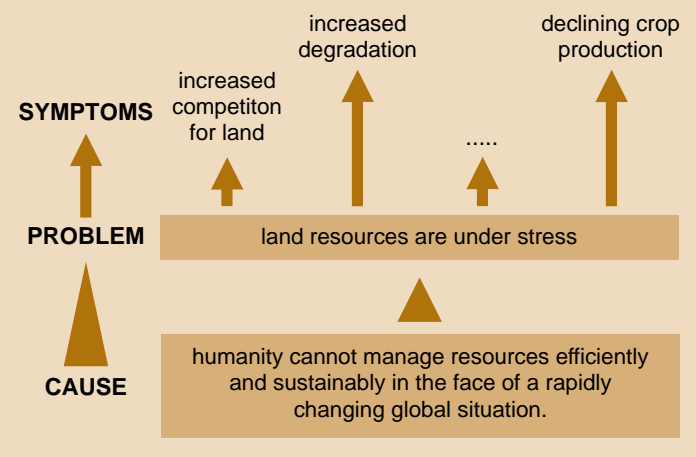
### The Cause of the Problem

Many of the above factors are interrelated. Figure 3 presents the relationship between cause, problem and symptoms.

The problem of land resources under stress has physical, social and political causes. At the national level, short-term political gains have often been made at the expense of long-term environmental damage. Decision-makers often face inordinately difficult decisions when trying to increase production to alleviate poverty and feed people and at the same time conserve resources to stave off environmental degradation. Often the decision-makers forfeit long-term sustainability for immediate needs. This also holds true for the subsistence level land users who have little choice but to seek immediate benefits for survival. Technology alone cannot be viewed as an answer. Frequently the technologies to manage such areas in a sustainable way are simply not available, or the land users do not have access to them due to lack of information or resources. However, a key factor is the role of human institutions and land use policies that must be adapted to face the challenge posed by these rapidly changing conditions.

FIGURE 3

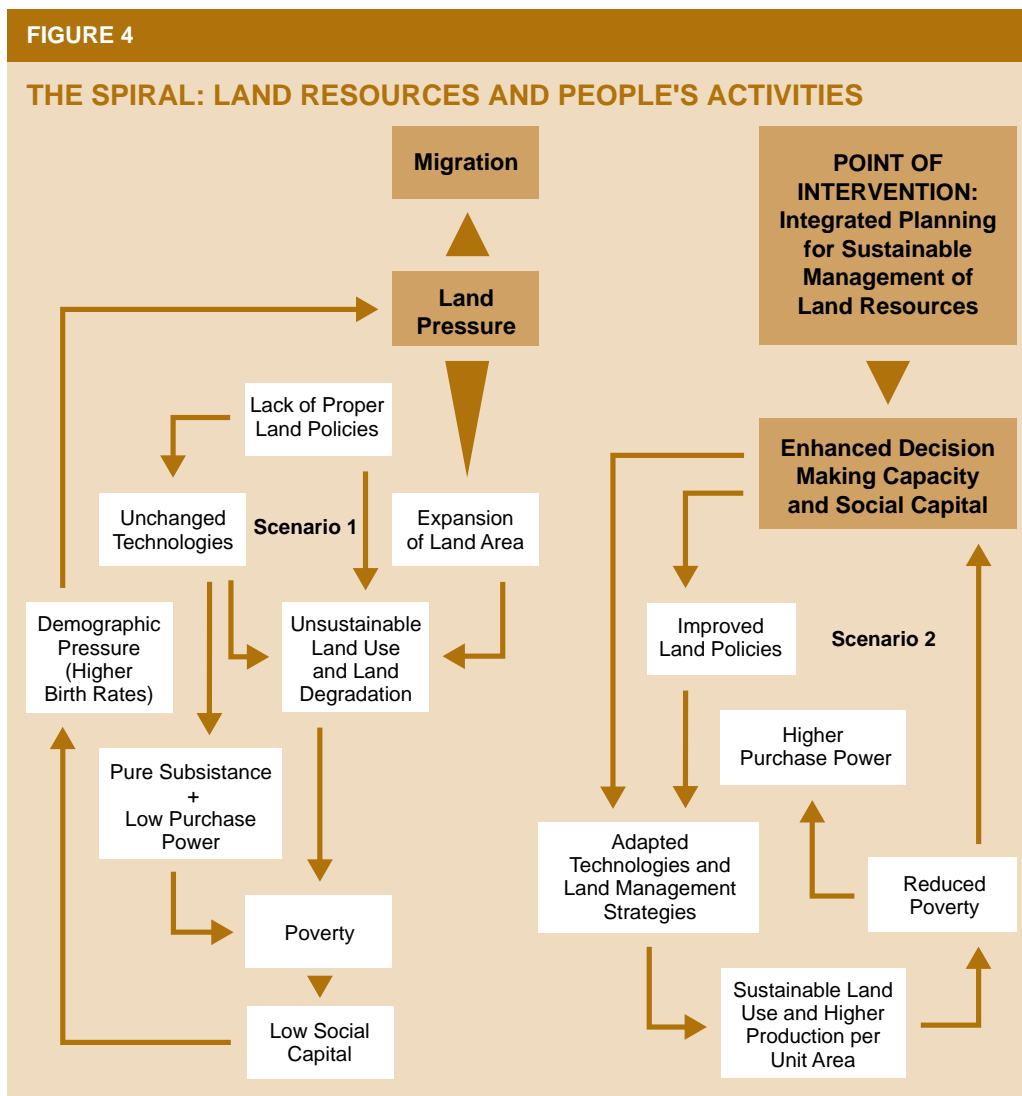
### CAUSE - PROBLEM - SYMPTOM RELATIONSHIP





## The Point of Intervention

The essential challenge is to address the pressure on land in a way which does not cause further deterioration in land resources or impair their essential functions. As the foregoing statistics indicate, this will be an extremely difficult task. The immediate priority is to break out of the downward spiral, in which resource-limited farmers are obliged, by shortage of land resources, to degrade these limited resources even further by inadequate land husbandry in order to satisfy immediate subsistence needs. This scenario is shown in **Figure 4**.



Given that land resources management has a production and a conservation component, an obvious task is to ensure that the rate of production increases in a sustainable way. Perhaps a less obvious, but equally important, aspect of land resources management is the ability of land users and other decision-makers to take informed decisions regarding the land resources. As long as rural populations remain significant and vulnerable, there is little opportunity to enhance social capital (education, institutional and social networks) which would lead to enhanced decision making.

As shown in the simplified second scenario in **Figure 4**, a key to breaking the present downward spiral is to improve land users' capacity to take informed decisions. One aspect of this is to improve access to information and technology and to enhance the capacity to use them. In one sense this is the mechanism used in conjunction with the green revolution, which has been extremely successful (especially in Asian countries) in

improving yields and even building surpluses. However, the green revolution technologies have not proven to be sustainable, neither in yield production nor conservation of the natural resources.

Information and technology and the capacity to use them are essential to informed and more conscious decision making. However, if individuals or institutions are not empowered to make decisions then sustainable land management cannot be the outcome. Establishing land-use policies that enable informed decisions to be made about land resources is therefore the critical factor because to be enabling policies must be built on stakeholder or land user involvement.

There is no universal technological fix for the challenge of meeting human needs while protecting the terrestrial biosphere. Land varies greatly in its productive potential, constraints and responses to management, even within areas as small as an individual farm. The specific goals of groups of land users also differ, as well as the technology and physical and financial resources at their disposal. The wide variations in land resources and socio-economic conditions necessitate an integrated planning approach applied with great flexibility to address particular questions and propose specific solutions.

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## SUMMARY

This chapter describes the evolution towards an integrated planning approach. The pitfalls associated with previous planning approaches are analysed and the need for an integrated approach is deduced.

## 2 - The Need for an Integrated Approach

### Planning and Management of Land Resources in the Rural Development Context

Planning and management of land resources are integral parts of any rural development programme as well as many development programmes with both rural and urban components. Land use does not consider agricultural uses only but also encompasses natural areas, forests, watercourses and urban areas among others. Land-use planning has often had negative connotations because it was traditionally

associated with top-down procedures. In centrally-planned economies, land users have been ordered how to use their land based on a scientific assessment of its capability or suitability.

In recent years, definitions have moved towards using planning in a more advisory capacity, as a mechanism to support the decisions of the land user in attaining his or her objectives. Planning has also come to be viewed as one step in land resources management.

The FAO Guidelines for Land-use Planning (FAO, 1993) defined **land-use planning** as:

Land-use planning is 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-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.

Agenda 21, the result of the UN Conference for Environment and Development in Rio de Janeiro. Biological diversity, and the post-Rio conventions such as those dealing with biodiversity and desertification, have called for a more integrated approach to planning and management of land resources. They emphasize the need for active involvement and participation of stakeholders, particularly at the local level, in decisions on land use and management. In this context, land-use planning is regarded as a mechanism for decision support rather than a technical evaluation procedure, and is closer in concept to the definition in **Box 1**.

## KEYWORDS

- ✓ land-use planning and rural development
- ✓ constraints in previous approaches
- ✓ need for an integrated planning approach

#### BOX 1: Bhutanese Definition of Land-use Planning

The means of supporting farmers and rural communities who make their living from utilization of natural resources, so that their standard of living increases sustainably, i.e. without creating conflicts between the different types of land uses and land users and without diminishing the resource base in the future.

**Source:** LUP News, Ministry of Agriculture, Thimphu, April 1993, Vol. 1, No. 1.



In line with the foregoing, planning of land resources is now defined as follows:

### DEFINITIONS

**Land-use (or Land Resources) Planning** is a systematic and iterative procedure carried out in order to create an enabling environment for sustainable development of land resources which meets people's needs and demands. It assesses the physical, socio-economic, institutional and legal potentials and constraints with respect to an optimal and sustainable use of land resources, and empowers people to make decisions about how to allocate those resources.

### Constraints Associated with Previous Approaches

People in rural areas are continually faced with the difficulty in practice of achieving the multiple goals of "increased production", "raised living standards", "resource conservation" and "food self-sufficiency". Worldwide many development projects related to land resources have failed. Many more are only partially successful. Sustained benefits of such projects are often relatively small in relation to inputs by government or donors.

Development programmes are essentially a response to perceived problems or symptoms of problems and development opportunities. Although it is recognized that much can be learned from successful projects, some of the most common lessons learned from less successful development programmes are given in **Box 2**.

#### BOX 2: Some Reasons for Less than Successful Outcomes of Previous Rural Development Programmes

- ✓ lack of clear and consistent policy for sustainable land use
- ✓ failure to address the legitimate goals of land users and to involve them in the planning process
- ✓ failure to address all issues relevant to the problem
- ✓ failure to integrate all the necessary disciplines and activities
- ✓ undue emphasis on technical solutions
- ✓ institutional problems
- ✓ inadequate or ineffective regulation of land use
- ✓ lack of well targeted incentives, or inappropriate incentives
- ✓ lack of funds (good planning is expensive)
- ✓ lack of access to information, tools or training to make informed decisions

The ultimate objective of assistance in planning and management of land resources must be to strengthen relevant local institutions to the point where they are fully capable of addressing and solving the problems of the country. However, at present, most technical assistance in the area of land-use planning or land management, and most project documents, place emphasis on technical solutions. External experts may assume a dominant role in problem identification and in programme implementation. If local staff are not trained in the application of the technical methods, and not fully involved in their development, there is no sense of intellectual ownership and systems are not used or maintained after the end of the project.

Apart from these drawbacks, such projects rarely address the larger institutional issues at government and grass-roots level. Unless these are successfully resolved no land-use methodology, even if perfect in theory, can ever be successfully put into practice.

### Needed: An Improved Approach to Integrated Planning for Sustainable Management of Land Resources

Conventional land-use planning has frequently failed to produce a substantial improvement in land management, or to satisfy the priority objectives of the land users. As a result, rural development programmes have had mixed success in meeting production and conservation aims. In calling for an integrated approach to the planning and management of land resources, Chapter 10 of Agenda 21 identifies the following specific needs:

- ✓ development of **policies** which will result in the best use and sustainable management of land
- ✓ improvement and strengthening of **planning, management, monitoring and evaluation** systems
- ✓ strengthening of **institutions and coordinating mechanisms**
- ✓ creation of **mechanisms to facilitate the active involvement and participation of communities and people at local level**

An improved approach is necessary to meet these needs. It must take into account the problems listed in Box 2, and must ensure:

- ✓ that programmes are **holistic and comprehensive**, so that **all** factors which are significant in relation to land resources development and environmental conservation are addressed and included. Among other things this implies that the planning process must include and consider all competing needs for land, and also that in selecting the “best” use for a given area of land in terms of needs and objectives, **all** possible land-use options must be considered, not only agricultural crops.
- ✓ that all activities and inputs are **integrated** and coordinated with each other. There must be built-in mechanisms to combine the efforts and inputs of all disciplines and groups.
- ✓ that all actions are based on a **clear understanding of** the natural and legitimate **objectives** and needs of individual land users, and how these affect the production process and the exploitation of land resources on the one hand, and on the other hand an appreciation of the necessary framework of incentives, sanctions and negotiations which needs to be developed to ensure sustainability, and the long-term needs of all individuals, considered as members of local and global communities.
- ✓ that all actions and programmes are **based on consensus** freely entered into, and a partnership between governments and other institutions, and people or stakeholders. This requires that the people should be fully informed and consulted, and that mechanisms are established to ensure this.
- ✓ that the **institutional structures** needed to develop, debate and carry out agreed proposals are put in place at all levels.



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**SUMMARY**

This chapter provides an overview of the framework and key factors associated with carrying out the integrated approach to planning for sustainable management of land resources.

### 3 - The Key Factors Necessary for Implementing an Integrated Approach

#### The Framework for an Integrated Approach

Planning of land use is an essential step along the road to sustainable resource use. Planning of land use should not be a top-down procedure, but a decision support mechanism, intended to guide the land user or decision-maker through the process of choosing the best land-use option, or range of options, consistent with his or her objectives. Often, the

process of planning which promotes interaction among land users, decision-makers and professional and technical staff, is more important than the documentation of the plan which results from this exercise.

The improved approach to planning for sustainable management of land resources that is described in the present chapter is both **integrated and interactive**.

**KEYWORDS**

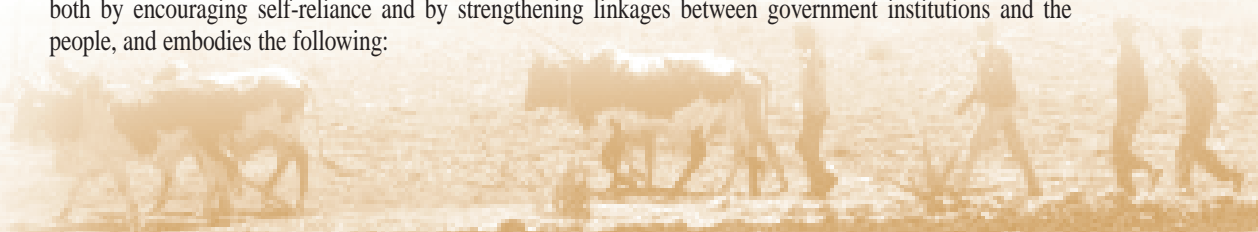
- ✓ framework and key factors
- ✓ objectives
- ✓ stakeholders
- ✓ enabling environment
- ✓ effective institutions
- ✓ negotiation platform
- ✓ knowledge base
- ✓ planning procedure

Integrated as	Interactive as
<ul style="list-style-type: none"> <li>✓ it combines elements of both the bottom-up approach, based on grass-roots participation, and traditionally top-down aspects of land resource assessment and evaluation of options</li> <li>✓ it takes into account the complex biophysical and socio-economic variables which determine the land-use system</li> <li>✓ it considers legal and institutional aspects which facilitate the implementation of the plan</li> </ul>	<ul style="list-style-type: none"> <li>✓ it is a negotiation process, in which land users interact among themselves and with specialists</li> <li>✓ different levels (national, sub-national and local level) interact in the planning process</li> </ul>

Essentially, the approach embodies an interactive partnership, between government and civil society, to address their common concerns to manage land resources sustainably for their mutual benefit. Commitment is therefore required on the part of both the government and the people. This is consistent with emerging principles of good governance now viewed as a prerequisite to sustainable development.

Integrated planning for sustainable management of land resources (IPSMLR) is always demand-driven, although the demand may result from a problem or development opportunity either perceived at village or sub-national level, or a concern of the national government. This marks a welcome departure from previous top-down planning procedures in which plans were often prepared as routine instruments of development.

Figure 5 illustrates the exchanges and flows of knowledge, links and actions in interactive development. This four-level structure strives towards an optimization of the bottom-up and top-down approaches to development, both by encouraging self-reliance and by strengthening linkages between government institutions and the people, and embodies the following:



- ✓ A strong and dynamic action programme driven by stakeholders at the grass-roots level, which can act as an engine for development and conservation and effectively respond to many local problems and resolve them more effectively and at a lower cost than central government.
- ✓ An efficient mechanism to inform government of felt needs and priorities, to drive the allocation of resources, and to influence the evolution of institutional structures and programmes towards more efficient and task-oriented forms.

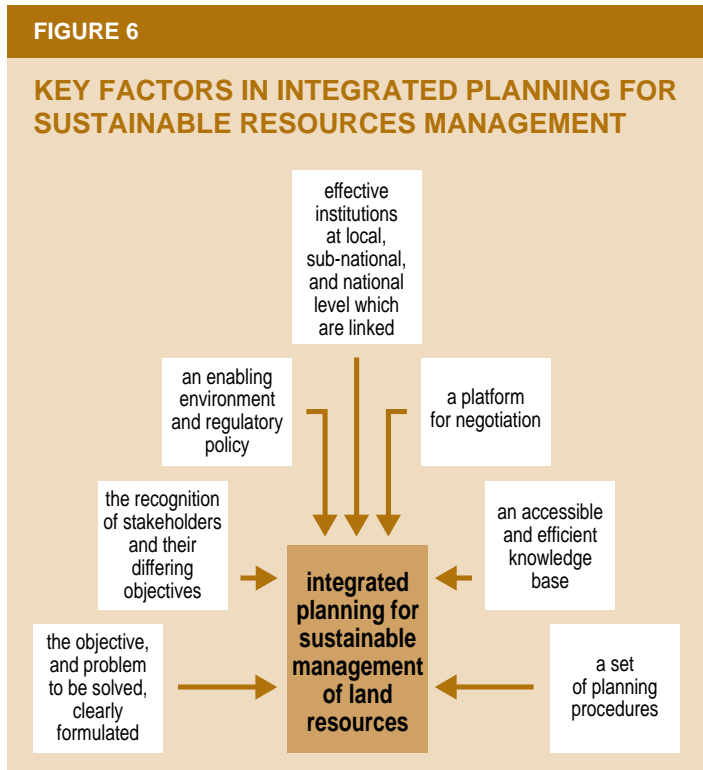
At the village or community level, local resource management groups elucidate their needs and objectives through negotiation. Needs and information are transmitted to the sub-national level and eventually to the national level, which responds with information and appropriate technical assistance. It is also becoming clear that the national and sub-national levels need information that only the local level can provide. The flows and interactions are no longer unidirectional.

