A Self-learning Course

Planning and Managing Forestry Research
Volume II

Module 2
Initial Steps in Strategic Planning

Module 3
Identifying Key Issues for Forestry Research

Module 4
Producing and Disseminating the Strategic Plan
The initial version of this self-learning course was developed by Dr. Allen L. Lundgren, Mr. Scott J. Josiah, Dr. Hans M. Gregersen, and Dr. David N. Bengston at the University of Minnesota, College of Natural Resources, Department of Forest Resources, in collaboration with the International Union of Forestry Research Organizations (IUFRO), Special Programme for Developing Countries (SPDC), and with the advice and assistance of experienced forestry research managers around the world (see the course guide for more detail on the course development).

The course is available from:

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October, 1994

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A SELF-LEARNING COURSE

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Planning and Managing Forestry Research
A Self-learning Course

Module 4
Producing and Disseminating the Strategic Plan

International Union of Forestry Research Organizations
Special Programme for Developing Countries
Vienna, Austria
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Once you have identified the key issues, and established research priorities, the next step in the strategic planning process is to develop strategies to address those strategic issues and achieve the research goals and objectives that have been established for your organization. This is an important step in the planning process, because it seeks to outline what actions will be needed to achieve the goals you have set.

The final step is to formalize the strategic plan. This may or may not be necessary, depending upon the intended use of the plan. Remember, the most important part of the strategic planning process is strategic thinking and acting, not necessarily preparing a formal strategic plan. However, organizations often find it helpful to condense their strategic planning results in one document to assist in periodic monitoring activities, for public relations purposes, and as a blueprint for guiding organizational change.

This module will help you develop practical strategies for addressing your organization's high priority research areas. It will help you design a format for the strategic plan, as well as provide some advice on obtaining formal agreement and political and public support. Formal acceptance will enhance legitimacy of the strategic plan and of any subsequent strategic actions which may follow. Lastly, we'll discuss the importance of periodic updates to the strategic plan, primarily by monitoring changes in your organization's internal and external environment, and methods to adapt the plan to these changes.
Skill & Knowledge Assessment

Module 4 - Producing and Disseminating the Strategic Plan

If you would like to find out how much you improve your skills and knowledge by studying this module, we suggest that you complete this exercise before beginning the module. This will establish your current level of skill and knowledge about the topics covered in this module. At the end of the module there is an identical skill and knowledge assessment form which you can complete once you have finished the module. By completing and comparing the before and after assessments, you can determine the extent to which you have improved your skills and knowledge.

Below are listed a number of skill and knowledge statements derived from the objectives of the study units in module 4. These are identical to those listed for this module in Study Unit 0.3 - Self-assessment of Training Needs, which you may have completed initially to guide your course of study. Please read each statement carefully and indicate with a checkmark the level that best describes your current skill or knowledge, from 1 to 5, using the following descriptions:

1. I cannot perform this skill, or I have not been exposed to the information.
2. I cannot perform this skill, but have observed the skill or have been exposed to the information.
3. I can perform the skill or express the knowledge with assistance from others.
4. I can perform the skill or express the knowledge without assistance from others.
5. I can perform the skill or express the knowledge well enough to instruct others.

<table>
<thead>
<tr>
<th>Skill or Knowledge Statement</th>
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<tbody>
<tr>
<td>a) Describe a 5-step process to identify strategies that will address previously identified important forestry research issues, or that will help your organization to achieve high-priority research goals.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>b) Describe the most commonly included elements of a strategic plan, and why they are important.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>c) Develop a format for a strategic research plan that is appropriate for your organization.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>d) Describe the importance of continuous interaction with policy makers, funding agencies, research users, and other key stakeholder groups to gain and retain political and public support for your strategic plan.</td>
<td>1 2 3 4 5</td>
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<tr>
<td>e) Describe the types of changes in the external environment and within your organization that could affect future research needs and program activities.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>f) Explain why it is important to update strategic plans to adapt to changing conditions in the external environment or within your organization.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>g) Develop a practical procedure that could be used by your organization to periodically review and update its strategic research plan.</td>
<td>1 2 3 4 5</td>
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Objectives

When you have completed this study unit you should be better able to:

• describe a five-step process to identify strategies that will address important forestry research issues you have identified, or help achieve high priority research goals; and
• use this process to develop practical strategies for addressing these high priority areas of forestry research, including strategies to strengthen research capabilities.

Formulating Strategies to Address Strategic Research Issues and Achieve Research Goals

After determining the forestry research needs of potential users, assessing the external and internal environments that are likely to affect your research organization, determining the strategic issues to be addressed by the research program of your organization, setting research priorities, and determining resource needs, there still remains the job of formulating strategies for addressing strategic research issues to achieve research goals. Strategies are “the pattern of purposes, policies, programs, actions, decisions, or resource allocations that define what an organization is, what it does, and why it does it” (Bryson 1988). Strategies are developed to deal with strategic issues or to achieve goals. They link the organization and its constituent parts to its external environment. In this study unit, we suggest a general approach to developing research strategies that can be used by your organization in developing its strategic plan.

Formulating Strategies to Manage Strategic Research Issues

Identifying key issues for forestry research and setting priorities on these research options are important steps in developing the strategic research plan. However, this process inevitably results in a compromise between what research is needed and desirable, and what research is feasible, given the existing state of knowledge and research capabilities.

Those who are directly involved in the political process, such as legislators and their staffs and high administrative officials, usually are well informed about the general desires and needs of their various constituencies, and are in a good position to set priorities and goals among broad competing areas of development. However, most lack the information needed to develop effective strategies for achieving the goals they desire. They often lack information about the specific needs of the varied potential clients for the
results of forestry research. At best, direction from the top can only point in the general direction in which they believe forestry research should be headed. Unfortunately, research suggestions that come from the top legislative and/or administrative levels may not be feasible, given the human, physical, and financial resources available, the current state of knowledge, and the knowledge of what can and cannot be done within the constraints of the time and resources available. Further, such top-down suggestions may be driven more by the knowledge of new funding sources and topics of current interest to legislators, policymakers, and top level decision makers than by knowledge of the needs of various client groups.

In contrast, those who carry out the research, such as research scientists and their assistants, are often well aware of the state of scientific knowledge, and of their own capabilities. They also know what kind of research program is most attractive from their viewpoint and the viewpoint of their peers in their particular field of science. However, research suggestions that come from research scientists may not take into consideration the broader aims and goals of government, the limitations imposed on funding by competing government programs, and the particular kinds of forestry research results that actually can be used by potential clients to solve their operational problems in practice.

Potential clients for the results of forestry research may be well aware of many of their needs for information and new technologies, but be less well informed about the capabilities of existing forestry research organizations to meet those needs. They may be unaware of how research might be able to help solve their operational problems.

Thus, in developing strategies for addressing high priority research issues, it is essential to find some way to promote the interaction of these competing views of research—the top-down versus the bottom-up development of research programs that involve both the doers of research and the clients for that research. Feasible research strategies that address high priority issues will emerge from an interaction of policy makers, scientists, and research users.

**A Suggested Process for Developing Strategies to Manage Strategic Issues**

Bryson (1988) recommends a five-part process for developing strategies to manage strategic issues. For each strategic issue that has been identified, the following questions should be addressed:
1. What are the practical alternatives the organization might pursue to address a particular strategic issue?
2. What are the barriers to carrying out these alternatives?
3. What major proposals might be pursued to achieve the alternatives directly, or to overcome the barriers?
4. What actions must be taken within the next year to implement the proposals?
5. What specific steps must be taken within the next six months to implement the major proposals and who is responsible?

The purpose of these questions is to clarify exactly what has to be done, and who has to do what by when, in order to effectively deal with each strategic issue.

For example, suppose a strategic issue facing a research organization (posed as a question that the organization can address) is: How can we best recruit and retain a highly talented and qualified research staff?

**Practical alternatives** to address this particular issue might include:

- better anticipate shortages of trained research personnel;
- simplify hiring practices;
- develop and maintain close ties with universities to identify potential researchers for recruitment; and
- improve the system of rewards and incentives for researchers to increase retention of researchers.

**Potential barriers** to realizing this last alternative, as an example, might include:

- lack of funding to increase researcher salaries;
- the existing civil service system is rigid and limits possibilities for career advancement in research; and
- lack of funding to establish a program of financial awards for outstanding researchers.

**Proposals to overcome these barriers** to improving rewards and incentives for researchers might include:

- establish a program of nonfinancial awards and recognition to reward outstanding research productivity, quality, contributions to technology transfer, etc.;
- provide opportunities for international travel (to attend scientific conferences or training courses) as a reward for productive researchers. Seek funds from international sources; and
- provide nonsalary benefits such as housing to productive researchers. Seek funds from international sources.

The next steps are to identify the specific actions that need to be undertaken and assign responsibility for carrying out the strategy.
to an individual or ad hoc committee. Alternatively, the planning team may address only the first question—identifying practical alternatives to deal with a strategic issue—and assign a key staff member to follow up on one or more of the alternatives as part of the implementation of the strategic plan.
Please read the situation analysis presented below and answer the questions that follow.

**Situation Analysis**

Imagine that as research manager, you have identified a number of strategic issues facing your organization that must be addressed. One issue among many, which you thought was of particular importance, is:

"How can your organization ensure that the research conducted by your unit addresses local research user needs?"

The questions below reflect the five-step process for formulating strategies to address strategic issues. Please answer the questions below as they pertain to the local needs strategic issue already identified:

**Activity 1**

What are some alternatives, dreams, or visions your organization might pursue to address this strategic issue of addressing local needs? Use your imagination when you answer this question!

**Activity 2**

What are the barriers to the realization of these alternatives, dreams, or visions?
Some examples of practical alternatives, dreams, or visions that your organization could pursue to better meet stakeholder needs and to address this strategic issue could be:

**Comment 1**

- Initiate procedures such as rapid rural appraisal among target client groups to determine their research needs.
- Conduct surveys among field practitioners and scientists to determine their views on research priorities.
- Develop mechanisms (field days, workshops, meetings, field trips, etc.) by which scientists would have more frequent contact with field practitioners and the targeted clients.
- Use onfarm research methods to ensure the interactions of scientists, field practitioners and extensionists, and farmers.
- Conduct joint meetings with relevant stakeholders on a regular basis to ensure that communication channels are open and used.
- Establish an organizational newsletter to encourage communication between stakeholder groups, and to distill field experiences and research results into an easily readable format.

*We hope you thought of others!*

Some barriers that may inhibit the realization of these alternatives could be:

**Comment 2**

- Staff members, both scientists and field practitioners may lack familiarity with rapid survey procedures such as rapid rural appraisal.
- Some people (particularly scientists) may resent and resist including other input into setting research priorities.
- Scientists may feel they have little time for interaction with field people, and field practitioners may not be motivated to spend time with researchers when they feel the research may not benefit them or their clients (farmers).
- Scientists may strongly resist onfarm research because of concerns about the potential lack of control over the experiments, which could jeopardize their validity.
- Depending upon the polarity between parties, joint meetings between stakeholders may turn into gripe sessions, with each group defending its actions and viewpoints, which could inhibit communication even more, rather than encourage it.
- Funds, personnel, or adequate staff may not be available to generate these changes, as well as to begin new programs such as newsletter production and distribution.
What major proposals or activities might you pursue either to achieve these alternatives, dreams, or visions directly or indirectly, or to overcome the barriers to their realization?
Major proposals that could contribute towards the achievement of these alternatives, vision, or dreams might be:

- Institute training programs to familiarize your staff with rapid survey procedures, such as rapid rural appraisal, to identify research needs.

- Persuade scientists that outside input (particularly from users and field practitioners) into the research agenda setting process is important to the overall usefulness of the research results. Incorporating research application as a criterion in evaluating researchers might be an effective way to encourage collaboration with research users.

- Conduct research that addresses the needs of specific stakeholders to win their support.

- Develop closer working relationships between researchers and farmers to demonstrate that onfarm research can be done fairly rigorously, particularly when there is an open relationship between the researcher and the farmer, and each is convinced that they can benefit from the research. Researchers must learn that there is a place for highly controlled research, and a role for more flexible onfarm studies.

- Funds can be applied for, grants can be found. With a well-organized vision of the future, funds can be obtained more easily.
What major actions with existing staff might be taken within the next year to implement the major proposals?

What specific steps should be taken within the next six months to implement these major proposals, and who is to be responsible for their implementation?
Actions that might be taken by existing staff to implement the above proposals include:

- Identify persons with expertise in rapid rural appraisal (RRA) in either your organization, or another research organization currently operating in your area. Organize a RRA workshop around this specialist for the key stakeholders.

- Conduct formal and informal surveys to determine the extent of research relevance, or irrelevance. Conduct meetings with your staff, and with those of the field offices to solicit input on research priorities.

- Establish research applicability as a criterion for researcher evaluation.

- Make changes in the current research agenda to ensure that all research activities have relevance to stakeholder needs and will be useful.

- Identify particular researchers who seem interested in onfarm research and support their onfarm collaborative activities via improved logistical and administrative support.

- Carefully determine the direction of the research organization, and using the revised research agenda, apply for grants or for improved core funding.

In this case, many of the longer-term (i.e., within one year) actions can be initiated within the first six months. Persons could be assigned as required to accomplish each phase, activity in the process of addressing the overall strategic issue.

We hope this example was helpful to you in understanding how you could formulate strategies to address strategic issues. If you have time, we would suggest that you take a few minutes and think about other strategic issues facing your own organization. Using the process above, how could your organization address these issues?
Summary

This study unit has discussed how strategies that address strategic issues are formulated. Strategies are “the pattern of purposes, policies, programs, actions, decisions, or resource allocations that define what an organization is, what it does, and why it does it” (Bryson 1988). Strategies that are developed to deal with strategic issues or to achieve goals serve to link the organization and its constituent parts to its external environment.