FIGURE 5

INTERACTIVE RURAL DEVELOPMENT			
Linkage	POLICIES	INSTITUTIONS	INFORMATION
Level			
INTERNATIONAL	Conventions (Agenda 21, CCD,CBD..)	International Taskforces (e.g. FAO)	Perspective Studies (Agriculture towards 2010)
↕	↕	↕	↕
NATIONAL	Land-use Policy	National Task Force (e.g. Board, Committee) • Decentralization • Awareness raising • Strengthening of institutions	Responds to National Demands (economy, politics, environment, etc.) Decision Making
↕	↕	↕	↕
MESO (e.g. District)	District Land-use Plan / Policy	District Committes • Ownership • Responsibility • Stewardship	Demands, Technical Knowledge and Assistance, Decision Making
↕	↕	↕	↕
COMMUNITY	Village Land-use Plan	Land Resource Management Group	Indigenous Knowledge, Decision Making Demands, Needs



The **seven key factors** associated with successful integrated planning for sustainable management of land resources are depicted in **Figure 6**.



These are briefly described in the following sections. Detailed information regarding the key factors can be found in Chapter 4.

### A Clearly Formulated Objective

In order to plan for sustainable management of land resources, a clearly formulated objective is necessary. The objective may be based on a common vision for the land resources and their associated society or on attempts to solve an immediate problem. In either case, once the objective is clear, details of the plan elements will begin to fall into place. Objectives are typically scale-dependent and will be different at the national, sub-national, and local level, but they should still be complementary and not contradictory. Stakeholders within a given level will be responsible for formulating the objective to meet their needs.

### Recognition of Stakeholders and Their Differing Objectives

#### DEFINITIONS

A **stakeholder** is anyone or any institution who has interests in, or is affected by, an issue or activity or transaction, and therefore has a natural right to participate in decisions relating to it.

There may be more than one stakeholder, or stakeholder group, claiming an interest in the land use on a particular area of land.

As examples, a farmer is a stakeholder in relation to the distribution or management of irrigation water from a common source, or as regards decisions on grazing rights on communal land. The term can also be applied to groups, as when several groups have an interest in, or are affected by, the exploitation of the water from a reservoir or products extracted from a forest. Stakeholders include those individuals or groups, such as women or indigenous communities, who have genuine and legitimate claims on use, but whose opinion may not be valued in current negotiations for cultural or religious reasons. Groups resident outside the area, such as non-governmental organizations (NGOs) and research institutions, can also be stakeholders. Also the government of a country may have ministries with the position of stakeholders. The concept can be extended to include unborn generations who have a future interest in the resource.

The extent of a stakeholder's interest in an issue is governed by the size of the "stake" which the stakeholder has in it; in other words the extent to which the stakeholder's feeling of ownership will be affected by any decision. Those most directly affected are the people whose livelihoods depend directly on the resource in question. Then there are those whose lives or whose health may be affected through use of the resource by others, and finally those who, for various reasons, have a strong interest in the subject or area (**Box 3**).

Differing stakeholders may have multiple objectives, but conflict arises most commonly between those with objectives related to production and those whose objectives are mainly concerned with conservation. Reconciling the two groups is a key to sustainable land use.

The importance of involving all stakeholders has been recognized in theory and practice for many years and stems from the rural development industry (Chambers, 1993). Through the years, the term participation, as associated with stakeholders, has come to have very different meanings to different people and groups. The multiple meanings are shown in **Box 4**.

The integrated planning and management of land resources approach recognizes that different degrees of participation are dependent on context; however, participation should be interactive to be successful.

### An Enabling Environment and Regulatory Policy

An enabling environment is the shorthand term for conditions in which decisions can be made, and proposed objectives achieved, at all levels of action. Village development objectives should be formulated in a village land-use plan or village development plan. Such plans should be supported by the objectives of the district land-use plan. Then the government land-use policy establishes the general framework for land use in the country and the government takes decisions and makes regulations accordingly. Local and sub-national land-use plans and policies (whether by public or private bodies) should always be developed in conjunction with the national land-use policy to ensure that they will be favourably treated by government.

### Land-use Policy

To achieve sustainable development, governments should have a national policy on land use.

#### BOX 3: Characteristics of Stakeholders

- ✓ Those having, needing or seeking control of or access to a resource.
- ✓ Those who are affected by the use of resources by others.
- ✓ Those wishing to influence the decisions of others on the use of resources, for scientific, ethical or conservationist reasons

**Source:** "Negotiating a Sustainable Future for Land".  
FAO/UNEP, 1997.

#### BOX 4: Typologies of Participation

**Passive Participation** – people are told what is going to happen or what has already happened.

**Participation by Information Giving** – people participate by answering the questions of external agents.

**Participation by Consultation** – people participate by being consulted, and external agents listen to views.

**Participation for Material Incentives** – people participate by providing resources in return for material incentives.

**Functional Participation** – people participate by forming groups to meet predetermined objectives related to a project but are still dependent on external initiators.

**Interactive Participation** – people participate in joint analysis, which leads to action plans and formation of new local institutions or strengthening existing ones.

**Self-mobilization** – people participate by taking initiatives to change systems independent of external influences.

**Source:** "A Trainers Guide for Participatory Learning and Action",  
IIED, 1995

#### DEFINITIONS

A **Land-use Policy** is essentially an expression of the government's perception of the direction to be taken on major issues related to land use and the proposed allocation of the national land resources over a fixed period of time. It has a production and a conservation component.

A sound national land-use policy is effectively part of the enabling environment for IPSMLR and should cover all uses of land. To achieve the policy objective of sustainable production and conservation of natural resources, governments should pursue strategies which actively promote forms of land use which are both attractive to the people and sustainable in terms of their impacts on land resources. By developing the national land-use policies through a participatory, integrated and iterative process, there is a much greater likelihood of achieving this. Additionally, strategies may involve the use of incentives, regulations or, more commonly, a combination of these. Incentives may be social, economic or related to structure or knowledge. The formulation process of a land-use policy should be based on a “top-bottom-interaction” which leads to the formulation of policy objectives according to the demand of the people (**Box 5**).

Introduction of an integrated and interactive approach to land-use planning may provide a convenient opportunity for government to review its existing policies and strategies for sustainable development and natural resource conservation.

Striking the right balance between incentives and regulation is essential if sustainable land management is to be achieved. It is important that incentives and regulations are complementary, rather than antagonistic in their effects. Policy contradictions, expressed by antagonistic incentives and regulations, are not uncommon when aims of conservation and production are being addressed. Examples are subsidies allocated for land clearing, commonly leading to accelerated soil erosion, not matched by incentives for adoption of sustainable cropping practices on cleared land, although legislation exists requiring land users to protect land from erosion. It is important to ensure that individual incentives are mutually complementary and there have been some successful cases in which society as a whole bears the cost of providing incentives for land users to conserve natural resources.

### Regulation of Land Use and Land Tenure

Perhaps the most effective incentive to production and conservation is the right of secure tenure to land and other natural resources.

#### DEFINITIONS

**Land tenure** is a way of regulating rights, access and control of land for the mutual benefit of the land user and the government.

#### BOX 6: The Eritrean Land Proclamation

The Land Proclamation of 1994 establishes the future basis for land ownership and right of usufruct in Eritrea. Under the Proclamation, land ownership is vested solely in the State, which allocates rights of usufruct under the authority of the Land Commission. Every Eritrean citizen has a right to a residential plot in his or her village of origin. Village residents, who are economically dependent on agriculture, also have the right to an agricultural plot. Land is allocated in relation to these rights on a lifetime usufructuary basis, and the allocation is non-discriminatory with respect to gender, marital status, religion or origin.

#### BOX 5: National Goal of Land-use Policy

The utilization of a sustainable basis of the land resources of Sri Lanka in order to:

- ✓ meet the demands of the country and its people for goods, services and recreation
- ✓ maintain a high quality of life without adversely affecting the quality of the land resources
- ✓ ensure that similar opportunities are not denied to future generations

**Source:** “Planning the sustainable management of land resources: the Sri Lanka example”. FAO, 1999

Rights of usufruct and, where applicable, rights of ownership may be defined by an umbrella law, or Land Code, which is later followed by more detailed regulations dealing with different types of usufruct or different aspects of its implementation. Any land-use policy should be linked to this umbrella law.

An example is the 1994 Land Proclamation of the State of Eritrea (**Box 6**), which was followed in 1997 by regulations on the procedures for land allocation as well as on the registration of allocated land rights. Security of tenure is a major concern of the land user in deciding whether or not



to invest in measures to promote conservation or sustainable production on a long-term basis. Land rights must be robust, allowing the user effective control over the resource, and the right to exclude others who might adversely affect its management. They must also be of sufficient duration to enable the realization of any benefits accrued as a result of the investment. The land user must also have confidence in the legal provisions and enforcement mechanisms to guarantee his or her right to the resource. None of these provisions requires actual land ownership, which is vested in the state in many countries, but it does imply a reasonably long-term control on a leasehold or similar basis.

## Effective Institutions

One of the principle strategies of IPSMLR is to devolve decision making to the lowest possible level that is consistent with the ability for implementation. In this approach, land resource management groups (LRMGs),

which either already exist or are newly established, take responsibility for decisions on land use and management at the appropriate level in the political hierarchy. This strategy has the dual advantages of mobilizing resources and knowledge at the grass-roots level by promoting participation of the people concerned and of reducing the burden on the government.

The framework within which the LRMG operates is shown in **Figure 7**. At grass-roots level the group itself would collect the necessary information for decision making and agree on its own rules and management plan. At the same time, the LRMG would be able to pass information and requests upwards, either to the appropriate institution in a district or similar administrative planning unit, or to the next higher institution. A LRMG may require technical information, legal advice or support on conflict resolution that is only available at a higher level of government.

For LRMGs to be fully effective, they should also be legal entities with a recognized mandate. Typical responsibilities would include formulation of a land-use plan covering the lands under the jurisdiction of the village, and the monitoring of any changes in land use or management resulting from the plan.

In the right environment, many groups may already exist, or may form spontaneously in response to local needs. It should be possible to build on or adapt existing local institutions. In other cases the initiative may come from government. 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.

FIGURE 7

### INSTITUTIONAL FRAMEWORK OF LOCAL MANAGEMENT GROUPS

#### INSTITUTIONAL FRAMEWORK

##### Key: Decentralization

- ✓ empowerment
- ✓ authority
- ✓ jurisdiction
- ✓ responsibilities (geographical area and subject matter)

NATIONAL INSTITUTION DEALING WITH LAND USE  
(Board, Committee, etc.)



SUB-NATIONAL INSTITUTION DEALING WITH LAND USE  
(District Committee, etc.)

support, information, technology transfer ↓

↑ information on needs, constraints and local factors

#### LOCAL LAND RESOURCES MANAGEMENT GROUP

- ✓ information on local resources, needs, current land use
- ✓ community management plans and agreed rules for land use
- ✓ accepted discussion, negotiation and decision forum
- ✓ linkage to sub-national institution dealing with land use
- ✓ representative of local level
- ✓ management of group revolving fund for loans, maintenance or repair

### BOX 7: Civic Action Groups: Armenia

Through the Caucasus Emergency Humanitarian Programme, the NGO Save the Children (USA), has established Civic Action Groups (CAGs) to promote democratization and self-reliance in communities which had previously been governed under a top-down centrally planned system. Communities are requested to form CAGs of 9-12 elected individuals, who will initially supervise a micro-project funded by Save the Children (with community contribution averaging 20 percent), but who are then expected to become dynamic agents of change in the long term. In two years of programme implementation, seven CAGs have registered as local NGOs and a further 12 have organized as cooperative or collective enterprises.

**Source:** SC Community Development Program in Armenia. Save the Children, Yerevan, 1st October 1997.

The level of power, resources and necessary expertise needed should be commensurate with the size and importance of the area and population. The necessary resources and expertise are usually provided partly by the community and partly by the government on an *ad hoc* basis. In some areas, NGOs may play an important role in mobilizing groups and supporting their activities (Box 7).

### Platform For Negotiation

The essence of negotiation among stakeholders is that all the people affected are fairly represented in the discussions. This implies firstly that each of them has been identified, secondly that arrangements are made for them to participate effectively, and thirdly that they are all fully informed on the issues at stake. To ensure that this happens it is necessary for the group to establish and adhere to agreed rules.

- ✓ The institutions proposed at local, sub-national and national level (the LRMG, the District (or Province) Land-use Planning Group, and the National Land-use Committee) are effectively platforms for negotiation as they represent the stakeholders.
- ✓ Consistent with the policy of devolving responsibility to the lowest level, the LRMG will be the key institution for negotiation and settlement of disputes at the local level.
- ✓ When conflicting objectives of different stakeholders or land disputes cannot be resolved at the lowest level, they can be referred to the sub-national body. The courts are a last resort if negotiation fails to resolve a dispute.

Clearly 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 supports it, is legitimized by them collectively or by law or custom. This implies that management structures may either be established by the stakeholders themselves, or facilitated by the government if it is not a stakeholder.

### Efficient and Accessible Knowledge Base

Effective negotiation and decision making on land use cannot take place without a knowledge base that is useful and accessible to all stakeholders. The knowledge base should have the information needed to meet users' needs and demands in order to reach their goal. Equally important is that the information should be accessible and users have the capability to use it.

The following types of information are needed by decision-makers:

- ✓ Information on the resource. For any form of land-use planning, precise information is needed on each area, including climatic factors, topography, soil, present land use, and many other aspects.
- ✓ Information on improved technology of resource management and the opportunities it provides for increased productivity and for conservation.
- ✓ Information on the current living conditions (especially problems), the needs and objectives of all stakeholder groups and of the community.
- ✓ Information on the institutional and legal framework, including rights of tenure to land, trees and wildlife. Stakeholders need to know their rights, what powers of decision they have, and where they can obtain further information and assistance.
- ✓ Information on economic conditions such as prices and interest rates.

Information is not merely handed down to the land users from higher levels of government. In most cases, local and traditional knowledge forms an important component of the types of information listed in most of the categories above. Making this information available to a wider group of stakeholders than the land users is not always easy and professional planners may have difficulties in structuring informal knowledge for analysis and planning. Techniques of rapid rural appraisal and participatory rural appraisal (Box 10, chapter 4) provide means of mobilizing an enormous amount of information including indigenous knowledge.

### DEFINITIONS

**Rapid Rural Appraisal (RRA)** can be defined as a systematic, semi-structured activity conducted on-site by a multidisciplinary team with the aim of quickly and efficiently acquiring new information and hypotheses about rural life and rural resources.

**Participatory Rural Appraisal (PRA)** places emphasis on empowering local people to assume an active role in analysing problems and drawing up plans, with outsiders acting mainly as facilitators.

**Source:** Schonhuth and Kievelitz, 1993

Local groups may be able to collect and analyse necessary information and make decisions without outside assistance. When there is a need for specific technical or other information which is not locally available, it is necessary to obtain expert advice. If such advice is only infrequently required it may be obtained informally, from an external specialist, or from a government agency or NGO. But in the case of some groups, for example at district planning level and above, there may be a need for specialist support to be available on a continuous basis to supply the required information on land resources and needs, and to help formulate options for consideration by the stakeholders. The function of such a specialist group or secretariat is to provide the necessary support for stakeholder negotiation. It is not to formulate decisions for stakeholders to accept. There needs to be a very clear distinction between the provision of information and advice, and the making of decisions.

### Land-use Planning Procedures

Adoption of an integrated approach to planning for sustainable management of land resources calls for a critical look at planning procedures. Clearly, some of the technical methods used in conventional land-use planning remain valid components (e.g. land evaluation), but certain aspects, particularly those involving people's participation and the analysis of stakeholder objectives, require significant expansion and development. Land-use planning procedures may differ substantially when applied at the village, district and national level. Some elements have more importance at one level than at other levels.

One important component of the integrated approach is monitoring and evaluation (M&E) of the land-use plan. Although often thought of as something one does after the plan is being implemented, M&E should be an integral part of the planning process. Participatory M&E methods have proved to be very useful in the development arena (World Bank, FAO, Heifer Project International). Participatory M&E encourages stakeholders to design and implement a monitoring and evaluation plan for the work they are doing. As part of the land-use planning process, stakeholders identify the indicators or feedback mechanisms which will inform them if the land-use plan is taking them toward their original objectives. They should also monitor the indicators of the success of their plan.





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## SUMMARY

The objective of this chapter is to present the methods used in the IPSMLR approach. The planning sequence is proposed and described in detail. The factors mentioned in Chapter 3 are linked logically in a step-by-step procedure. Each key factor is elaborated in a separate section and practical advice is given.

# 4 - The Planning Method

## The Decision Sequence

Land-use planning essentially consists of a logical decision making process in which the resources are evaluated in the context of objectives, and potential options are identified which can be implemented by the land user. Land-use planning is based on the premise that land resources vary and that the particular properties and characteristics of any land area set the limits of possible land-use options. A set of systematic technical procedures is needed to evaluate the resources and to guide the choice of those options which are sustainable and which satisfy the objectives of the land users. Markets, infrastructure and other external factors as well as personal preferences are also considered in reaching a final decision.

**Figure 8** illustrates an iterative and cyclical process with nine essential steps in IPSMLR. This method is independent of scale and level of detail, except that at the individual garden or farm level usually only one stakeholder is involved whereas at higher levels there are more stakeholders and they are more diverse.

The nature and detail of analysis and the methods used depend on the aims of the land-use plan and the resources available. In many circumstances a comprehensive plan is not produced in a single exercise but components, defined either by location or sector, are tackled individually according to their comparative urgency and the availability of resources. For example, if village grazing lands are severely degraded, some remedial actions could be put in place without a comprehensive land-use plan of the entire village land; subsequently, when resources become available another area of village land may be developed with small-scale irrigation. While such sectoral planning is not the ideal, it may present a way forward in circumstances where resources are limited or coordination is difficult. Developments in one sector should take account of past, ongoing and future developments in other sectors, and of possible interactions (crops-livestock, livestock-wildlife, etc.).



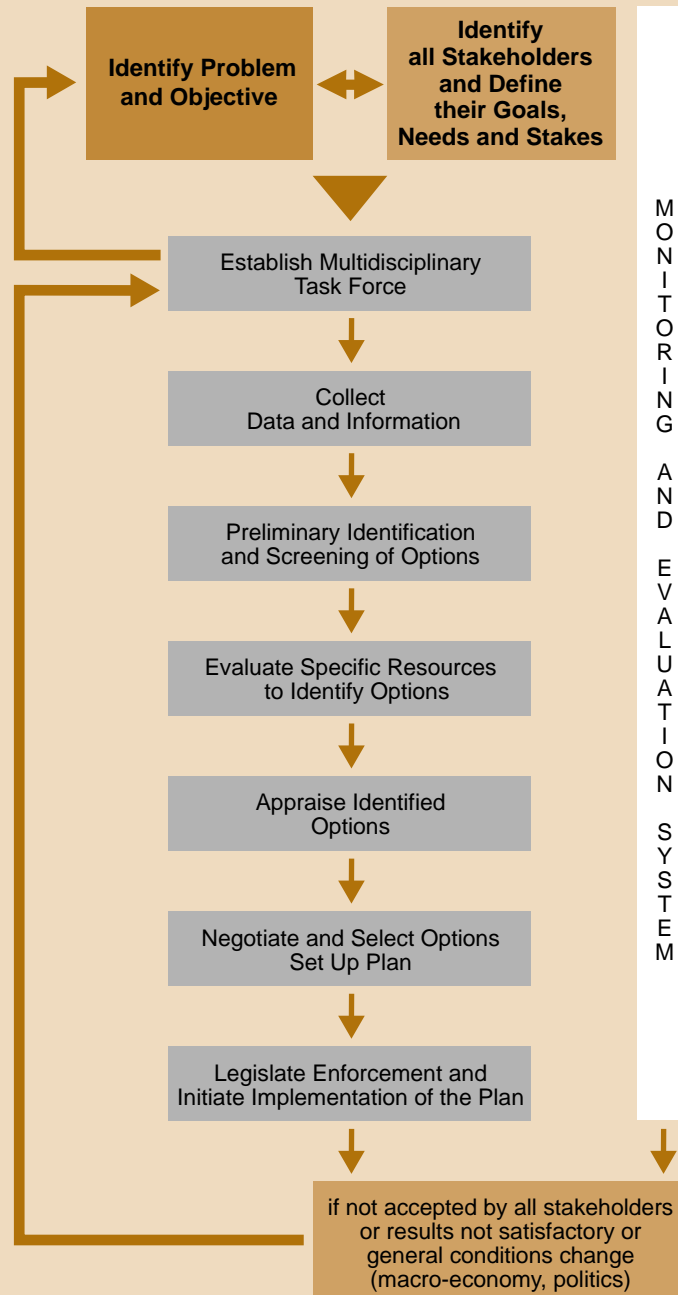
The sequence is iterative and needs constant adjustment as the different elements, especially financial or economic conditions, tend to be variable or even unstable. If the final plan or policy is not accepted by all stakeholders, or the first results of the plan are not satisfactory, the planning procedure must be reviewed to correct mistakes or insert missing elements. An accompanying monitoring and evaluation system will facilitate the success of this process.

## KEYWORDS

- ✓ planning sequence
- ✓ problem and stakeholder identification
- ✓ data and information
- ✓ screening of options
- ✓ evaluating resources
- ✓ appraisal of options
- ✓ selection of option/negotiation
- ✓ plan set-up
- ✓ enforcement and implementation
- ✓ monitoring and evaluation

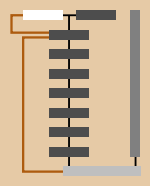
FIGURE 8

## THE PLANNING METHOD



There is a wide range of land-use planning methods which may be appropriate at different scales and levels of detail, and the comparative emphases may vary in different physical, socio-economic and political environments. Although IPSMLR stresses active stakeholder participation and the role of LRMGs in coordinating planning activities, technical assistance is normally needed to complete the plan. This does not imply foreign consultants. IPSMLR emphasizes self-reliance and the development of appropriate technical skills by national professional land-use planners and extension staff. At the national and sub-national level, such technical assistance would be provided by professional land-use planners, but at the village level it is anticipated that necessary technical assistance could be provided by specially trained extension staff, working for government, the private sector, or NGOs.

This chapter presents a range of tools for each step in the planning method outlined in **Figure 8**. The presentation is mainly targeted at professionals and technical practitioners in land-use planning as well as decision- and policy-makers. Examples of applications are described in boxes for clarity and ease of understanding.



## Problem Identification and Formulation of the Objective

For successful implementation, the plan requires that the objectives to be achieved should be clearly formulated. An objective may be proposed as a response to an identified problem which has to be solved, or to a felt need for change or further development in a society. The more clearly the objective is formulated, the better and more detailed the subsequent plan elements can be in terms of sub-objectives, outputs or activities.

The nature of the objective is level dependent. In a **national land-use policy** or a master plan, the long-term development objective is formulated for allocation of the natural resources of the whole country. This objective has a production and an environmental component. Typically it should not only reflect the country level needs but be based on the objectives of the actual land users.

At the sub-national level, a **district land-use plan** will have an objective, which aims at development in the district or other relevant area (e.g. a watershed). Its objective should conform to and serve the objectives in the overall land-use policy of the country. The planning timeframe should address long-term and short-term objectives. The plan will play a critical role as it creates the link between national objectives and community level objectives. For this link to be effective, participatory planning tools must be employed.

In a **community land-use plan**, people will formulate objectives relevant to their community. The objective should consider short-term and long-term aspects and be focused on sustainable development of the community and its land resources. Such plans will fit into and feed the district or watershed plans thereby creating mutual support. The plan formulation process, including formulation of the objective, has to emerge from the people with assistance as needed from government agencies, NGOs or private firms. One useful and successfully applied consultative method is participatory rural appraisal.

### BOX 8: Objectives of the Doon-Valley Watershed Management Project

#### Long-term Objectives:

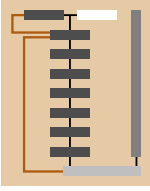
- Arrest and as far as possible reverse ongoing degradation of the Doon Valley eco-system.
- Improvement in living conditions of rural people.
- Positive involvement of rural people in managing the environment.

#### Immediate Objectives:

- Managing natural resources in a sustainable manner.
- Increased productivity from land and water.
- Strengthening community participation.
- Improved socio-economic conditions for disadvantaged groups, especially for women's activities

**Source:** Overall Workplan 1993 - 2001 for Doon Valley Integrated Watershed Management Project. Watershed Management Directorate. Dehradun 1993.





## Identifying Stakeholders and their Goals, Needs and Stakes

### Identifying Stakeholders

In simple land-use plans, the stakeholders may be limited to a farmer and his or her family, or to a small group of villagers with similar interests. More commonly, a much wider range of stakeholders is involved. Some of these stakeholders may not be readily apparent and it is important that they are identified so that their interests and objectives can be considered in the plan. **Box 9** describes three types of stakeholder.

Direct stakeholders may include farmers, pastoralists, harvesters of forest products, private enterprises or government agencies. None of these is necessarily a homogeneous group in terms of resources and objectives. It is often convenient to distinguish different groups of farmers according to wealth, size of landholding, or numbers of livestock (De Wit, 1993). Such groups have different resources, different degrees of commercial orientation, and would normally favour different land-use options in the plan. Women commonly constitute another stakeholder group which, again, is not homogeneous.

#### BOX 9: Types of Stakeholders

- Direct stakeholders,**  
who use the land targeted in the plan.
- Indirect stakeholders,**  
who are affected by the actions of the land users.
- Interest groups,**  
concerned with conservation or scientific use of land.

The responsibility for identifying the stakeholders lies with the institution coordinating the planning process. This would normally be a government agency at the national or sub-national level or the LRMG at the village level. Both are also to be considered as stakeholders. Having identified all stakeholder groups, it is the responsibility of the coordinating institution to ensure that each is adequately represented, and that a suitable forum is provided for discussion and negotiation.

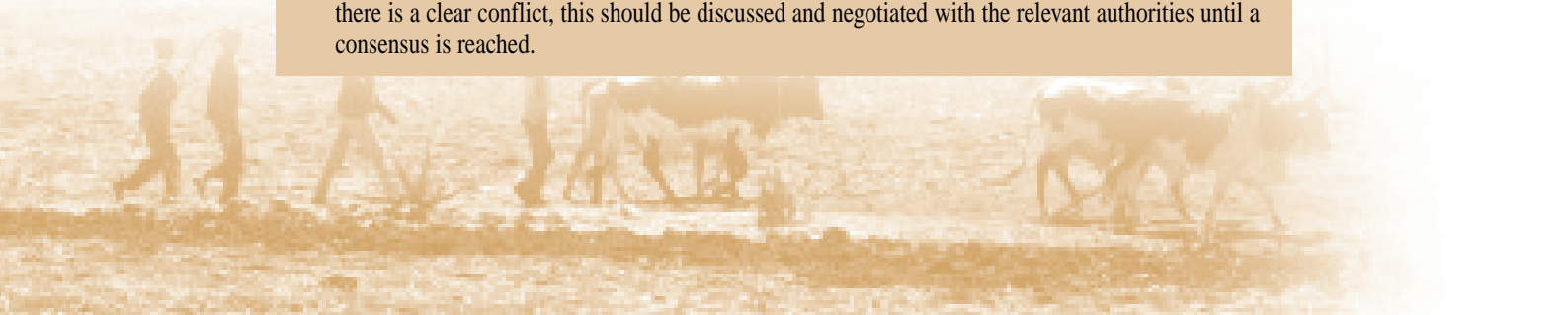
### Defining Goals, Needs and Stakes

The main purpose of land-use planning is to arrive at an improvement in present land use using a rational sequence of optimization and trade-offs among the different stakeholders. The objectives of the various groups or individuals are likely to vary and may be in conflict. It is therefore essential that all the various stakeholders are clearly identified and that their objectives are clearly defined.

**Table 1** gives a hypothetical example of the objectives of various stakeholders for a tract of land in a semi-arid part of Africa. Although this is a far from comprehensive list, it illustrates the complexity of interests in land which must be unravelled and analysed during land-use planning.

Clear specification of differing objectives provides the basis for defining and evaluating improved types of land use aimed at satisfying all of them as far as possible. Although the format of objectives and the level of detail to which they are specified may vary, the following two principles should be followed when drawing them up:

- ✓ **Participation of the stakeholders.** The objectives considered in land-use planning are those of the stakeholders, so it therefore follows that the stakeholders should formulate them. When there are different groups of stakeholders, care must be taken to ensure the active participation of them all.
- ✓ **Legal framework.** Objectives should be framed in the context of existing legislation, or at least within the bounds of possible new legislation which is within the scope of government policies. If there is a clear conflict, this should be discussed and negotiated with the relevant authorities until a consensus is reached.



**TABLE 1: An Example of Stakeholders and their Objectives**

Level	Stakeholder	Objective
National	Ministry of Agriculture Department of Wildlife National Conservation Strategy Secretariat	Generate income from commercial livestock development Conserve wildlife and provide opportunities for economic utilization Conserve soil and water resources and protect environment
Sub-national	District Council	Increase opportunities for ranching
Local	Richer farmer Poorer farmer Landless peasant Transhumant pastoralist Trader / entrepreneur	Maximize profits Meet family needs; spread risks Obtain employment; maintain access to wildlife and veldt products Maintenance of livestock herds Increase business opportunities

The coordinating institution is responsible for compiling the inventory of the goals and objectives of the stakeholder groups. In some cases, planners or other agencies may need to act as facilitators in elucidating the objectives of some stakeholder groups, perhaps by using PRA techniques (**Box 10**) such as focused group discussions, open meetings and transect walks.

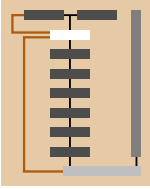
After the objectives of all the various stakeholders have been identified, any areas of obvious conflict and synergy should be flagged, as these will have to be addressed sooner or later in the planning process. For example, in **Table 1**, the objectives of the landless peasant may conflict with those of the District Council, which may restrict their access to wildlife and veldt products in order to develop commercial ranching. Conversely, the local trader may welcome an increase in production or profits by the richer farmer, as he or she may benefit from increased business opportunities.

#### **BOX 10: Common RRA/PRA Techniques**

- Learning by doing
- Semi-structured interview
- Chains of interviews on linked topics
- Participatory mapping and modelling
- Time-lines; listing events and approximate dates
- Seasonal diagrams
- Participatory diagramming
- Organizational analysis
- Key local indicators
- Case studies and stories
- Immediate report writing
- Seeking and interviewing key informants
- Group discussions and activities
- Using villagers to lead research
- Transect walks
- Local history and trend analysis
- Livelihood analysis
- Wealth ranking
- Ranking and scoring
- Probing questions
- Interchanging team members
- Brainstorming







## Establishment of Multidisciplinary Task Forces

### Basic Principles

To make a land-use policy or plan workable, there must be an institution which is concerned not only with the establishment of the plan but also with its implementation. An institution with this mandate is called a **multidisciplinary task force**. It is a group whose members are representatives of identified stakeholders and stakeholder groups. The task force must have an interest in the solution of the identified problem, and in reaching a certain development objective. The philosophy of the stakeholder representatives working as the taskforce is explained in chapter 3. The main tasks of this body are:

- ✓ coordination of relevant activities
- ✓ provision of information to the stakeholders
- ✓ awareness creation among the stakeholders
- ✓ representation of the stakeholders at higher level
- ✓ provision of a platform for negotiation (including conflict resolution) among the stakeholders
- ✓ decision taking and final plan
- ✓ monitoring and evaluation of the planning and implementation process

The installation of a task force encompasses both the technical expertise to deal with the various problems concerning land use and the power to take decisions and legal actions. The technical expertise may be provided by an associated advisory committee (national level) or the extension service (at local level).

When the task force is being formed, the following key questions should be considered:

- ✓ Do stakeholders have a stake in the group? Do they see it as carrying out a useful task? Do they support it? (For example, at local level the effective stake may be either economic, such as a crop produced for subsistence or sale, or non-economic, such as an endangered plant or animal species which may have religious significance or esoteric value to some members of the community.)
- ✓ Does the group “belong” to the stakeholders; are they really involved? Do they have real power to take decisions, or to have any real impact? Or is the group in reality a meeting periodically called together to hear about government proposals and programmes?
- ✓ Does the group represent all the stakeholders (including disadvantaged groups), and do all stakeholders have an opportunity to negotiate and partake in decision making? Is particular attention given to women or others who are 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 the information?
- ✓ Do the people recognize the benefits of membership? Do they have a direct or indirect incentive to join the group?

### Task Force at the Community Level: LOCAL RESOURCE MANAGEMENT GROUPS

Local people are usually those best informed of local conditions, resources and problems. However, individuals can rarely negotiate on equal terms with the organized structures of government and the private sector with which they interact. The formation of local resource management groups (LRMGs) empowers stakeholders and brings them together to coordinate and address mutually important land resource issues.



When there is local “ownership”, their creativity, initiative and enthusiasm will contribute greatly to the overall outcome. Ownership translates to responsibility on the part of stakeholders and in some cases voluntary contribution of resources.

A local management group:

- ✓ makes full use of local knowledge about production systems and the environment
- ✓ takes full account of local capabilities, attitudes and customs, thus ensuring that management plans are consistent with them, and feasible in the local context
- ✓ coordinates individual decisions within the group, thus foreseeing and forestalling resource use conflicts and the resource degradation they entail
- ✓ addresses and resolves existing resource use conflicts within the community that would otherwise lead to further resource degradation or unsustainable use patterns
- ✓ enables 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.)
- ✓ empowers people who are traditionally excluded from management structures and decision-making processes, thereby combating a mentality of dependency that perpetuates poverty and resource degradation
- ✓ creates 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
- ✓ manages its own revolving fund as a source for loans, maintenance work or repair
- ✓ puts people in touch with their land

It is important that the LRMG serves as a forum where the views of all interest groups in the community can be represented. It is also a government responsibility to ensure that the disenfranchised communities or sub-groups, such as indigenous communities or female-headed households, are adequately represented, and that the rights of the community as a whole are not violated. Effective LRMGs are seen as a means of empowering stakeholders at the grass-roots level, and of providing some traditionally disadvantaged groups in the community with a voice in managing the land resources of the village. Participation of women is seen as particularly important because their practical experience in managing the resources is often greater than that of the men. In addition, in areas characterized by a high out-migration rate of men, the workload is left to the women.

In the right environment such a group may already exist, or may form spontaneously in response to local needs. In other cases the initiative may come from government. Such groups should be established slowly and with care over a period of time, developing the model and the methods which best suit local conditions. In many cases it should be possible to build on or adapt existing local institutions. The level of power, resources and necessary expertise needed should be commensurate with the size and importance of the area and population. The necessary resources and expertise may be provided partly by the community, and partly by the government on an *ad hoc* basis. In some areas, local or national, or even international, NGOs may play an important role in mobilizing groups and supporting their activities. Special attention should be given to issues of gender, class and ethnicity.



For LRMGs to be fully effective, they should also be legal entities with a recognized mandate. Typical responsibilities would include formulation of a land-use plan covering the lands under the jurisdiction of the village and monitoring of any changes in land use or management resulting from the plan. The LRMG would also have the power to enact and enforce local by-laws in support of sustainable use and conservation of natural resources as shown in the example in **Box 27** in this chapter.

Experience has shown that the introduction of a revolving fund can serve as a direct incentive for the people to join the group. The collected money can be used for individual loans, or for purchase, maintenance and repair of facilities established and used in common by user groups.