You learned about a five-step process for formulating and clarifying strategies and completed an exercise that explored this process with a fictional example. While utilizing this process can be helpful in the setting of strategies that address strategic issues and that achieve organizational goals, it is important to remember that thinking and acting strategically are essential for forestry research managers to enable them to effectively manage their organization.

If you would like more information about formulating strategies to address research issues, we encourage you to obtain and review the interesting articles identified in the literature cited and other references listed at the end of the module.
**Objectives**

When you have completed this study unit you should be better able to:

- describe the most commonly included elements of a strategic plan, and why they are important; and
- develop a format for a strategic research plan that is appropriate for your organization.

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**Designing a Format for the Strategic Plan**

The intent of the strategic plan for a research organization is to provide a clear sense of direction as to where the organization is going, and a justification as to why this particular direction was chosen. One of the primary uses of a strategic plan is communicating this overview of the research program to others who may not be familiar with the organization in detail and need to obtain only a general sense of the proposed research program. If the strategic plan is to serve its purpose, some care should be given to ensuring that the format of the plan includes all the key elements necessary to describe and justify the proposed operations of the research organization. This brief study unit outlines a format for the strategic plan that includes the key elements that should be discussed in the plan.

**A Suggested Format for the Strategic Plan**

The final written strategic plan should briefly summarize the planning team's efforts. The simplest form for a written strategic plan consists of the final versions of some of the worksheets completed by the planning team (please see Modules 2, 3, and 4), generally with the following components:

- mission statement;
- organizational mandates (formal and informal);
- external opportunities and threats (factors that might affect the direction of future programs);
- internal strengths and weaknesses;
- strategic issues facing the organization;
- strategies to manage the issues (including personnel assignments and a time frame); and
- procedures for updating the plan.

The components need not be in this order, and some may be combined with others. There is no fixed outline for a strategic plan. Each is unique to meet the specific needs of the organization.

Most strategic plans include more than these basic components. Depending upon
the complexity desired, the plan might include some of the following elements (listed in no particular order) in addition to the those listed above (adapted from Barry 1986 and Bryson 1988):

- grand strategy statement;
- statement of research needs, problems, or goals to be addressed;
- strategy statements for organizational subunits or functions;
- description of research program areas and plans;
- staffing plans, including full-time and part-time;
- financial plans, including general operational budgets, capital budgets, expected income, and fund-raising plans;
- plans for implementation strategies;
- a vision of success (a picture of what the organization would look like if it fulfilled its mission and achieved its full potential);
- organizational structure (existing, proposed);
- governance procedures (existing, proposed);
- key organizational policies (existing, proposed);
- stakeholders and relationships;
- assumptions on which the plan is based;
- facilities plans;
- contingency plans to be pursued if circumstances change; and
- other sections deemed to be important.

The strategic research plan will be used to explain, justify, and guide the research program of your organization. To do this effectively, it should provide a simple, clear statement of where the research organization is going with its proposed research, and why this direction was chosen. To make the strategic plan useful, it should be kept as short as possible (usually 10 to 15 pages) so that those who need to know will read it and use it. A lengthy document is likely to remain unread, defeating its purpose. Where detail is needed, it should be placed in annexes to the document, perhaps bound separately from the main plan, for use by those who wish or need to know more. In this way, the main message of the document will not be obscured by less important details.

A key staff person, in direct consultation with the planning team, should be assigned the task of preparing the first draft of the written strategic plan. The draft is then reviewed and modified by other members of the planning team, key decision makers, and possibly by key external stakeholders. After a final review, the plan will be ready for formal adoption and implementation.

The International Centre for Research in Agroforestry recently revised its strategic plan (ICRAF 1993). The contents of the plan is reproduced in box 4.2.1. A full copy of the plan is reproduced as an additional reading at the end of this module.

CONTENTS - STRATEGIC PLAN
International Centre for Research in Agroforestry

SUMMARY

EXTERNAL ENVIRONMENT
- Rural Poverty
- Tropical Deforestation
- Land Depletion
- Resource Conservation and Sustainable Development
- Agroforestry Today
- ICRAF Today

PHILOSOPHY
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- Agroforestry Defined
- Goal
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RESEARCH PROGRAMMES
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- Training
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IMPLEMENTATION and IMPACT
- Programme Structure
- Modes of Operation
- Institutional Collaboration
- Relations with CIFOR
- Capital Development
- Resource Deployment and Needs
- Monitoring and Evaluating Impact

ACRONYMS and ABBREVIATIONS
Please read the situation analysis below.

**Situation Analysis**

Jean, the manager of research for a national forestry resource organization in a developing country, attended an international conference on managing forest research. During the conference, several papers were presented that extolled the virtues of strategic planning as a means of dealing with future uncertainty. Jean was impressed. His organization has experienced serious problems in the recent past, and he felt his organization could do a better job in determining the direction of their research program. Upon his return from the conference, he immediately began to prepare a strategic plan. He didn’t have any guidelines to follow, except he had heard that strategic plans should be short. Three weeks later, he presented the plan to the director of the research organization for his assessment and review.

Jean’s strategic plan, as submitted to the director, follows:

Please read over the plan, looking for weaknesses, and answer the questions that follow.
National Forestry Research Organization Strategic Plan

Mission Statement:
The organization's mission is to conduct forestry-related research that meets the needs of forest users and contributes to national development. The purpose of our organization is to conduct research that contributes to a better scientific understanding of our forest resources, and to develop means to ensure their protection into perpetuity.

In order to maintain harmony and improve research efficiency and effectiveness, the research agenda will in large part respond to the requirements of the government, donor organizations, and the research staff.

Strategic Goal
To initiate and produce appropriate and usable research results that provide solutions for the pressing problems facing the use and conservation of our nation's forests.

The Operational Environment
Our research organization operates within an institutional environment that affects its activities, efficiency, and effectiveness. This environment has been changing rapidly as growing human populations increase pressure on our country's forest resources. Rural poverty is being exacerbated as the rate of population growth exceeds the capacity of the land to provide for these people. This results in migration of rural poor to urban centers, increased cultivation on marginal lands, migration to forested regions, and depletion of the land resource base of smallholders.

The impact of these trends is devastating to human welfare, and to the stability and integrity of the environment. Land degradation and its effects in terms of deforested watersheds, soil erosion, declining productivity and crop yields, floods, sedimentation, and other negative downstream effects are serious problems demanding attention by our research organization. Since other government organizations exist to conduct research in fields related to forest use (agriculture, etc.), and since we have a long tradition of conducting quality forestry-related research, we will build upon these strengths and will continue to focus only on the forestry-related aspects of these problems.

Strategic Objectives
In order to meet the demand for finding solutions to these pressing problems facing the nation's forests, the research organization has determined a number of strategic objectives, as follows:

• to conduct research aimed at improving agricultural sustainability and the conservation of forest resources;
• to conduct research intended to increase our understanding of human/forest interactions, and the development of specific technologies designed to reduce the negative impacts of human use of forest resources; and
• meet the growing demands for forestry research by strengthening our research organization's capacity to conduct forestry research by securing greater funding, increasing the number and calibre of our research staff, and expanding the scope of our research agenda to specifically address the issues and problems facing our forests.

Setting Research Priorities
Our forestry research organization, in collaboration with extension and university personnel, will determine the research agenda by carefully considering and prioritizing the many problems affecting the forestry sector and that require research. Guiding factors will be our organizational mission, goal, objectives, and our organizational capacity to implement the research.
Now that you’ve read over this strategic plan, please answer the following questions. Feel free to re-read the text if needed to complete this activity.

**STUDY UNIT ACTIVITIES**

**Activity 1**

What components are missing from this plan that should have been included?
Comment 1

Missing in this so-called strategic plan are a discussion of the organizational mandates and how they affect the operations of the research organization; a clear discussion of external opportunities and threats, and internal strengths and weaknesses; and a review of the strategic issues facing the organization, and strategies to manage these issues. Finally, there is no mechanism described which indicates how the plan is to be implemented or updated. Jean obviously didn’t fully understand how to draft a strategic plan, or what to include in it. His plan indirectly identified the important issues to be dealt with, but needs much clarification and restructuring.
Are you satisfied with the manner in which Jean presented his research organization's mission, operational environment, and strategic issue management? Note in the space below any changes or improvements that you might make.
Comment 2

We hope you were not satisfied! While the mission statement identified the overall direction and goals of the organization, it lacks inspiration, or a description of its organizational philosophy or values. More importantly, the mission statement is based on a very incomplete stakeholder analysis, and seems to ignore perhaps the most important stakeholders—the users of the research and the local people the research impacts. Jean seems to imply that the organization's primary concern is to serve its donors and ensure its own growth and existence. If this were really the case, the organization is likely to be ineffective in solving the country's problems, and could jeopardize its own long-term survival.

The section dealing with the operational environment seems to be a combination of an informal analyses of internal strengths and weaknesses and external opportunities and threats, often termed a SWOT (strengths, weaknesses, opportunities, threats) analysis. Jean has also mixed in some strategic issues into his discussion. Sorting out the results of the SWOT analysis, as well as separately defining the strategic issues facing the organization is the correct way to format the strategic plan. For more information on the SWOT analysis process, see Study Unit 3.3 - Assessing external and internal environments affecting the research organization.

In the strategic objectives section, Jean combines strategic issues with strategies and management of these strategies. Apparently, Jean feels that the most important strategic issue is organizational expansion, and disregards the information he presented regarding other challenges posed by the operational environment. A clear depiction of the strategic issues, particularly of emerging issues, and the strategies intended to specifically deal with these issues is required.

We intentionally created this situation in order to highlight in a clear way the importance of proper organization and presentation of a strategic plan. Many plans masquerade as being strategic plans, but unfortunately lack the essential components that we have discussed in this study unit.

For a better example of a well-written strategic plan, please refer to the ICRAF Strategic Plan included in this module's appendix.
Strategic plans can vary a great deal in form and content. Informal strategic plans may exist only in the minds of decision makers, mapping out the direction of the organization and guiding them in its management. Or, strategic plans may include only a listing of issues and the strategies to deal with those issues. Formal, complete strategic plans should contain an analysis and discussion of mission, mandates, internal strengths and weaknesses, external opportunities and threats, strategic issues, strategies, and procedures for updating the plan. A formal strategic plan can be useful for assuring legitimacy for strategic actions, and for communications and public relations purposes. They also can serve: (1) as a tool to unify diverse stakeholders and factions; (2) to assist in periodic monitoring activities and in judging strategic performance; and (3) as a blueprint for guiding organizational change.

Regardless of the format, keep in mind that producing a formal strategic plan is less important than thinking and acting strategically!

If you would like more information about structures and formats for strategic plans, we encourage you to obtain and review the interesting articles identified in the literature cited and other references listed at the end of the module, and read ICRAF's strategic plan, which is reprinted for your use in the section on readings at the end of the module.
Objectives

When you have completed this study unit you should be better able to:

- describe the importance of continuous interactions with policy makers, funding agencies, research users, and other key stakeholder groups to gain and retain political and public support for your strategic plan; and

- outline a program of activities to strengthen support for your research program among key stakeholder groups.
Developing Consensus and Gaining Political and Public Support

In order to successfully initiate, plan, implement, report on, and publicize research programs, a research organization must continually interact with policy makers, funding agencies, and the end users of the research. National leaders need to be convinced that forestry research plays a key role in achieving a sustainable national development. Funding agencies must be assured that an organization's research program is consistent with their own goals and objectives. And the research agenda must address the problems and felt needs of the end users and beneficiaries.

Developing a strategic plan that addresses the exacting requirements and needs of many different stakeholders and interest groups is no small task. Research managers should cultivate ties and linkages with policy and decision makers, politicians, user groups, and the public. The key to obtaining political and public support of your research organization's strategic plan is to directly and successfully address the needs of the key stakeholders, and to ensure that key stakeholders participate in the planning process from the beginning.

In this unit, we will explore the importance of obtaining political and public support of the strategic plan. We also will suggest a number of ways to obtain this support, and to assist you in justifying and supporting your organization's requests for funding.

Gaining Political and Public Support

A well-designed strategic research plan is of little use if it cannot be implemented. One of the most critical jobs of the research manager is to gain the political and public support necessary for implementing the strategic plan. In developing strategies to strengthen political and public support for forestry research, several factors should be considered.
Competing effectively for limited funds
Forestry activities within a national government must compete for limited funds with many other governmental sectors—agriculture, health, education, transportation, national defense, to name a few. Each sector has a seemingly endless array of critical needs. In most countries forestry receives only a small percentage of the total budgeted for governmental activities, and can easily be overlooked as being relatively insignificant in the total picture. Forestry research usually comprises only a small percentage of the forestry budget, or of the total scientific research budget. If forestry research managers and administrators are to compete effectively with other interests for scarce funds, they must find ways to help forestry administrators demonstrate how forestry can contribute to national economic development and the improvement of human welfare, and how forestry research can contribute to forestry-related development activities. Expenditures on forestry and forestry research should be justified on their contributions to meeting basic human needs, such as food, housing, adequate water supplies, and a clean environment, both now and in the future.

Understanding the formulation of political agendas and policies
To become more effective in the national arena, and become more visible in national priorities, forestry research administrators and managers need to understand how political agendas and national policies are set. This understanding will enable them to become more effective in bringing the needs and potential contributions of forestry in society to the attention of higher level administrators, legislators, and the public at large. Many in forestry research management and administration began their careers as scientists within forestry research organizations, often as physical or biological scientists. Some may feel uncomfortable about becoming active in the political arena. Others may enjoy it. Regardless, forestry research managers must become more aware of the political agenda-setting, decision-making processes within their societies, so that they can become more effective in influencing resource programs and policies regarding forestry research.

Publicizing contributions of forestry research to national goals
It isn’t enough to know how forestry research and forestry can contribute to sustainable development, and how the political process works. Forestry research administrators and managers must make policy makers and political leaders more aware of the
roles forestry can play in sustainable development. They must be convinced of the importance of forestry research and its potential contributions to the sustainable economic development of the nation. Research managers also must be able to generate widespread public support for forestry programs and activities. Generating public support may require investing more effort in widely publicizing forestry activities and their contributions throughout society, rather than concentrating primarily on scientific publications. Overall, this may be one of the more important and time-consuming tasks of the forestry research manager.

If the strategic plan is to be useful in gaining political and public support, it must be distributed to those whose support is sought. The plan itself may be sent directly only to a few key supporting groups who have the interest and need to read such a document. Short summaries and brief descriptions of the program may be sent to various news media for broader public information. Personal contacts with key groups by research managers and administrators may be one of the most effective means to make the plan more widely known and to gain the necessary support.

Relating research programs to concerns of stakeholders
Every stakeholder group faces a number of critical issues that affect their concerns and interests. With limited resources, they often must make hard choices as to which issues they should support, and how much time and funds they should devote to each issue. They must be convinced that the time and effort they devote to supporting the research program of a forestry research organization will pay off in terms of their interests and concerns. In order to gain the support of any interest group, the research manager must first identify the major concerns of that interest group, and then be able to show how the strategic research program addresses those concerns (see Study Unit 2.3 - Identifying stakeholders and their concerns). In order to gain an interest group's support, the research manager must develop information about how the research program is likely to affect each interest group's concerns. This information must be conveyed to the interest group through discussions and personal contact to convince them that this is important to their concerns.

Maintaining Political and Public Support
While it is necessary to gain political and public support for your strategic plan of research to ensure its acceptance and adoption, it is equally important to maintain that support as the program is implemented. This is a continuing responsibility of research management.
Having once gained the support of influential political constituencies, there is a temptation to assume that this support will continue over time. However, these different stakeholder groups often have many concerns, and must confront a number of issues that are important to their interests. There is no guarantee that they will be ready, or even willing, to support your organization’s forestry research activities in the future without regular periodic contacts to discuss how the research program activities are likely to affect their interests. Personnel within interest group organizations change, and new personnel may be unaware of, or be less sympathetic to, your research program and how it relates to their concerns. New issues arise, and priorities within interest group organizations change. As a research manager, you should be in regular contact with your political constituencies to be aware of changes within the groups that may affect their support for your activities, and to reaffirm that support from time to time.

We live in a dynamic world that can undergo substantial change in a relatively short period of time. As economic, social, and political changes take place, new political constituencies emerge, and the political and economic balance of power shifts. Research managers must keep abreast of such changes, and continuously reassess their support base. New environmental and resource issues emerge that may have to be reassessed in terms of their relevance to the existing program of research. Old sources of funding may stagnate or decrease, and new sources may appear, requiring a reassessment of existing research plans. Key personnel, around which segments of your research program are based, may leave, creating gaps in capabilities. New research capabilities may be developed within the organization, through recruitment of new research talent or training and education of the existing staff. For any of these or a number of other reasons, it may be necessary to change or modify the research program of your organization. Research managers must be alert to these changes, and keep key political constituencies informed about external and internal changes that may require changes in their research programs.

**Developing Consensus**

In order to gain political and public support for a strategic program of forestry research, those who must eventually approve and fund that program must be convinced that the proposed research program is feasible, will be completed as planned, and will produce results that will help meet high priority needs of society. Such support can best be achieved by developing a consensus among all of the research stakeholders regarding the
appropriateness and potential usefulness of the proposed program of research. If there is broad agreement about, and support for, the research program among stakeholders, there is more likelihood of developing the political and public support needed to implement the research program laid out in the strategic plan.

There also is a need to develop a consensus regarding the proposed research program among the research administrators, managers, and scientists who will be involved in justifying, administering, managing, and doing the research. Their support is essential to the success of the program. Before they wholeheartedly give their support, they must be convinced that the proposed research program is desirable and feasible. Their input throughout the planning process is essential to ensure their support of the final product.

Before research results can be considered effective, they must be adopted and used to change the ways things are done. If the results of the proposed research are intended to be used by forest managers and users, then it is important that these people are convinced that the proposed research will be useful and will meet their needs, and are willing to adopt and put into use the results produced. These user groups are more likely to support the proposed research program if they participate in developing the strategic plan of research so that their viewpoints can be incorporated into the plan. There also is a need to consider the interests of others who may be affected in one way or another by the adoption and use of the research results. Since there is a diversity of interests among the potential clients of forestry research, there is a need to develop a consensus among potential users of the research, as well as others who may be affected directly or indirectly by their use, as to the usefulness of the research.

Achieving a consensus regarding a program of forestry research among the research staff, users, and others is a difficult, but important job of the research manager. It may not be possible to reconcile all of the conflicting views as to what research can be and should be done. However, it is important to understand and weigh the viewpoints of all of the major constituents of forestry research, even if they all cannot be accommodated in the final strategic plan. Their support of the proposed research program may be critically important when justifying the program to those who are likely to fund it. In practice, some compromises may be necessary in order to achieve a reasonably unified consensus among key constituents as to an acceptable forestry research program that they can support.
We thought it would be helpful to return to the forestry research organization managed by Anita, as depicted in Study Unit 2.4. To refresh your memory, her story is again presented here:

**Situation Analysis**

Anita is the research manager for a national forestry research organization in a tropical developing country. She and her scientists feel they do a good job identifying and incorporating the latest issues facing forest science in her country into their research agenda. She feels proud that her organization's research program is producing large gains in knowledge on the biology of her country's tropical forests and their management. Her scientists are well-known in their disciplines, produce high quality research, and publish their results in international journals. While she feels that the results of their research will eventually be used, Anita grudgingly admits that there is really no mechanism to extend the information to those who could use it, other than through scientific journals.

Her organization doesn't often publish nontechnical reports for the public, since their research deals with complex topics which she feels the public wouldn't understand. Anita doesn't see this as her problem; after all, her responsibility is managing research, and she really doesn't enjoy or have time to deal with the public. She does have a vague notion that she needs to be more in touch with people other than scientists. But she feels that since she sees other natural resource professionals, politicians, and upper-level policy makers at social occasions several times a year, that should be enough. Again, she's a scientist, not a politician!

So Anita is nearly always surprised and disappointed that, despite her institution's excellent scientific performance, it nevertheless constantly (and unsuccessfully) struggles to acquire adequate funding to implement its research agenda. Her institution is, in fact, severely underfunded by the national government, particularly for core funding. She submits her budget each year and meets all the requirements and deadlines, yet is consistently told that financial resources are limited and that her planned programs must be curtailed. Yet, other programs within the government seem to be expanding in scope, at the same time her's is being cut. She feels that there is little support for forestry research in her country. Lately, she's even been considering applying to international organizations outside her country for core funding to support her research agenda. Anita feels that it's obvious that the major decision makers in her country are incapable of recognizing the importance of supporting forestry research.
Looking at this situation from a strategic point of view, why do you think that Anita is having difficulty obtaining political and public support for her organization's research activities?

Write your response in space below:

If you were an independent consultant hired by Anita to help her improve her relationship with policy makers and the public, how would you advise her to improve her organization's relationship with the public? Write your response in space below:
It should be clear that Anita is not addressing the needs and requirements of key stakeholders of her research organization. She has no idea how these stakeholders (other than scientists) view her research organization, or the criteria they use to judge its performance. Policy and decision makers apparently see little value in the research organization's activities, as evidenced by chronically low funding levels, and its inability to successfully compete for scarce funds with other departments and divisions within the government.

Further, she makes no effort to publicize her organization's accomplishments, or to design a research agenda to meet the needs of key stakeholders. Since the public probably has little idea of the purpose or activities of the research organization, Anita cannot generate public support to convince policy and decision makers to increase or even maintain adequate levels of funding.

This example clearly describes the dangers and risks an organization takes when it ignores the needs of key stakeholders. Anita has not achieved consensus on a research agenda that meets stakeholder needs, in large part because she has no idea what those needs are. Unfortunately, too many forestry research organizations resemble Anita's.

Anita definitely needs some advice. We hope you advised her to improve her linkages and communication with the public to increase public knowledge and presumably public support. Anita could use her organization's strategic plan as a public relations tool to inform the public of the overall purpose, direction, and benefits of the research organization. Distilling research results into simple language that can be readily understood by the public and users would also be appropriate. Making an effort to periodically inform the public of the results of the research activities of the organization and their value to society via the media (publications, the press, radio, television), as well as by public appearances and demonstrations, would also greatly help Anita build public support and create a badly needed constituency for her organization. However, it would be even more effective to ensure that the research program is addressing issues that the public perceives as important, and then publicizing this work.
Activity 3

How would you advise her to improve her organization's relationship with key policy and decision makers? Write your response in space below:

What steps should Anita take to be better able to defend and justify her organization's funding requests? Write your response in space below:

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4. 
To become more effective in the national arena, and to become more visible in national priorities, Anita needs to understand how political agendas and national policies are determined. With this understanding, she can be more effective in informing policy and decision makers of the needs and real and potential benefits of forestry research to society.

Some practical means for Anita to strengthen information flow to policy and decision makers would be for her organization to produce publications that clearly and succinctly present the current and potential values of forestry research to society. In addition, politicians are extremely sensitive to the needs of their constituents—the public. Should some of their constituents become avid and vocal supporters of her organization and its research activities, Anita will be able to bring considerable pressure to bear on the policy setting-funding process. Lastly, Anita needs to cultivate informal channels of communication to policy and decision makers. Personal meetings with key policy makers, government decision makers, and members of other key interest groups could generate more support for the research program. Frequently interacting and working with people from the political realm could provide her with important information that would help her understand their needs and the criteria they use to judge the performance of her organization. It would also help her in formulating and targeting funding requests and justification strategies.

Forestry organizations have to contend with a seemingly endless array of competing critical needs to obtain a portion of very scarce and limited funds. Further, forestry research usually comprises only a small percentage of the forestry budget, or of the total scientific research budget. If Anita is to compete effectively with other interests for scarce funds, she must find ways to demonstrate how forestry can contribute to national economic development and the improvement of human welfare, and show how forestry research can contribute to forestry-related development activities.

Anita’s funding request justifications should be based on her organization’s contributions to meeting basic human needs, such as food, housing, adequate water supplies, and a clean environment, both now and in the future. When making funding decisions, politicians find evidence about the economic returns generated by forestry research helpful in justifying the substantial costs of the programs, and supporting their funding allocations in a public forum. Recognizing this, Anita should explore ways to develop such economic data to support her funding requests.
STUDY UNIT ACTIVITIES

Activity 5

What steps might you take to strengthen support for your organization's research program among key stakeholder groups? Write your response in space below:
Of course, we can’t anticipate exactly what your response might be. However, some general steps you might take to strengthen support for your own organization’s research program among key stakeholders might include:

- gain and maintain political and public support;
- understand the process by which political agendas are set;
- publicize the contributions your forestry research program has made toward achieving national goals;
- directly link the research to the needs and concerns of key stakeholder groups; and
- develop consensus among the key groups, actors, and organizations regarding the research program and agenda.
Summary

A well-designed strategic research plan is of little use if it cannot be implemented. One of the most critical jobs of the research manager is to gain and maintain the political and public support necessary for implementing the strategic research plan. Achieving consensus among key stakeholders on key issues and strategies is essential to obtaining political and public support of the strategic plan. An important role of strategic plans is to serve as a “treaty” among key stakeholders, factions, and coalitions (Bryson 1988), that brings these diverse groups together to hammer out a consensus.

Obtaining political and public support, and achieving consensus on strategic issues and strategies, requires that key stakeholders be involved in the strategic planning process from the very beginning. Developing a strategic plan internally, with little input or participation from external stakeholders, followed by later attempts to obtain support, is a sure recipe for failure of the strategic planning process.

If you would like more information about consensus building and methods to gain political and public support, we encourage you to obtain and review the interesting articles identified in the literature cited and other references listed at the end of the module.
Objectives
When you have completed this study unit you should be better able to:
• describe the types of changes in the external environment and within your organization that could affect future research needs and program activities;
• explain why it is important to update strategic plans to adapt to changing conditions in the external environment or within your organization; and
• develop a practical procedure that could be used by your organization to periodically review and update its strategic research plan.

S
Strategic plans are tools to help develop and guide your organization’s research program to respond to critical issues. However, over time, conditions and development priorities change within a country, and research capabilities change as well. New research opportunities and priorities can change within a few years, making the strategic plan more and more obsolete. If the strategic plan is to continue to be of use, it should reflect these changing internal and external conditions. Inevitably, it will need to be periodically updated to take new developments into consideration. This study unit describes some of the external and internal changes that may need to be considered in updating the strategic plan for your organization.

Anticipating and Coping with Uncertainty in Strategic Planning
Every strategic plan is built upon assumptions regarding future events, which cannot be known with any degree of certainty. Inevitably, the future brings about unexpected changes that cannot be foreseen at the time plans are made. In developing strategic plans for research, managers must recognize that change is inevitable. Sooner or later, any plan will become obsolete and will need to be revised to reflect new conditions and new opportunities that arise.