### Task Force at Sub-national Level: LAND-USE PLANNING GROUPS

In most circumstances, there is a need for a body concerned with land resources management and land-use planning issues at a level intermediate between the village or community level and the national level. This land-use planning group would operate at the district or province level, and be multidisciplinary. The group could comprise professionals seconded from various government departments at the relevant administrative level, elected representatives from national and local level, NGOs and government organizations (GOs). This group provides a crucial link between strategic planning at national level and the more practical land-use planning carried out in the village (**Figure 5**, chapter 3).

More specifically, the task force would also possess the necessary technical expertise to carry out the following functions:

- ✓ implement district level land-use planning activities in collaboration with LRMGs, and develop and maintain district level infrastructure
- ✓ provide technical support to village-based LRMGs in subject matter areas in which it is competent
- ✓ coordinate village level land-use planning activities and assist in resolving any conflicts or incompatibilities in land use plans produced by different communities within the district or province
- ✓ report to national level on district level priorities, which can only be addressed at national level, such as required changes in the legal or policy framework

Such groups may function more effectively if they are accountable to the local electorate. Ideally, elected representatives are not re-elected if they do not respond to the needs and priorities of the local stakeholders.

**Box 11** gives an example of a meso-level group established to deal with land use and pollution problems in a river catchment in the Netherlands. In this case, as in many developed countries, NGOs representing a range of interests play a key role in the group.

#### BOX 11: A Meso-level Group: The Guelderlan Commission (The Netherlands)

The Guelderland Valley is an agricultural area where intensive methods of animal production have resulted in problems of soil and water pollution. At the same time the area has an attractive landscape and is bounded by two nature reserves. In 1990 the Valley Commission was set up with the objective of optimizing achievement of stakeholder objectives within an integrated land-use planning framework. The commission consists of 25 people: six civil servants from three government ministries, six politicians from the province and municipal levels, and various NGOs representing the interests of farmers and other concerned groups.

**Source:** adapted from Van den Berg, Van de Kundert and Smaling (1995) Integrated Approach to Planning and Management of Land; Operationalization of Chapter 10 of UNCED's Agenda 21. Issues paper for an International Workshop, Wageningen, 20 – 22 February 1995. Winand Staring Centre for Integrated Land, Soil and Water Research.

### Task Force at National Level: NATIONAL LAND-USE COMMITTEE

Government at national level can be regarded as analogous to a number of stakeholder groups, each of which is trying to solve one or more land related problems. These stakeholder groups are the ministries, departments, institutes, universities and other institutional bodies. Each has different mandates, goals, terms of reference, human and financial resources, and programmes.

What is required is an intersectoral negotiating forum for land related issues. This may be an official committee with a mandate to make overriding decisions on land resource issues. Sometimes, two groups may be appropriate, one of which comprises high-level decision-makers and the other technical specialists. In any case, the national body or bodies must be multidisciplinary and must represent all the relevant government ministries and departments concerned with land and natural resource issues. The group should also include representatives from district level and important NGOs within the country.

The functions of the group would be:

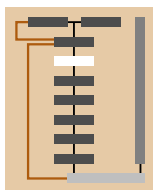
- ✓ coordination of land-use planning activities at national level and advising the government on issues related to land and to the use and management of land resources
- ✓ facilitation of exchange of information to the district and community level, and promotion of a holistic and integrated approach to land related issues
- ✓ development of information systems covering land resources, land use and effects on the environment
- ✓ prediction and tracking of land-use needs and priorities
- ✓ support of a coordinated approach to the formation, implementation and monitoring of development and management plans
- ✓ modification and updating of the land-use policy and related legislative or institutional matters
- ✓ final decision making in cases of conflicting objectives in land use

The group should, therefore, be a legally independent body charged with enforcement of laws and policies designed to conserve or properly manage national resources. Such bodies, which are often called boards, commissions or councils, must be established by law, with defined terms of reference and powers, including the power to bring court cases. An examples of such a body in Botswana is given in **Box 12**.

#### BOX 12: The Agricultural Resources Board, Botswana

Botswana's 1972 Agricultural Resources Conservation Act established this Board as a corporate body capable of suing and being sued. Its ten members are appointed by the President, meet at least four times a year, and are charged with exercising supervision over a wide range of natural resources. The Board advises the President on legislation, carries out investigations on its own motion or at the direction of the Minister, issues conservation orders and regulations and ensures their enforcement. Investigatory powers include the ability to issue summonses, which are served by the courts. Any person directly or indirectly affected by an order may appeal to the Minister within 30 days that such an order is inequitable, unreasonable or unduly harsh; the Minister's decision is not open to appeal. Owners or occupiers of land who fail to comply within a reasonable time shall be guilty of an offence; the court can impose fines or prison terms.

**Source:** Botswana Government Gazette. 5 January 1973. The Agricultural Resources Conservation Act. No. 39. 1972.



## Collecting Data and Information

### Basic Principles

The systematic evaluation and planning of land resources requires basic data and information about the land, the people and the organization of administration and service. This statement is true at any level of detail. However, the range and the amount of information, as well as its accuracy and precision, vary greatly according to the scale and objectives of the land-use plan. Five basic principles apply to the collection of information for land-use planning:

- ✓ Data and information collection should be objective-oriented and meet users' demands.
- ✓ Data and information collection should be geared to gaining an understanding of how the land/land-use ecosystem functions. What are the processes involved, how do land properties affect land use, and what is the impact of changes in land use on the land resource?
- ✓ Data and information collection should be efficient, focusing on minimum data sets, and flexible, to allow collection of any additional data which may be relevant.
- ✓ Physical data is needed in a spatial format, as maps or geo-referenced observations. The spatial variation in land resources is the main justification for land-use planning.
- ✓ Data and information collection should be part of a continuous process. Rather than being seen as a one-time exercise needed to produce a rigid land-use plan, the initial data set should be used to formulate a flexible, rolling land-use plan, which can later be modified in light of future information, or according to changing circumstances.

### Nature and Scale of Data and Information

As the approach to planning and management of land resources emphasizes the integration of various disciplines, the nature of data and information to be collected reflects it as well. In general, the types of data and information needed are listed in **Box 13**.

#### BOX 13: Nature of Data and Information

Land resources data:	climate landforms and soils land cover water resources
Land use related data:	present land use and characteristics selected physiological characteristics of crops (as determining ecological requirements) land utilization types (LUTs) and production systems (present and potential) ecological requirements of LUTs, production systems, land use
Social-economic data:	population (including age and gender distribution, stakeholder) living conditions (including workload, cultural aspects, traditions, etc) access to markets costs of production and product prices socio-economics of communities
Legal data and information:	relevant government policy documents, laws and regulations related to land present system of land allocation land tenure information traditional ownership and user rights
Institutional information:	involved institutions and their mandates, resources and infrastructure links between institutions support services (extension, etc.)
General data and information:	infrastructure, accessibility

Land-use planning is a form of spatial planning and therefore a base map of an appropriate scale is a requirement for a land-use plan. Most types of information are scale-related and scale-dependent. This is so for spatial distribution of biophysical characteristics on a map, and for factors such as population, production or infrastructure specific to certain mapping units. Scale is very significant with regard to the information base and the level at which land-use planning takes place. There should be a proper balance between scale and density of information for optimal application and usefulness.

The relationship between the level of land-use planning and the scale of spatial information is given in **Table 2**. The planning level normally relates to administrative boundaries. Because administrative boundaries differ from country to country, there is a natural overlap of map scales from national into regional. Large countries may have more than two intermediate levels, e.g. region - province - district, or state - district - sub-district.

In recent years, geographic information systems (GIS) have emerged as powerful tools in the management and analysis of a large amount of basic data in a spatial format. GIS can be used to generate, in a flexible, versatile and integrated manner, maps, tables and textual reports needed to support land-use planning. While greatly facilitating data analysis, access to GIS does not reduce the importance of accurate spatial information. Quality control on data input should be even more stringent than if manual methods are used.

**TABLE 2: Planning Levels and Recommended Map Scales**

Level	Administrative unit	Map scale
national	country	small: 1 : 250 000 medium: 1 : 1 000 000 large: 1 : 5 000 000
sub-national (meso)	region, province, district	small: 1 : 100 000 medium: 1 : 250 000 large: 1 : 1 000 000
local	sub-district, village, community	small: 1 : 10 000 medium: 1 : 25 000 large: 1 : 50 000
farm	farm, ranch	small: 1 : 1 000 medium: 1 : 5 000 large: 1 : 10 000

### Data on Land Resources

A land unit can be described in terms of basic data or land characteristics:

#### DEFINITION

A **Land Characteristic** is an attribute of land that can be measured or estimated. (FAO, 1996)

The FAO land evaluation method for rural land use is used to describe and assess physical factors within a planning or land unit (FAO, 1976).

Through experience, minimum data sets to be collected for the planning units and sub-units on climate and soils have been determined (**Box 14**). Whenever possible, the data collected on climate and soils should be cross-referenced to national and international units of classification, such as the Köppen climatic classification, the agro-ecological zones methodology and the FAO/UNESCO/ISRIC soil classification (FAO, 1990a) or preferably the World Reference Base (FAO, 1998). Such systems should not replace local classification methods, as these emphasize factors important to a particular ecozone. Accuracy of assessment



can often be improved if greater detail is available. Additional parameters may be important determinants of land use in different environments. For example, factors such as incidence of frost, toxic elements or subsoil permeability may strongly influence land use or crop choices in specific locations.

#### BOX 14: Data Requirements on Land Resources for Land Evaluation

##### Climatic data

*For each climatic station*

- location (coordinates) and elevation
- precipitation
- maximum daily temperature
- minimum daily temperature
- relative proportions of sunshine and cloud cover by time period
- relative humidity
- wind speed
- climatic hazards

*Note: The time period over which the data are collected depends on the purpose and level of detail of the land-use plan. Where possible, rainfall data should be collected for a historical sequence of years, particularly in semi-arid areas with a high coefficient of variation in annual totals.*

##### Land data

*For each land mapping unit*

- proportions of component land management units
- area
- landform or landscape unit

*For each land type*

- land element
- slope
- land cover (vegetation) or present land use
- surface rocks and stones
- rootable soil depth
- soil texture (including stones and gravel)
- soil drainage class
- soil horizons and depth ranges
- soil structure and consistence
- organic carbon content (topsoil)
- available phosphorus (topsoil)
- exchangeable cations, cation exchange capacity and base saturation
- pH (acidity, alkalinity)
- salinity

Surface water and shallow groundwater resources are important in land-use planning. The quality and quantity of water resources contribute to determining which potential land uses can be considered as options. Important aspects are temporal and spatial availability of groundwater and surface water (for irrigation potential and domestic use) and flood hazards.

#### Land-use Related Data and Information

For the purposes of resource evaluation and land-use planning, the major land uses relevant in the area must be described. The FAO framework for land evaluation has therefore introduced the terms “land utilization type” and “production system”, which are defined as follows:

##### DEFINITION

A **Land Utilization Type (LUT)** is a use of land defined in terms of a product, or products, the inputs and operations required to produce these products, and the socio-economic setting in which production is carried out. (FAO, 1976)

A **Production System** describes a series of activities (the management system) carried out to produce a defined set of commodities or benefits (produce). (FAO, 1996)

An example of a land utilization types definition is given in **Box 15**.

<b>BOX 15: Example of a Land Utilization Type Definition</b>			
<b>Attribute</b>	<b>Low inputs</b>	<b>Intermediate inputs</b>	<b>High inputs</b>
Produce and Production	Rainfed cultivation of barley, maize, oat, pearl millet, dryland rice, wetland rice, sorghum, wheat, cowpea, green gram, groundnut, Phaseolus bean, pigeon pea, soybean, cassava, sweet potato, white potato, banana, palm oil and sugar cane. Sole and multiple cropping of crops only in appropriate cropping patterns and rotations.		
Market Orientation	Subsistence production	Subsistence production plus commercial sale of surplus	Commercial production
Capital Intensity	Low	Intermediate with credit on accessible terms	High
Labour Intensity	High, including uncosted family labour	Medium, including uncosted family labour	Low, family labour costed if used
Power Source	Manual labour with hand tools	Manual labour with hand tools and/or animal traction, with improved implements; some mechanization	Complete mechanization
Technology	Traditional cultivars. No fertilizer or chemical pest, disease and weed control. Fallow periods. Minimum conservation measures	Improved cultivars as available. Appropriate extension packages including some fertilizer application and some chemical pest, disease and weed control. Some fallow periods and some conservation measures	High-yielding cultivars including hybrids. Optimum fertilizer application. Chemical pest, disease and weed control. Full conservation measures
Infrastructure	Market accessibility not necessary. Inadequate advisory services	Some market accessibility necessary with access to demonstration plots and services	Market accessibility essential. High level of advisory services and application of research findings
Landholding	Small, fragmented	Small, sometimes fragmented	Large, consolidated
Income Level	Low	Moderate	High

**Source:** Agro-ecological assessment for national planning: the example of Kenya. FAO. 1993b



An example description of a production system is given in **Box 16**.

#### BOX 16: Example of a Production System

Production System:	Smallholder sorghum production
Product	Sorghum (c.v. Segalane). Grain - maximum attainable yield 2 000 kg/ha, typical yields 500-1 000 kg/ha. Residues (maximum attainable yield 8 000 kg dry matter/ha).
Land Preparation	Single ploughing, followed by disk harrowing, between August and October. Pair of draught oxen used.
Planting	Mechanical seeder drawn by pair of oxen, on first rainfall >30 mm during period 1 December -20 February.
Weeding	Manual. 40 days after planting.
Fertilizer	Nil.
Harvesting	Manual, after crop matures (120 days after planting).
Labour	Family labour. Moderate requirement at peak periods.
Animal Power	Access to 2 oxen needed at critical period for planting.
Land Tenure	Holding size 2-5 ha. Usufruct conferred by Land Board.
Risks	Crop failure anticipated 1 year in 10 (no planting opportunity due to low rainfall).

A LUT can cover a number of products produced in a particular socio-economic setting using inputs and operations which are often related, while a production system refers to the products from a single crop or animal as well as the inputs and operations required to produce it. Conceptually, a LUT can also refer to land uses such as national parks or forest reserves, which are not necessarily regarded as production systems.

A very large number of potential production systems may emerge from the many theoretical combinations of products, management and inputs. It is important to limit these to a manageable number and choose the modifications of existing production systems which are practicable and in line with stakeholder objectives.

#### BOX 17: Checklist of Requirements for Crop Based Production System

Temperature and radiation  
 Moisture  
 Nutrients  
 Adequate depth for rooting  
 Freedom from toxicities  
 Conditions for germination and establishment (tilth)  
 Ripening conditions  
 Freedom from climatic hazards  
 Freedom from soil-borne diseases  
 Workability of soil  
 Location and access  
 Soil erosion within tolerable limits

*Note: In the original FAO Framework for Land Evaluation (FAO, 1976) most of these requirements were evaluated with reference to particularly land qualities or characteristics. In technical land evaluations, computer modelling has now largely replaced mechanical matching techniques. Nonetheless, this list gives a useful check on factors which may have to be considered by the model.*



A list of the specific requirements of each production system or LUT should bear in mind that requirements depend to a large extent on the analytical method used for land evaluation. **Box 17** provides a checklist of requirements to be inventoried. For extensive land uses such as wildlife utilization, a much less detailed treatment is required, and requirements may be related to broad categories of vegetation type and water availability.

### Socio-economic Data and Information

The collection of information on the socio-economics in the planning unit should be geared to gaining an understanding of local communities and their natural, human and capital resources. This includes data on the community structure, in order to estimate the living conditions, gender-related issues, class and ethnicity, labour availability, data on agricultural or other land-use practices and data on access to land, land tenure and holding size, livestock, infrastructure, etc (**Box 18**). One of the purposes of socio-economic data collection is to identify and characterize specific groups that can be targeted with the land-use plan. Guidelines for the collection of socio-economic data using the SEAGA-Approach (Socio-economic and Gender Analysis) (FAO/ILO, 1998) or the farming systems analysis (FAO, 1990b) are useful, and some appropriate participatory techniques which could be used are listed in chapter 4, **Box 10**.

Based on information drawn from the local level as well as from “official” sources, data should be assembled on the costs of production of the various components in the farming or land-use systems. Information on the farm-gate and market prices of produce, the amount of money available to farmers for investment, access to credit and opportunities for income generation will be important for planning purposes. This type of information is likely to vary between stakeholder groups in the community.

In addition to information at the community level, information on such factors as population (including growth rate, age and gender distribution), labour availability, infrastructure, markets and support services, such as agricultural extension and veterinary facilities, should be collected by the administrative unit. The actual administrative unit selected will depend on the planning level.

Information should also be assembled on legal rights and restrictions on land use and related issues, and on any particular government policies or development plans pertaining to the land-use planning area.

#### BOX 18: Socio-economic Data and Information Requirements

- Farm household data
- Legal and tenure aspects
- Infrastructure (roads, quality, etc.)
- Access to markets, price development, etc.
- Supporting services (extension service, etc.)
- Intervening agencies (NGOs, GOs, etc.)
- Population (age, growth rate, ethnic composition, gender distribution, etc.)

### How to Collect the Data and Information

Data and information collection should be coordinated by the appointed task force responsible for the plan preparation. A technical advisory committee can support the group. Professionals or technical staff will normally be involved in collecting and compiling data and information. However at the local level community members will also be actively involved.

For both land evaluation and subsequent planning, existing data should be used as far as possible and augmented by additional data collected in the field where required.

Topographic base maps, climatic data and soils information can normally be obtained from the relevant government departments. Information on production systems may be available from farm or household surveys, while information on the requirements of crops and livestock can often be gleaned from the departments dealing with agricultural extension and research.

These “official” data sources should be tapped but particular attention should be given to maximizing use of the information resources of the local communities. Local people understand the operation of the land-use systems on which they depend better than outside experts do. Suitable mechanisms must be employed to share knowledge among the LRMGs, other local people, technical specialists and decision-makers at higher levels. Indigenous knowledge may not be obvious, or it may not be structured in a form that is readily accessible or understood by land-use planners. RRA and PRA provide ways of elucidating and analysing such information with local communities.