Strategic plans should include provisions for monitoring and evaluating the assumptions built into the plan to see if they still hold, or if changing conditions suggest the need to revise the plan. There is a need to check periodically to see whether or not the objectives stated in the plan are still relevant; whether the clients for the research, and their concerns, have changed in any substantial way; whether the research targets have been met; whether the personnel and resources expected to be available for research have actually been available, and have been used for that purpose; whether the results
expected from research were actually produced; whether the results produced actually reached their intended users and were adopted by them; and whether the adoption and implementation of the research results produced the anticipated results.

Every strategic plan for research should reflect the need to reconsider and revise the plan periodically in response to changes in your organization's external and internal environments. There is no fixed interval at which such a revision needs to be done. Certainly it would be prudent to review the strategic plan at least every five years to determine whether or not it adequately reflects the current situation. At that time a decision must be made as to whether a revision is necessary, based on changes both inside and outside of the organization. In today's dynamic, fast-moving world, substantial changes in economic, social, and political conditions can occur within a relatively short time frame. Changes in key personnel can occur even more rapidly, with potential impact on your research capabilities. It is important to be aware of these changes and anticipate their importance to your research organization and their potential impact on the research program directions laid out in your strategic plan. Some of the changes that may require a revision of the strategic plan include:

**External changes:**

**Changes in societal values and needs.** Changes in the ways in which society values goods and services from forests and views forest-related issues may require changing research priorities to better reflect those needs. For example, to meet an increase in concern for environmental protection, your research organization may have to accelerate and/or expand its research into the environmental impacts of human uses and ways to reduce or overcome those impacts. Similarly, increased concerns about meeting the needs of indigenous or local people, or maintaining biodiversity, may require a new assessment of research priorities. If substantial changes in your organization's research program are required to meet these new needs, it may be necessary to revise your strategic plan. Or, a shift in emphasis to increasing reforestation efforts on degraded lands, or social forestry activities, may require revisions of the strategic plans to address these new directions.

**Changes in government policies.** Changes in government policies that reflect changing priorities may result in changes in economic development programs and objectives. This, in turn, may require a shift in forestry research programs to better address the needs and objectives of these changing priorities. A shift in emphasis in government programs, for example, from job creation to improved environmental protection, may require a shift in research program priorities and a revision in your organization's strategic plan.
The addition of new clients for research. The identification of new clients to be served by your organization's research programs may require revising your strategic plan to ensure that their concerns are addressed by the proposed program of research. For example, a new program to address social forestry may add a number of new clients—villagers, farmers, and rural residents—who previously had not been considered part of your research clientele. Such groups of people are likely to require a different approach to research and dissemination than had been used previously in your organization.

Changed responsibilities and program directions of old clients. If program directions of existing clients change in response to changed responsibilities, the strategic plan may have to be revised to reflect changing needs for research. Thus, for example, if a forest land management agency that formerly was responsible primarily for the management of government owned land were directed to take on new responsibilities in social forestry, including agroforestry and community forestry, then it is likely to require help in developing information related to these new tasks. It may turn to your forestry research organization for help in its new assignment, which would require you to reappraise your own research program and perhaps revise your strategic plan of research.

Changes in research funding opportunities. Opportunities to secure additional funding from new sources or for new research programs may require you to reassess your research opportunities, and develop a new set of research priorities based on the new funding opportunities. Or, if old funding sources decrease or disappear, a reappraisal of research priorities may be required. If the changes are substantial, this may require revision of your strategic plan of research.

Expanding concern about global issues. With an increasing need to rely upon sources of funding from outside of your country, there is also the need to address the issues of concern to them in developing your research program. Many of these concerns relate to global issues, such as global warming, the loss of biodiversity, the preservation of unique ecosystems and wildlife habitat, the preservation of indigenous societies, etc. Although it might be difficult to justify the use of national funding to support research on some of these issues, given the scarcity of such funding to work on national problems, research on these issues may be given top priority by many funding agencies outside your country. In order to secure funding from these agencies, it may be necessary to develop a research program that contains a component of work on global issues, as well as national and local issues.
New scientific discoveries and/or technologies. As new scientific discoveries are made in the various fields of science related to your program of research, and as new technologies become available that facilitate new ways to conduct research, your research program and strategic plan of research may have to be revised to incorporate these changes.

Internal changes:
Loss or gain of key personnel. The loss or gain of key personnel may seriously disrupt an existing research program, particularly in smaller research organizations. Often, small research groups may have only one senior scientist who can carry out research in a particular discipline. If this scientist were to be promoted to an administrative position, or leave for any other reason, the line of research conducted by the scientist may have to be discontinued if no other comparable scientist could be recruited. Similarly, the addition of a qualified scientist with particular skills, knowledge, and interest in a new field of scientific research may present opportunities to pursue research in totally new directions. Any substantial changes in research programs of this nature might require revision of the strategic plan of work.

Changes in the capabilities of personnel. As scientists gain research experience, and additional skills and knowledge through education and training, their capabilities for conducting research increase. Having more capable people on the staff of your research organization may make it desirable to reassess research opportunities and directions. The strategic plan of research may have to be revised to reflect these additional capabilities.

Changes in available facilities, equipment, and other resources. The resources available for research act as constraints on the types of research programs that your organization can undertake. If additional facilities, equipment, or other resources become available, this may make it possible to change the direction and intensity of research programs which, in turn, may require revision of the strategic plan. Similarly, the loss of key facilities or equipment may require program changes that eventually may call for revision of the strategic plan.

The above are only examples of the types of changes in the external and internal environments that might require revision of your organization's strategic plan for research. However, they do suggest the types of factors that should be considered in revising the strategic plan for your organization. For more information regarding understanding and assessing your organization's internal and external environments, please see Study Unit 3.3.
In developing a strategic plan for your organization, some provision should be made for its future revision. This should include specifying periodic assessment of the need for a revision, including when such determinations should be made, and by whom they should be made. An outline of key factors to be considered in assessing the need for changes, perhaps based on those listed above, may provide a systematic approach to determining the need for revision.

**Practical Procedures for Monitoring and Understanding Change**

It should be clear that monitoring the external and internal (organizational) environments is critically important for the development of a proactive (anticipatory) management approach.

One method commonly used by many organizations is called "environmental scanning" (Pflaum and Delmont 1987). Scanning is an information management technique which is formally incorporated into your organization's ongoing activities. The primary task of scanning is to help your organization identify key issues and trends that pose actual or potential threats or opportunities, analyze and interpret the issues or trends, and provide information vital to decision makers and strategic planning.

Scanning is conducted by reading widely across many fields, as well as the major scientific journals in forestry, reviewing conference reports and proceedings (and thus being exposed to the latest ideas and emerging issues of the field), attending task force meetings and conferences, and networking broadly across specialties ("one good informant is worth a thousand theories" [Bryson 1992]). Personnel selected to conduct scanning should be especially adept at integrating seemingly disconnected facts and issues into a coherent picture of the future.

To identify key issues, scanners should (Bryson 1988):

- select issues and trend categories of interest (i.e., political, economic, social, and technological);
- identify appropriate sources of information;
- understand that there is a life cycle to issues and the attention they receive from organizations and the public;
- ask key questions:
  - Is the issue or trend new?
  - Does it come from a surprising source?
  - Does it contradict prevailing wisdom?
  - Is there a pattern to the issue or trend?; and
- develop a simple recording system or scanning report.
The simplest and best way to analyze issues is through group discussion, creative idea generating techniques, and the creation of potential future scenarios.

Scanning is best conducted by persons within the organization and in general should not be delegated or assigned to outside consultants. Scanners should be officially permitted to devote a portion of their time to scanning activities, a policy which requires a high level of commitment on the part of senior management.
Activities

Activity 1

Look back over the past 3 years and describe in the space below any important changes in the external environment that affected your organization’s management and direction. Write your response in the space below:

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Again, look back over the past 3 years and describe in the space below any important changes in your organization’s internal environment that affected your organization’s management and direction. Write your response in the space below:

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In this rapidly changing world, organizations are faced with dramatic changes in their internal and external environments. In forestry research, external changes in populations, forest resource utilization, deforestation and its associated effects, misuse of upland watersheds, national policy shifts, and changes in the institutional environment both locally, nationally, and internationally, all affect the manner in which forestry research organizations operate. Internal changes within the organization could be personnel changes, unionization trends, internal policies and decision making approaches, funding and budgeting, etc.

We are certain that as you think about it, you will generate on your list many changes that have occurred over the past three years, perhaps convincing you of the dynamic age of change in which we live.
Activity 4

Considering your responses to the questions above, how did your organization respond to these changes? Was it well prepared for the challenges the changes posed? How could your organization have improved its response?

Write your response in the space below:

Would you characterize your organization’s current management style as crisis management (often responding to problems seen as crises demanding immediate resolution)? Or do you think that your organization is rarely surprised by change, practices an anticipatory, proactive management style, and invests considerable resources to regularly evaluate how changes, predictable and otherwise, might affect the organization? Characterize your organization in the space below.

Activity 3

Consider how your organization have improved its response. Were your organization prepared for the challenges the changes posed? How could your organization respond to these challenges better next time?
Chances are, your research organization successfully anticipated some changes, and failed to anticipate others. It is impossible to anticipate every change and prepare for it. The strategic planning process recognizes this difficulty, and provides managers with ways to structure their organizations to be prepared for change, even though the exact nature of the changes cannot be clearly perceived. It is important to consider the future impacts of present decisions, and make robust decisions which handle a range of possible futures. Completing the strategic planning process, continually updating the plan to address current conditions, and thinking and acting strategically are vitally important actions organizations can take to improve their response to unexpected changes.

Organizational management styles exist on a continuum, from being extremely unprepared for any changes, opportunities, or threats the organization may experience (reactive, crisis management style), to those organizations that regularly and thoroughly analyze their organizational and external environment for emerging trends and changes and are rarely surprised (proactive, anticipatory management style). Your organization likely exists somewhere between these two extremes, with some room to improve its ability to anticipate change.
Anticipating and addressing future changes that affect your organization is fundamental for continued success. What mechanisms would you establish to formalize the strategic planning process within your organization in order to anticipate and manage change? Write your ideas in the space below:
Comment 5

There are several approaches you could take. First, you could establish a timetable to periodically conduct a SWOT analysis to review the strengths, weaknesses, opportunities, and threats as they affect the organization (for more information on SWOT analyses, see Study Unit 3.3). In addition, you should regularly schedule formal reviews of previously identified strategic issues and their strategies, as well as to identify newly emerging strategic issues facing the organization.

An even more organized and formal approach is to incorporate scanning, or information management techniques, into your organization's ongoing activities. Scanning helps your organization to identify key issues and trends that pose actual or potential threats or opportunities, analyzes and interprets the issues or trends, and provides information vital for decision makers and strategic planning. For more information on environmental scanning, please see the text of this study unit.
Because change is inevitable, sooner or later any plan will become obsolete and thus will need revision to reflect new conditions. All planning is concerned with anticipating future events, which cannot be known with any degree of certainty. Thus, it is necessary to periodically update your research organization's strategic plan to address changes and trends.

Preparing a formal strategic plan is time-consuming and human resource-demanding. It cannot and should not be an annual event. However, once the strategic plan is formalized, limited periodic reviews of the external and organizational environment to keep abreast of change are necessary and appropriate. Using methods such as environmental scanning can improve the efficiency of this information management process, and can contribute to a management style that is proactive, anticipatory, and considerably more effective at dealing with change.

If you would like more information about ways to update your strategic plan in response to change, we encourage you to obtain and review the interesting articles identified in the literature cited and other references listed at the end of the module.
Below are listed a number of skill and knowledge statements derived from the objectives of the study units in module 4. These are identical to those listed in the initial skill and knowledge assessment at the beginning of the module. Now that you have completed module 4, please read each statement carefully and indicate with a checkmark the level that best describes your current skill or knowledge, from 1 to 5, using the following descriptions:

1. I cannot perform this skill, or I have not been exposed to the information.
2. I cannot perform this skill, but have observed the skill or have been exposed to the information.
3. I can perform the skill or express the knowledge with assistance from others.
4. I can perform the skill or express the knowledge without assistance from others.
5. I can perform the skill or express the knowledge well enough to instruct others.

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<tr>
<th>Skill or Knowledge Statement</th>
<th>Your Level of Skill or Knowledge</th>
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<tr>
<td>a) Describe a 5-step process to identify strategies that will address previously identified important forestry research issues, or that will help your organization to achieve high-priority research goals.</td>
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<td>b) Describe the most commonly included elements of a strategic plan, and why they are important.</td>
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<td>c) Develop a format for a strategic research plan that is appropriate for your organization.</td>
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<td>d) Describe the importance of continuous interaction with policy makers, funding agencies, research users, and other key stakeholder groups to gain and retain political and public support for your strategic plan.</td>
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<td>e) Describe the types of changes in the external environment and within your organization that could affect future research needs and program activities.</td>
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<td>f) Explain why it is important to update strategic plans to adapt to changing conditions in the external environment or within your organization.</td>
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<tr>
<td>g) Develop a practical procedure that could be used by your organization to periodically review and update its strategic research plan.</td>
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LITERATURE CITED: MODULE 4


ADDITIONAL SOURCES OF INFORMATION


READINGS FOR MODULE 4

The following reading has been selected to provide you with additional information related to the material covered in module 4. We hope you will find it of interest.

ICRAF: THE WAY AHEAD

Strategic Plan

May 1993
Preface

The purpose of this strategic plan is to outline the way in which the International Centre for Research in Agroforestry (ICRAF) intends to develop its role as a CGIAR centre with a global responsibility for agroforestry.

Many people have contributed to this plan, far more than we could ever list, or thank individually. The concepts and issues have been extensively discussed by ICRAF staff, ICRAF's Board of Trustees, Donors, the Technical Advisory Committee (TAC) of the CGIAR, and scores of ICRAF's research and development partners.

The plan builds upon an earlier document, ICRAF: Strategy to the Year 2000, which was published in 1990. That earlier strategy formed the basis of a first draft which was presented to TAC in June 1991. After incorporating TAC's comments, a second draft was presented at International Centres Week in October 1991. More amendments followed, and during the early part of 1992, a third draft was presented at three consultative meetings held in Africa, South-East Asia and Latin America. At the same time, copies were distributed widely to those Donors and ICRAF partners who were unable to attend any of the three meetings.

After this intensive review, a fourth draft was prepared and presented to ICRAF's Board of Trustees at its March Annual Board and Donor Meeting. At this meeting, with minor modifications, the Board approved the fifth version of the plan for wider distribution, which was published as a 'Final Draft' in April 1992. About 2000 copies were distributed. This final version reflects many of the comments that were received during the year, including those which arose during the course of ICRAF's External Programme and Management Review and the preparation of ICRAF's Medium-Term Plan 1994-1998.

In brief, the approach presented describes ICRAF's development into a strategic research centre in the CGIAR. ICRAF's roles and responsibilities are wider than before and include: a rapidly expanding research and dissemination role in Africa, Latin America and South-East Asia; a more explicit strategic research agenda and an active interface and collaboration with the Center for International Forestry Research (CIFOR), and other international, regional and national research institutions.

ICRAF's Board and Management are keen to retain the innovative and integrated approach to research and institution strengthening, which has characterized ICRAF in the last ten years. It is ICRAF's conviction that this approach will be a major contribution to the CGIAR.

George Holmes   Pedro A. Sanchez
Chairman, Board of Trustees      Director General

May, 1993
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Summary

This document outlines the way in which ICRAF intends to develop its new role as a CGIAR centre with global responsibilities in agroforestry over the next decade. The approach stems from ICRAF’s distinguished history as a catalyst for agroforestry research and its natural evolution from a Council to a Research Centre.

ICRAF’s definition of agroforestry and its mission statement are as relevant today as when they were developed. Although farmers of diverse socio-economic levels can practise agroforestry in any climatic regime, ICRAF will concentrate its activities on three critical agro-ecological zones in the tropics — the humid, sub-humid and semi-arid. These are the areas where essential increases in food and fibre production must be obtained in ways that mitigate the major ecological threats of deforestation and massive land depletion.

Agroforestry technologies have the potential to provide sustainable alternatives to the practice of shifting cultivation and to ameliorate the secondary forest fallows and grasslands that follow in its wake. In sub-humid savannas and woodlands and in the semi-arid tropics, they can also play a decisive role in increasing the agricultural productivity and sustainability of small-scale farming systems. In these agro-ecological zones, agroforestry technologies can prevent soil erosion, bring a halt to deteriorating soil fertility, and provide food, fuelwood, building material, fodder and numerous other valuable products that have the potential for generating additional income.

ICRAF’s philosophy embraces several concepts and approaches. It is oriented to systems and problems; it draws on the expertise and knowledge of many disciplines; it is driven by beneficiaries and is responsive to them. ICRAF’s mode of operation is collaborative in action and, in scope, focuses on agro-ecological zones. Very close collaboration will take place with the following institutions: the Centre for International Forestry Research (CIFOR) on tropical forestry; the International Plant Genetic Resources Institute (IPGRI) on germplasm; the International Food Policy Research Institute (IFPRI) and the International Service for National Agricultural Research (ISNAR) on policy and institutional issues; and CGIAR Centres focusing on specific commodities or agro-ecological zones. Close collaboration is also envisaged with other international organizations such as the Food and Agricultural Organization of the United Nations (FAO), the International Fertilizer Development Center (IFDC), the Tropical Soil Biology and Fertility Programme (TSBF), the International Geosphere-Biosphere Program (IGBP), the Tropical Agricultural Research and Training Centre (CATTIE), with national institutions in developing countries, with existing agroforestry research networks, with non-governmental organizations (NGOs) and with specialized institutions. ICRAF will serve as a focal point for agroforestry world-wide, and will build on existing capacities and strengths.

In the past decade, through collaboration with national scientists, farmers and pastoralists, much has been learned about traditional agroforestry...
ICRAF... practices and their potential for improvement, particularly in marginal ecoregions. ICRAF’s overall strategy is aimed at building on this knowledge through four research and three dissemination programmes.

The four research programmes are:
Characterization and Impact — dealing with environmental and economic characterization of land-use systems, the validation of technologies and the assessment of policy and impact issues related to their adoption

Multipurpose-Tree Improvement — identifying, collecting, evaluating, conserving and improving multipurpose-tree germplasm

Component Interactions — focusing on process-oriented research designed to test hypotheses and to obtain scientific data on nutrient cycling, soil conservation, and how trees and crops compete for light, water and nutrients and how pests affect such processes

Systems Improvement — dealing with the development and improvement of management systems and strategies.

The three dissemination programmes are:
Training — focusing on improving the performance of scientists and development workers in the fields of agroforestry research and dissemination

Education — helping tertiary institutions strengthen their capacity to teach agroforestry

Information — supporting agroforestry research, training and development through the dissemination of information on agroforestry worldwide.

ICRAF’s administrative services are grouped into six units: budget; finance; personnel; operations; information systems; and travel & conferences.

Research and dissemination activities will be structured within a matrix — the seven research and dissemination programmes on one axis and geographical locations on the other. Programmes will be implemented through collaborative networks. The Agroforestry Research Networks for Africa (ARENAS) will be consolidated. In Latin America and South-East Asia, ICRAF will link into existing institutional structures dealing with agroforestry and will focus, at least initially, on the humid tropics (four countries in Latin America and four countries in South-East Asia).

Within the CGIAR system, ICRAF will also serve as the mechanism for implementing two major activities: an ecoregional network — the highlands of East and Central Africa — and a global initiative concerned with research on alternatives to slash-and-burn agriculture in the humid tropics. Appropriate laboratory, greenhouse, shadehouse and field-research facilities will be established at ICRAF’s headquarters. These will include a Multipurpose Tree Germplasm Resource Centre and a Training Centre to enable ICRAF to fulfill its global responsibilities for strategic research and dissemination.

ICRAF fully supports the concept of an integrated approach to land-use research within the CGIAR system and intends to work closely with CIFOR and other International Research Centres to attain this goal. The chairman
ICRAF fully supports the concept of an integrated approach to land-use research within the CGIAR system and intends to work closely with CIFOR and other CGIAR Centres to attain this goal.
External environment

ICRAF's strategy has been formulated within the context of emerging development trends and factors that influence the strategic research agenda for agriculture, forestry and the management of natural resources. The Technical Advisory Committee (TAC) of the Consultative Group on International Agricultural Research (CGIAR) has defined the major driving factors as population growth, income growth and rates of urbanization, and has identified a set of priorities by activity and agro-ecological zone. ICRAF's programmes and priorities fit well within those of TAC, and clearly define how agroforestry can contribute to equity and environmental issues.

The deliberate use of woody perennials with crops and/or livestock — agroforestry — is one of the most widespread land-use systems in the tropics. Although it can be practised in virtually all climatic zones by farmers of all socio-economic levels, agroforestry is a particularly useful tool for dealing with three universal concerns: rural poverty, natural-resource conservation and sustainable development.

Rural Poverty

Population growth in developing countries continues at escalating rates. The capacity of existing land-use systems to sustain rural populations at present per-capita levels of food production is rapidly being outstripped by population increases, particularly in Africa. This results in migration of rural poor to urban centres, increased cultivation of marginal lands, migration to forested regions, and depletion of the land-resource base of smallholders. The prospects for people involved in these changes are bleak. Most newcomers to cities fail to find gainful employment; migrants to the humid tropics often find that available land is only marginally suitable for agriculture; and farmers that remain where they are face increasing soil erosion and loss of soil fertility, coupled with declining crop yields and decreasing supplies of fuelwood, building materials and livestock fodder. In real terms, poverty increases. In addition to these social costs, deforestation and soil erosion exacerbate environmental pollution.

These human-equity and environmental issues can be tackled by improved agroforestry systems as a foundation for improving economic growth and environmental protection. Agroforestry systems have the potential to increase the production of food, fuelwood, building materials, and fodder while arresting soil erosion and fertility decline. Importantly, they also offer significant opportunities to create additional income for rural households — providing cash in hand to help people break free of the poverty cycle.

Tropical Deforestation

In the tropics, forests are disappearing at the rate of 14 million hectares per year. Deforestation devastates the world's largest reservoir of plant and...
animal genetic diversity, contributes a significant proportion of global warming (present estimate is 18%) and threatens the integrity of many watersheds. The principal proximate cause of deforestation is slash-and-burn agriculture — in some cases following selective logging — carried out by thousands of landless farmers, many of whom are recent migrants to the humid tropics and who are unfamiliar with the sophisticated practices of indigenous people who make shifting cultivation a sustainable system. In addition to structural changes that would provide tenure for the landless, there is a need to create viable land-use alternatives that would provide the incentive to halt further deforestation. Preliminary research indicates that for every hectare put into promising alternatives, five to ten hectares of tropical rainforest can be spared from the shifting cultivator’s axe, each year. Besides their attractiveness as sustainable land-use practices, agroforestry technologies have the potential to reclaim the secondary forest fallows and derived grasslands that often follow in the wake of slash-and-burn activities.

Land Depletion

In the sub-humid and semi-arid savannas of the tropics where the population density is high and woody biomass is low, shifting cultivation is not common. But many practices of resource-poor farmers and pastoralists, especially overgrazing and continuous cropping without inputs such as fertilizer, are causing massive soil fertility depletion. This depletion is leading to serious erosion and exacerbated poverty. It is particularly acute in Africa. Agroforestry technologies have the potential to reverse this process and to provide to land users in these regions a sustainable supply of food, fodder, building materials, fuelwood, and additional sources of income.

Although other major regions of the world face similar problems, it is in these three major agro-ecological zones — the humid, sub-humid and semi-arid tropics — that agroforestry has the greatest comparative advantage to address equity and environmental concerns, simultaneously. Agroforestry also has potential for other important agro-ecological zones — for example, the Mediterranean and the Andean regions — and these may be included in ICRAF’s programmes later, as complementary activities.

Resource Conservation and Sustainable Development

Throughout the world, a consensus is emerging that conservation and development are not necessarily incompatible. In fact, it is now recognised that human poverty makes physical environments poorer, just as poor physical environments make for greater human poverty. The twin goals of economic growth and environmental protection can be pursued simultaneously with an integrated, balanced approach. Agroforestry is likely to play a significant role in achieving this balance, particularly in the humid, sub-humid and semi-arid tropics.

The CGIAR system is addressing the issues of sustainability and resource conservation. National Research Systems are also concerned with conservation and development, and several are looking at agroforestry technologies as tools to enhance the well-being of rural dwellers whilst containing deforestation and land depletion. In brief: resource-poor rural households...
may benefit from improved soil fertility coming from the introduction of nitrogen-fixing trees in enriched fallows or interplanted with crops; they may gain additional income through the sale of tree products such as fruit or timber; and they may enjoy improved food security as trees extend the season when green fodder and food supplies are available. This last benefit has significant implications for the nutritional vulnerability of the poorest groups, especially women and children. At the same time, the quality of the environment is enhanced through the maintenance of biological diversity, water and soil quality and forested land.

**Agroforestry Today**

In the 14 years since ICRAF first helped put agroforestry on the scientific map, much has been learned about the advantages and limitations of agroforestry, particularly in marginal ecological regions. During this time, it has become clear from collaborative work with land users that the perennial component of agroforestry systems—the trees and shrubs—can be combined with other components in a variety of technologies. Some of these are improved fallows, hedgerow intercropping, multi-storeyed tree gardens, boundary plantings, live fences, fodder banks and trees on rangelands or pastures.

It is also clear that the adoption and consequent impact of agroforestry technologies are influenced by many socio-economic factors, such as labour availability (total and seasonal) versus requirements of the agroforestry technology, market demand and accessibility, and gender-related issues in the farming system. Unless these factors are understood and the incentives and constraints to adoption identified, agroforestry technologies—no matter how well designed—will not provide the desired benefits. In this context, one key issue is the fact that, in many parts of the world, women play a major role in growing food and, compared with men, tend to use more tree products—for example, fuelwood, fodder, and raw materials for crafts and medicines. Because men and women commonly have differential access to household resources, women need to be involved in the design and testing of agroforestry technologies so that they and their households can benefit equitably from them.

Several CGIAR Centres already have an agroforestry agenda, and many National Research Institutions—such as the Brazilian Agricultural Research Enterprise (EMBRAPA), the Indian Council of Agricultural Research (ICAR), and the Ministry of Agriculture in Malawi—have also established agroforestry research centres. Many bilateral aid programmes and environmentally oriented non-governmental organizations (NGOs) are also active in agroforestry development. Linkages between this diverse constituency and ICRAF must be maintained and enhanced.

In spite of such activity, there is still much to learn about agroforestry technologies. Major questions need to be answered, for example: how can competition between woody species and crops for water, light and nutrients be managed for the farmer’s benefit? Can silvopastoral systems remain sustainable? What is the best way to recycle nutrients in nutrient-poor environments? Are improved agroforestry systems more beneficial economically than traditional practices? These and many other strategic questions must be resolved. ICRAF is committed to serving as a catalyst in a collaborative mode with sister CGIAR Centres, National Research Systems, NGOs, and research institutions in those countries where agroforestry has a major role in sustainable development.
ICRAF is an autonomous, non-profit international organization with a global responsibility to conduct and support agroforestry research. ICRAF was established in 1978, with Headquarters in Nairobi, Kenya.