While formal surveys should be kept to a minimum, some conventional surveys may be needed to fill gaps in existing data, or to obtain types of data which are completely lacking. Techniques for carrying out surveys of soils or the socio-economic conditions of farm households are described in standard manuals (e.g. FAO, 1979; 1990b). For surveys of land resources, a physiographic approach (**Box 19**) is recommended, which integrates landforms, soils and vegetation. The use of aerial photographs and of satellite imagery, either as prints or in digital format, can greatly enhance the efficiency of land resource survey, although they do not eliminate the need for ground truthing.

### BOX 19: Physiographic Approach to Land Resource Survey: the SOTER Example

Hierarchical physiographic systems have been defined (FAO Global and National Soil and Terrain Digital Database (SOTER), FAO 1995) in which the higher level classification is based on morphometric landform criteria and altitude levels. The units are subdivided on the basis of form, topography and dimensions. The lower level is open-ended and provides the structure for further subdivision on the basis of geology and soils. It is therefore useful for land-use planning from country level down to farm levels, as it provides information at the required level of generalization.

Especially in non- or little-disturbed areas there will be a high correlation between physiography and vegetation types, and the physiographic units will serve as a reliable base for a vegetation inventory. In areas where the original vegetation has been degraded, the lower level physiographic units will serve as open-ended basic land units, which can be further defined and subdivided as required.

Physiographic units also provide a suitable framework for the description and mapping of actual erosion and land degradation (Jansen, Rimmelzwaal and Dlamini, 1994).

Data on the physiographic land unit system should be combined with climatic information for subsequent land resource evaluation.

### Data and Information Storage, Retrieval and Accessibility

Both for land evaluation and for subsequent land-use planning, data analysis can be greatly facilitated if the data collected from secondary sources, field surveys and RRA/PRA are systematically arranged and stored in an ordered format for ready sorting and retrieval. Although access to computers is not essential to carrying out land-use planning, the availability of relatively inexpensive computers and database software can assist these operations.

At village level where computers may not be available, the organization and availability of the information is still critical.

Databases can either be constructed from commercial software, or custom-made databases can be used. Some relevant databases and programs developed by FAO are described in **Box 20**.

### BOX 20: Selected FAO Databases and Programs

**Multilingual Soil Database (SDBm)** is a straightforward database for storage and retrieval of soil descriptions and analytical data, including soil physical tests. Search and query facilities enable soils matching specified criteria to be selected, and the program enables soil descriptions and analytical data to be printed out in standard formats. The database can be operated using menus in English, French or Spanish. After several years of development the database is now in a “final” form, and is accompanied by a manual.

**Land Use Database (LUD)** has been developed by the International Training Centre (ITC) and Wageningen Agricultural University, in cooperation with FAO. LUD describes land use based on a hierarchy of location, products, operations and inputs, power source and ownership. Some of the descriptor fields are compulsory, but many can be user-defined. The database has powerful query and search functions, which enable selection and classification of production systems.



Geographic information systems (GIS) are essentially databases which store information in a spatial format. The use of GIS leads to rapid generation of thematic maps and area estimates, and enables many of the analytical operations to be carried out in a spatial format, by combining different sets of information in various ways to produce overlays and interpreted maps. Digital satellite imagery can be incorporated directly into many GIS packages. GIS gives results of high presentational quality, but requires considerable investment in computer hardware and staff training if it is to be effective. Its use is most applicable at sub-national and national levels of planning. GIS packages used for land resource appraisal should include modules for data analysis. FAO has developed an integrated GIS/ data analysis package for agro-ecological zoning (AEZ), land suitability assessment and multicriteria analysis of land use scenarios for land-use planning, integrating biophysical and socio-economic data in Kenya (FAO, 1993a). The package has been used to analyse various options of land use in district land-use planning.

#### BOX 20: Selected FAO Databases and Programs (cont'd.)

**ECOCROP1** is essentially a combination of a database of crop requirements, and a simple land evaluation program which filters out suitable crops for user-defined environments. Crops are also classified according to their use, and it is also possible to restrict the evaluation to those crops having a particular use or range of uses.

**AQUASTAT** is a database with statistics on freshwater and its availability in agriculture and rural development. It produces regional analyses and country profiles on water resources development, with emphasis on irrigation and drainage.

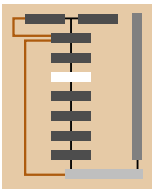
**CROPWAT** is a computer program which main functions are to calculate reference evapotranspiration, crop water requirements, irrigation requirements and scheme water supply, to develop irrigation schedules under various management conditions and to evaluate rainfed production and drought effects.

**CLIMWAT** is a climatic database to be used in combination with the computer program CROPWAT. It includes data from a total of 3262 meteorological stations from 144 countries.

**Source:**

<http://www.fao.org/WAICENT/FaoInfo/Agricult/AGL/AgIhome.htm>

The ease with which data can now be stored in databases should promote availability of data to the public at large and particularly to those stakeholders with a vested interest in a particular area or region. In areas with adequate resources and communications technology, users could tap into databases through remote area networks or through the Internet. The breakdown of the strict control of data previously exercised by many governments is seen as a positive step toward the development of integrated planning for sustainable management of land resources.



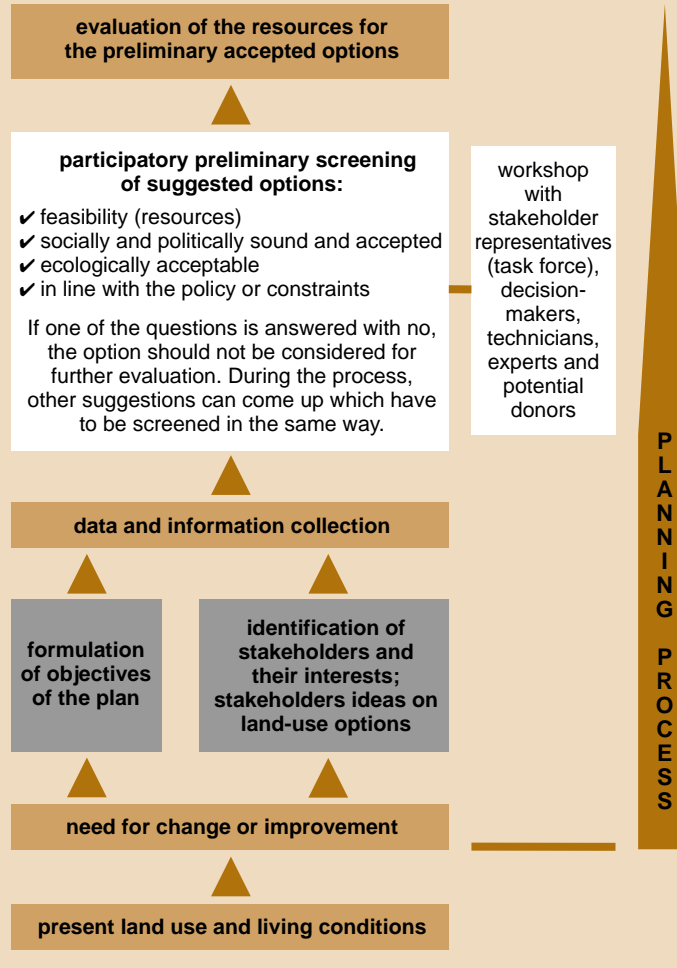
### Preliminary Identification and Screening of Options

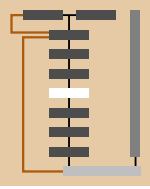
Ideas for improved land-use options will emerge through the planning process as stakeholders suggest changes and information becomes progressively available. Review of these options by the task force and advising institution coordinating the plan should be a continuous process, which is consistent with the iterative nature of land-use planning. However, at certain points in the schedule, a more formal review is needed, involving the appointed task force, collaborating institutions, the stakeholders, the technical team and also potential donors. This process is depicted in **Figure 9**.

The review may take the form of a workshop, in which initial objectives are reviewed in the light of the proposed options and the new information that has been collected. Its first task is to formulate possible improved land-use options (e.g. modified or new production systems). Secondly these options are screened for consistency with all the stakeholder objectives, for acceptability within the framework of government policy and legislation, and for broad feasibility according to the resources needed for their implementation. If there are constraints identified, related to the existing general conditions (policies, regulations, etc.), potential solutions or alternatives have to be sought. Changes to some of the general conditions, if possible, might be considered. Those land-use options which pass this screening process are subjected to land evaluation. In addition, there are useful tools such as the FAO-AEZ model for screening land-use options and also providing information to formulate sustainable land-use alternatives.

FIGURE 9

### PRELIMINARY IDENTIFICATION AND SCREENING OF OPTIONS





## Evaluating Resources for the Identified Options

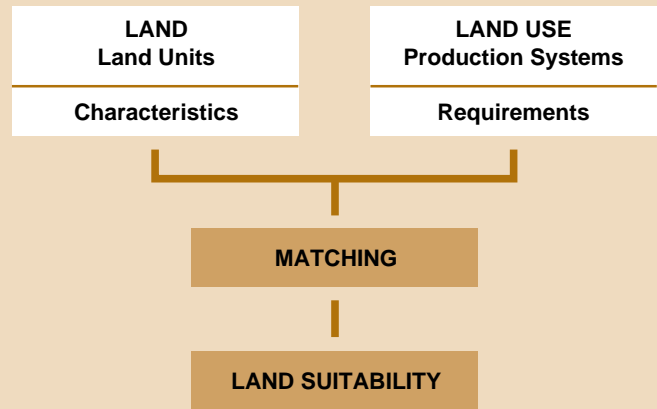
### Basic Principles

Land resources must satisfy certain requirements if the land is to be successfully used. Many of these requirements are specific to the type of land use, and they include both the ecological requirements of the crop or other biological product, and the requirements of the management system used to produce it. Evaluation of land resources therefore involves a comparison of the properties of the land with the requirements of possible types of land use. Defined planning or land units are rated according to how well these land-use requirements are satisfied.

The principles of this essentially ecological approach are presented in the Framework for Land Evaluation (FAO, 1976), and are illustrated in **Figure 10**. Evaluation is based on an inherent understanding of the interactions between land and land use. The terms used in land evaluation are defined below. Information requirements for the land management units (LMUs), LUTs and production systems have been described in a previous section.

**FIGURE 10**

### LAND EVALUATION RATIONALE



### DEFINITIONS: Some Land Evaluation Terms

**Land Evaluation.** The assessment of land performance or potential with respect to a particular purpose, designed to assist in land-use planning and management.

**Land Mapping Unit.** An area of land delineated on a map. May consist either of a single land type or of multiple land types occurring as a complex or association.

**Land Type.** A specific unit of land with definable ranges of characteristics. May not always be mappable at scale used.

**Land Quality.** A complex attribute of land which acts in a distinct way in its influence on the suitability of land for a specified use.

Land evaluation consists of physical and socio-economic evaluations. Physical land evaluation involves the interpretation of data concerning the physical environment, and past and present land use in terms of its resource potential. It is thus concerned with seeking solutions to problems such as the possible long-term degradation of land quality as a result of current use, the viability of alternative land uses, the extent to which the management of existing land uses can be improved, and the impact of inputs on productivity and land quality.



## Land Evaluation Procedure

The main activities in a land evaluation are as follows (FAO, 1976):

- ✓ initial consultation, concerned with the objective of the evaluation, and the data and assumptions on which it is to be based
- ✓ description of the kinds of land use to be considered, and establishment of their requirements
- ✓ description of land mapping units, and derivation of land qualities
- ✓ comparison of kinds of land use with the types of land present
- ✓ economic and social analysis
- ✓ land suitability classification (qualitative or quantitative)
- ✓ presentation of the results of the evaluation

In addition to the FAO framework for land evaluation, FAO has published four guidelines for land evaluation for different land uses, based on this concept (**Box 21**). The publications provide practical guidelines on the planning and execution of the various steps in land evaluation, from interpretation of basic data to the final recommendations. These form a basis for the decisions to be discussed with the stakeholders and relevant institutions and, if accepted, for implementation.

The procedure of comparing the land characteristics and qualities with the requirements of land use may be carried out either by simple matching, based either on previous experience or scientific knowledge, or by modelling of crop or animal growth and development in the particular environment. The results are normally expressed as classes of land suitability, or as quantitative estimates of yield or benefits which may be linked to estimates of financial or economic return.

### BOX 21: FAO Guidelines on Land Evaluation

- ✓ A framework for land evaluation (FAO, 1976)
- ✓ Land evaluation for rainfed agriculture (FAO, 1983)
- ✓ Land evaluation for forestry (FAO, 1984)
- ✓ Land evaluation for irrigated agriculture (FAO, 1985)
- ✓ Land evaluation for extensive grazing (FAO, 1991)

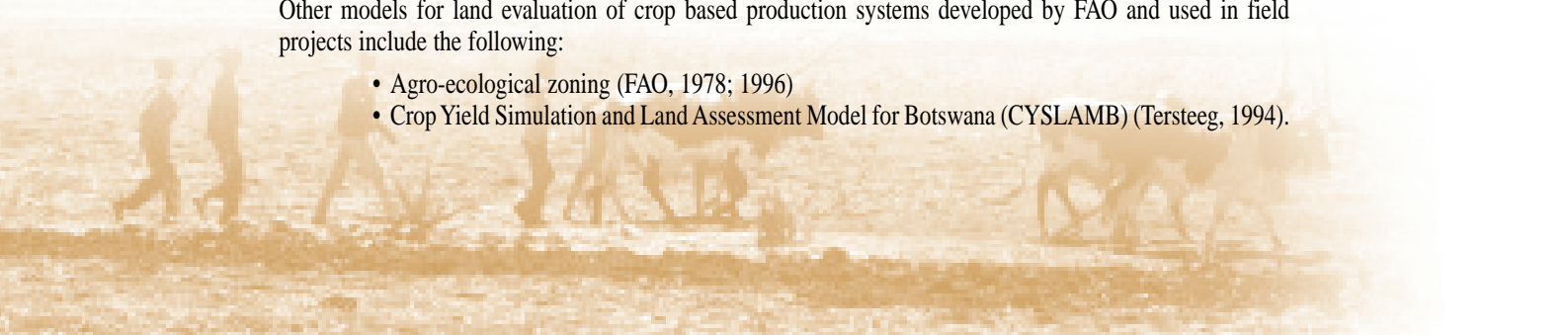
The technique and level of complexity of the matching process are determined by the purpose and level of detail of the land-use plan and by the amount and quality of information that has been collected to characterize the LMU, the LUT and the production system.

At the simplest level, matching is carried out based on the transfer of experience from observations of similar LUTs or production types or soils. For example, farmers recultivating an area of fallow will draw analogies from their experience of similar soils elsewhere and from previous experience on the same plot in deciding which crops to grow and which management practices and inputs to apply. This approach does not require specification of individual land-use requirements and land characteristics but is simply based on experience and intuitive reasoning.

The Automated Land Evaluation System (ALES) (Rossiter and van Wambeke, 1993) for modelling provides a package for building an expert system based on the FAO framework for land evaluation. ALES has been used for model building on FAO projects in Mozambique and Malawi (e.g. Eschweiler *et al.*, 1991).

Other models for land evaluation of crop based production systems developed by FAO and used in field projects include the following:

- Agro-ecological zoning (FAO, 1978; 1996)
- Crop Yield Simulation and Land Assessment Model for Botswana (CYSLAMB) (Tersteeg, 1994).



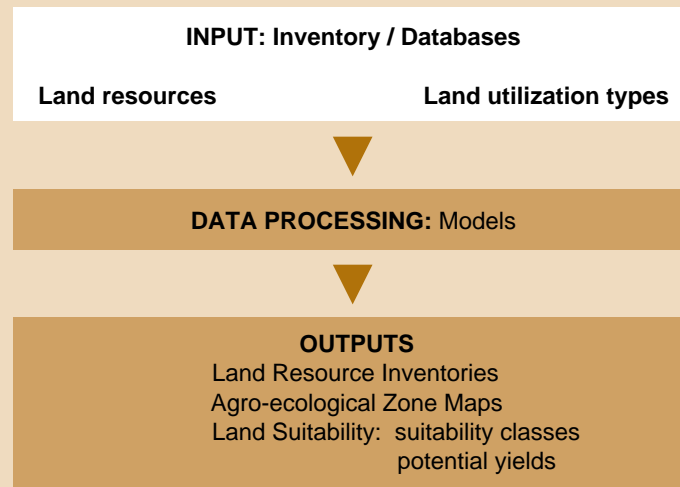


AEZ has been used in a variety of environmental conditions, at global, regional, national and sub-national scales. It comprises a set of basic applications on which more advanced applications are based. The AEZ applications are presented in **Figure 11**. CYSLAMB has been applied at national, district, village and farm level in Botswana, and may be suitable for similar semi-arid environments. But regardless of the approach used, models must be validated against actual performance under field conditions.

**FIGURE 11**

### APPLICATIONS OF AGRO-ECOLOGICAL ZONING (AEZ)

#### CORE APPLICATIONS



#### ADVANCED APPLICATION (examples)

- Potential Land Productivity
- Estimation of Arable Areas
- Population Supporting Capacity
- Land Degradation Risk Assessment
- Livestock Forage Balance Assessment
- Agricultural Inputs Recommendation
- Farming System Analysis and Development
- Environmental Impact Assessment
- Monitoring Land Resource Development

### Presenting Evaluation Results

Irrespective of the procedures used to evaluate land resources the results should be presented in a systematic way to enable possible land-use alternatives to be identified and physically unsuitable land uses to be rejected. The standard format for presenting the results of physical land evaluation is a matrix in tabular form, listing the suitability of different production systems or land utilization types on different LMUs. **Table 3** gives an example (extracted from a legend of a land suitability map) of such outputs for land evaluations based on qualitative matching. It is usually most convenient to present the results of land evaluation on a map, or a series of maps, so that the location of land suitable for various uses can be readily observed. Maps may be produced either by conventional manual means or by using a GIS.