When ICRAF was founded, agroforestry was a new field still lacking the theoretical basis and accumulated data of traditional areas such as forestry and agriculture. Therefore, early work concentrated on developing the conceptual and methodological basis for agroforestry research, collating relevant information from disparate sources so that it would be available to a wider audience, and applying resources to training and education with a view to developing greater national capacity in agroforestry research and development. Building on this foundation, ICRAF initiated a collaborative research programme in 1985. The goal is to strengthen national research capacity and ultimately to generate agroforestry technologies suitable for farmers.

At present, work concentrates in four ecoregions of Africa: the humid lowlands and the semi-arid lowlands of West Africa, the highlands of East and Central Africa, and the plateau lands of Southern Africa. Research in these regions is conducted through the Agroforestry Research Networks for Africa (AFRENAS). ICRAF also participates in collaborative research activities in India and Bangladesh, and has initiated activities in the humid tropics of Latin America and Asia.

Following rapid growth during the 1980s, ICRAF now has more than 250 staff members, including about 50 senior scientists involved in field research in 12 African countries. Financial support is provided by 22 donor organizations, while collaborating governments provide staff, facilities and land for field trials. ICRAF's core budget in 1992 is US$15.1 million. In 1991 ICRAF became a member of the CGIAR and changed its name from Council to Centre while maintaining the same acronym.
ICRAF's philosophy should be seen in the context of the role that ICRAF has played in nurturing the new field of agroforestry. It builds upon the strengths of the past while actively pursuing new opportunities and challenges for the future as a member of the CGIAR. ICRAF's ultimate purpose is to:

'Help mitigate tropical deforestation, land depletion and rural poverty through improved agroforestry systems'.

Key elements to achieve this ultimate purpose are ICRAF's mission, goal, guiding principles, and strategic objectives.

Mission Statement

ICRAF's mission, as derived from its charter, remains as relevant today as when it was originally written:

'To increase the social, economic and nutritional well-being of peoples of developing countries through the use of research and related activities to integrate woody perennials in farming and related land-use systems in order to increase productivity, profitability, sustainability, diversity of output and the conservation of natural resources.'

Agroforestry Defined

To place agroforestry in context with other land-use practices, ICRAF uses the following definition:

'Agroforestry is a collective name for land-use systems and practices in which woody perennials are deliberately integrated with crops and/or animals on the same land-management unit. The integration can be either in spatial mixture or in temporal sequence. There are normally both ecological and economic interactions between the woody and non-woody components in agroforestry.'

Goal

In order to fulfil its mission, ICRAF's goal is:

'To initiate and assist in the generation and dissemination of appropriate agroforestry technologies for resource-poor farmers and other land users.'

Implementing Guidelines

To achieve this goal, ICRAF's approach to research and dissemination is guided by the following:

- A systematic analysis of the needs of resource-poor land users and the relevance of agroforestry to address those needs to determine priorities
Understanding the social and economic factors that determine environmental problems and opportunities for change is central to ICRAF’s work.

...the way ahead

• A determination to use appropriate indigenous knowledge to develop improved technologies
• A concern to ensure that agroforestry technologies simultaneously address the welfare of rural households and the conservation of natural resources for sustainable production
• An approach that seeks out collaborative opportunities, is oriented to systems and problems, draws on the expertise and knowledge of many disciplines, is driven by beneficiaries and is responsive to them
• A desire that results should promote equity among various users.

Strategic Objectives

ICRAF’s mission, goal and implementing guidelines have provided the framework for the following strategic objectives:

• Conduct collaborative research aimed at improving the welfare of resource-poor farmers and other land users, whilst enhancing agricultural sustainability and the conservation of natural resources in areas of ecoregional and global significance
• Undertake and foster research leading to an understanding of processes and to the development of appropriate agroforestry technologies
• Strengthen national capacities to conduct agroforestry research by fostering collaboration between institutes and promoting the dissemination of information through training, education, documentation and communication.

Setting Priorities

ICRAF will continue to set its priorities in close consultation with its major partners. Guiding factors are ICRAF’s mission and goal, the potential contribution that agroforestry technologies can make to specific ecoregions and to priority land-use systems, the constraints and potentials facing rural households, the interest demonstrated by national institutions, and the comparative advantage of ICRAF to undertake specific research and dissemination activities.

The dynamic and transparent mechanisms used in setting priorities include, among others, macro and micro Diagnosis-and-Design exercises that put ICRAF staff into direct contact with farmers and other land users, regional research planning workshops in the AFRENAs, regional and international conferences, and annual planning meetings at ICRAF.

In expanding its geographical scope and its strategic research and dissemination programmes, ICRAF will build closer collaborative programmes with National Research Systems, International Agricultural Research centres, specialized institutions, universities and non-governmental organizations.

Geographical Balance

ICRAF will focus on three major agro-ecological zones:

• Humid tropics
• Sub-humid tropics
• Semi-arid tropics.
These have been defined on the basis of the potential of agroforestry to contribute to productivity and sustainability of farming systems and to address ecological concerns. The agro-ecological zones fall within three geographical regions: Africa, Latin America and South-East Asia. In the medium term, only in Africa will work take place in all three agro-ecological zones. In Latin America and South-East Asia, work will be focused — at least initially — in the humid zone.

Research
Research priorities are established within the framework of agro-ecological zones, the ecoregions and land-use systems within them, and the needs and priorities of farmers and other land users. These priorities are continually adjusted as findings from multiple locations are synthesized, analyzed and compared. Strategic research will focus on global issues and those of key agro-ecological zones, whereas applied research will address the human, edaphic and environmental problems of priority ecoregions and land-use systems. Approaches used to establish research priorities will be based on:

- Identifying human needs, priorities, potentials and constraints
- Understanding land-use systems, their problems and opportunities
- Conducting research on key components of the systems and their interaction, and on performance of agroforestry technologies, both on-station and with farmers on their land
- Improving systems and providing solutions in terms of products and services
- Understanding the social and economic factors and the policy environment influencing the adoption and impact of these technologies.

Dissemination
Dissemination activities are closely tied to ICRAF’s research agenda and to the needs of ICRAF’s national research partners. However, information dissemination will also play a broader role in synthesizing and guiding the work of the global agroforestry community.

Approaches used to establish priorities will be based on the need to:

- Establish a lasting capacity for agroforestry research and development in developing countries through short- and medium-term training for both men and women
- Assist the incorporation of agroforestry into curricula in national universities and professional schools
- Identify and process information related to agroforestry and help national institutions gain access to this information
- Ensure that the research results of ICRAF and others reach the global community of scientists and specialists concerned with agroforestry research and development.
The goals and content of ICRAF's research programmes not only reflect a comprehensive global agenda for strategic and applied research, but also follow the natural iterative flow associated with an orientation towards systems. Together, the programmes aim at understanding and explaining basic processes in addition to determining and predicting the potentials of agroforestry. The cycle of technology development shown below provides a framework within which priorities can be continually reassessed. ICRAF's proposed agroforestry research activities are organized into four research programmes:

1. Characterization and Impact — dealing with environmental and economic characterization of land-use systems, the validation of technologies and the assessment of policy and impact issues related to their adoption.

2. Multipurpose-Tree Improvement — identifying, collecting, evaluating, conserving and improving multipurpose-tree germplasm.

3. Component Interactions — focusing on process-oriented research designed to test hypotheses and to obtain scientific data on nutrient cycling, soil conservation, and how trees and crops compete for light, water and nutrients and how pests affect such processes.

4. Systems Improvement — dealing with the development and improvement of management systems and strategies.
Characterization and Impact

Whether farm households choose to adopt particular improved agroforestry technologies depends upon the needs of these households and a set of biophysical and socio-economic potentials and constraints. Needs, potentials and constraints — such as climatic risk, soil fertility, governmental policies, degree of integration of farmers in the market, and rapidly changing demographic patterns induced by health problems such as AIDS — vary across the major land-use systems in priority ecoregions. It is necessary to understand these factors, their interactions and their variations in order to design appropriate agroforestry technologies for these different systems.

Goal

To enhance the adoption and beneficial impact of agroforestry systems through a thorough characterization of the biophysical and socio-economic environment of priority land-use systems and the production of recommendations through the on-farm testing and evaluation of promising technologies and their components.

Major thrusts

Environmental characterization
• Evaluating land resources
• Socio-economic, ex ante evaluation of agroforestry systems
• Environmental consequences, with emphasis on carbon fluxes and conservation of biological diversity.

Testing technologies
• Testing agroforestry technologies with farmers
• Quantifying costs and benefits
• Developing predictive models

Policy Issues
• Agricultural and forestry policies
• Land and tree tenure
• Infrastructure and services (e.g. processing and marketing)
• Economic, trade and environmental policies
• Institutionalization of agroforestry research and development
• Export of high value/low volume products.

Adoption and Impact Issues
• Adoption dynamics and constraints
• Socio-economic impacts: nutrition, income, value-added activities
• Impact of gender issues and its implications
• Impact on food and fibre production
• Impact on land-resource depletion and deforestation
• Impact on biological diversity and climate change.
ICRAF’s policy research will be carried out in collaboration with national institutes provided they have requested help with identifying policy requirements and constraints to successful agroforestry systems.

**Multipurpose-Tree Improvement**

The use of plants that are well adapted to the biophysical constraints of land that is marginal for agriculture is essential for systems that use low levels of purchased inputs such as fertilizer. This is as true in agroforestry woody germplasm as it is in annual crop, pasture or livestock germplasm. Woody germplasm will be selected according to its tolerance to constraints such as soil acidity, drought, low nutrient availability, salinity, and major pests and diseases. Selected germplasm that combines tolerance to such constraints with a capacity to produce sustainable yields of food, fruit, fodder, fuelwood, building materials, medicines, or mulch is the key to a successful agroforestry system. There is also a major need to identify species suitable for economically improved fallows as an alternative to shifting cultivation, or as a source of mulch or ground cover to protect steep slopes from erosion.

To encompass the multiple products and services that trees can provide, breeding programmes aimed at improving trees for agroforestry need radically different objectives, criteria and methods from the traditional breeding programmes of plantation forestry.

**Goal**

Identify, collect, evaluate, conserve and improve multipurpose-tree species and provenances that have the proven potential to enhance the productivity, profitability, diversity and sustainability of small-scale farms in priority land-use systems.

**Major thrusts**

**Selection and conservation**

- Collection of seed and associated root symbionts, subject to strict adherence to quarantine regulations
- Conservation of germplasm — long-term storage capacity
- Creation of an accompanying rhizobium bank for legume species
- Studies of seed and vegetative propagation, including tissue culture
- Maintenance of a database holding details of valuable species

**Evaluation and management**

- Determination of selection objectives (such as deep rooting, aluminium tolerance and canopy structure)
- Evaluation of promising species and provenances for specific agro-ecological zones
- Breeding for desired traits in a few priority species for specific agro-ecological zones.
- Determination of how individual species respond to various management practices. In this context, factors to be studied include tree phenology; spacing patterns and biomass production; and coppicing and responses to pruning.
ICRAF...

In collaboration with other institutions currently involved in agroforestry germplasm collections, ICRAF will develop and maintain a Multipurpose Tree Germplasm Resource Centre (MPT-GRC) at its headquarters. The MPT-GRC will serve the role that similar units play for crop or pasture species at other international Centres.

Component Interactions

Agroforestry is one of the most complicated scientific challenges in the CGIAR system today. Central to this challenge is the need to learn how to grow annual crops with trees in a way that minimizes the inevitable competition for light, water and nutrients so as to sustain food production without degrading the environment.

There is limited fundamental understanding about how such interactions occur at the process level, and how best to manipulate them using adapted germplasm and agronomic or silvicultural management techniques. Furthermore, agroforestry systems need time to get established and to exercise cardinal functions such as nutrient cycling and soil conservation. This programme, working at key locations in humid, sub-humid and semi-arid agro-ecological zones will develop a predictive understanding of the major interactive processes between trees and crops and/or animals that is necessary for the extrapolation of agroforestry technologies within and between ecoregions.

Goal

To contribute to sustainable increases in the output of agroforestry systems by understanding and enhancing the biophysical interactions between system components, hence increasing the viability and predictability of management options available to resource-poor farmers.

Major thrusts

- Above-ground competition for light; below-ground competition for water and nutrients
- Nutrient cycling and soil fertility enhancement
- Management of organic and inorganic inputs
- Control of soil erosion on sloping lands in the sub-humid and humid tropics, and in the semi-arid environment of the Sahel
- Integrated pest management
- Livestock feeding systems using fodder trees and forages
- Analysis of mulch and fodder quality
- Modelling component interactions.

Systems Improvement

Research within this programme is long term and will be conducted by multidisciplinary teams of scientists at a range of locations in many countries across ICRAF's three priority agro-ecological zones. Scientists will monitor soil and vegetation dynamics, economic production, emission of greenhouse gases, biomass and nutrient balance, and socio-economic
Implications. Much of this work will take place within the framework of ICRAF's collaborative research networks and will include strong participation from farmers.

The priorities and research agenda of this work are determined through careful analysis of the problems and opportunities that farmers experience in priority land-use systems in major ecoregions. They draw upon the output of specific germplasm improvement and component interaction research. The research centres around the improvement of existing agroforestry technologies or the development of new ones and is linked to the study of a range of tree-, crop-, and animal-management strategies. The systems currently investigated address the major alternatives to slash-and-burn agriculture and the reclamation of abandoned lands in the humid tropics, and land depletion in the savanna, woodland and agro-silvopastoral systems of the sub-humid and semi-arid tropics.

**Goal**

To monitor and evaluate the long-term biophysical, ecological, and socio-economic dynamics of alternative management strategies using both traditional and new agroforestry technologies that have the potential to increase benefits to resource-poor farmers whilst arresting the global threats of deforestation and land depletion.

**Major thrusts**

**Agroforestry alternatives to slash-and-burn in the humid tropics**
- Production systems that combine crops grown using low levels of purchased inputs with under-utilized, indigenous fruit trees and other multipurpose trees
- Multi-strata systems and home gardens; economically managed fallows; silvopastoral systems (where grazing is important); live fences (in all systems); systems that facilitate weed suppression

**Reclaiming abandoned lands through agroforestry**
- Developing and/or improving technologies for the alang-alang areas in South-East Asia and Madagascar and the degraded pastures in the Amazon
- Systems that facilitate weed suppression

**Overcoming land depletion in sub-humid savannas and woodlands**
- Improved fallows; fodder hedges; hedgerow intercropping; multi-strata systems (eg. upper-storey trees with banana); trees on boundaries; indigenous fruit production systems

**Overcoming land depletion in the semi-arid tropics**
- Management and improvement of 'farmed parkland'
- Live fences for protecting crops from livestock
- Soil and water conservation through windbreaks and contour planting
- Improved nutrition of livestock with the aid of fodder banks.
Dissemination programmes

As an international institution, ICRAF plays a significant role in the collection, analysis, processing and dissemination of information on agroforestry research. Three programmes are devoted to dissemination: Training, Education and Information. Experience has shown that a major limitation on agroforestry in developing countries is a dearth of personnel with the knowledge and skills to integrate the various disciplines required in planning, studying and managing agroforestry development. Because agroforestry is a new field, the shortage of trained personnel is more acute than in established disciplines such as agriculture and forestry. Thus, all three of ICRAF’s dissemination programmes reflect a commitment to strengthen the capacity of national systems to conduct agroforestry research as a multidisciplinary, systems approach to land use. In addition, collaboration will be emphasized with international agricultural and forestry research centres, regional and national educational institutions and National Research Systems.

Training

As ICRAF’s research programmes generate new results that contribute to the global pool of agroforestry knowledge, the training programme contributes to the world-wide dissemination of information generated by ICRAF and others.

The need for agroforestry training is apparent at all levels within national agricultural and forestry research and development systems. The main audiences for ICRAF’s training programme are scientists and development specialists. However, training tailored to different audiences, such as field technicians or extension agents, is organized through the collaborative programmes as needs arise.

Goal

To enhance the skills and knowledge of agroforestry scientists and others so that they can diagnose land-use problems and constraints and design and implement agroforestry research projects leading to the development of systems and technologies that are suited to local conditions and adoptable by farmers.

Major thrusts

- Training courses on agroforestry research for development for researchers and development planners
- Specialized courses and workshops for scientists and field technicians
- Individual training, such as research projects for post-graduate students
- Training materials.
...the way ahead

Education

The development and dissemination of productive and sustainable agroforestry land-use systems are constrained by a lack of specialists with the skills and knowledge needed to conduct agroforestry research. Although agroforestry is gradually being incorporated into the curricula of universities and technical colleges, global surveys and workshops in Africa have revealed that, there is a need to: clarify concepts and approaches; look at institutional structures which do not easily accommodate multidisciplinary programmes; update the skills of teaching and research staff and develop instruction and resource materials to support teaching and research programmes.

Goal

To strengthen the capacity of universities and technical colleges to teach agroforestry at the post-graduate, under-graduate, diploma and certificate levels.

Major thrusts

- Development and testing of model curricula for agroforestry courses at technical, under-graduate and post-graduate levels
- Exchange of information and academic staff between colleges and universities in Africa through the African Network for Agroforestry Education (ANAFE) — to be extended to other continents
- Inventory of existing teaching materials and support for the development and production of teaching aids by national educational institutions
- Establishment of links between educational institutions and the AFRENA research projects
- Organization of refresher courses for faculty members who are teaching agroforestry.

Information

Relevant and timely information is a vital prerequisite for planning and implementing effective agroforestry research and development programmes. Much of this information is not readily available, particularly for the highly diverse audiences — researchers, development specialists, policy makers, trainers, educators and extension workers — that need it. For these reasons, ICRAF has developed a system to identify, collect, process and disseminate information on agroforestry on a global basis. ICRAF publishes material, co-publishes with other organizations, and prepares material for publication by others. ICRAF also has a special role in assisting national institutions improve their agroforestry information handling capabilities. Because of its global mission and strong linkages with major international providers of agricultural information such as CAB International, AGRIS and AGRICOLA, ICRAF has a comparative advantage to serve as a clearing-house for agroforestry information. Emphasis will be given to increasing the base of information in Spanish, Portuguese and French.
ICRAF...

Goal
To support agroforestry research, training and development through the dissemination of information on agroforestry.

Major thrusts

- Develop and maintain databases of agroforestry information — both bibliographic and factual — from the literature, external databases and other sources
- Disseminate information according to individual needs, conduct literature searches and produce specialized bibliographies, reviews, and bi-monthly accession lists
- Strengthen the capacities of national institutions to access and disseminate agroforestry information through the provision of training and advice
- Co-publish *Agroforestry Abstracts* with CAB International and distribution to researchers and libraries throughout the developing world
- Co-publish *Agroforestry Systems* with Kluwer Academic Publishers and sponsorship of free subscriptions to agroforestry institutions in developing countries.
- Provide document delivery services
- Produce and distribute ICRAF's primary publications — *Agroforestry Today* and the Annual Report — plus monographs, annotated bibliographies, conference proceedings, training materials, AFRENA reports, promotional materials; news releases and audiovisual productions
- During the 1990s, there will be an effort to co-publish titles in Spanish and to increase the number appearing in French.

ICRAF has a comparative advantage to serve as a clearinghouse for agroforestry information.
Implementation and impact

ICRAF's programmes will be structured in a matrix with global activities and those within specific agro-ecological zones and ecoregions on one axis and the programmes (Research and Dissemination) on the other. Networks (as described below) can be based on either axis — centred on an agro-ecological zone or ecoregion or on a specific programme.

ICRAF PROGRAMME STRUCTURE

<table>
<thead>
<tr>
<th>AGRO-ECOLOGICAL ZONES AND ECOREGIONS</th>
<th>HUMID TROPICS</th>
<th>SUB-HUMID TROPICS</th>
<th>SEMI-ARID TROPICS</th>
<th>GLOBAL</th>
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<tbody>
<tr>
<td>PROGRAMMES</td>
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<tr>
<td>RESEARCH</td>
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<tr>
<td>1. Characterization and impact</td>
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<td>2. Multipurpose-Two Improvement</td>
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<td>3. Component Improvements</td>
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<td>4. Systems Improvement</td>
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<td>DISSEMINATION</td>
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<tr>
<td>5. Training</td>
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<td>6. Education</td>
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<td>7. Information</td>
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Modes of Operation

ICRAF will implement its programmes in three ways: through activities at headquarters, through networks (thematic or agro-ecological), and through ecoregional mechanisms.

Activities at headquarters

ICRAF headquarters will serve as a focal point for activities in research and dissemination that have a global orientation. These will include the synthesis of process-oriented research carried out at multiple locations; the development of standardized research methodologies; the maintenance of the central library and information databases; and the development of a Multipurpose tree Germplasm Resource Centre.

Networks

Research and dissemination networks will continue to be an important mechanism for conducting ICRAF’s work on priority issues within and across agro-ecological zones.
Thematic networks will generally reflect programme thrusts being undertaken in various ecoregions (contiguous groupings of countries that share certain commonalities in climate, soil and vegetation) and agro-ecological zones. These networks will bring together work on a common theme, such as the development of alternatives to slash-and-burn agriculture, the screening of specific multipurpose trees, and the development of educational networks such as ANAFE.

The first example — the development of alternatives to slash-and-burn agriculture — has now evolved into a major global initiative coordinated by ICRAF. The initiative has drawn together nearly 20 national and international institutions in partnership with several non-governmental organizations. The objectives are to:

- identify, evaluate — and where necessary, to modify and develop — land-use systems and technologies that are sustainable alternatives to slash-and-burn agriculture and that can be used to help reclaim degraded lands
- identify, evaluate and design policies — and the tools and mechanisms with which they could be implemented — that will protect the environment by reducing the area deforested by the practice of slash-and-burn, and that will promote the establishment of sustainable systems
- enhance the capacity of national institutions to develop and implement appropriate policies, to disseminate research results and to facilitate their application.

Studies will be undertaken in Africa, Latin America and South-East Asia at benchmark sites that represent the range of biophysical and socio-economic conditions where unsustainable slash-and-burn agriculture is posing a major threat to Earth's remaining rainforests. Much of ICRAF's initial work in the humid tropics of Africa, Latin America and South-East Asia will be contributing to this initiative.

Agro-ecological research networks will concentrate on generating appropriate technologies for priority ecoregional and land-use systems, and strengthening the capacity of national institutions to plan and implement agroforestry research. Four such networks — the Agroforestry Research Networks for Africa (AFRENAs) — have been established in Sub-Saharan Africa. These are:

- **Southern Africa** — The sub-humid unimodal rainfall plateau of Southern Africa, including Malawi, Tanzania, Zambia and Zimbabwe.
- **East and Central Africa** — The sub-humid bimodal highlands of East and Central Africa in Burundi, Ethiopia, Kenya, Rwanda and Uganda.
- **SALWA** — The semi-arid lowlands of West Africa in Burkina Faso, Mali, Niger and Senegal.
- **HULWA** — The humid lowlands of West Africa in Cameroon and Ghana.

Similar networks will be developed in Latin America and South-East Asia, and will complement existing agroforestry work. ICRAF will promote the exchange of germplasm, technologies and ideas between regions through workshops and other dissemination techniques.

Much of ICRAF's initial work in the humid tropics will focus on the search for alternatives to slash-and-burn agriculture.
...the way ahead

In Latin America, ICRAF will focus, initially, on the humid zone of the Amazon basin in Brazil and Peru and on south-east Mexico, where the remaining tropical forest is threatened with extinction. In collaboration with CATIE, ICRAF plans to develop a special support programme on germplasm, component interactions, training and information.

In South-East Asia, ICRAF will limit its activities, at least initially, to the humid zone, again with a focus on two major areas: the equatorial rainforest in Indonesia and Vietnam and the hillsides of Thailand, the Philippines and Indonesia. The principal goal is to develop alternatives to slash-and-burn agriculture, a major factor in the progressive destruction of these resources.

Ecoregional mechanism

Because ICRAF has the global responsibility for agroforestry research and dissemination within the CGIAR system, it will provide an essential overview and reference point for all international agroforestry activities. However, different institutions will become the focal point for specific ecoregions. For the sub-humid highlands of East and Central Africa, it is logical that ICRAF, in addition to its global role, will serve as an ecoregional focal point.

The ecoregion delimited by the highlands of East and Central Africa is a high-potential zone, but with dramatically increasing demographic pressure there is a clear need to develop sustainable land-use practices. ICRAF has established a major agroforestry network in this zone and there are plans to develop ICRAF’s role in the existing APRENA network and to establish a strategic research programme for the zone.

The overall goal of the ecoregional mechanism will be to contribute to the generation of appropriate technologies for improved management, productivity and sustainability of land-use systems. ICRAF will work in partnership with national and international institutions operating in the region in order to:

• Undertake strategic research on the sustainable use and management of natural resources of the highlands of East and Central Africa.
• Plan and implement relevant research programmes for the generation of agroforestry technologies
• Strengthen national programmes by acting as a catalyst of research, training and information activities.

Resource sharing and better coordination among International Centres and national programmes should lead to a more coherent and consistent approach to the generation of crop, livestock and agroforestry technologies suitable for the ecoregion. Expansion of this approach into Southern Africa, with a focus on the Southern African plateau, is envisaged for the future.

Institutional Collaboration

One of ICRAF’s operating principles is to undertake research and dissemination activities, collaboratively. ICRAF’s main institutional partners can be classified as follows:

• National Research Systems (which encompass national agriculture and forestry research institutions), universities, development or-
organizations, extension agencies, and non-governmental organizations

- Regional agricultural and forestry research organizations, which may be responsible for coordinating and facilitating or for implementing regional research programmes. Examples include CATIE, CILSS/INSAH, IICA, IRAZ, and SACCAR.

- Other advanced research institutions in developed and developing countries with which ICRAF collaborates or contracts work to meet specific objectives. Examples of institutions with which ICRAF is currently collaborating are: the Land Tenure Center of the University of Wisconsin (land and tree tenure), Reading University (soil fertility and agroforestry systems), the International Fertilizer Development Center (plant nutrition), Tropical Soils Biology and Fertility Programme (nutrient cycling in agroforestry), the Institute of Terrestrial Ecology (root symbionts of multipurpose trees), CABI and ICPE (insect pests of multipurpose trees), Oregon State University (germplasm improvement in the humid lowlands of Africa), Consultative Advisory Committee on Semi-Arid Food Grain Research and Development (networking), North Carolina State University (tropical soils research), Oxford Forestry Institute, CTFT, DANIDA Tree Seed Centre, and CSIRO (germplasm), NFTRAL (legume rhizobia), and CABI, CTA (information).

- International Centres of the CGIAR. Examples of ongoing collaboration include joint programmes with CIAT, CIP, CIMMYT, ICRISAT, IFPRI, IITA, IPGRI, ISNAR and ILCA.

Relations with CIFOR

ICRAF fully supports the concept of an integrated approach to land-use research, including forestry and agroforestry, within the CGIAR system. At the operational level, ICRAF will work with trees in relation to crops and/or livestock while CIFOR, according to its draft strategic plan, will work on natural forest management, reforestation and the improvement of timber species for smallholders and public-sector forestry. There will, of course, be areas of common interest — in some tree species as well as in policy issues. ICRAF considers these areas as opportunities for joint activities.