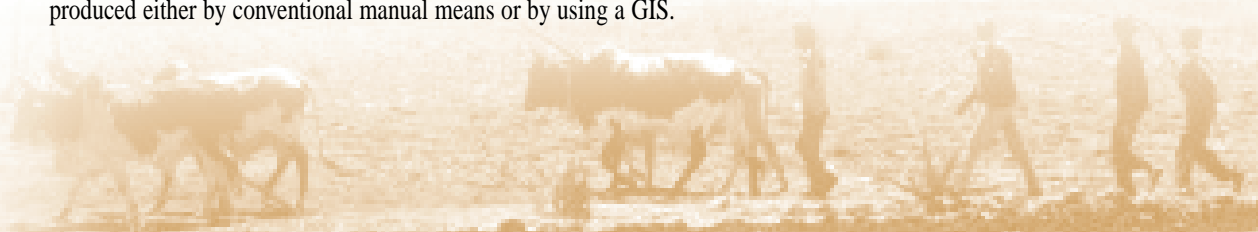
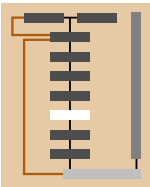


TABLE 3: Extract of Land Evaluation Based on Qualitative Matching

LS-Unit	Crop and Input Level							
	Maize		Wheat		Barley		Teff	
	Low	Intermed.	Low	Intermed.	Low	Intermed.	Low	Intermed.
A	N	N	N.S3	N.S3	N.S3	N.S3	N.S3	N.S3
B	S3.S4	S3.S4	S1.S4	S1.S4	S1.S4	S1.S4	S2.N	S1.N
C	S3.N	S3.N	S1.S4	S1.S4	S1.S4	S1.S4	S3.N	S3.N
D	N	N	S3.S4.N	S3.S4.N	S2.S3.S4.N	S2.S3.S4.N	N.S4	N.S4
E	N	N	N	N	S4	S4	S3.N	S3.N

Notes: 1. Land suitability unit (LS-Unit) is derived from a combination of soil mapping unit, rainfall and altitude.  
 2. "Intermediate" level of inputs includes implementation of surface drainage (broadbeds and furrows) where needed.  
 3. S1 = highly suitable; S2 = moderately suitable; S3 = marginally suitable; S4 = very marginally suitable; N = not suitable.  
 4. Where more than one suitability class is indicated, the suitability of the unit varies according to different soil types which are not mappable at the scale used (1:250 000). An uppercase designation implies that 50% or more of the unit is in the stated class, while a lowercase designation implies that 25% of the unit is in the class indicated. e.g. S1.S4 = 50% of land suitability unit is S1 and 50% is S4. S3.s4.n = 50% is S3; 25% is S4 and 25% is N.

Source: Adapted from Radcliffe, Bechtold and Teshome Estifanos (1988).



## Appraisal of Identified Options

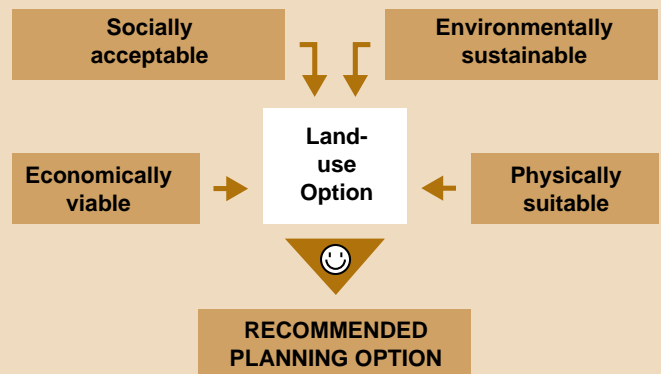
As a result of physical land evaluation, a series of physically suitable land-use options is derived for each LMU. These options must now be appraised according to financial and economic viability, social acceptability and potential impacts on the environment. The sustainability of each option and constraints for implementation should also be vetted before the group proceeds to a recommendation. The various steps in the screening process are shown in Figure 12.

### Financial and Economic Viability

The effective assessment of land-use options requires an understanding of the nature, characteristics and behaviour of the types of local agricultural production units. In developing countries, agricultural production units are typically smallholdings supporting complex farming systems of mixed crop and livestock production, managed by farm-households. In general these smallfarmers make effective use of all production factors within the framework of their knowledge, resources and objectives and the constraints and risks of the location. Domestic tasks, social commitments and non-farm earning activities contribute to or compete with agricultural activities.

FIGURE 12

### APPRAISAL OF SUSTAINABILITY FACTORS OF LAND-USE OPTIONS





Possible land-use options are subjected to financial or economic analysis, depending on the aims of the land-use plan<sup>3</sup>. Financial viability can be assessed with reference to the following parameters:

- ✓ Gross margins
- ✓ Benefit: cost ratio
- ✓ Net present value
- ✓ Internal rate of return

To appreciate the heterogeneity, complexity and interdependence of the farm-households and the rural communities within the biophysical, socio-cultural and economic environments, it is necessary to complement orthodox aggregate methods of analysis with farm-household and community-level perspectives. Different types of analyses, including quantitative measures such as gross margin

analyses and the qualitative information from participatory rural appraisal, will need to be combined to produce adequate, reliable data, indicators and parameters for assessment of benefits and impacts. Above all, land-use options must be evaluated so that satisfactory trade-offs can be identified between the different, multiple objectives of farmers and the local community and those of the nation.

In summing up the total impact of a land-use option, the benefits and costs of achieving different objectives and satisfactory trade-offs between them have to be estimated. Multiple objectives relevant for selecting options such as equity, efficiency and sustainability in resource use have to be reconciled with each other in terms of parameters reflecting relative weights, which are the values assigned to the achievement of an objective. These parameters have to be taken into account on top of the social rate of discount when estimating future benefits. This would ensure that a viable land-use option would take account of social time preferences, uncertainties, issues of inter-generational equity and externalities.

The essence of an externality in economic terms is that it involves an interdependence between two or more economic agents and their transactions, an interdependence of which the effects are not priced. In other words externalities are effects of economic or project activities not influenced by the market. They may include impacts on health and education, advantages accruing to males or females only, negative or positive effects on conservation of resources, i.e. the degree of pollution or degradation of land, water and air, and other external effects. They do not enter into calculations of commercial economic viability since these are based on market prices; however they are relevant for social choice and should be taken into account when determining the merits of an option.



For example, conservation is concerned with allocating land resources in an efficient way over time. Consequently, it implies a minimization of the net present value of both capital and operating cost, and may entail a programme of accelerating and increasing capital inputs in the short run in order to reduce longer term operating costs later on. Conservation is part of a continuum of resource use, from that which excludes the welfare of future generations to that which negates the welfare of current participants; it consequently depends on distributional equity judgements as well as economic efficiency.

<sup>3</sup> - Financial analysis is based on market prices and costs. Economic analysis takes into account shadow prices and opportunity costs. Whereas a land-use plan of a large farm or group of commercial enterprises may rely on financial analysis to determine feasibility, a land-use plan covering a broader range of activities within a nation, a district or a community would normally use the more complex procedures of economic analysis to evaluate alternatives.

### Social Impact

The active participation of all stakeholders and their representatives in the formulation of land-use objectives, and a continued dialogue through the procedures of land resource evaluation, should ensure that the proposed land uses are socially acceptable to these groups. At this critical stage in the planning process, intensive consultations should be held with these groups to discuss the implications of possible land-use changes in detail in so far as they may change such factors as rights of access or impose responsibilities for management and conservation. Particular care should be taken to include groups who are not land users in the target area but who may be affected by proposed land-use changes. For example, communities living further downstream in a catchment may be affected by developments involving increased water use or changes in land cover. If they have not been involved previously, such groups should be involved in the discussions at this stage.

More formal screening of social impacts may be required, particularly in national and sub-national land-use plans where grass-roots stakeholder involvement in planning may have been less active. The impact of any changes in land use should be assessed in relation to the following social factors:

- ✓ access to land resources (including wild plant and animal products)
- ✓ nutritional status (particularly of vulnerable groups)
- ✓ health status (presence and virulence of endemic diseases)
- ✓ education (opportunities to learn new skills)

It may be necessary to conduct a focused RRA at community level with stakeholder groups or key informants to elucidate what exactly might happen when land-use changes take place. Reference should be made to case studies of comparable developments in similar environments, and to the records of local clinics to observe current health trends.

### Environmental impacts

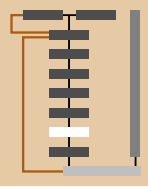
Sustainable land management is, by definition, dependent on maintaining the productive potential of natural resources. In addition to protecting the resources on which a specified production system depends, operation of the production system may have effects on other attributes of the environment, either at the site of production or elsewhere.

The technique of *scoping* can be used to select a number of key factors to evaluate from a more comprehensive list. The term is borrowed from environmental impact analysis, which has much in common with the assessment of sustainability. Scoping is intended to reduce the amount of analysis to a manageable level, and should be carried out in consultation with all relevant groups which may be affected by land-use changes (Bisset, 1987). Once identified, changes in key factors, resulting from a specified production system, can be predicted by methods based on FAO, 1993b:

- ✓ observing present evidence of trends (observation)
- ✓ researching historical evidence (historical)
- ✓ extrapolation of geographical evidence from similar sites (spatial)
- ✓ empirical or deterministic modelling

The method chosen depends on the availability of data, the knowledge of cause-effect relationships of the factors concerned, the availability of models and the requirement for quantitative results. Often a combination of the above methods is appropriate. In addition to direct effects on land resources resulting from changes in inputs or husbandry practices, likely effects on valuable or rare plants or animals should be considered. Changes in land use may have off-site impacts, such as reduced downstream flows, concentration of livestock on limited grazing areas, or interruption of wildlife migration corridors.





## Negotiating and Deciding upon Options - Set up the Plan

The output of the previous step is a range of land-use options, comprising land utilization types or production systems, for each land mapping unit.

All these options are physically suitable, financially and economically viable, socially acceptable, free from significant adverse environmental impact and have manageable constraints for implementation. The selection of the best option, or the best range of options, is now determined by weighing the alternatives against the goals of the various groups of stakeholders. In most cases it is hoped that land use will be decided by negotiation leading to trade-offs and consensus.

The task force is responsible for arranging the forum in which negotiations can take place and providing mediation for reaching consensus and resolving conflicts. This is the opportunity for all opinions to be voiced. Every effort must be made to resolve any disputes arising from conflicting objectives within this forum. A mechanism should be available for recourse to the land arbitration body or to the Courts in cases of irreconcilable disputes. Such disputes result in postponement of the implementation of the land-use plan or of some of its components.

### The Negotiation Process

The essence of negotiation among stakeholders is that all the people affected are fairly represented in the discussions. Negotiation can only be effective if all stakeholders accept the forum as legitimate, or if the process and the institutional structure (task force) which supports it is 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, even if it is not a stakeholder, as outlined in the section *Establishment of multidisciplinary task forces*.

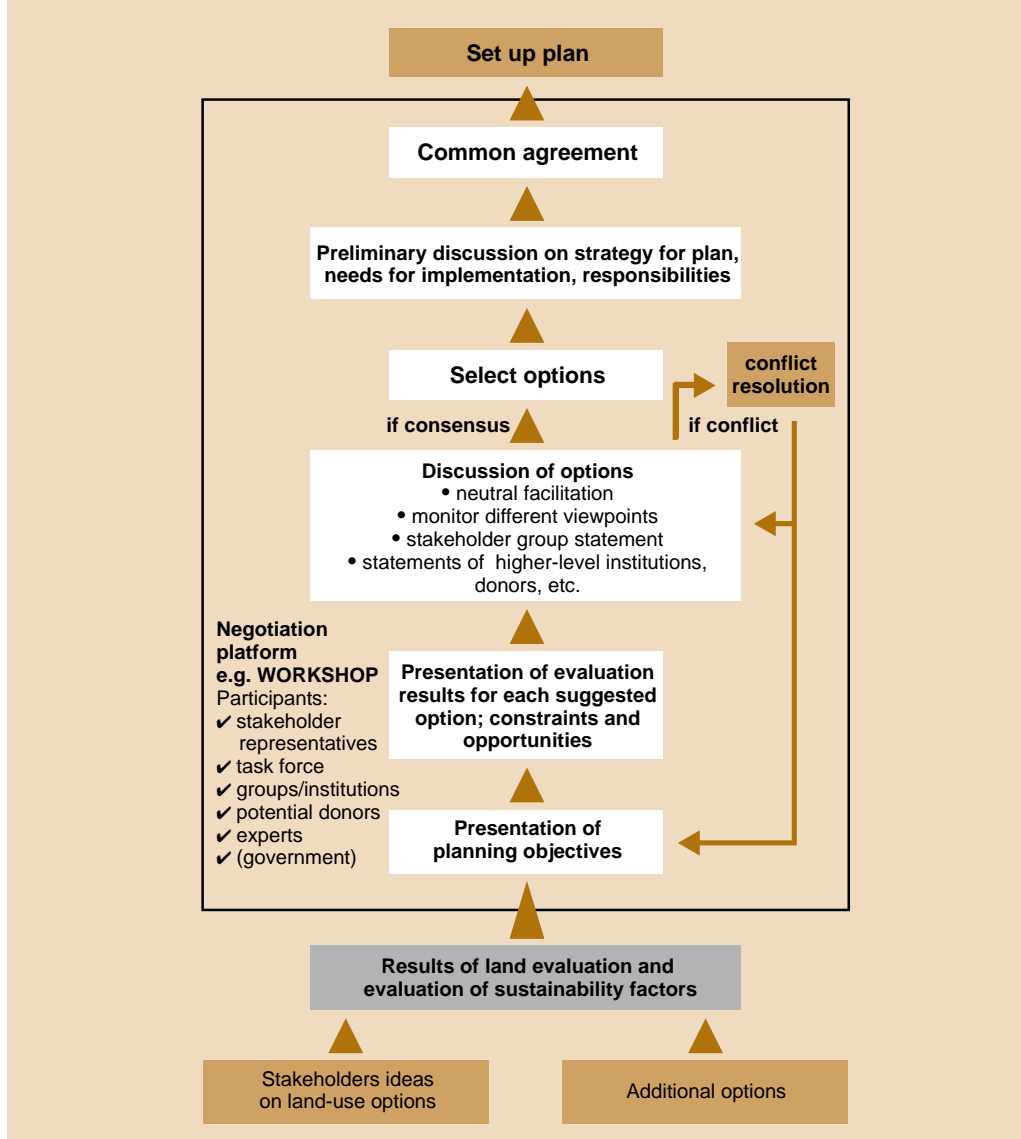
At this stage of the planning cycle the stakeholders will actively participate in the negotiation process, which can be done in the form of a workshop. It is the duty of the task force to guide the discussion or to engage a neutral facilitator to help reach a consensus among the stakeholder representatives and ultimately a decision. If no decision can be reached, another meeting has to be arranged to allow time for the representatives to discuss relevant issues with their groups and, if required, to improve the quality and quantity of the information on which the decision will finally be based.



There are numerous cases where it is physically impossible for all stakeholders to participate personally in all aspects of the negotiating process, for example involving village land-use planning, the management of an entire forest or irrigation scheme, district level planning, or national or global issues. Up to the present time, the only way that they have been handled is through some form of representation of stakeholders. In future, however, it may become increasingly possible to use computer-based networking or conferencing facilities to enable large numbers of stakeholders to negotiate together, as is already practised in some countries through electronic mail (e-mail). Meanwhile, the main participants in the negotiation process should include the task force, as leading institution, additional stakeholder representatives, staff from institutions dealing with land-use planning at higher levels (e.g. the higher-level task force), technical experts, potential donor organizations, and other groups or institutions which have an interest in the matter.

FIGURE 13

## THE NEGOTIATION PROCESS



At the sub-national level, issues of importance can be addressed through negotiation in the District (Province) Land-use Planning Group. The National Land Use Group or Committee provides a forum for discussing land related matters of national importance (e.g. updating land-use policy).

In addition, before initiating the decision-making process, the present stakeholders, representatives from institutions, or potential donors have to agree commonly on certain rules concerning the discussion procedure. The minutes or record of the meeting should then be distributed, not only to immediate stakeholders, but also to others who may need to know of actions proposed because they impinge on their own programmes.

A neutral moderator or accepted authority may play a valuable part in conflict resolution. Mediators might be provided by NGOs, or employed at the district level and made available to the management groups within the district as necessary. It is important to remember that mediators are supposed to facilitate the process of conflict resolution, not to control it.



### Supporting Tools in Assisting the Selection of Options

Mechanistic methods can assist in selecting the best options. Examples are the multiple goals achievement matrix and multiple objective linear programming. The objectivity of such methods can support the choice of certain options over others and can assist in resolving disputes. However care must be taken in selecting goals and in their relative weighting.

Frequently the emphasis should not be on selecting the best land-use option, but on providing the land user with a portfolio of choices.

### Conflicts among Stakeholders and Conflict Resolution

#### DEFINITION

A **land conflict** is a natural phenomenon and refers to the legitimate but opposing interests, activities and impacts on the environment resulting from the different goals and objectives of the many groups and individuals involved or affected by the use and exploitation of land.

Source: FAO, 1998a.

In extreme situations this can result in physical conflict or war, but in most cases conflict is regulated by socially accepted norms of behaviour, by custom or by law, and is resolved through compromise and exchange of values in the framework of economics and negotiation. Conflict is natural and will always exist. Some origins of conflict are given in **Box 22**. It is not possible to eliminate conflict once and for all so conflict resolution mechanisms are an essential ingredient in the management of land resources.

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

Conflict may also arise due to the effects or impacts of resource use, or when one party's actions affect another party's interests. This may happen when long-term interests compete with short-term 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 conserve a population of elephants may conflict with the local people's need to protect their crops from elephant damage in order to grow enough to feed themselves.

In traditional societies, rights to use land resources are often linked to membership of a group, such as village or kinship group, and disputes are referred to Chiefs or Councils of Elders and are settled with

#### BOX 22: Possible Origins of Land Conflicts

- ✓ Impact of empowerment on tradition, tenure jurisdiction (e.g. chief conflicts)
- ✓ Influence of leadership on land use (development)
- ✓ Competition for resources and land uses
- ✓ Land tenure (parallel legal system)
- ✓ Conflict between different policies
- ✓ NGOs versus government
- ✓ Demand versus environment
- ✓ Conflicting interests and common good
- ✓ Communal interest versus commercial interest
- ✓ Culture versus economic interests
- ✓ Social equity versus national economy
- ✓ Conflict in land restoration
- ✓ Conflict among existing groups in a community
- ✓ Widening gap of poverty
- ✓ Cultural interests versus economics

Source: Proceedings of Workshop on Integrated Planning and Management of Land Resources. Mbabane-Rome. Swaziland, 1998.

reference to customary laws and practices. In modern societies, disputes may be referred to a village or town council or to the Courts. The number of potential adversaries in typical modern-day resource conflicts, and the variety of interests they represent, make the dynamics of such conflicts more difficult to untangle, and the design of effective solutions extremely complicated. Conflicts are multifaceted, with each possible resolution having many implications.

Institutions dealing with land issues often have overlapping mandates but different priorities. If a decision has to be taken on an issue which concerns more than one institution, conflict is inevitable if the decision authority is not clearly defined by law.

With mounting pressure on land resources, the incidence of conflict is set to increase. A recent study of resource conflict in semi-arid Africa by the Overseas Development Institute (Blench, 1996) concluded that an awareness of the nature, causes and potential results of conflicts must be a part of effective development planning.

A conceptual framework for conflict resolution is provided in the FAO Guidelines for Integrated Coastal Area Management and Agriculture, Forestry and Fisheries (FAO, 1998b). There, the term “conflict resolution” is defined as follows:

#### DEFINITION

**Conflict resolution** is a process by which two or more parties improve their situation by cooperative action (informal or formal discussions, court) based on a mutual compromise.

Common conflict resolution structures are:

- ✓ traditional negotiation structures
- ✓ facilitators (neutral position, ground rules, response of and respect for traditional authority)
- ✓ traditional court
- ✓ statutory court

### Setting up the Plan

After completion of the successful negotiation process, the plan for achieving the agreed objective and for related activities can be set up by the task force in collaboration with the other institutions concerned. The appointed task force at each level will be the leading and coordinating group. The details have now to be worked out within a strategic framework such as:

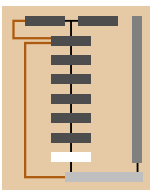
- ✓ objective(s) (long-term and short-term)
- ✓ activities
- ✓ outputs
- ✓ workplan and time schedule
- ✓ inputs (in money and in kind)
- ✓ supporting agencies, groups, etc.
- ✓ assumptions
- ✓ success indicators

The expected output of the land-use plan should be documented in the form of maps, and a report containing tabular information relating the various land mapping units to recommended land use options and presenting supporting recommendations on sustainable land management and environmental protection associated with each option. However, as with the collection of data for the plan, production of the report should be economical of time and expense, and any documentation should be as concise as possible within the broad framework of the terms of reference.

It may be useful to separate the broad land-use plan, with continuing recommendations, from an “action plan”, containing actions to be implemented over a shorter time period, perhaps three to five years (Lesotho Government, 1991). Action plan items should be prioritized using objective criteria such as those in **Box 23**, and specific mention should be made of any external support needed from government or NGOs, so that requests can be linked up with national or sub-national development programmes. Presentation in the form of a matrix showing objectives, outputs, activities, costs and benefits may make projects more attractive to governments or external donors. An example of a simple matrix presentation for village level activities is given in **Box 23**:

BOX 23: Extract from Community Action Plan				
Sector and Activity	Area of Application	Responsible Agent	Priority and Timing	Comments
<u>Settlement</u> Drainage ditches	Ha Rapula village	Conservation Committee	Medium to be completed before September	District Conservation Officer will seek help from Roads Branch on design and finance
<u>Cropland</u> Liming field	Fields in Unit 9 on Land-use Plan	Farmers' Association with District Cooperatives Officer	High Must be completed by early September	Approach Institute of Land-use Planning for finance
<u>Rangeland</u> Establish Grazing Association	All grazing areas	District Range and Livestock Officer	High	Is expected to take more than one year to get operating smoothly

**Source:** Lesotho Government (1991)



## Legislation and Enforcement for the Plan

To achieve the planning objectives, strategies must be pursued which allow for the effective implementation of the plan. Such strategies may involve the use of incentives, regulations or, more commonly, a combination of the two. Incentives may be social or economic, or related to structure or knowledge. As alluded to earlier, the introduction of the integrated and interactive approach to land-use planning may provide a convenient opportunity for government to review its existing policies and strategies for sustainable development and natural resource conservation. **Box 24** gives an example of conceptual goals to which policies and specific incentives may be directed.

### Incentives

Striking the right balance between incentives and regulations is essential if sustainable land management is to be achieved. It is important that incentives and regulations are complementary rather than antagonistic in their effects. Policy contradictions, expressed by antagonistic incentives and regulations, are not uncommon when aims of conservation and production are being addressed.

### BOX 24: Conceptual Goals of SARD\*

- ✓ **EFFICIENCY.** Resources should be used efficiently to achieve the maximum value from any particular input (such as land or labour)
- ✓ **RESILIENCE.** The ability of a system of land use to recover from, or withstand the impact of, a growing or transient stress or shock, such as accumulating salinity or episodic drought.
- ✓ **EQUITY.** The poorest section of the population sometimes has no option but to destroy the environment. However the links between equity and sustainable land use may in fact be more complex and individual cases may have to be examined before equity can be adopted as a focus for policy in this context.

\*SARD = Sustainable agriculture and rural development

**Source:** Adapted from “Sustainability issues in agricultural and rural development policies”. (F.Pétry, Editor). Training Materials for Agricultural Planning. No.38, FAO 1995a.

The overriding incentive is security that expectations will be met and will not be adversely affected by war or civil disturbance. Strife undermines any possible incentives for investment of labour or capital either in production or in conservation of natural resources. Clearly, peace is the most essential ingredient of the enabling environment for land-use planning and for establishing sustainable land use. Other incentives can be broadly divided into those promoting production and those promoting conservation. It is important to ensure that individual incentives are mutually complementary rather than antagonistic.



One of the justifications for subsidizing soil conservation is that a single farmer may pay the costs, but a much larger number of people may stand to benefit. In cases where the benefits of soil conservation can be realized directly through maintaining crop yield levels which would otherwise decline, further incentives may not be needed (Stocking and Tengberg, in press).

Land policy must also take account of the increasing importance of the private sector in taking over many former government functions in the supply of services to farmers and in the marketing of produce. Incentives and regulations should aim to stimulate the growth of this private service sector while protecting the rights of farmers.

## Legislation

### *The Role of Law in Land Use*

Law is an essential component of land use and land development. It is the body of rules, customs or practices that determines how the members of a group behave toward each other. Law creates both social order and defines the management framework within which a group uses natural resources to create life-sustaining enterprises.

Laws establish rules and procedures through which stakeholders can resolve conflict and reach agreement while implementing the plan or policy. The fora and institutions, for example public meetings and task forces such as government boards, legislatures and technical departments, enable the stakeholders to analyse information constantly, debate issues and make decisions, and create a body of land law and regulation.

Incentives for compliance may be written into the law itself, or sanctions for non-compliance imposed by an outside source such as the state or village council. A court or tribunal can be used to settle a dispute or determine a remedy. In summary, law comprises agreements and institutions and is a land resource management tool.





### BOX 25: Role of Law in Water Management

“Reforming Water Resources Policy” (FAO, 1995b) included four categories in a policy analysis matrix: planning and analysis, legal and institutional, economic regimes and projects and programmes. Legal objectives were to create an “enabling environment”, set up a legal framework in which rights and obligations in respect of water are clear and which facilitates its rational use, set up institutions and management responsibilities consistent with the strategy and ensure appropriate regulations are in place. Detailed components for each objective are listed below:

Legal framework:	Law clarifying ownership and rights
Institutional reform:	New authorities Coordinating bodies Responsibilities of institutions Privatization
Management structures:	Operation and maintenance reviews Delegation, user groups
Regulations:	Water quality Environmental standards Regulation of private sector Abstraction

#### *The Legal Framework*

Law in planning and management of land resources is designed to improve the capacity of stakeholder institutions to manage their designed resources in a sustainable way. Sufficient legal requirements include a comprehensive package of national legislation to **first** support the establishment of local resource management groups; **second** to provide pro-active technical support from government through a national land resources management working group; and **third** to ensure that appropriate fora exist for monitoring and enforcement of land-use decisions. Detailed legislative policy goals, principles and structures for creating this new covenant with user management groups are outlined below. Almost every government will have an existing body of law on land-use and land use planning at local, district or national levels. The framework presented here is not aimed at replacing existing law. Rather, it is a guide to evaluate the effectiveness of existing law and institutions in generating an interactive process with stakeholders at local level. Even the most sophisticated legal schemes may fail to consider the full range of stakeholders or account for all sectors affecting land. On the other hand, governments lacking legal tools to integrate local users may find this proposal an appropriate solution for filling in the gaps.

#### *Legislative Policy*

Integrated land-use law has four main policy objectives:

- ✓ the protection of the environment
- ✓ ecological stability of the farming systems
- ✓ meeting long-term basic needs of the population for self-sufficiency in food and other agriculture products
- ✓ contribution to economic growth at the national and local levels



### *Legislative Principles*

Ten principles guide the law-making process.

- ✓ Consciously identifies and includes resource users, especially women and future generations, as the primary stakeholders in land-use planning.
- ✓ Describes the rights and duties of stakeholders; empowers stakeholders with clear authority, jurisdiction and responsibilities.
- ✓ Recognizes the importance of traditional agricultural practices and knowledge and supports their evolution through decentralized resource management.
- ✓ Legitimizes a process by which information flows from the resource users on needs and to the resource users for support.
- ✓ Provides institutional fora for stakeholders, policy-makers, administrators and others in authority to discuss, negotiate and make decisions on conflicting land-use needs and priorities. Uses the fora to identify both incentives and constraints to production and conservation.
- ✓ Develops a regulatory framework for implementing agreed upon management plans and rules.
- ✓ Shares and distributes decision making authority and power of enforcement at levels most responsive to local needs.
- ✓ Provides ready access to reliable and qualified adjudicatory systems.
- ✓ Recognizes the legal relationships among local land and water use, national agricultural, fiscal, economic development and environmental policy and regulations and international obligations. Creates an institutional structure that integrates these issues into land-use planning and decision making.
- ✓ Makes use of parallel institutional structures that support economic development, including off-farm, private sector development, as an essential component of improved resource management and conservation.

### *Legislative Structure*

The proposed legal and regulatory framework consists of three interrelated laws. The **first** establishes and empowers local level, resource management groups to negotiate, make and enforce land-use rules (see Enabling Legislation below). The **second** sets up an institutional network for interagency cooperation through a working group at the national level for departments concerned with land-use issues. It ensures that information flows to and from technical sources on local needs and that appropriate policy decisions and reform are responsive to those needs (see Inter-agency Support for Local Groups below.) The **third** establishes a national oversight board or committee to strengthen enforcement of sustainable land-use management decisions and offers suggestions for improving dispute settlement procedures and resolving land related conflicts and claims. The necessary elements and requirements for each law, and options for accomplishment, are presented below. Policy-makers may find that existing legislation can be used or revised to accomplish interactive land-use planning goals. Others may choose to implement the entire package at once or in stages. The interagency coordination law, for example, could be used to establish a task force on implementation that could then be converted into a permanent coordinating body once proper legislation is in place. The requirements proposed need to be incorporated into a comprehensive and integrated legal package of support at the national level in order for the approach to be most effective.

An example of a local by-law is given in **Box 26**.



### BOX 26: Regulations Governing the Use of Fire on the Rangeland

The following by-laws governing the use of fire on rangelands were written and accepted by Mbume Silalanda Committee (Zambia) as well as the residents of Mbume area, and later verified and endorsed by the Royal Establishment and government institutions

- LAW 1: The community appoints the Natural Resources Committees at Village, Silalanda and Silalo level, which is also the fire authority.
- LAW 2: The fire authority has the duty to educate the community members on proper utilization of fire and to inform them about by-laws, coordinate making fire breaks.
- LAW 3: The committee of fire authority is responsible for the utilization of the fines or resources and is directly accountable to the committees.
- LAW 4: Indiscriminate burning of the rangelands by an adult is an offense. The culprit is fined an animal (cattle) which is in-calf or an ox fit for inspanning OR to pay a sum of K50 000 OR an equated punishable fine which should be used for the development of the area. This law is applicable to by-passers as well.
- LAW 6: Approved time of burning the rangelands
- ✓ Forests (Mushitu) and savanna (Musheke): May to end of June
  - ✓ Plains (Libala): October to November (after the first rains)
  - ✓ Likanda: November interchangeably (i.e. each year a different Sikanda)
- LAW 7: If fire starts close to a settlement (e.g. village) and nobody is answerable, then the whole settlement should be fined K50 000 OR an animal (cattle) which is in-calf or an ox fit for inspanning OR an equated punishable fine which could be used for the development of the area.
- LAW 8: Any person in the vicinity of a fire which is potentially dangerous to life or property is obliged by law to assist in the control of such fire. Failure to abide by this law is an offence which is finable an animal (cattle) which is in-calf or an ox fit for inspanning OR pay a monetary sum of K 50 000 OR an equated punishable fine which could be used for the development of the area.
- LAW 9: Anyone can arrest without a warrant and take the culprit to the nearest fire authority.

*Note: K 50 000 = US\$ 53 (November 1995)*

Policing the use and management of land should be seen as a last resort, and the most effective laws will have the support of at least the majority of the population. However it is important that the resources and mechanisms for law enforcement, for prosecution of offenders, and for arbitration, exist if land protection laws are to be effective deterrents to misuse of land. Also required are a general willingness to uphold the law on the part of the population, and reasonable access to law for all stakeholders.

Effective plans are most likely to emerge when local, sub-national and national policies are complementary and supportive. An example of the provincial planning supporting local and national level initiatives to manage natural resources is shown in **Box 27**.



**BOX 27: Local and Provincial Groups Working Together in the Philippines**

With support from the Sustainable Agriculture and Natural Resources Management Collaborative Research Support Program, the Lantapan Municipality, Bukidnon, Philippines, organized a Natural Resource Management Council and with the facilitation of a full-time staff member began the participatory process of developing the municipality's natural resource management and development plan (NRMDP)—the first of its kind in the province of Bukidnon. The NRMDP details the municipality's research and development directions toward conservation of its natural resource base and its restoration. It includes actions for policy making and capacity building. The NRMDP recognizes that partnership among the local people, policy-makers and the various projects/programmes operating in the community is the key to ensuring its full implementation. The Lantapan Government's initiative to set in place the NRMDP reinforces its response to the 1991 local government code which transfers administration responsibilities from national to local government. Lessons evolving from the Lantapan experience provided a vital input to the provincial government's planning and development office where policies are created related to sustainable development. As a result, the provincial planning and development office, for example, is introducing a policy requiring municipal governments to invest in upland resource conservation activities if they want to pursue programmes and projects in the lowlands such as irrigation systems and potable water supply.

*Matching of Land Use and Land Tenure Structure*

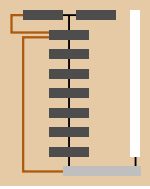
Land-use changes are usually possible within an unchanged system of land tenure arrangements. If, however, far-reaching changes in land use might occur, new instruments are needed to match those land-use options with the present land tenure structure.

Land consolidation and land readjustment are the most comprehensive of all land tenure instruments. They are applied in the development of rural areas for the elimination of deficiencies in the agrarian structure considering the existing ownership, and for matching the land-use pattern with the land tenure structure (GTZ, 1998) (**Box 28**).

**BOX 28: Land Consolidation and Land Readjustment**

- ✓ Regulates the use of land on the basis of a land-use and infrastructure plan agreed upon by all affected institutions and serves to reconcile the interests of regional development, land-use planning and those of the individual landowners.
- ✓ Eliminates deficiencies in the agrarian structure such as the fragmentation of property and the poor development of the project area; thus it fundamentally increases productivity.
- ✓ Regulates the ownership, user and protective rights to land and water and contributes considerably to settling conflicts of use and to harmonization of interests.
- ✓ Mobilizes the change in structure additionally through project-related land banking, lease regulations and efficient regulations for avoiding expropriation in the public's interest such as for the construction of infrastructure and protected areas.
- ✓ Guarantees democratic rules for the active participation of the target group as individuals and as a mutually supportive group (participants in association).
- ✓ Makes a diverse range of land readjustment processes available for the different challenges in rural areas which include the voluntary exchange of land, simplified types of land consolidation and the comprehensive readjustment of the planning area.
- ✓ Creates a comprehensive legal and organizational context for those land developments and infrastructure planning measures which have a far-reaching effect on the ownership structure, such as the following:
  - irrigation projects
  - settlement projects
  - establishment of smallholder plantations (e.g. Sumatra)
  - dams and reservoirs
  - special resource protection projects

**Source:** GTZ, Land Tenure in Development Cooperation (1998)



## Monitoring and Evaluation

There should be continuity between the completion of the land-use plan and the implementation of its various components. A monitoring and evaluation plan should be established which clearly indicates when recommended measures are being implemented and if they are having the desired impacts.

Integrated planning for sustainable management of land resources does not provide a blueprint for rural development but an iterative process for achieving the best possible outcomes based on stakeholder objectives. The plan as well as the implementation phase must be somewhat flexible as it will undoubtedly encounter unexpected externalities or new findings which will directly or indirectly influence the plan.

Having coordinated formulation of the land-use plan, the task force, e.g. at local level the LRMG, is the body best placed to coordinate its implementation and also to coordinate the monitoring of its effectiveness. The task force provides continuity and the link between stakeholder groups and institutions supporting implementation of the various plan components.

Just as planning cannot be left to external bodies, neither can monitoring. To ensure adequately that implementation is going as planned and is achieving the desired outcomes, it is necessary to establish a monitoring and evaluation plan even while developing the land use plan. A participatory monitoring and evaluation plan allows the stakeholders to identify indicators or feedback mechanisms that will let them know if the implementation is successful or not. When stakeholders are designing the monitoring and evaluation plan, they should ask themselves the following:



- ✓ If the implementation is going according to plan and meeting the objectives, how will we know?
- ✓ What will be the key indicators that it is working as desired?
- ✓ How will the key indicators tell us if it is not working?
- ✓ Are the assumptions realistic?

Typically, monitoring and evaluation should be done throughout the implementation process and stakeholders should review and retest the indicators they have already identified and ask:

- ✓ Is the implementation keeping to the time schedule? Do adjustments have to be made?
- ✓ Are the activities proceeding successfully (criteria for success)?
- ✓ What is proving to be less than successful?
- ✓ Is there new information or are there influencing factors (threats, opportunities) that need to be taken into account?
- ✓ What actions and strategies need to be taken to address the new conditions and reform unsuccessful aspects?