The Chairman of ICRAF’s Board of Trustees is serving on the CIFOR Board and the Chairman of CIFOR is serving on ICRAF’s Board. This interlocking Board membership facilitates the operational integration of forestry and agroforestry in the CGIAR.

ICRAF’s Coordinator for South-East Asia will be responsible for developing an agroforestry research programme in that region’s humid zone by complementing, wherever possible, ongoing initiatives from CIFOR. To facilitate this process, ICRAF has based the Coordinator at CIFOR’s headquarters. Similarly, ICRAF has invited CIFOR to base its scientists who will be working in Africa at ICRAF and/or at appropriate AFRENA sites.

Capital Development

In order to implement its strategic research mandate, ICRAF will develop the necessary facilities to supplement the existing building at Gigiri in Nairobi. The most promising approach is to build additional facilities on ICRAF’s present headquarter’s site. This will be expanded with additional
ICRAF needs to expand to fulfill its global responsibility and to strengthen research capacity in key programmes.

...the way ahead

land provided by the Government of Kenya. Three major facilities are envisaged:

- A laboratory complex, including soil and plant analysis facilities, plus laboratories for research on soil physics, soil fertility, microbiology, plant physiology, pathology, entomology, forage quality and wood quality; facilities for geographic information systems; offices for senior and junior scientists; and teaching laboratories and conference rooms.

- A Multipurpose Tree Germplasm Resource Centre, to store, multiply and distribute seed, rhizobia and vegetative material of improved agroforestry species and accessions to collaborators worldwide. This facility will include shadehouses, seed-handling and quarantine areas, tissue-culture and wood-quality laboratories, database-management facilities, training rooms, offices for senior and junior staff, and a conference room.

- A training centre, with lecture rooms; facilities for graphics, audiovisual production and desktop publishing; offices, cafeteria, board room and a dormitory for 50 course participants.

Coupled with the necessary maintenance and infrastructure facilities and landscaping, the building programme will total approximately 6000 sq. m of finished space at an estimated cost in the order of about US$9 million. A proposal for a separate capital development programme has been developed.

Resource Deployment and Needs

The human and operational resources needed to implement ICRAF’s strategy are described in terms of internationally recruited core senior staff positions for the period 1992 to 2000 with 1992 as the base year. These are graphically depicted in Figures 1 to 4. Staffing levels beyond 1997 should be considered as speculative. In addition, the ICRAF staff complement will
include visiting scientists, post-doctoral fellows, seconded scientists, national professionals and support staff.

Total requirements (Figure 1) indicate an overall increase from 50 positions in 1992 to 89 positions in 1995. Most of these increases are planned for 1993 and 1994. The requirements are analyzed from several perspectives.

**Research and Dissemination Programmes**

Most of the staff increases are in the Research Division, which increases from 33 senior scientists in 1992 to 61 in 1995. Thirteen of these are due to the fulfilment of ICRAF’s global responsibility in South-East Asia and Latin America and 11 are to strengthen strategic research at headquarters. The Training & Information Division will more than double from 7 senior staff positions in 1992 to 17 in 1996. [Detailed allocation of staff for 1994 to 1998 may be found in ICRAF’s Medium-Term Plan.]

**Administration and Senior Management**

The Finance and Administration Division will add one internationally recruited staff member, a capital assets manager who will oversee the maintenance of the physical plant. There will be significant growth in nationally recruited staff numbers to provide administrative support for an expanded Centre. Growth in the Director General’s office is limited to an internal auditor.

The balance of senior staff allocated among divisions is shown below in percentage terms:

<table>
<thead>
<tr>
<th>Division</th>
<th>1992</th>
<th>1995</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>66%</td>
<td>69%</td>
<td>66%</td>
</tr>
<tr>
<td>Training Information</td>
<td>14</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Finance and Administration</td>
<td>12</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Management (DG’s Office)</td>
<td>8</td>
<td>17</td>
<td>20</td>
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</tbody>
</table>

The balance in the deployment of senior staff is relatively constant, with some decreases in administrative support. Such decreases, however, are offset by projected increases in nationally recruited staff for the Finance and Administration Division. About 20% of the staff are involved in the overall management of ICRAF. This figure includes Finance and Administration staff, senior management and the Directors of the Research and Training & Information Divisions.

**Geographical Distribution**

ICRAF will continue to be a substantially decentralized organization. In 1992, 40% of the senior staff are outposted. This will increase to 43% in 1995. In absolute terms, total outposted staff will nearly double from 20 in 1992 to 39 in 1995. The trend is shown in Figure 2.

Total outposted staff will peak in 1995, with 22 in Africa, 9 in Latin America and 8 in South-East Asia (Figure 3). The 22 scientists in Africa are allocated to the four AFRENAS as follows: nine in Southern Africa, five in East and Central Africa, five in the semi-arid lowlands of West Africa (SALWA) and three in the humid lowlands of West Africa (HULWA). Scientists in the two oldest AFRENAS — Southern and East and Central Africa —
ICRAF will continue to be a substantially decentralized organization.

will be relocated to one common site in order to create a critical mass and to focus on strategic research. Similarly, all HULWA scientists will be stationed in Cameroon. Consolidation is also planned for SALWA after this network has been operating for five years.

A similar strategy is contemplated for Latin America and South-East Asia, with a total of three scientists in the Amazon of Brazil, two in the Amazon of Peru and one in south-east Mexico together with liaison positions at CATIE. In South-East Asia, senior staff will be located in Indonesia, the Philippines, Thailand and Vietnam.

ICRAF research aimed at overcoming land depletion will focus on the Southern Africa, East and Central Africa and SALWA AFRENAS with a total
of 19 outposted senior staff in 1995 (Figure 4). Work on reducing deforestation through the reclamation of cleared and abandoned lands, secondary forest fallows and derived grasslands will focus on HULWA, Latin America and South-East Asia with 20 senior staff by 1995. This research will be closely linked to the global 'Alternatives to Slash-and-Burn' project that ICRAF has developed with other international and national institutions.

Monitoring and Evaluating Impact

ICRAF has internal monitoring and review mechanisms to ensure that programmes, strategies and management are continuously improved. These mechanisms consist of ecoregional planning meetings, annual programme reviews, mid-term and final reviews of donor-funded projects, and quinquennial programme and management reviews. Regular, outside review of components of ICRAF's work is also central to these mechanisms.

In addition, ICRAF is developing monitoring and evaluation procedures that will enable the Centre to quantify the impact of its work.

Medium Term

In the medium term, the impact of ICRAF’s research and dissemination programmes could be evaluated in terms of two complementary criteria:

1. Does ICRAF produce valuable research results that enhance the science and the practice of agroforestry? Indicators are:
   - Demonstration of the development of agroforestry technologies that improve productivity, sustainability and the welfare of land users
   - Formulation of extension messages using ICRAF results
   - Production of peer-reviewed publications and their use.

in the long term, the real measure of ICRAF's impact will be its contribution to mitigating tropical deforestation, land depletion and rural poverty.
In the long term, the real measure of ICRAF’s impact will be its contribution to mitigating tropical deforestation, land depletion and rural poverty.

2. Does ICRAF strengthen national scientific capacity to coordinate, plan, implement and evaluate agroforestry research for development? Indicators are:

- The presence of national agroforestry strategies and coordinating mechanisms
- Budget allocations for agroforestry from national and external sources
- Number and type of institution and project involved in agroforestry research, extension and education
- Number and level of professionals trained and working in agroforestry
- Publications from national institutions

Long Term

In the long term, ICRAF’s success will hinge on whether it has achieved its goal — the generation and dissemination of agroforestry technologies for resource-poor farmers and other land users. Implicit in this goal is that ICRAF’s most important partners — rural households — will use agroforestry technologies. Therefore, an understanding of key factors, causes and constraints related to successful adoption must also be an integral aspect of ICRAF’s impact analysis.

As a corollary to this process, ICRAF anticipates that adoptable agroforestry technologies will provide significant opportunities for investment by development agencies, banks, and private companies. This external investment will be needed to facilitate technology adoption.

Ultimately, the real indicators of ICRAF’s impact will be the level of adoption of agroforestry technologies and their concomitant positive contributions to the global environment and to human welfare. At the global level, agroforestry technologies must have contributed to the mitigation of tropical deforestation and land depletion. At the household level, impact should be judged not just on its contribution to improved food security, equity and incremental improvements to household income, but on whether, as a result of agroforestry technologies, the rural poor face major changes to their prospects for the future and the future of their children. There should be clear signs that these technologies have helped them break free of the poverty cycle.
## Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AFRERA</td>
<td>Agroforestry Research Networks for Africa (coordinated by ICRAF)</td>
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<tr>
<td>AGRICOLA</td>
<td>Database of the National Agricultural Library (Beltsville, Maryland, USA)</td>
</tr>
<tr>
<td>AGRIS</td>
<td>International Information System for the Agricultural Sciences and Technology (Rome, Italy)</td>
</tr>
<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
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<tr>
<td>ANAFE</td>
<td>African Network for Agroforestry Education (coordinated by ICRAF)</td>
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<tr>
<td>CAB</td>
<td>CAB-International (Wallingford, UK)</td>
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<tr>
<td>CATIE</td>
<td>Centro Agronómico Tropical de Investigación y Enseñanza (Turrialba, Costa Rica)</td>
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<tr>
<td>CGIAR</td>
<td>Consultative Group on International Agricultural Research (Washington, DC, USA)</td>
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<tr>
<td>CLAT</td>
<td>Centro Internacional de Agricultura Tropical (Cali, Colombia)</td>
</tr>
<tr>
<td>CIFOR</td>
<td>Center for International Forestry Research (Bogor, Indonesia)</td>
</tr>
<tr>
<td>CISS</td>
<td>Comité permanent inter-états de lutte contre la sécheresse dans le Sahel (Ouagadougou, Burkina Faso)</td>
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<td>CIMMYT</td>
<td>Centro Internacional de Mejoramiento de Maíz y Trigo (Mexico, DF, Mexico)</td>
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<td>CIP</td>
<td>Centro Internacional de la Papa (Lima, Peru)</td>
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<td>CSIRO</td>
<td>Commonwealth Scientific and Industrial Research Organisation (Canberra, Australia)</td>
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<td>CTA</td>
<td>Centre technique de coopération agricole et rurale (Wageningen, Netherlands)</td>
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<tr>
<td>CTF</td>
<td>Centre technique forestier tropical (Nogent-sur-Marne, France)</td>
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<td>DANIDA</td>
<td>Danish International Development Agency (Copenhagen, Denmark)</td>
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<tr>
<td>EMBRAPA</td>
<td>Empresa Brasileira de Pesquisa Agropecuária (Brasilia, Brazil)</td>
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<tr>
<td>FAO</td>
<td>Food and Agricultural Organization of the United Nations, (Rome, Italy)</td>
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<tr>
<td>HULWA</td>
<td>Humid Lowlands of West Africa (AFRENA network coordinated by ICRAF)</td>
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<tr>
<td>ICAR</td>
<td>Indian Council of Agricultural Research (New Delhi, India)</td>
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<tr>
<td>ICPE</td>
<td>International Centre of Insect Physiology and Ecology (Nairobi, Kenya)</td>
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<tr>
<td>ICRI</td>
<td>International Crops Research Institute for the Semi-Arid Tropics (Hyderabad, India)</td>
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<tr>
<td>IFDC</td>
<td>International Fertilizer Development Center (Alabama, USA)</td>
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<tr>
<td>IFPRI</td>
<td>International Food Policy Research Institute (Washington, DC, USA)</td>
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<tr>
<td>IGBP</td>
<td>International Geosphere-Biosphere Program (Secretariat in Stockholm, Sweden)</td>
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<tr>
<td>IICA</td>
<td>Instituto Interamericano de Cooperación para la Agricultura (San José, Costa Rica)</td>
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<tr>
<td>ITA</td>
<td>International Institute of Tropical Agriculture (Ibadan, Nigeria)</td>
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<tr>
<td>ILCA</td>
<td>International Livestock Center for Africa (Addis Ababa, Ethiopia)</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>INIBAP</td>
<td>International Network for the Improvement of Banana and Plantain (Montpellier, France)</td>
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<tr>
<td>INSAH</td>
<td>Institut du Sahel ( Bamako, Mali)</td>
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<tr>
<td>IPGRI</td>
<td>International Plant Genetic Resources Institute (Rome, Italy)</td>
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<tr>
<td>IRAZ</td>
<td>Institut de recherche agronomique et zootechnique (Gitega, Burundi)</td>
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<tr>
<td>ISNAR</td>
<td>International Service for National Agricultural Research (The Hague, Netherlands)</td>
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<tr>
<td>NGOS</td>
<td>Non-governmental organizations</td>
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<tr>
<td>NIFTAL</td>
<td>Nitrogen Fixation in Tropical Agricultural Legumes (USA)</td>
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<tr>
<td>SACCAR</td>
<td>Southern Africa Centre for Cooperation in Agricultural Research (Gaborone, Botswana)</td>
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<tr>
<td>SALWA</td>
<td>Semi-arid Lowlands of West Africa (AFRENA network coordinated by ICRAF)</td>
</tr>
<tr>
<td>SAFGRAD</td>
<td>Consultative Advisory Committee on Semi-arid Food Grain Research and Development (Ouagadougou, Burkina Faso)</td>
</tr>
<tr>
<td>TAC</td>
<td>Technical Advisory Committee of the CGIAR (Rome, Italy)</td>
</tr>
<tr>
<td>TSBF</td>
<td>Tropical Soil Biology and Fertility Programme (Nairobi, Kenya)</td>
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International Union of Forestry Research Organizations
Special Programme for Developing Countries
Vienna, Austria