Monitoring of implementation of the land-use plan would normally be carried out by the task force, for example the LRMG, in association with technical extension staff, who would record the progress made in implementing the various components (based on the monitoring plan and interviews with stakeholders) and report at regular task force meetings. Progress should also be reported, and publicized, to the community at large, so that particular implementation problems and possible remedial measures can be discussed and appropriate action taken. It may be necessary to modify the plan or some of its components if they are not being adopted or are seen to be ineffective. As with the planning process, communication and cooperation among the various actors is of utmost importance.

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## 5 - How To Get Started

### SUMMARY

In this chapter the practical steps that are required to introduce integrated planning for sustainable management of land resources in a particular country are described.

### Initiating the Approach

Because the scope of this document is global, it is impossible to cater for all the variations in environmental, socio-economic and political conditions. It is therefore necessary to interpret these guidelines in a flexible and adaptive way that respects and uses particular national circumstances. Nevertheless, the seven key factors provided in Chapter 3 remain common to all introductions of integrated planning for sustainable management of land resources and are essential to its success. To recapitulate these are:

- ✓ a clearly formulated objective
- ✓ a recognition of stakeholders and their differing objectives
- ✓ policy and regulations that create an enabling environment
- ✓ effective institutions at local, sub-national and national level
- ✓ an accessible knowledge base
- ✓ a platform for negotiation
- ✓ a set of planning procedures

### KEYWORDS

- ✓ initial activities
- ✓ time frame
- ✓ introductory workshops
- ✓ campaign for information and education
- ✓ pilot area
- ✓ countrywide application

It is the responsibility of the government to ensure that these prerequisites are put in place, or that the conditions are created for them to evolve. Partnership between government and people is the key to the success of the programme. Because effective implementation is participatory and built upon local people's initiative, it should be recognized that time spent to engage and gain local support is of inestimable value and of greater importance than the mere speed of adoption of a plan.

The introduction of the new approach into a country will therefore be a gradual process in most cases. Parallel and mutually supportive activities are recommended to achieve a successful outcome as shown in **Figure 14**.

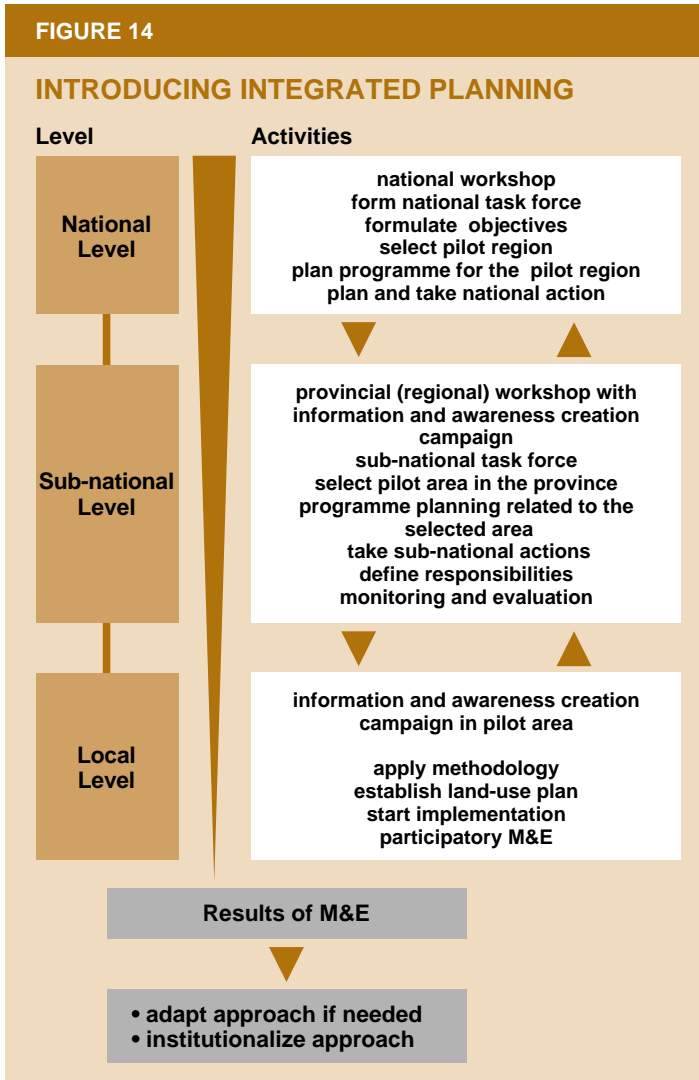
At the national level, an introductory workshop will be held. Those invited include representatives from ministries concerned with land and land-use related matters, representatives from the sub-national level, potential donor organizations, NGOs and other interested institutions. The objectives of this workshop are to create awareness about land-use issues in the country, to formulate related objectives and to establish a coordinating committee - the task force. Attention will be given to facilitating various institutional, fiscal and legal reforms to create an enabling environment. In addition, a pilot district is selected, a programme of action in this district developed, and responsibilities discussed with the district representatives. The linkage between the national and the sub-national task force has to be established and formalized. An efficient M&E system is set up.

After the national workshop, activities at sub-national level are undertaken. A workshop informs people at this level about the results of the national workshop, and a strategic plan of action is developed. Participants should come from relevant district institutions (e.g. line departments, local farmer associations), NGO representatives at local and national levels, and potential donor organizations. In addition, the task force has to be established and responsibilities discussed. During the workshop, a pilot area within the region or district is selected.

### BOX 29: Learning by Doing

It is all but impossible to learn to fly an aeroplane by simply reading instructional books. While this kind of learning is important, you must eventually get in the pilot's seat and practice flying.

**Source:** S. Halpin. 1996. Holistic Resource Management Quarterly. Special Edition. Center for Holistic Resources Management. Albuquerque, New Mexico, USA.



At the local level the process will be initiated by the regional task force with an assessment of the present situation in the rural areas and an awareness creation process using different media (e.g. theatre, newspapers, comics, etc.). This should serve the purpose of informing people at the local level that the government is in the process of national planning which requires people's input and action. After the first meeting, a programme has to be agreed upon to apply the proposed planning methods. Experience from this pilot exercise will guide activities at the national level, and provide the basis for widespread adoption of the approach.

### Time frame

Experience has shown that the planning process should not take longer than eight to ten months. The first phase focussed on initiating the planning process will cover a relatively short time. Workshops at different levels can be held within the first two months, starting with the workshop at national level.

The implementation phase will cover at least two years. The technical part will start after the plan is accepted and formalized. However, some activities can already start in parallel with the planning phase, particularly the creation of an enabling environment by reforming institutional structures and by review and change of policies and laws. This accompanying process needs a relatively long period as any change of policies, laws or institutional structures is inevitably time consuming.

It would be unhelpful to propose a generally applicable time frame for planning and

implementation because it is dependent on the specific situation in the planning area and has to incorporate flexibility. Therefore a realistic time schedule has to be negotiated by the task force and the groups or institutions involved. The M&E system allows adaptation of the time frame for planning and implementation if necessary.

### Introductory Workshops

The first step is to organize a national workshop to discuss the concepts and methods of integrated planning for sustainable land management and to identify and tailor the best strategy to promote its adoption.

This workshop might be arranged on an *ad hoc* basis or hosted by a committee already operating in a related field. All the relevant government ministries should be involved, together with representatives of decision-makers at regional level, local groups, appropriate NGOs and, if possible, the donor community. Among the potential topics for discussion are:



- ✓ the present national approach to land-use planning and land resource management
- ✓ adapting IPSMLR to the specific conditions of the country (including creation of the enabling environment and institutional support)
- ✓ coordination and information exchange among ministries
- ✓ mechanisms for devolving responsibilities to community level
- ✓ ways of constructively involving NGOs in the process
- ✓ opportunities for donor support or technical assistance
- ✓ the next steps for introducing the new approach at sub-national and local level

A direct result of this workshop will be the establishment of a task force to guide the introduction of IPSMLR in the country. If possible, an existing body should be entrusted with these responsibilities. If not, a new body has to be created (chapter 4).

The task force at national level should be made up of policy- and decision-makers and technical experts from government departments concerned with food production, agriculture, rural development, fisheries, forestry, the environment, public works and planning. In some countries, traditional community representatives and officials from NGOs will also play an important part. The task force must also have expert support in the field of communications and education, and also access to legal and financial expertise when required. The composition of the sub-national task force should follow the same strategy of membership. The duties of this task force are related to its position as an intermediary between the national and local task forces and they are therefore oriented to provide practical assistance.

The task forces are responsible for setting up a coordinated action-orientated information programme for the pilot area and later on for each part of the country.

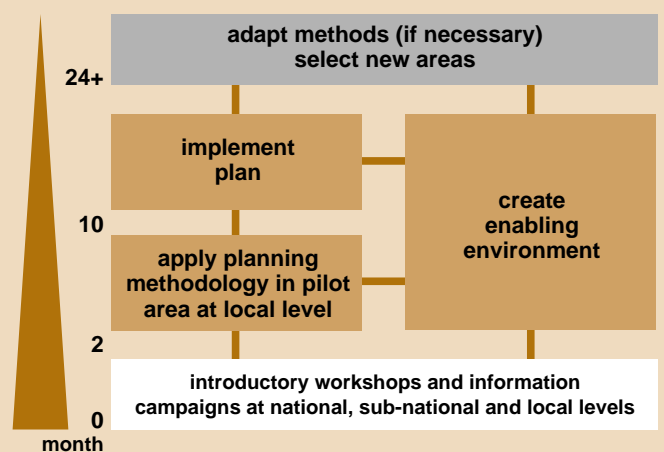
### A Campaign of Information and Education

The aim of the information campaign is not simply to provide information to the people. Its purpose is to set in motion a process by which the land users generate and exchange information, actively participate in discussions and in community-level environmental initiatives, and begin to use the information provided by the government task force through the regional task force. A successful programme will consist of a number of communication activities using a wide variety of media, aimed at persuading people across the country, but also targeted at specific groups, such as indigenous communities, women farmers, youth, or the inhabitants of individual regions such as mountains or wetlands.

The fact that at national level there is interest in addressing land management issues through the empowerment of those who actually manage the land may be conveyed through press releases, posters and radio campaigns. Initiation and publication of studies into the causes of local environmental degradation problems should complement mass media communications. Additionally, information on success stories where environmental degradation is currently being controlled at local level should be publicized. From the very beginning of the campaign, media initiatives should be designed within an interactive framework. The message is that the task force wants to know what the people think, what is working, and what is not working. Phone-in radio programmes and live debates about land resource issues on television can be used both to provide information to a large audience and to allow the people to vet the agenda and participate in discussions.

FIGURE 15

### TIME FRAME FOR PLANNING AND IMPLEMENTATION



Sensitization is important not only to inform people about environmental issues, decentralization of government power and management group formation, but also to generate community interest in the land resources available and build a sense of community by promoting collaborative efforts to improve the environment. Although subsistence farmers are often well aware of land degradation that is happening around them, often as a direct result of their own activities, they perceive themselves as having no power to intervene, contribute or make their voices heard. For the situation to change radically, so as to tap the knowledge, enthusiasm, and work potential of local communities, they must first be aware that they do have the power to make and implement decisions and that they will be supported in doing so. The aim of the sensitization programme is to get the people thinking, talking and organizing activities to improve the management of their land and other natural resources, to inform them of their rights, to enable them to demonstrate their capacities and to begin to support and train them to enhance their skills.



The information programme will be most effective if it works in a practical way as well as on an abstract educational level. Practical, short-term initiatives, proposed by the people to improve the local environment, such as cleaning up wasteland, planting trees, etc., should be promoted during the sensitization phase to encourage active involvement and a sense of potential and achievement.

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One or more pilot areas should then be selected that adequately represent the land management issues and in which the community is willing to get involved in the implementation process.

### Select Pilot Area

The objective of the pilot exercise is to demonstrate an integrated approach to land-use planning which is essentially reliant on the resources available to the village or community, and is not dependent on high technology or expensive technical assistance. Although the geographical conditions obviously differ between villages within the same country and even within the same district, the approach and the methods can be replicated given that the people are trained and committed and that they receive at least the minimum technical support necessary from government.

As outlined above, the selection of the pilot area is a direct result of the awareness creation campaign at national and sub-national level. To ensure that the approach is adapted and can be successfully implemented, a small number of pilot areas should be selected for trials, preferably in two different districts and in contrasting geographical regions or agro-ecological zones of the country. These areas would normally correspond to the land of a village or community. The following aspects should be considered in the selection process. The pilot area should:

- ✓ be located in one agro-ecological zone
- ✓ have a manageable size
- ✓ be representative in living conditions, resources, population, accessibility, etc.
- ✓ have land-use-related problems

In addition, the population in selected pilot areas should also reflect different attitudes towards the campaign. Therefore, it would be appropriate to select at least one area where a positive attitude could be stated and another area where people have reacted reluctantly.

The lessons learned from these different settings will provide valuable input to further implementation. It is anticipated that experience from the pilot areas will guide the policy review at national level, leading to an



improved enabling environment for future planning and management of land resources which most comfortably fits the social and political conditions of the country.

Once the pilot areas are selected, the methods described in chapter 4 can be applied according to the specific conditions. Making a land-use plan in the pilot village is the key element of testing the new approach and training the villagers. It is assumed that, at least for the pilot phase, the LRMG will be guided by the national task force and will need to receive technical and administrative assistance from government personnel at the district or provincial level, or from NGOs. Nevertheless, the techniques used should be participatory, with maximum involvement of stakeholders, and adapt the technical procedures, as far as possible, to a level at which they can be carried out by trained extension or rural development agents.

### BOX 30: Formulating National Strategies for Production

**Strategy:** Identify and remove constraints to production and provide incentives encouraging increased production.

**Action programme:** Identification of constraints and the needs for incentives through surveys and consultation with land users, including the following issues:

#### (a) Economic production incentives

Is the present net reward to producers a sufficient incentive to encourage increased production; if not, what interventions are necessary? What part is played by direct or indirect taxation? Factors are:

- demand and supply situation, contributing factors
- net rewards retained by the producer
- quantification of incentive gap, if existing
- possibilities and points for intervention

#### (b) Land tenure system

Do present systems inhibit or encourage production, and what are the reasons for this? Is land available to all potential producers on conditions which permit and encourage long-term investment in sustainable or increased production? Information will be required on:

- availability of land, land markets
- type and characteristics of present tenure systems
- access to land or the right to own land
- analysis in terms of user control and return on investment
- security of tenure and adequacy of arrangements for settlement of disputes

#### (c) Physical infrastructure

Do arrangements exist to transport produce to markets or is this a constraint? Do cleaning, packing or processing facilities exist where necessary? If not, how could they be provided?

#### (d) Services

To what extent do the following exist, and how efficiently do they operate?

- market structure, availability of price and market information
- production related information (agricultural extension, availability of improved varieties of crops, seeds, inputs)
- credit: is lack of availability or entitlement a constraint?
- planning and management assistance
- land demarcation and registration
- resolution of disputes.

#### (e) Social and other factors

Are there any other factors, for example factors relating to gender, education or social class, which adversely affect production ?



An example checklist for the formulation of possible strategies and action plans to meet policy goals related to production areas is shown in **Box 30**. This evaluation process will consider two viewpoints: the viewpoint of the people in the pilot area and the viewpoint of the members of the task force who initially introduced the approach. Constraints have to be identified and discussed and an improved planning strategy developed in order to overcome them. Positive experience should also be analysed to characterize the components of success and identify new opportunities. Finally the approach has to be adapted according to the results of evaluation of the pilot experience.

### Countrywide Application

Once the approach is applied in the pilot area, the experience and results can be evaluated. Widespread application of integrated land-use planning throughout the country will also depend on the synergy established between the pilot area studies and the activities being carried out in parallel at national level (chapter 5). Successful demonstration of IPSMLR in the pilot areas is essential if the new approach is to capture public support and spread throughout the country. The creation of enabling laws and incentives, and effective institutional support, including empowerment of local institutions, is equally essential. **Box 31** lists guidelines for keeping the introduction of IPSMLR on course.

#### BOX 31: Guidelines for Action

- 1. Involve the Community in managing its own resources**  
 Maintain an active and participatory programme of awareness raising.  
 Provide the resources needed for innovative education, extension, development of regional skills and capacity building.  
 Strengthen and feed a culture of participatory planning, debate, feedback and decision making.  
 Encourage, support, finance 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 caused by legal 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 integrated government policy framework.  
 Identify a suitable departmental or host agency, or collaborating institutions at national level, to foster and provide requirements for the development of LRMGs, regional land resources planning groups, and the national land resources 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.

It is important that land-use planning is integrated at the various levels of government, and that the linkages between land-use planning at national, sub-national and village level are transparent and obvious to the stakeholders. Given this mutual understanding, the preparation of an Indicative National Land-use Plan, or the incorporation of land resource concerns in a National Environmental Action Plan should act as a stimulus to land-use planning at the local level. These Plans indicate the geographical, administrative or sectoral areas affected by their strategies and programmes and thus reveal opportunities for villages to obtain additional resources that become available when such programmes are implemented.



The IPSMLR process is easily replicable and positive experience of application in the pilot areas should lead to its rapid spread if there is a very clear partnership between the government and the people. Governments should be seen as promoting a popular policy, which effectively empowers local people and gives them a greater degree of control over the resources on which their livelihoods depend. Ultimately, IPSMLR benefits individual land users whose livelihoods and quality of life are dependent on the land. At the same time it provides long-term benefits from the conservation of natural resources, which also fulfill country commitments to the plan of action of the UNCED Earth Summit and subsequent conventions on desertification, climate change and the preservation of biodiversity.

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In collaboration with UNEP, FAO has developed an improved planning framework for land resources development and management that addresses the problems recognized during the United Nations Conference on Environment and Development in 1992 in Rio de Janeiro (Brazil).

This document is the last in a series of three publications which introduce these new concepts and propose an integrated planning approach for sustainable management of land resources based on an interactive partnership between governments and people. The approach is centred on the concept of stakeholders and their objectives, and the role of government in creating the conditions within which rural people can use their land resources productively and sustainably.

Several examples from different projects worldwide illustrate the importance of the key elements of the approach in creating an enabling environment that makes it possible to address the common concern to manage land sustainably for the benefit of present and future generations.



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